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mrs 5.1

message.routing.system

System Architecture




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1 Introduction

... she called Ulysses: "Stranger," said she, "rise and let us be going back to the town; I will introduce you at the house of my excellent father, where I can tell you that you will meet all the best people among the Phaecians."

Homer: Iliad.

The Message-Routing-System MRS 5.1 expands manifold the communication capabilities of the Windows NT Server:

- Message switching for e-mail, fax and voice in a store-and-forward operation,
- Realtime-switching device for dialog services, e.g. voice.
- Central information-provider with access through Windows-Client, Internet, telephone or fax devices.
- Windows NT Application server: Extraneous software can be integrated with the MRS server: Virus-Checker, OCR (Optical character recognition), Microsoft Office Packs (for conversions), speech recognition, speech syntheses (text to speech), and much more.
- CTI Applications

The MRS server can be configured for two different operating modes:

- The MRS server as stand-alone solution,
- or the MRS server can be integrated within a communications server. Integration is possible with Microsoft Exchange, Lotus Notes and SAP R/3.

Both operation modes have their specific advantages. In the first case no extraneous software and no preexisting communication infrastructure is required, thus forming a complete solution for electronic communications. In the second case the MRS is integrated into an existing infrastructure. From the perspective of the communication server (MS Exchange, Lotus Notes, or SAP R/3), the MRS acts purely as a gateway, and is administered through the foreign system after the installation.

Because of the symmetrical architecture of the server, communication is possible in all cases between two heterogeneous networks. MRS functions as a switch between various networks and communication architectures. All needed conversions, document formats, and addresses are automatically processed by the server. Necessary switching times are within a fraction of a second.

An incoming fax can for example be routed directly into an Exchange e-mail network or an Internet mail could be prepared for retrieval via fax. Users can retrieve information selectively through either the MRS client, Internet, over the telephone or fax, or through an extraneous mail system.

The MRS 5.1 Server is implemented under Windows NT. Windows NT with its excellent scalability and extensive software basis, further expands the application possibilities of MRS.

The MRS server is a highly scalable unit. Numerous NT servers can be inter-connected forming a complete system. To the outsider this system has the appearance of a singular MRS server. At the next level of expansion, numerous MRS servers can be connected through use of “remote system links” forming a logical MRS community. Within a system configuration of this type, communication resources are at the disposition of all connected servers.

Server characteristics:

- Routing with symbolic address transcription and conversion. The converter manages a large number of text, image, voice, and application formats.
- Scalability. Scalability is not only a characteristic of the complete system, but also of the internal architecture. The internal scalability guarantees the transition from a single node to a multi-node system. Externally the MRS server can be operated as a total system using “remote system links”.

MRS 5.1 also offers concurrently the following functions:

- E-Mail server and gateway (store-and-forward between e-mail and telematic services)
- Fax, voice, Teletex, Euro file transfer, modems, ISDN, pager server (access to public networks)
- Voicemail-server
- Fax on Demand server
- Gateway between fax groups 3 and 4 (transition between analog fax and ISDN G4 fax including format conversions)
- Gateway between fax G3 and various text-based telematic services. (realtime and store-and-forward switching)
- Internet gateway
- Telematic-gateway for external mail systems.
- Unified Messaging
- Integrated Messaging with Lotus Notes
- Integrated Messaging with Microsoft Exchange

2 MRS 5.1 Kernel

... let us then send chosen messengers, who may go to the tent of Achilles son of Peels without delay. Let those go whom I shall name. Let Phoenix, dear to Jove, lead the way; let Ajax and Ulysses follow, and let the heralds Odius and Eurybates go with them.

Homer, Iliad.

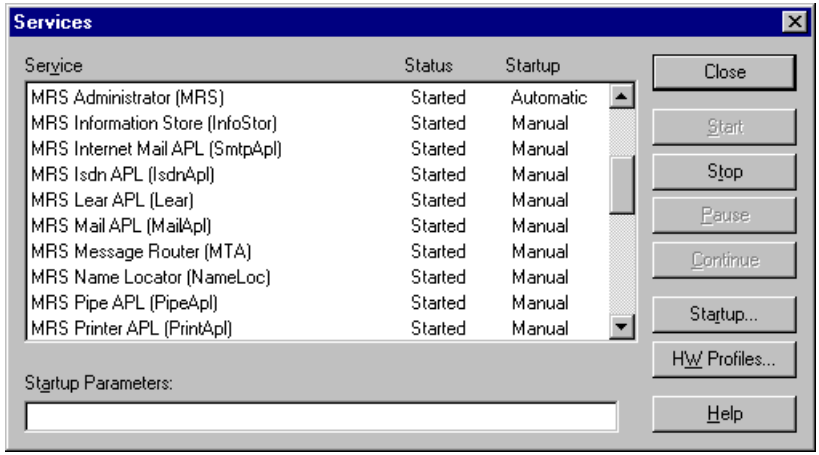
2.1 MRS Server Structure

The MRS Software consists of

- a series of NT services that implement server functionality,
- a GUI (Graphical User Interface) tool set that enables operation and administration

2.1.1 MRS Server Windows Services

After the installation from MRS, the Windows Service Control Manager indicates a series of new services.[1]



To access the Windows Service Control Manager, call **Settings → Control Panel → Services** under Windows NT and **Settings → Control Panel → Administrative Tools → Services** under Windows 2000.

1. Application of these NT Services are explained in the *MRS Server Administration* manual. Focus on the internal structure of the server follows.

These services can be divided into two groups:

- MRS Kernel components. The kernel contains databases, router, and administrative software.
- MRS APL's (Access Protocol Layers). The APL's provide the kernel with the required communication protocols. The APL's implement e.g. ISDN protocols, Exchange gateways, and TCP/IP transports. These modules result in the actual MRS Server functionality then.

2.1.1.1 MRS Kernel Components (MRS)

MRS Administrator (MRS)

The MRS Administrator controls the starting and stopping of the MRS Server. The Administrator is the only service that has the start option "automatic" in the Service Control Manager. As soon as the NT server is started, the Administrator is also started since it controls the starting of the kernel and subsequently the starting of the APL's. A list of the starting processes can be found in the Windows NT registry `HKEY_LOCAL_MACHINE\Software\PP-COM\MRS\Services` in the values `Kernel` and `Access Protocol Layers`.

The MRS will refuse to start when the system date is less than 1995 or greater than 2038. This is done to prevent database corruption through invalid system dates.

MRS Name Locator (NAMELOC)

At least one instance of the MRS Name Locator is started on every Windows NT server within a distributed system. The Name locator replicates the status of the various MRS services, in order to expedite communication between the services. Through MRS Name Locator, the functionality of the MRS services is independent of which service is performed upon which server. The MRS Name Locator gives the NT servers an overlapping name space.

MRS Status Dispatcher (XMRSVC)

The MRS Status Dispatcher assembles all logging and status information of the various MRS services. MRS services generate log messages and line states that can be selected by topic and priority.

The MRS Monitor is the user interface for the MRS Status Dispatcher. The MRS Monitor displays information assembled by the MRS Status Dispatcher.

The XMRSVC is a highly optimized mediator between Monitors and MRS services. Basically, information is only generated for active Monitors. Information is gathered by the MRS Status Dispatcher from through-out the NT network. This information can then be viewed by specially configured MRS Monitors within the network.

The XMRSVC is much more powerful than the NT Event Viewer.

MRS Information Store (INFOSTOR)

Four components are managed by the MRS Servers database:

- Address books. Address book and user information are stored in the Correlation database.
- Journal. The central MRS Server journal.
- Charge data.
- General File System. The MRS is an information provider for diverse clients. The RECH/DISTRIB database translates file names to different name spaces e.g. ISDN direct inward dialing numbers.

The Infostore database is founded on the highly optimized cTree kernel. Less than a milli-second is required for a typical read operation. Fast database transaction times forms the basis for employment of the MRS as a switching computer

MRS Message Router (MTA)

The MRS Message Router assumes the function of document routing and the establishment of connections. As soon as a document is received by an Access Protocol Layer (APL), it is then routed to the MRS Message Router. The MRS Message Router uses the address book and any applying rules to convert and forward the document to the target APL.

Distribution lists and conversions are executed within the MRS Message Router.

The switching kernel is implemented over a thread pool (parallel processing within a program). Numerous switching operations are executed parallel to one another. A router by conventional terms, is like the eye of a needle. Only one thread can be passed through at a time. Thanks to the scalable technology involved in MRS, the switching processes can be distributed to various CPU's.

"Routing Rules" (see below) govern the behavior of the router.

2.1.1.2 MRS Access Protocol Layers (APL)

Computer Telephony Integration APL (CTIAPL)

Connection of telephone exchanges for CTI functionality.

Database APL (DBAPL)

Connection to external databases. Data can be retrieved by other APL´s via transactions. This is currently used for example in special E-scripts to realize question & answer pages for call center agents.

Dialogic APL (DLGAPL)

Voice and fax protocols for Dialogic hardware. In addition, the CornetN protocol is supported for the Siemens Hicom PBX.

Microsoft Exchange 2000 APL (E2KAPL)

Gateway to Microsoft Exchange Version 2000. This APL is comprehensively described in an individual documentation.

Microsoft Exchange APL (EXCHAPL)

Gateway to Microsoft Exchange Version 5.5. This APL is comprehensively described in an individual documentation.

Microsoft Exchange True Unified Messaging APL (EXUMAPL)

Additional connector enabling True Unified Messaging with Microsoft 5.5. or 2000 connections.

File Interface APL (FIAPL)

General File Interface. File Interface exchange formats can be defined through use of a Script language.

An application of this File Interface APL is the SAP R/3 gateway using the SAPcomm interface.

Gamma APL (GAMMAAPL)

Integrates the functions of the GammaLink Fax card with the MRS Server.

Hicom APL (HICOMAPL)

CIT functions through a special interface of the Siemens Hicom PBX. Especially the triggering and monitoring of terminal end devices.

Integrated Services Digital Network APL (ISDNAPL)

This APL implements the ISDN protocol voice, G3 fax, fax polling, G4 fax, teletex and Euro file transfer.

A virtual machine is integrated into the ISDN APL which uses a Script language to implement customized applications. Fax-on-Demand or complex voice mail systems are built upon this Script language.

Lightweight Directory Access Protocol APL (LDAPAPL)

User data replication via the LDAP protocol with a directory service such as the one of Windows 2000.

Lotus Notes APL (LNAPL)

Gateway to Lotus Notes. This APL is comprehensively described in an individual documentation.

Lotus Notes True Unified Messaging APL (LNUMAPL)

Additional connector enabling True Unified Messaging with a Lotus Notes connection.

Mailbox APL (MAILAPL)

The Mail APL implements the MRS e-mail protocol. The Mail APL allocates mailboxes for the use of each user for message receipt and transmission.

Through the use of “Awake Rules” is it possible for documents that have not been read within a certain time period to be sent to another user e.g. Postmaster.

Automatic subscriber lists (List-Server) can be created with help from the Mailbox APL.

The Mailbox APL enables using an LDAP directory server for addressing.

Further features are the CTI Journal and Printer Embedded Codes.

Named Pipes Transport APL (PIPEAPL)

Implements client-server communications over the Windows NT network protocol Named Pipes.

Report APL (REPAPL)

The Report APL generates various statistics over data contained within the databases.

SAPphone APL (SAPPHONEAPL)

CTI functions for SAP R/3 via the SAPphone interface.

SAP R/3 APL (SAPAPL)

Gateway to SAP R/3 using the SAPconnect interface.

Internet Mail APL (SMTPAPL)

Gateway to the Internet. Messages can be sent or received using the SMTP protocol. After logging in, received documents are then forwarded to the POP3 or IMAP4 client.

Print APL (PRINTAPL)

Automatic printing of in and outbound documents can be configured through use of the *Carbon Copy Rules*

SPX Transport APL (SPXAPL)

This Network APL implement the client-server communication over the Windows NT network protocol SPX/IPX.

TCP/IP Transport APL (TCPAPL)

This Network APL implement the client-server communication over the Windows NT network protocol TCP/IP.

V.24 APL (V24APL)

The V.24 APL enables the use of fax with fax class 2 modems. Through use of the Script language, numerous V.24 protocols for document transmission and receipt can be created. Completed protocols include CompuServe, SMS-D2, SMS-D1, and SMS-Eplus (German cellular networks).

Virtual Machine APL (VMAPL)

This APL only includes the virtual machine to execute E-scripts. Simultaneously, however, special functions are made available to these E-scripts within the scope of this APL. Thus highly complex tasks can be accomplished here via E-scripts, e.g. Automatic Call Distribution (ACD) as central routing logic of a call center.

Web Server APL (WEBAPL)

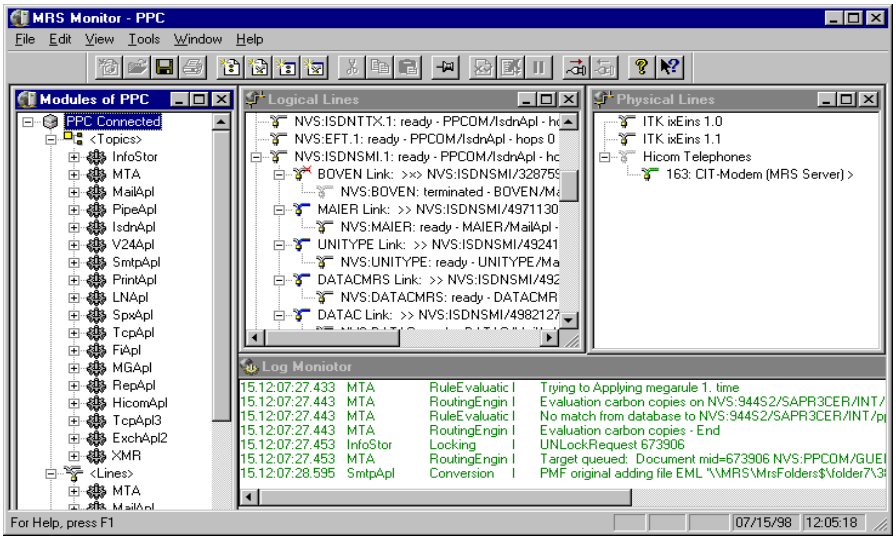
The MRS Web Server can respond to normal HTTP 1.1 queries and via an E-Script, insert various MRS functionalities in transmitted HTML pages. Access to messages is therefore possible via any web browser.

Furthermore, besides the server functionality, a Web Client is included which can be controlled by other APL´s via transactions. Thus HTML pages can automatically be called and information can be extracted from these pages per E-script and forwarded to the querying APL.

2.1.2 MRS Server User Interface

The user interface MRS Monitor displays the log-in and line status information of the MRS server.

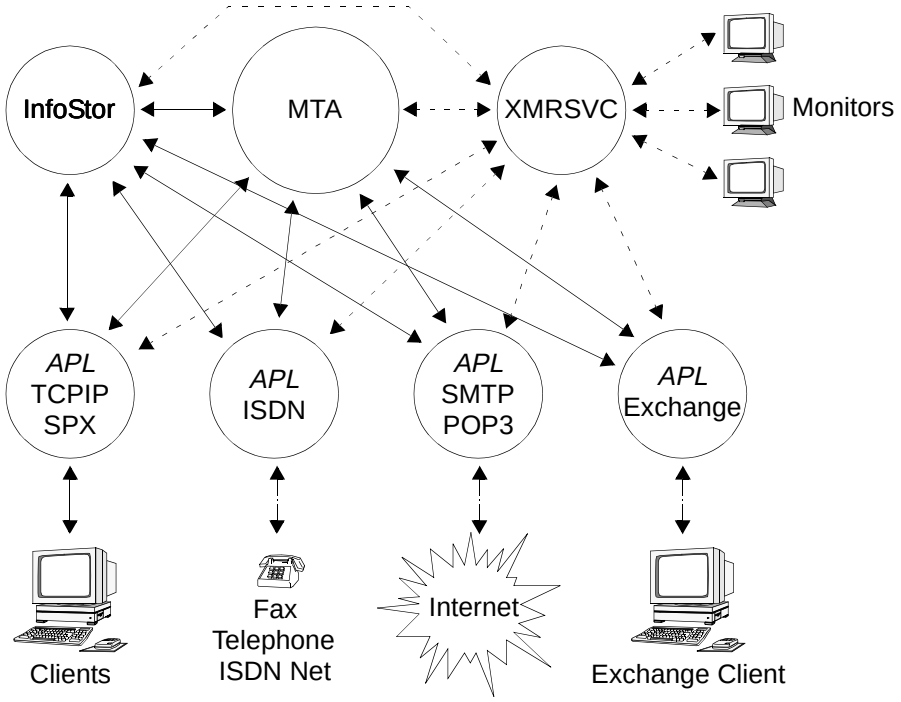
A wide-range of configurations are possible for the displayed information.



More information to the operation of the MRS Monitor is found in the *MRS Server Administrations* manual.

2.2 MRS Process Structure

The following illustration provides an overview of the MRS process structure.



The SMI 2.0 protocol (Standard Message Interface Protocol) is an internal protocol used for the entire inter-communication of the server components and simultaneously to communicate with native MRS Clients.

XMR IPC (Inter Process Communication) is used for information displayed in real time on the MRS Monitor.

2.3 The MRS Addressing

The MRS Server uses the following addressing form. This form of addressing is independent of protocol and structure of the target system.

```
NVS:NODE.CLASS/USER
```

or

```
NVS:NODE/USER
```

The first address section (`NVS:`) is a constant and non-changeable, as it characterizes the syntax as well as the address type. No other address types are used within the MRS Server.

The target network is defined within the address section `NODE`. Typical nodes are `FAXG4`, `ISDNTTX`, `FAXG3`, `TCPIP`, `SMTP`, `MSMAIL`, `EXCH`, etc.

The optional entry `CLASS` further defines the target network to differentiate between various accesses within the same network `NODE`. If the MRS Server is connected with seven logical fax lines, then by using the option `CLASS`, the logical lines could also be appended to the net `NODE`. If the option `CLASS` is not used (e.g. `NVS:NODE/USER`), then the router decides which access is to be used to the net `NODE` based on internal evaluation tables. The entry `USER` is an address expressed in local syntax within the network. In the case of a fax this could be the international fax number.

The address sections `NODE` and `CLASS` are not case sensitive. Although, depending upon the kernel configuration, the `USER` section of the address is sensitive to upper or lower case letters.

The corresponding Registry *Values* are found under the *Key*

```
HKEY_LOCAL_MACHINE\Software\PP-COM\MRS\MTA
```

```
LowerCaseAddresses
ForceUpperAddresses
ForceLowerAddresses
```

For individual network types this could be intentionally changed with e.g.

```
ForceUpperAddresses=WP,MS
```

or with

```
ForceLowerAddresses=TXDLG,TXSF
```

Examples for MRS Addresses

`NVS:LN/Ralph User`

Lotus Notes address “Ralph User” in MRS Syntax.

`NVS:FAXG3/491234567890`

Fax address for telephone number +49 1234 567890.

`NVS:FAXG3.1/491234567890`

The same address using the `CLASS` option.

`NVS:MS/MAYER`

MS-Mail user MAYER.

`NVS:SMTP/MAYER@mister.de`

TCP/IP e-mail with SMTP protocol to user MAYER at domain `mister.de.`

`NVS:FAXG4/491234567890`

Fax G4 member `491234567890`.

Every MRS address always defines a logical access to and from the MRS server. The Access Protocol Layers (APL's) define the actual constellation of the physical access points.

2.4 TCP/IP Ports used by the MRS Server

Component	Portnumber	Comment
All	UDP 137	Distributed MRS Server via firewall (“Firewalls between Nodes of a Distributed MRS” on page 83)
All	UDP 138	Distributed MRS Server via firewall (“Firewalls between Nodes of a Distributed MRS” on page 83)
All	TCP 139	Distributed MRS Server via firewall (“Firewalls between Nodes of a Distributed MRS” on page 83)
LDAPAPL	389	
MSP	8968	MRS Service Provider (client applications)
SMTPAPL	110	POP3 server
SMTPAPL	995	POP3 server with secure sockets
SMTPAPL	143	IMAP4 server
SMTPAPL	993	IMAP4 server with secure sockets
SMTPAPL	25	SMTP server
TCPAPL	1107	With updates of old versions this port can still be used for client access.
TCPAPL	8944	Client access
WEBAPL	80	HTTP server
WEBAPL	443	Secure HTTP server

These ports should not be blocked with usage of the respective feature via firewall.

2.5 MRS 5.1 Server Rules

The configuration of the MRS Server is highly flexible through use of “Rules”. Every transaction (dialog or store-and-forward) is checked for conformity with the rules within the router MTA.

Recipient addresses are transformed through use of the Rules. Routing is implemented through the Rules. The Rules transform recipient addresses either by pattern-matching or through an address table lookup.

Rules configure the MRS 5.1 Server for the areas

- **Routing**. In the Registry under the *Key*

  `HKEY_LOCAL_MACHINE\Software\PP-COM\MRS\MTA\Rules`

  in *Value* `Rerouting`, Routing-Rules are defined that determine the switching behavior at the time of the system start. Numerous switching procedures within the MRS are regulated by these rules. In MRS 5.1 there are no hardwired routing allocations.

- **Carbon-Copies**. In the Registry under the *Key*

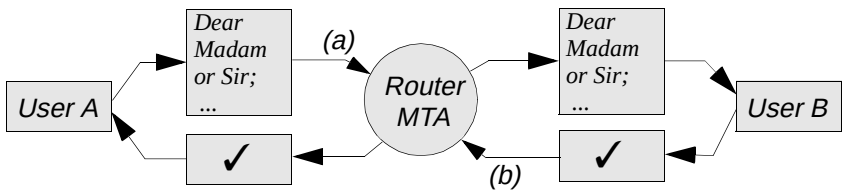
  `HKEY_LOCAL_MACHINE\Software\PP-COM\MRS\MTA\Rules`

  in *Value* `CarbonCopy` the conditions are defined for when a copy is to be created from store-and-forward documents. Transmission copies could be used for example for LAN printers, manual switching positions or logs.

- **Alarm-Copies**. The Mail APL can be instructed to send a copy when a time dependent rule condition occurs. In this way faxes that have not been read within a prescribed period could be sent to an administrator.

2.5.1 Rule Application within the Kernel

The following graphic illustrates the path a document and corresponding reports travel through the server:



User A sends a document to user B and receives the appropriate status report. On the way from A to B, the applicable routing Rules from the *Value* `Rerouting` will be applied as the document passes through point (a).

The application of the Carbon Copy Rules is controlled by the Registry *Key*

`HKEY_LOCAL_MACHINE\Software\PP-COM\MRS\MTA\Rules`

with the following *Value*:

CarbonMode REG_SZ *[DOC,][REPORT,][REPEAT,][HIDE]*

If the CarbonMode contains the string `DOC`, then following the application of the rerouting rules, the Carbon Copy rules would be applied as the document passes

through (a). The rules for CarbonMode `REPORT` would be applied at the passing of point (b).

Carbon Copy rules are per default only used by reports that have a final status e.g. `OK` or `FAILURE`. If the application of rules to a report without final status (redial etc.) desired is, then `REPEAT` must be specified. Certain transactions (e.g. transmissions from service terminals) are hidden through use of the internal system flag `TS_FLAG_HIDE`. If `HIDE` is specified, then the rules would also be applied to hidden transactions.

2.5.1.1 Application of the Rerouting Rules

When switching, the kernel attempts to apply all rules in a sequential order. At the same time, the rerouting rules are internally numbered and applied in canonical sequence. As soon as the condition of a rule is satisfied, the kernel then continues the process through-out the rule list. This process is repeated until no applicable rules remain in the rule list.

Restriction definitions are permitted with the following *Values* listed under the *Key*

`HKEY_LOCAL_MACHINE\Software\PP-COM\MRS\MTA`

RecursivReRout REG_DWORD *0 or 1*

Through the use of `RecursivReRout` it is specified whether the rule list may be applied in more than one instance. A value of `0` (false) specifies that only one application of the rule list is allowed.

ReRoutLevel REG_DWORD *1…*

Through `ReRoutLevel` the maximum number of rules are specified, that could lead to a change in the addressee. If `ReRoutLevel` has the value of `1`, then the application of the rules is terminated after the conditions of one rule have been fulfilled. The kernel creates debug information in the event that more than one rule has been used.

2.5.2 First Rules Examples

2.5.2.1 Routing through Pattern Matching

Rerouting of G3 fax documents that are addressed as 49240490*, to the G4 fax address 49240492*:

Rerouting

```
NVS:FAXG3/49240490*=NVS:FAXG4/49240492*
```

With this rule, an incoming G3 fax addressed to 492404906650 would be rerouted as a G4 fax to address 492404926650. All document conversions are automatically executed.

Rerouting of all inbound Internet mails from one SMTP domain to another domain.

Rerouting

```
NVS:SMTP/*@firm.com=NVS:SMTP/*@firm.de
```

With this rule, all inbound Internet mails addressed to anyone within the domain `firm.com` would be rerouted to the same user account in the domain `firm.de`.

In pattern matching the "`*`" is used for an arbitrary portion of the address.

2.5.2.2 Routing through Address Tables

Rerouting of G3 fax documents from the address e.g. 49123490*, to an Internet address located in the address tables (user database).

Rerouting:

```
NVS:FAXG3/49123490*=NVS:SMTP/<DB>
```

This rule processes an incoming G3 fax addressed to 491234905678. The server first tries to locate the user with the address 491234905678. If an equivalent user address is found, the server then tries to locate the SMTP Internet address from the address tables in the user database. If an address exists, then the fax is rerouted to the corresponding Internet address. All conversions pertinent to the rerouting of the document are automatically executed. An address table entry should have approximately the following format:

```
USER    MAYER
FAXG3   491234905678
SMTP    mayer@mister.de
```

The target fax address 491234905678 is first translated into the user `MAYER,` and then the SMTP address `mayer@mister.de`

2.5.3 Rule Structure

Rules can contain up to four elements and an optional comment.

```
Address1[Condition]=Address2[Assignment]"Comment"
```

Example:

```
NVS:FAXG3.*/*[ORG=NVS:FAXG3/001*]=NVS:MS/<DB>"Comment"
NVS:FAXG3.*/*=NVS:MS/<DB>[PRIO=1]"Comment"
```

Address1 and Address2 are in the form of an MRS address. In the address sections NODE, CLASS, and USER the use of wild cards '*' (multiple or zero characters) and '?' (exactly one character) is permitted. The condition in Address1 is always applied to the recipient in the transaction. If Address1 and the recipient correspond with another, then [Condition] would be evaluated. If the requirements of [Condition] are satisfied, then Address1 will be substituted with Address2. The variables in [Assignment] would also be set to their given values.

Besides direct swapping from address patterns through the use of wild cards there is another, much more powerful type of conversion; the transcription through database reference. Dissimilar address types can be transcribed through the use of "correlation entries" found within the user database.

2.5.3.1 Rule Element Structure - Address1

The recipient of a transaction is checked against the rule governing the address section Address1, to decide if the rule is applicable.

Address1 has the format: NVS:NODE.CLASS/USER

Example

```
NVS:FAXG3/32*
```

In the event that Address1 and the recipient correspond with another, then the rule is further evaluated. In this example the transaction to the recipient NVS:FAXG3/32155 would be further evaluated.

2.5.3.2 Rule Element Structure - Condition

Through Condition further requirements are defined that must be satisfied before the rule can be applied.[Condition] can be comprised of one or more requirements separated by a semicolon (logical AND):

ABORT =,<,>,!= n

Rule only applies when the variable ABORT (see below) is equal, greater than, less than, or not equal to n. The default value from ABORT is 0, but can be set with [Assignment] to prevent recursion.

AGE=*n*<s,m,h,d>

Only with awake rules of the mailbox administrator. This sub-condition is fulfilled if the age of the job is greater or equals *n* seconds, minutes, hours or days (e.g. AGE=10s or AGE=10d, age 10 seconds resp.10 days).

```
FLAG=Flag1,Flag2...
FLAG!=Flag1,Flag2...
```

```
FLAG<Flag1,Flag2...
FLAG>Flag1,Flag2...
```

Rule only applies if the condition is fulfilled. = stipulates that all included flags are set, != stipulates that at least 1 flag is not set, and < specifies that none of the included flags are set. > specifies that at least one of the included flags must be set.

Possible flags are:

Flag	Significance

ADMINDELETE	If a message carries this flag, the message body is deleted as soon as an OK or FAILURE report arrives. The body is replaced with the short information that the message has been deleted.
	In order to delete e.g. all fax documents after their transmission, you can use the following rules:
	`NVS:FAXG3.*/*[ORG!=NVS:FAXG3.*/*;FLAG!=ADMINDELETE]=`
	`NVS:FAXG3.*/*[FLAG=ADMINDELETE]`
	`NVS:FAXG4.*/*[ORG!=NVS:FAXG4.*/*;FLAG!=ADMINDELETE]=`
	`NVS:FAXG4.*/*[FLAG=ADMINDELETE]`
	Attention: This option prevents the Unified Messaging access via a telephone user interface since the documents are deleted on the MRS Server as soon as e.g. an acknowledgement of receipt is delivered by the Exchange server.

ARCHIVE	Document recorded in archive.
AUTOTIMECPY	Document created through an AWAKE rule from the Mailbox-process.
CARBONCOPY	Document is a switching copy.
CIT	CIT signal sent.
CONFIDENTIAL	A message must not be forwarded when it carries this flag.
COST	Document booked in charge acquisition.
DONTFORWARD	Document was not forwarded.
EXLINE	Document sent with explicit CLASS declaration (e.g. NVS:TXSF.**1**/823423).
EXTERNCOPY	Document is copied through the router.
FLAG1, FLAG2	Multi-purpose flags 1 and 2. These flags differ from all others in that they can be set with [Assignment]. In this way specific recursions can be prohibited.

Flag	Significance
GATEIN	This document has come in via a Remote System Link.
GATEOUT	This document war forwarded via a Remote System Link.
HIDE	Hidden document.
MAXREPSFAIL	Maximum number of repeats has been attained. Status set to failure.
NODELDOC	Document cannot be deleted through physical deletion of journal entry.
NODELMID	Document message ID was externally created.
NOPREFERRED	*Preferred Routing Rule* no longer applicable.
NOREPORT	Standard reports are surpressed when Report-Mails are used.
PRINTED	Document has been printed.
READ	Document has been read.
TXUNKAK	Special flag for VU-S charge invoice.
VFSROUT	Document switched through the Voice-Fax-Special protocol.

Example: `FLAG=PRINTED,READ` signifies that a rule is only applicable when a document has been read or printed.

`FOLDER=`<*Folder Name*>

Presetting is `FOLDER=INBOX`;

Subfolder example: `FOLDER=INBOX/TRASH` (`INBOX` is always an element of the path).

`FORMAT=`<*`format-list`*>, `FRM=`<*`format-list`*>

Rule is applied only when the document format is contained in the format list `<format-list>`.

A `<format-list>` is an abbreviation list (separated by commas) of all supported formats. See ”Supported Document Formats“ on page 429.

Example:

`NVS:FAXG3[FRM=DCX,ASC;ABORT=0]=NVS:FAXG3.1[ABORT=1]`

Fax documents with formats `DCX` and `ASC` will only be transmitted over fax line `1`. The `ABORT` value (default `0`) is set to `1`, to prevent recursion after application of the rule.

`FORMAT!=<format-list>, FRM!=<format-list>`

Rule only applies when document format is not contained within the format list.

`GROUP(ORG)=<Group Name>`
`GROUP(REC)=<Group Name>`

The recipient (REC) and the originator (ORG) must belong to the group *<Group Name>*. An application example is a Robinson list which blocks certain fax numbers for transmission.

`NVS:FAXG3.*/*[GROUP(REC)=ROBINSON]=NVS:NIL/FAIL`

`LEN=n, LEN>n, LEN<n, LEN!=n`

Rule only applies when the length of the document is equal to, greater than, less than or not equal to the `n` bytes.

`ORG=`*<Address Wildcard>*

Rule only applies if the originator´s address corresponds with the address form *<Address Wildcard>*. Example:

`NVS:FAXG4/*[ORG=NVS:FAXG4/49*]=NVS:FAXG3/*`

Documents whose recipient `NVS:FAXG4/*` (Fax G4) is, would through this rule be switched to `FAXG3` if the originator address was from type `NVS:FAXG4/49*`. A document originating from `NVS:FAXG4/491234`, sent to `NVS:FAXG4/49123490` would in this example be sent to `NVS:FAXG3/49123490`.

`ORG!=`*<Address Wildcard>*

Rule only applies when the originator does not correspond with the address form.

`ORGDB(`*<Field>*`)=`*<String>*`, ORGDB(`*<Field>*`)!=`*<String>*

The database would try to ascertain the user name of the originator, otherwise the function works the same as `RECDB`.

Example: `NVS:FAXG3.*/*[ORGDB(OPTION1)=X]=NVS:FAXG4/*`

In the example an outgoing `FAXG3` would be rerouted to the same number as `FAXG4` if the value `X` is found in the database field `OPTION1` of the originator.

`PRIO=n, PRIO>n, PRIO<n, PRIO!=n`

Apply rule only when the transmission operation priority is equal, greater than, less than, or not equal to `n`. Priorities fall within the area of 0 to 30000. Highest priority is 0. The following text priorities may also be used: `URGENT` (1000), `HIGH` (4000), `NORMAL` (5000), `LOW` (6000), `NIGHT` (10000).

PRIVMODE=<*Mode*>
PRIVMODE!=<*Mode*>

The internal flag PRIVMODE is verified. PRIVMODE can have the following values:

Value	Significance
EMAIL	e-mail
FFU	Fax-Fax converter
FFUACN	Fax-Fax converter confirmation
KGCHK	ID generator check
PR	Departmental printer information
SMTP	SMTP-Mail
TLXTTX	Transition telex-teletex
TTU	TTU transition
TTUACN	TTU acknowledgment
VOICE	Voice

PRIVOGROUP(ORG)=<*Private Group of the originator*>
PRIVOGROUP(REC)=<*Private Group of the originator*>
PRIVRGROUP(ORG)=<*Private Group of the recipient*>
PRIVRGROUP(REC)=<*PrivateGroup of the recipient*>

Same as GROUP, however, for private groups.

RECDB(<*Field*>)=<*String*>, RECDB(<*Field*>)!=<*String*>

The user name of the recipient is ascertained with help from the database. If successful, then the contents of the user database field <*Field*> is compared with that of the <*String*>.

SUBJ=<*Text*>

Compares the contents of <*Text*> with that of the Subject field. Conditions are applicable if they are present in Subject.

SUCCESS=n, SUCCESS>n, SUCCESS<n, SUCCESS!=n

Apply rule only when transaction SUCCESS code is equal, greater than, less than, or not equal to n. The variable n can either be a number or a string.

n=0 or n=UNDEFINED

Success undefined, no report as of yet.

`n=1` or `n=UNKNOWN`

Success is unknown, transaction continues.

`n=2` or `n=OK`

Transaction successfully completed.

`n=3` or `n=FAILURE`

Transaction failed. No further redial.

`n=4` or `n=REJECT`

Call collision. Redial will be performed.

`n=5` or `n=REPEAT`

Faulty termination. Redial will be performed.

`n=6` or `n=DELAYED`

Processing successfully completed, recipient to receive information at next login. This status is applicable when a document is sent to an e-mail subscriber that is currently not logged in. The information has been successfully written to the subscriber's mailbox.

`TIME=h1:m1-h2:m2`

Rule only applies if the current time is between `h1:m1` o'clock and `h2:m2`. For example: `TIME=17:00-8:00` specifies that a rule is only to be applied between five o'clock in the evening and eight o'clock in the morning.

`TYPE =,>,<,!= n`

Rule only applies when the transaction type is equal, greater than, less than, or not equal to `n`.

n`=1` or *n*`=DOCUMENT`: Document transmission process.
n`=2` or *n*`=REPORT`: Report transmission process.
n`=3` or *n*`=TRANSACTION`: Opening of a dialog.

`WDAY=wd1,wd2...`
`WDAY!=wd1,wd2...`

Rule only applies if the current week day appears (or does not) in the list. For example: `WDAY=MO,TU,WE,TH,FR` or `WDAY!=SA,SU` specifies that the rule is to be applied only Mondays through Fridays.

Several conditions can be linked with a semicolon (logical AND).

`[PRIO=0;SUCCESS!=REJECT]`

Subcondition priority equals 0 **and** success is not equal to `REJECT` (no call collision)

Examples

NVS:FAXG3.*/*[RECDB(OPTION1)=XYZ]=NVS:MS/<DB>

1. An incoming fax to NVS:FAXG3/491234567890. The database will now try to ascertain if a user with the fax number 491234567890 exists. In the event that a match is found, then the user database field OPTION1 is read and then compared with the string XYZ.

   If the field OPTION1 contains the string XYZ, and if the user with the arbitrary G3 fax address has an MS address, then the fax will be sent to the MS Mail address of the user.

2. A fax to 491234567890. User Mayer has the following entry in the user database:

   ```
   USER      MAYER
   FAXG3     491234567890
   MS        NETWORK/OFFICE/SCHULZ
   OPTION1   XYZ
   ```

   Since a user does exist for the example transaction with the fax G3 address 491234567890, the database is further queried to see if the OPTION1 database field contains the string XYZ. Since this is also the case, the transition will be rerouted to the user's MS MAIL address. The target address is NVS:MS/NETWORK/OFFICE/SCHULZ.

Tip:

For some applications it is useful when database fields are added to facilitate any routing decisions. section *The Mask Description Language MDL* "The Mask Description Language MDL" on page 64 explains in detail how database fields are incorporated to the user database.

2.5.3.3 Rule Element Structure - Address2

Address2 defines how a transaction is to be routed to the recipient in the event that rules apply. Three different versions are available.

Address2 can have either an explicit form

```
NVS:NODE[.CLASS]/USER
```

or it can consist of a database query

```
NVS:NODE[.CLASS]/<DB>
```

In this example the recipient's database is queried and <DB> is then replaced by the entry. In the event that a database entry from the originator is required for the routing decision, <ODB> would be used.

The third version simply uses the originator´s address as address:

```
<ORIG>
```

An example is the usage of a Carbon Copy Rule with report form. See section 2.4.4.

Example (Database request):

```
NVS:FAXG3.*/*[ORG!=NVS:FAXG3.*/*]=NVS:PR/<ODB>
```

In this example all outgoing fax G3 documents that are defined in the originator´s database also are routed to the printer. This rule could be used as a Carbon Copy Rule.

Example (Explicit form):

If the recipient corresponds to the transaction type `Address1` and requirements in `[Condition]` are satisfied, then `Address1` is replaced by `Address2.`

```
NVS:FAXG3/49832*[PRIO=4]=NVS:TXSF/498888*
```

If a fax with the priority 4 is sent to the address `NVS:FAXG3/49832155`, then it would be rerouted to `NVS:TXSF/498888155`.

Example (Database request):

```
NVS:FAXG3/*=NVS:SMTP/<DB>
```

All documents sent to a fax G3 address are to be examined. The first step is to determine if a user with the fax G3 number * exists. If a user is found, then the user's SMTP-Mail address is queried from the database. If both operations are successful, then the document would be rerouted to the users SMTP-Mail address.

The system receives a fax with the address number 491234567890. The system then tries to determine the user with this fax number. In the event that the user exists (e.g. `MAYER`), then an attempt is made to determine the SMTP address of user `MAYER`. If the database field `SMTP` from user `MAYER` contains the value `MAYER@MISTER.DE` then the fax is automatically rerouted via the Internet to the SMTP address `MAYER@MISTER.DE`. If the database query fails (e.g. no value in the database field SMTP), then the rule is ineffectual.

In the example user MAYER has the following database entries:

```
USER    MAYER
FAXG3   491234567890
SMTP    MAYER@MISTER.DE
```

2.5.3.4 Rule Element Structure - Assignment

In addition to the recipient, other characteristics of the transaction can also be modified. `[Assignment]` can be made-up from one or more expressions separated by a semicolon

`ABORT=n`

The `ABORT` variable is set to `n` if the recipient address is the type `Address1` and `[Condition]` is satisfied. The `ABORT` value can be queried under `[Condition]` in other rules to prevent recursion. The default `ABORT` value is 0.

`DEFER=`*n*
`DEFER=hh:mm`
`DEFER=hh:mm@day`
`DEFER=hh:mm@`*n*`d`

The transmission time is delayed by *n* seconds, set to the clock time `hh:mm`, set on the time `hh:mm` on the next week day from [MO,TU,WE,TH,FR,SA,SU], or set on the time `hh:mm` in *n* days, if the recipient address is from type `Address1` and `[Condition]` is satisfied.

`FLAG=FLAG1|FLAG2`, `OFLAG=FLAG1|FLAG2`, `CFLAG=FLAG1|FLAG2`

`FLAG1` or `FLAG2` is set. This flag can be queried later in `[Condition]`. Other than the `ABORT` variable, `FLAG1,2` remain unchanged outside of the routing process. `ABORT` is only valid during the routing process and cannot be queried further. Only these two flags may be set by the user.

The variations `OFLAG` and `CFLAG` are intended for use with Carbon Copy Rules and set the flag by the Original resp. by the copy.

`FOLDER=`*<New Folder>*

Shifts the message to an Inbox subfolder if the recipient is a user.

`FORM=`*<Filename>*

Report form used for transmission reports via mail under the Carbon Copy Rules.

`ORIG=`*<MRS Address>*

Setting the originator. This is useful for returning a report form to the originator of a message per Carbon Copy Rule. In this case you do not want using the primal message originator as report originator since he is actually the report´s recipient. Therefore choose e.g. the user `POSTMASTER` as originator of the report. Rule example:

```
NVS:*/*[FLAG!=CARBONCOPY]=
   <ORIG>[FORM=rpt.frm;ORIG=NVS:$(NODE)/POSTMASTER]
```

This rule sends the originator a report form for each message. `POSTMASTER` is then the report form´s originator. Please remember that such a rule can trigger an endless recursion if the originator has appointed e.g. an out-of-office-assistant or a similar feature for automatic replies.

`PRIO=`*n*

The priority of the transaction will be set to *n* if the recipient address is of type `Address1`, and the `[Condition]` is satisfied.

`SUBJ=<text> OSUBJ=`<*Text*>, `CSUBJ=`<*Text*>

The Subject is set on <*Text*>. The variants `OSUBJ` and `CSUBJ` are intended for use with Carbon Copy Rules and set the flag by the Original resp. by the copy. The following variables may be contained in <*Text*>:

Variable	Significance
`{ORG}`	Message originator as a complete MRS Address. Example: `NVS:FAXG3.1/1234567890`
`{ORGNODE}`	Service used by originator. Example: `FAXG3`
`{ORGUSER}`	Originator address. Example: `1234567890`
`{REC}`	Message recipient as complete MRS address.
`{RECNODE}`	Service used for delivery to recipient. Exchange: `EXCH`
`{RECUSER}`	Recipient address
`{SUBJ}`	Original Subject which can thus be completed.

2.5.4 Extended Rule Syntax

Remember the rule structure:

```
Address1[condition]=address2[assignment]"comment"
```

2.5.4.1 Regular Expressions

You can use regular expressions for addresses and within the conditions. They offer a significantly more precise language for creating rules more flexibly and beyond that you can filter parts from the found address that are separately queried in the conditions and can be used for creating a new address.

The following table provides an overview of elements that form a regular expression:

Element	Description
`.`	corresponds to each character except a line break.
*	corresponds to no or several copies of the previous expression.

Element	Description
`[]`	a character class that corresponds to any character within the brakkets. If the first character is a '^', this specification corresponds to all characters except those within the brackets. Ranges can be specified by means of '-' (example: `[a-z]`)
`+`	corresponds to one or several copies of the previous expression.
`?`	corresponds to no or one copy of the previous expression.
`|`	corresponds either to the previous or to the following expression.
`()`	groups a number of regular expressions to a new regular expression.
`[:`<*ctype*>`:]`	is another option to represent a character class. This representation can also be used in the character class described above. <*ctype*> is one of the following expressions:

`alnum`	corresponds to	`[0-9A-Za-z]`
`alpha`	corresponds to	`[A-Za-z]`
`cntrl`	corresponds to	each character with an ASCII smaller than 0x20
`digit`	corresponds to	`[0-9]`
`graph`	corresponds to	each printable character
`lower`	corresponds to	`[a-z]`
`print`	corresponds to	`graph` and `' '` (blank)
`punct`	corresponds to	`[!.,:;]`
`space`	corresponds to	`[ \f\n\r\t\v]`
`upper`	corresponds to	`[A-Z]`
`xdigit`	corresponds to	`[0-9A-Fa-f]`

All other characters represent a regular expression that exactly corresponds to this character. By means of the '\' character a special character can be used as normal character again. This means that you need to enter two '\' characters in order to have one real backslash.

Example

Expression	applies to
`.*`	any arbitrary character chain

Expression	applies to
`\*\*`	precisely two stars
`www\.cycos\.com`	www.cycos.com

Further information on regular expressions are found in section *Rules for match patterns* in *The E Programming Language* manual.

So that regular expressions can be used, the `Address1` and `Address2` portion must be set in inverted commas. The individual parts (subpatterns), found in `Address1`, can then be used in other parts.

The following syntax serves this purpose: `%[`<*n*>`]`<*i*>

<*i*> corresponds to the subpattern number, with 0 corresponding to the entire pattern. `[`<*n*>`]` is an optional length specification and restricts the number of subpattern characters to be considered.

Example

```
"NVS:FAXG[34](\..+)?/<.+>"  [ %1 ?  "^0+190.*" ] =  NVS:NIL/FAIL
```

This would find all valid Fax G3 and G4 addresses and check in the condition whether the number starts with 0..0190.. to reject it in this case.

The comparison of regular expressions within a subcondition is enabled with the new operator `?`. The operator `=` would perform a simple comparison of the given character chain, regardless upper and lower case (case insensitive).

Further new operators `<=` and `>=` are only valid with numeric variables or flags.

Logic Composition of the Subconditions

You can link the single subconditions via the operators & (logic AND) or | (logic OR). The older syntax performs always only a logic AND of the single conditions with the operator `;` used up to now corresponding to `&`. To invert a logic value you can use the operator `!` (logic NOT).

By means of the brackets `()` you can skip the normal right association.

Example: ...`[ !(SUBJ ? "I LOVE YOU") | ABORT > 1 ] =` ...

Functions

Three functions can be used: `len()`, `node()` and `add()`. node() and add() have either `O` (originator) or `R` (recipient) as argument and deliver the `NODE` resp. the `ADDRESS` portion of the NVS address (`NVS:NODE.CLASS/ADDRESS`) each.

`len()` can have an arbitrary string value as argument and redelivers the string length. The variables `SUBJ` or `ORG` can, for example, be an argument.

Example:

…[len(SUBJ) > 80] = … [SUBJ = "{SUBJ[60]}...(truncated)"]

If the subject field of a message exceeds 80 characters, it would be shortened to 60 characters and the "...(truncated)" string appended.

New Operators for the Assignment Portion of the Address

Besides the familiar = you can now also use += and -=: they enable incrementing a variable (e.g. ABORT) and adding or removing flags.

Example: [FLAGS -= READ]

This removes READ flag.

Comment Lines in Routing Rules

Each line that begins with ; is considered a comment line.

2.5.4.2 ReRouting

Fax rerouting according to document format to dissimilar lines

The registry contains the *Key*

HKEY_LOCAL_MACHINE\SOFTWARE\PP-COM\MRS\MTA\Rules

and in the *Value* Rerouting the following is found:

```
NVS:FAXG3/*[FORMAT=TXT;ABORT=0]=NVS:FAXG3.1/*[ABORT=1]
NVS:FAXG3/*[FORMAT=FG3;ABORT=0]=NVS:FAXG3.2/*[ABORT=1]
```

Every document in text format (TXT) to fax G3 address (NVS:FAXG3/*) would be transmitted over line number .1, and every document in fax G3 format (FG3) would be transmitted over line .2. As soon as either rule is applied, the ABORT variable is set to 1. Since ABORT is no longer =0, [Condition] allows this rule to be applied only once.

Incoming fax switching

The Registry contains the *Key*

HKEY_LOCAL_MACHINE\SOFTWARE\PP-COM\MRS\MTA\Rules

and in the *Value* Rerouting the following is found:

```
NVS:FAXG3.*/*=NVS:$(NODE)/<DB>
NVS:FAXG3.*/*[ORG=NVS:FAXG3.*/*]=NVS:$(NODE)/$(POSTMASTER)
```

Fax G3 documents that are directed to an arbitrary number *, will be routed to the corresponding user on the MRS-System $(NODE), as long as an appropriate database definition is found. If the database contains no definitions pertaining to a fax G3 address *, then the document would be forwarded to the $(POSTMASTER). At

the time of the system installation the `$(POSTMASTER)` was declared as default recipient of documents whose originator is a `FAXG3` document (only incoming documents will be sent).

Routing rules may contain the variables: MRS System name `$(NODE)`, default recipient `$(POSTMASTER)`, system administrator `$(ADMINISTRATOR)`, or default printer `$(DEFPRINTER)`. The default printer is configured in the Print APL.

Default-Settings

Default settings are easily accessed through the configuration menus on the MRS Monitor. The ReRouting *value* normally contains the following default *routing rules* with the variables `$(NODE)` and `$(POSTMASTER)` having been replaced with the corresponding value:

```
; Standard Routing Rules
NVS:STAND-IN/*=NVS:$(NODE)/*
NVS:VOICE.*/*[FLAG!=EXTERNCOPY & FLAG!=NOPREFERRED]=<NW>
NVS:*.*/*=<PREFERRED>
; Extended rules:
; an address representing a regular expression must be quoted
; subconditions may combined by '&' or '|', ';' is equivalent to '&'
; '?=' denotes a regular expression match
; evaluation order of subexpressions can be grouped by '(' ')'
"NVS:FAXG[34](\..+)/.*" [node(ORG)?="FAXG[34]" &
                                FLAG!=VFSROUT]=NVS:$(NODE)/$(POSTMASTER)
NVS:VOICE.*/*[node(ORG)=VOICE;FLAG!=VFSROUT;FLAG!=NOPREFERRED]=
                                NVS:$(NODE)/$(POSTMASTER)
NVS:EFT.*/*[node(ORG)=EFT]=NVS:$(NODE)/$(POSTMASTER)
NVS:SMTP.*/*[node(ORG)=SMTP;FLAG=LOCALUSER;addr(ORG)!=MAIL-REPORT]=
                                NVS:$(NODE)/$(POSTMASTER)
NVS:LN.*/*[node(ORG)=LN]=NVS:$(NODE)/$(POSTMASTER)
NVS:CC.*/*[node(ORG)=CC]=NVS:$(NODE)/$(POSTMASTER)
NVS:*.*/*=<PRIVRULES,$REC.rules>
```

2.5.4.3 Transmission Copies, CarbonCopy

By using another set of rules, the copy recipient can be declared (e.g. printer as recipient, automatic switching to a collection point for jobs that fail). This transpires in the following *Values* in the *Key*:

`HKEY_LOCAL_MACHINE\Software\PP-COM\MRS\MTA\Rules`

CarbonMode REG_SZ

This *Value* determines when the Carbon Copy rules are to be applied. The following values may be given:

Values	Significance
`DOC`	Apply with every document transmission.
`REPORT`	Apply to reports with final status. These are reports with either `OK` or `FAILURE` status.
`REPEAT`	Apply to all reports (especially reports created by redial). This value is significant only when `REPORT` value is also set.
`HIDE`	Uses the rules on hidden transactions. Hidden transactions are generally created by the system to document administrative processes. By hidden transactions is the `HIDE` flag set.

CarbonCopy REG_MULTI_SZ

Rules for automatic copy creation.

Example:

```
CarbonMode
   REPORT

CarbonCopy
   NVS:TCPIP.*/*[ORG=NVS:FAXG3.*/*;SUCCESS=DELAYED;
   REC!=NVS:TCPIP/$(POSTMASTER)]=NVS:TCPIP/$(POSTMASTER)
```

Reroutes all incoming fax G3 documents addressed to not currently logged-in Mail user, to the TCP/IP address `$(POSTMASTER)`. In order to prevent recursion, the rule is only used if the addressee is not `$(POSTMASTER)`.

```
CarbonMode
   REPORT

CarbonCopy
   NVS:*/*[REC!=NVS:PRINTER/*]=NVS:PRINTER/LASER"Printer"
```

Reroutes a copy from all transactions to the address `NVS:PRINTER/HPLASER`. To prevent recursion, the recipient is not equal to `NVS:PRINTER`.

Service Modification

In some instances it is desirable to modify not only the user address, but also the service that is provided. Example:

```
CarbonCopy
   NVS:*.*/*=NVS:COPY/<DB>
```

In the user database from MAYER is:

```
   COPY     LANA
```

By SCHULZ is:

```
   COPY     NVS:PPC/SOND
```

A copy of mail sent to user MAYER, would be created and sent to NVS:COPY/LANA. By user SCHULZ, a copy would be made and sent to NVS:PPC/SOND. If the database address field contains a complete address, then the service (NODE) would be substituted also.

Attention:

This option should only be used when no other possibility exists. If a complete MRS address is entered in a database field the field can no longer be used for inbound routing.

Default Settings

Default settings are easily accessed through the configuration menus on the MRS Monitor. The following *Carbon Copy Rules* have been entered in the *Value* CarbonCopy.

Copy incoming fax documents to default printer routs a copy to the default APL printer.

```
NVS:*.*/*[ORG=NVS:FAXG3.*/*;FLAG!=CARBONCOPY;
   FLAG!=NOPREFERRED]=$(DEFPRINTER)[FLAG=NOPREFERRED]
NVS:*.*/*[ORG=NVS:FAXG4.*/*;FLAG!=CARBONCOPY;
   FLAG!=NOPREFERRED]=$(DEFPRINTER)[FLAG=NOPREFERRED]
```

Copy incoming fax documents to user defined printer expects a printer to be entered in the database field PRINTER. When used this option routes a copy of all incoming faxes to the printer.

```
NVS:*.*/*[ORG=NVS:FAXG3.*/*;FLAG!=CARBONCOPY;
   FLAG!=NOPREFERRED]=NVS:PRINTER/<DB>[FLAG=NOPREFERRED]
NVS:*.*/*[ORG=NVS:FAXG4.*/*;FLAG!=CARBONCOPY;
   FLAG!=NOPREFERRED]=NVS:PRINTER/<DB>[FLAG=NOPREFERRED]
```

2.5.4.4 Awake Rules

Awake rules define under which circumstances and after what time period, documents should be “awakened”. Administration of the Awake rules is by the mailbox administrator. Time periods used for the Awake rules can range from seconds to months.

The following *Values* are found under the *Key*

`HKEY_LOCAL_MACHINE\Software\PP-COM\MRS\MailApl`

AutoAwake REG_DWORD

If the mailbox administrator wants to execute a time supervision of journal entries, then the value must be set to `1`. The administrator then regularly accesses the database.

Default: `0`

AllowRecursiveAwake REG_DWORD

If the Awake rules are to have a multiple application, then the value must be set to `1`.

Default: `0`

DatabasePollRate REG_DWORD *Seconds*

Polling rate in which the Awake rules query the database. The polling rate must be less than the minimum value entered by `AGE`. If the `AGE` condition is 10 seconds, then the polling rate must be set to 1 second. If `AGE` is in days, then a polling rate of 3600 seconds (1 hour) is sufficient.

MaxAwake REG_DWORD

Maximum number of Awake rules. Memory is reserved for the number of Awake rules entered here.

The *Value* Awake is found under the *Key*

`HKEY_LOCAL_MACHINE\Software\PP-COM\MRS\MTA\Rules`

Awake REG_MULTI_SZ

The Awake rules. For the structure see section *Rule Structure* on on page 30ff.

Example:

```
AutoAwake
   1
DatabasePollRate
   3600
MaxAwake
   16
Awake
   NVS:TCPIP.*/*[SUCESS=DELAYED;AGE=7d]=
      NVS:$(NODE)/$(POSTMASTER)[SUBJ=7 days without Login]
```

```
NVS:TCPIP.*/*[SUCCESS=OK;AGE=10d;FLAG!=READ;
   FLAG!=PRINTED]=NVS:$(NODE)/$(POSTMASTER)
   [SUBJ=10 days neither read or printed]
NVS:*.*/*[ORG=NVS:FAXG3.*/*;SUCESS=DELAYED;AGE=4d]=
   NVS:$(NODE)/$(POSTMASTER)[SUBJ=4 day old fax G3]
NVS:*.*/*[ORG=NVS:FAXG4.*/*;SUCCESS=DELAYED; AGE=4d]=
   NVS:$(NODE)/$(POSTMASTER)[SUBJ=4 day old fax G4]
NVS:SPX.*/*[SUCESS=DELAYED;AGE=7d]=
   NVS:$(NODE)/$(POSTMASTER)[SUBJ={REC} hasn't read!]
```

Each rule in the example is one line in the *Value* `Awake`. In the example the multi-string contains four lines, each starting with "NVS:".

Every hour (3600 seconds) documents are investigated to see if one of the four `AWAKE` conditions apply.

Awake Rule 1:

Mail sent to a TCP/IP user that has not logged-in for a period of more than 7 days. A copy with the reference "7 days without login" will be sent to the `POSTMASTER`.

Awake Rule 2:

Mail sent to TCP/IP user that was received (`SUCCESS=OK`), but has not been read or printed within a 10 day period would be sent to the `POSTMASTER`.

Awake Rules 3 and 4:

Incoming fax G3 and G4 documents that are not processed within a 4 day period are sent as a copy to the `POSTMASTER`.

Awake Rule 5:

Mail to SPX users which have not logged-in within 7 days (condition is `DELAYED`). A copy with the Subject Line "{REC} hasn't read" is forwarded to the postmaster. The variable {REC} will be replaced with the original recipient.

Default Settings

Default settings are easily accessed through the configuration menus on the MRS Monitor. The following *Awake Rules* have been entered in the *Value* `Awake`.

Unread incoming documents will be sent to Postmaster

```
NVS:*.*/*[ORG=NVS:FAXG3.*/*;AGE=10d;FLAG<READ,PRINTED]=
   NVS:$(NODE)/$(POSTMASTER)
NVS:*.*/*[ORG=NVS:FAXG4.*/*;AGE=10d;FLAG<READ,PRINTED]=
   NVS:$(NODE)/$(POSTMASTER)
NVS:*.*/*[ORG=NVS:VOICE.*/*;AGE=10d;FLAG<READ,PRINTED]=
   NVS:$(NODE)/$(POSTMASTER)
```

```
NVS:*.*/*[ORG=NVS:EFT.*/*;AGE=10d;FLAG<READ,PRINTED]=
   NVS:$(NODE)/$(POSTMASTER)
```

2.5.5 Automatic Report Transmission per Mail

Some email systems do not support the complete Report Information from the MRS Server. Email reports can be created for these systems, whereby the missing information is excluded from the report.

Example: A fax is sent from an external mail system (e.g. SAP R/3 or MS Exchange) over the MRS Gateway. Occasionally, these external systems transmit insufficient report information to the user or to a third person (System Administrator) in the event of an error. The following sectors describe Report Forms which allow the distribution of additional report information on the originator or a third person.

2.5.5.1 Report Form Installation

Report Forms are simple text files which are stored in the directory `res\forms`. In order to activate these forms, the Report mode must be switched on in the Carbon Copy Rules. The *Value* `Report` must also be inserted in the CarbonMode *Key* in the Registry.

The Mail-Report must now be activated through the appropriate Carbon Copy Rule. Example:

```
NVS:*.*/*[TYPE=REPORT;ORG=NVS:LN/*]=NVS:LN/<ODB>[FORM=report.ok]
```

Report Forms can be applied to the various status reports through use of the `SUCCESS`-Condition. Example

```
NVS:*.*/*[TYPE=REPORT;SUCCESS=OK;ORG=NVS:LN/*]=NVS:LN/<ODB>
   [FORM=report.ok]
NVS:*.*/*[TYPE=REPORT;SUCCESS=FAILURE;ORG=NVS:LN/*]=NVS:LN/<ODB>
   [FORM=report.bad]
```

2.5.5.2 Report Form Structure

The Report Form is a simple text file which could contain the following variables:

Variable	**Significance**
`{COST}`	Cost Information
`{COSTUNITS}`	Number of cost units (Charge pulses).
`{DATE}`	Date.

Variable	Significance
{DIGEST[, <*Max*>]}	A portion of the original message is embedded in the Report. The maxim length can be defined through the optional entry <*Max*>. The algorithm used for building the Digest attemptes to retreive the text without a loss of information. Example: Empty lines, greetings, …
{DOCUMENT}	The sent document is enclosed in the report as attachment. If this document is a fax with cover page, the actually sent fax cover page is then displayed in the report. In the individual send journal e.g. only the original document would otherwise appear with the MRS Server probably attaching the fax cover page to it per Application Converter.
{FILENAME}	Readable list of file names for the original message including attachments.
{FORMAT}	Original message format (e.g. Voice, Fax or E-Mail).
{MID}	MRS Message ID.
{ORGID}	Originator ID for the telematic service.
{ORGNAME}	Readable form of the originator address. If information over the fax originator is contained in the Alias database, this could appear as a name instead of a fax number.
{ORGNODE}	Incoming Service
{ORGORGNAME}	Readable form of the original originator for documents that are forwarded to other users.
{ORGRECNAME}	Readable form of the original recipient for documents that are forwarded to other users.
{ORGUSER}	Origtinator Address. The USER-portion of a NVS:NODE/USER-Address.
{RECID}	Recipient ID.
{RECNAME}	A readable form of the recipient address.
{RECNODE}	Target Service.
{RECUSER}	Recipient Address- The USER-portion of a NVS:NODE/USER-Address.
{REPEATS}	Number attempts required for the successful transmission of a document.

Variable	Significance
{REPORTTIME}	Time of the last MRS Report for original message.
{SENDTIME}	Document transmission time.
{STATE}	Readable delivery status.
{SUBJECT[,<*Max*>]}	Subject line of the original message. The maxim length can be defined through the optional entry <*Max*>. If the actual length is longer than <*Max*>, it will be truncated and "…" appended.
{TIME}	Creation time of the report.

Report Form Example:

```
=========================================================================
  MRS Report: OK
=========================================================================

   From:       {ORGNAME}
   To:         {RECNAME}
   Original-To:{ORGRECNAME}

   MID:        {MID}

   State:      {STATE}
   Cost:       {COST}

   Subject:    {SUBJECT}

   Digest:     {DIGEST,256}

=========================================================================
```

2.5.5.3 Normal Report Suppression

If the normal default report for the recipient APL is to be suppressed, the NOREPORT flag must be set for the Carbon Copy Rule sending the report. This suppresses the default report so that only Report Mail created by the Carbon Copy Rules can be sent as a document. Example:

```
NVS:*/*[TYPE=REPORT]=NVS:MAILBOX/<ODB>[FORM=report.ok;FLAG=NOREPORT]
```

2.5.6 Meta Rules

The following special rules serve to simplify procedures.

```
NVS:*.*/*=<PREFERRED>
```

This rule defines the entry routing for all services:

1. Attempts to ascertain the recipient NVS:*.*/* from the database.

2. If a corresponding user exists, then the database field PREFERRED in the user database will be queried.
3. If an entry is found, the service defined in PREFERRED is read from the users database.
4. If this service exists as entry in the database, then the document would be routed there.

Example

Incoming fax G3 on 9099. An entry exists in the user database for user AAA with the following database field contents:

```
USER        AAA
PREFERRED   MS
FAXG3       9099
MS          NOVELL/MSMAIL/AAAUSER
```

The Meta Rule determines the user AAA from the information in FAXG3 and 9099. The PREFERRED field from user AAA contains the entry MS (MS Mail) and the MS field contains the entry NOVELL/MSMAIL/AAAUSER.

The fax addressed to 9099 (NVS:FAXG3/9099) would therefore be routed on the MS Mail network to NVS:MS/NOVELL/MSMAIL/AAAUSER.

Additionally, the database field PREFERRED is used for entering services preferences from the alias list. If a message is addressed to a user through an alias function of the MRS Client, the Client forwards the message to the user through the appropriate service and corresponding address.

2.5.7 RouteLets

Under RouteLets several function expansions are implemented as a DLL, and therefore allow extremely complicated transformations of routing information. The call is executed as follows:

```
NVS:*.*/*=<CUSTOM,dllname.dll>
```

This Routing Rule calls the function

```
extern int WINAPI CustomRoute (T_DESC *desc)
```

in the DLL dllname.dll, which then executes a transformation.

An example of the application is the implementation of Least Cost Routing through the use of internal tables to find the cheapest telecommunications provider.

2.5.8 Error Handling

The absence of rules would lead to catastrophic routing errors. If for example, there were no rules for the incoming routing of fax G3 documents, all incoming fax docu-

ments would be directly sent to the same number to which they were addressed. In an ideal situation this would lead to a resonance catastrophe for the server.

MRS generates a warning in the event such a routing situation is discovered.

Example

The *Value* `ReRouting` has no entries and a fax comes into the system addressed to the number `8324567`. Since the address cannot be translated through any application of a rule, the address remains `FAXG3/8324567` and is sent back out to the number: `8324567`.

2.5.9 Recursions

When defining rules, it is imperative that careful attention be given, so that no recursions occur. Recursions will be detected by the system, but never the less, it's an unnecessary load upon the system.

2.5.10 Testing new Rules

The MRS Monitor should be used in all instances of rule modification to test the effects of the modification. This is accomplished by configuring a Viewer that displays the MTA topics *RuleEvaluation*, *RoutingEngine* and *Messages*.

2.6 Logical and Physical Lines

The Access Protocol Layers (APLs) sets physical lines into logical lines. A physical line is defined and made available through an external network, and is represented through a connection (network hardware). A logical line is independent of the external network and is determined by the network type and protocol. They are represented through `NODE` and `CLASS` of a MRS address. The entire MRS server (with exception of the APL's) works exclusively with logical lines. If the network has the appropriate protocols, then a physical line can be composed of many logical lines.

Example

An ISDN connection with two B-channels represents two physical lines (B0 and B1). To these two physical lines, it is possible to assign a series of logical lines.

```
FAXG4.1, FAXG4.2,
FAXG3.1, FAXG3.2,
VOICE.1, VOICE.2
```

Conversely, a bundle of physical lines could be assigned as a single logical line.

Example

A fax connection has seven physical lines. If one does not wish to assign an individual address to these lines, then they could be represented by a single logical line.

```
FAXG3.1
```

With this configuration, the MRS-Router would not be able to address the individual lines. Therefore it is generally a better practice to assign at least one logical line to all physical lines.

Logical lines are displayed as MTA Lines in the MRS Monitor.

Physical lines are displayed as Lines corresponding to an APL.

2.7 Maintenance Script

The MRS Server automatically executes maintenance and clean-up tasks. Through the use of a Script language, is it possible to precisely define the various tasks. The name of the script is found in the Registry value MaintenanceScript of the MTA. Note that with an MRS Server update a modified script would be overwritten again by the script default version. To avoid this, save the modified version under a different name in the <*MRS Root*>`\res\maint\` directory. This new name with complete path specification should be entered in the regisry value MaintenanceScript in key `HKEY_LOCAL_MACHINE\SOFTWARE\PP-COM\MRS\MTA`.The Script is not limited by the number of task groups that can be executed at a predetermined time.

```
<TaskGroup>
   {
   Periodicity = <TimeSpec>
   InformOnFailure = <User>
   InformOnSuccess = <User>
   Task
      {
      <Task>
      <Task>
      ...
      }
   }
```

<*TaskGroup*> is an arbitrary name for a group of <*Tasks*>, that are to be collectively started.

<*TimeSpec*> in format `n[s,m,h,D,W,M,Y]@hh:mm` gives the time `hh:mm` and intermittence `n`, with which the <*TaskGroup*> is to be executed. The suffix `@hh:mm`

give the time at which the <*TaskGroup*> is started. The prefix `n[s,m,h,D,W,M,Y]` gives the intermittence: `10s` (every 10 seconds), `30m` (every 30 minutes), `6h` (every 6 hours), `15D` (every 15 days), `4W` (every 4 weeks), `2M` (every 2 months), `7Y` (every 7 years). With `Periodicity = 6h@0:00` the affected <*TaskGroup*> is started every day at 00:00, 06:00, 12:00, and 18:00.

<*TimeSpec*> in format `DD@hh:mm`. Here `DD` corresponds to the English weekday abbreviations, thus `MO`, `TU`, `WE`, `TH`, `FR`, `SA`, `SU`. Consequently you can e.g. with `Periodicity = SU@12:00` start an affected <*TaskGroup*> every Sunday at 12:00.

<*TimeSpec*> in format `!`<*Date*>`@hh:mm`. This task is executed just once at the set date <*Date*>. <*Date*> is specified as YYYY-MM-DD. Thus for example `Periodicity = !`1999-12-31@23:00. With this example a separate database bakkup was generated at the turn of the year 2000.

<*User*> are MRS user names that are to be informed of the success or failure of a <*Task*>.

2.7.1 Actions

All commands <*Task*> described here can also be executed independently from the Maintenance Script from the command line prompt. For this purpose, the InfoTool utility is available in the directory <*MRS Root*>`\SDKTools`. Certain actions can only be done through the use of the InfoTool and not directly from the Maintenance Script. These commands are then explicitly executed according to their individual descriptions, with one exception: the parameter `record=` is always abbreviated in the command line prompt Utility InfoTool as `rec=`.

Call: `InfoTool node=\\`<*Server*> <*Task*>

<*Server*> is the server name of a Windows NT server in UNC notation, on which a MRS database (InfoStor) runs. If the call is being executed locally, the parameter `node=` may be excluded.

The following actions can be started through `<TASK>`:

`EXPORT record=`<*Record*> `file=`<*Filename*>

The records for the database `CORREL`, `GEB`, `JOURNAL`, `DISTRIB` and `RECH` are exported in the file <*Filename*>. Database fields are always separated with a tab. When the parameter `FULL` is included, all these databases are simultaneously saved to a file. The parameter `FULL` is only available in the Maintenance Script, and corresponds to the InfoTool command `FULLEXPORT`.

Example:

```
EXPORT record=CORREL file=c:\tmp\correl.txt
```

A file has the following format:

```
DOMAIN   CLASSNAME     CLASS        KEYNAME       KEY
```

```
FERENGI   USER        MK           BEM          Documentation
FERENGI   USER        MK           GROUP        USER
FERENGI   USER        MK           MAILBOX      MK
FERENGI   USER        MK           NAME         Martin Koser
FERENGI   USER        MK           PASSWORD     1148324553
FERENGI   USER        MK           PREFERRED    MAILBOX
FERENGI   USER        MK           SMTP         mk@cycos.com
FERENGI   USER        SUPERVISOR   NAME         Group definition for group administrators
FERENGI   USER        SUPERVISOR   PRIVILEGES   FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF
FERENGI   USER        USER         NAME         Group definition for group user
FERENGI   USER        USER         PRIVILEGES   1480fb815f000000008007805f
FERENGI   USER        POSTMASTER   GROUP        USER
FERENGI   USER        POSTMASTER   MAILBOX      POSTMASTER
FERENGI   USER        POSTMASTER   NAME         Postmaster - receives nondeliverable Mail
FERENGI   USER        POSTMASTER   PASSWORD     3702854253
FERENGI   USER        POSTMASTER   PREFERRED    MAILBOX
...
```

`EXPORT rec=USER file=`<*Filename*>

The user database is exported in a usable form for extraneous applications as a file <*Filename*>. An excerpt from various fields:

```
USER     BEM                  GROUP    MAILBOX  NAME          PASSWORD     PREFERRED     SMTP
MK       Documentation        USER     MK       Martin Koser  1148324553   MAILBOX       mk@ppcom.de
USER     Groupdefinition
...
```

Attention: This function only available through the InfoTool. If this is to be executed within a maintenance script, the EXECUTE command must be given as in the following example:

```
EXECUTE cmd="..\sdktools\infotool rec=USER file=..\backup\user.txt"
```

`EXPORT record=SHORT file=`<*Filename*>

The alias (short) database is exported in a usable form for extraneous applications as a file <*Filename*>.

`EXPORT record=RUND file=`<*Filename*> `class=`<*LName*>

The distribution list <*LName*> is exported in a usable form for extraneous applications as a file <*Filename*>.

Example:

```
EXPORT record=RUND file=rund.txt class=TESTLISTE
```

```
CLASSNAME     CLASS         KEYNAME   KEY
RUND          TESTLISTE     GLIST
GLIST         TESTLISTE     1         NVS:FAXG3/1234
GLIST         TESTLISTE     2         NVS:FAXG4/2343
GLIST         TESTLISTE     3         NVS:SMTP/hugo@do.main.de
GLIST         TESTLISTE     4         NVS:FERENGI/MK
```

`IMPORT rec=`<*Recordtype*> `file=`<*Filename*>

The records `CORREL`, `JOURNAL`, `GEB`, `DISTRIB`, and `RECH` can be imported. Many applications (Excel, Winword, dBase, etc.) have an export format that uses TABs as separators. In this manner it is quite simple to import user information from extraneous systems. Such an user import contains a mask description of the

fields from the extraneous system plus the user data. This command is only available over the InfoTool.

`IMPORT rec=USER|SHORT file=<`*Filename*`>`

A list with the applicable export format is imported. It is inserted into the user database without deleting the existing data. In the `USER` mode, password/PIN can also be imported in the clear text. These are then encoded during the import. The password resp. PIN must be preceded by a `^` for this purpose. This command is only available over the InfoTool.

`IMPORT rec=RUND file=<`*Filename*`> class=<`*LName*`>`

A distribution list with the applicable export format is imported without deleting existing entries. This command is only available over the InfoTool.

`DELDB record=<`*Recordtype*`> age=<`*age-in-days*`>`
`[originator=<`*MRS_Address*`>] [recipient=<`*MRS_Address*`>]`
`[flags=<`*Flags*`>] [options=<`*Options*`>]`

`JOURNAL` or `GEB` record types, that are older than <*age-in-days*> days, will be deleted. With the deletion of journal entries are the corresponding message files also deleted.

Optional parameters are only possible when the record type is `JOURNAL`.

<*MRS_Address*>

Complete or partial MRS address in the form `NVS:NODE/USER`.

Example: `originator=NVS:FAXG3`

Use `DELDB` only with records whose originating address begins with `NVS:FAXG3`.

Example: `recipient=NVS:NODENAME/MAYER`

Use `DELDB` only with records received by user `MAYER`.

`flags=<`*Flags*`>`

Deletes only data records which contain all of the set flags. <*Flags*> is a comma separated list of the flags `READ`, `PRINTED`, `ARCHIVE`, `DELORG`, `DELREC`, `DELARC` and `DELPOP`. The `DEL*` flags refer to messages that were deleted by either the originator (`DELORG`), recipient (`DELREC`), archiving (`DELARC`), or POP3 client (`DELPOP`.)

Example: `flags=READ`

Deletes only records that have been read.

`options=<`*Options*`>`

If the option `FILEONLY` is set, then the document will be deleted and replaced with a short text containing deletion information. The database entry in the jour-

nal remains intact. Through the use of database queries, it is possible to reconstruct what has happened to the document.

Through use of the option `REMOVECONVERSIONS`, original documents are retained and all conversions are deleted. When used with voice files, the original may also be retained in a compressed format. The codec settings in the MTA configuration are used for this purpose.

Attention: In the event any of these optional parameters are used, then the option `options=FILEONLY` should always be included. A complete deletion of documents and database entries should only be executed in an emergency.

`EXECUTE cmd=`<*Command*>

A NT shell command is executed. Since no user interaction is possible, this function should only be used together with the automatic backup (see below). No interactive programs should be started (e.g. editors). The essence of the `EXECUTE` command is the starting of backup-scripts that allow specific backup extensions. The `EXECUTE` command can also be called from the Maintenance Script therefore enabling the use of commands not normally available to the Maintenance Script. Example:

```
EXECUTE cmd="..\sdktools\infotool rec=USER file=..\backup\user.txt"
```

`MASKEXPORT file=`<*Filename*>

Exports the user, alias and profile mask description in a `*.mdl` format. This command id only available over the InfoTool.

`MASKIMPORT file=`<*Filename*>

Imports the user, alias and profile mask description in a `*.mdl` format. This command id only available over the InfoTool.

`CLASSIMPORT class=`<*Classname*> `file=`<*Filename*> `[delete=1]`

Correlation-records of the CLASS <*Classname*> are imported. If the option `delete=1` is set, then all correlation-records with `CLASS=`<*Classname*> will be deleted. Example: A new privilege list is to be installed on the server. The new privileges are contained in a correlation-export file as `privlist.txt`. With

```
CLASSIMPORT class=PRIVILEGES file=privlist.txt delete=1
```

the old `PRIVILEGES` definitions are first deleted, then the new definitions are imported. Other correlation entries *are not* modified.

`FULLEXPORT file=`<*Filename*>

The complete database is exported as the file <*Filename*>. A full-export is the short form of separate exports of the `JOURNAL`, `RECH`, `DISTRIB`, `GEB` and `CORREL` databases. The resulting file qualifies as a backup for the database con-

tents. This command is only available over the InfoTool. In Maintenance Script the normal EXPORT should be used with the parameter FULL.

FULLIMPORT file=<*Filename*>

The complete database is imported from the file <*Filename*>. A full-import is the short form of separate imports of the JOURNAL, RECH, DISTRIB, GEB and CORREL databases. This command can only be executed when a FULLEXPORT has previously been done. This command is only available over the InfoTool.

REMOVE path=<*Wildcard*> age=<*Days*> [option=[x][,WARN] [,RECURSIVE]]

In the path <*Wildcard*> all files are deleted that are older than <*Days*> days. If the option X is present, then all files are deleted. Otherwise only a message is generated. With the option WARN, a message in the MRS log is given by every delete operation. By RECURSIVE are all sub-directories from <*Wildcard*> searched.

PURGE <*Message ID*>

Removes the document file corresponding to <*Message ID*>. The file is replaced with the text "Document has been deleted by system administrator". All previous information (e.g. charges) is retained in the journal entry. This command is only available over the InfoTool.

VERIFY Options=CASE[,FIX]

Checks the consistency address database in regards to the attributes LOWER and UPPER. Any inconsistencies are immediately corrected if the option FIX is included.

QUOTA [User=<*Username*>]

The database field QUOTAUSED is asynchronously actualized with the amount of harddisk storage space used by each user. If the option <*Username*> is used, then this field will be use exclusively for the given user. This field was designed for use with **InfoTool**.

OldUserCleanup

This task removes all non-active user entries from the database. Non-active user entries are those entries which do not have a password or PIN number. In this case the following happens:

- All documents received by the user are tagged as being deleted by the user.
- All documents sent by the user are tagged as being deleted by the user.
- If the default mode KILLDOCS is selected all documents sent to and from this user would be deleted unless allocated to another user.
- All MCK script or TNG voice resources belonging to the user will be deleted.

- All EFT documents owned by the user will be deleted.
- All entries from the user in the Correlation database will be deleted.
- The user will be removed from all distribution lists.
- If an executable program (with complete path) is listed in the registry value `HKLM\Software\PP-COM\MRS\MTA\UserRemovalExtension`, this program will be called with the user name as the first command line parameter.

Warning:

If for any reason documents (owner_originator or owner_recipient) on the server have the form `NVS:`<*Servername*>/<*LocalUser*> and this <*LocalUser*> does not have a password or PIN number, all documents and database entries it will be deleted for this user.

If uncertain whether this pertains to the server installation or not, the directory folders, databases, user data should be saved prior to installing this maintenance job.

2.7.2 Variables

Within the expression `<Username>` and `<Task>` the following variables are allowed:

`$(ADMINISTRATOR)`

Administrator´s name. Entered at the time of the MRS installation.

`$(POSTMASTER)`

Name of the user that is to receive all undeliverable mail. Also entered during the installation.

Both of these users are defined in the Registry under the *Key*

`HKEY_LOCAL_MACHINE\Software\PP-COM\MRS\Infostor\Accounts`

`$(BACKUP)`

Backup directory as defined under the *Key*
`HKEY_LOCAL_MACHINE\Software\PP-COM\MRS\MRS Globals`
in the *Value* `BackupDirectory`.

`$(FOLDER)`

Document Storage directory as defined under the *Key*
`HKEY_LOCAL_MACHINE\Software\PP-COM\MRS\MRS Globals`
in the *Value* `FolderDirectory`.

`$INTERACTIVE`

This is a list of all interactive services, including those that are not executed by `$NONINTERACTIVE`. It should be observed that no parenthesis are used with this variable. Since this is an enumeration of several services, these are not required.

`$(LIFETIME)`

Maximum document calendar life in days as defined under the *Key*

`HKEY_LOCAL_MACHINE\Software\PP-COM\MRS\MTA`
in the *Value* `DocumentLifeTime`.

`$(LIFETIMECOMPRESS)`

After the expiration of this time period (in days), all document conversions are deleted and only the original retained. The *Value* `DocumentLifeTimeCompress` is defined in the Registry *Key* `HKEY_LOCAL_MACHINE\Software\PP-COM\MRS\MTA`.

`$(LIFETIMEEMAIL)`

After the expiration of this time period (in days), email documents are deleted from the server and only the journal entry retained. The *Value* `DocumentLifeTimeEmail` is defined in the Registry *Key* `HKEY_LOCAL_MACHINE\Software\PP-COM\MRS\MTA`.

`$(LIFETIMEINBOUND)`

After the expiration of this time period (in days), all inbound documents are deleted from the server and only the journal entry retained. The *Value* `DocumentLifeTimeInbound` is defined in the Registry *Key* `HKEY_LOCAL_MACHINE\Software\PP-COM\MRS\MTA`.

`$(LIFETIMEOUTBOUND)`

After the expiration of this time period (in days), all outbound documents are deleted from the server and only the journal entry retained. The *Value* `DocumentLifeTimeOutbound` is defined in the Registry *Key* `HKEY_LOCAL_MACHINE\Software\PP-COM\MRS\MTA`.

`$(LIFETIMEPASSTHROUGH)`

After the expiration of this time period (in days), all forwarded documents are deleted from the server and only the journal entry retained. The *Value* `DocumentLifeTimePassthrough` is defined in the Registry *Key* `HKEY_LOCAL_MACHINE\Software\PP-COM\MRS\MTA`.

`$(LIFETIMESERVICE)`

Maximum life (in days) of a document as defined in the *Value* `DocumentLifeTimeService` in the Registry *Key* `HKEY_LOCAL_MACHINE\Software\PP-COM\MRS\MTA`.

`$(LIFETIMEUSERDEFINED)`

Can be applied for various rules and can be comfortably configured in the MTA configuration dialog. The *Value* `DocumentLifeTimeUserdefined` is defined in the Registry *Key* `HKEY_LOCAL_MACHINE\Software\PP-COM\MRS\MTA`.

`$NONINTERACTIVE`

This is a list of all services which never delete documents (e.g. fax G3, voice), as defined in the *Value* `NonInteractiveServices` in the Registry *Key* `HKEY_LOCAL_MACHINE\Software\PP-COM\MRS\MRS Globals`.

`$(ROOT)`

Root-directory. Directory in which MRS is installed. Defined under the *Key* `HKEY_LOCAL_MACHINE\Software\PP-COM\MRS\MRS Globals` in the *Value* `LocalSystemList`.

`$(SCRIPTDIR)`

Path to <*MRS Root*>`\RES\MAINT` directory.

Tips

- The descriptions for the various `$(LIFETIME…)` values pertain only to those variables used in a standard maintenance script. The meaning of these variable immediately change when used in other applications.
- Attention must be given when defining paths in a script that run over the network. A NT service runs only locally and per default has no rights for accessing the network. The MTA must be given an account through the Service Control Manager if network access is required. This account must also have the necessary rights to access the network.
- If counter based CIT is used, the sequence of `DelDB`-commands must be ended by the command `DelDB record=Journal age=$(LifeTime)`. Through this, an implicit consistency check is made of the new message counters used by the CIT based counter.

Example

```
Backup
{
 Periodicity = 24h@0:00
 InformOnFailure = $(Administrator)
 InformOnSuccess=
 Task
 {
  Execute cmd=$(ScriptDir)\backup.bat
```

```
  Export record=FULL file=$(Backup)\fullexp.exp
  Export record=correl domain=$(node)
    file=$(Backup)\correl.txt
  Export record=correl domain=$(node)/$SYSTEM
    file=$(Backup)\correlsys.txt }
 }
}

RemoveOld
{
 Periodicity=2D@2:00
 InformOnFailure=$(Administrator)
 InformOnSuccess=DSC
 Task
 {
  DelDB record=Journal age=$(LIFETIME)
  DelDB record=Geb age=$(LIFETIME)
  Remove path=$(Folder) age=$(LIFETIME) option=x,recursiv
 }
}

RemoveDeleted
{
 Periodicity=24h@3:00
 InformOnFailure=$(Administrator)
 InformOnSuccess=
 Task
 {
  DelDB record=Journal originator=$NONINTERACTIVE
   flags=DELREC age=10
  DelDB record=Journal originator=$INTERACTIVE
   recipient=$INTERACTIVE flags=DELREC,DELORG age=3
 }
}
```

In the example, `<TaskGroup> Backup` executes the following functions every 24 hours at `0:00`:

- Execution of the script `backup.bat`
- Full database export to `fullexp.exp`
- Address book export to `correl.txt`

In the example, `<TaskGroup> RemoveOld` executes the following functions every 48 hours at `2:00`:

- Deletes all journal database entries including documents that are older than `$(LIFETIME)` days.
- Deletes all charge cost database entries that are older than `$(LIFETIME)` days.
- Recursive deletion of all files that are in the path `$(Folder)` and older than `$(LIFETIME)` days.

The `<TaskGroup> RemoveDeleted` in the example executes every 24 hours the following functions at `3:00`.

- All inbound messages are automatically deleted when the recipient has already deleted theirs (`DELREC`) and the message is more than 10 days old. The message must additionally originate from a service that cannot delete messages (e.g. fax G3).
- All email messages (even though both the originator and recipient are interactive) are deleted, which have been deleted by the originator and recipient and are older than 3 days.

2.8 The Mask Description Language MDL

The layout of entry masks for the user, alias (short), and profile database can be given through use of the Mask Description Language MDL. Every field can be assigned an attribute. The profile database corresponds to that of the user database, but consists only of fields which the user can modify. It should be noted that these three databases are virtual databases and are a portion of the correlation database.

A mask description is comprised of the following

- $mask, mask layout is fixed
- $attrib, field attributes are defined

Example:

```
; MRS 3.0 Mask Description for TEST
;
$mask PROFILE
NAME       ######################################################
PASSWORD   ############################## PIN   ###############
PRIVILEGES ############################## GROUP ########################

PREFERRED  ######################################################
MAILBOX    ######################################################
STAND-IN   ######################################################
CIT        ######################################################

FAXG3#     ################### FAXG3-ID      ###################
VOICE#     ################### FAXG3-HEADLINE ############################
FAXG4#     ################### FAXG4-ID      ########################
ISDNTTX#   ################### ISDNTTX-ID    ########################
EFT#       ###################
SMS#       ################### COSTINFO      ########################
```

```
SMTP       ########################################################
EXCH       ########################################################
LN         ########################################################
MS         ########################################################
CC         ########################################################

ZIP        ###########  CITY ###################################
COUNTRY    ########################################################
COMPANY    ########################################################
DIVISION   ########################################################
ADDR1      ########################################################
ADDR2      ########################################################
REMARK     ########################################################
PRIVTEL#   ########################     PRIVFAX########################
GSM#       ########################

PMI-SCHEDULE ########################################################
PMI-HOSTNAME ########################################################
PMI-USERNAME ########################################################
PMI-PASSWORD ########################################################
$attrib
ADDR1              CHAR
ADDR2              CHAR
CC                 PSERV,CHAR,UNIQUE,UPPER
CIT                PSERV,CHAR
CITY               CHAR
COMPANY            CHAR
COSTINFO           PSERV,CHAR
COUNTRY            CHAR
DIVISION           CHAR
EFT#               PSERV,DNOREAD,CHAR
EXCH               PSERV,CHAR,UNIQUE,UPPER
FAXG3#             PSERV,DNOREAD,CHAR,UNIQUE
FAXG3-HEADLINE     PSERV,CHAR
FAXG3-ID           PSERV,CHAR
FAXG4#             DNOREAD,PSERV,CHAR,UNIQUE
FAXG4-ID           PSERV,CHAR
GROUP              CHAR,UPPER,PSUPER
GSM#               DNOREAD,CHAR
ISDNTTX#           PSERV,DNOREAD,CHAR,UNIQUE
ISDNTTX-ID         PSERV,CHAR
LN                 PSERV,CHAR,UNIQUE,UPPER
MAILBOX            PSERV,CHAR,UPPER,UNIQUE
MS                 PSERV,CHAR,UNIQUE,UPPER
NAME               CHAR
PASSWORD           CHAR,UPPER,KRYPT
PIN                CHAR,UPPER,KRYPT
PMI-HOSTNAME       PSERV,LOWER,CHAR
PMI-PASSWORD       CIPH,CHAR
PMI-SCHEDULE       PSERV,CHAR
PMI-USERNAME       PSERV,CHAR
PREFERRED          CHAR,UPPER
PRIVFAX#           DNOREAD,CHAR
PRIVILEGES         CHAR,UPPER,PSUPER,HIDE
PRIVTEL#           DNOREAD,CHAR
REMARK             CHAR
SMS#               DNOREAD,CHAR
SMTP               PSERV,CHAR,LOWER,UNIQUE
STAND-IN           CHAR,UPPER
VOICE#             PSERV,CHAR,DNOREAD,UNIQUE
ZIP                CHAR
$end
```

```
$mask SHORT
NAME       ######################################################

FAXG3#     ####################    VOICE#     ####################
FAXG4#     ####################    ISDNTTX#   ####################
SMS#       ####################    EFT#       ####################

PREFERRED  ################    GROUP      ########################

ZIP        ###########  CITY ###################################
COUNTRY    ######################################################
COMPANY    ######################################################
DIVISION   ######################################################
ADDR1      ######################################################
ADDR2      ######################################################
REMARK     ######################################################
PRIVTEL#   ######################## PRIVFAX#######################
GSM#       ######################## KEYWORD ######################

SMTP       ######################################################
EXCH       ######################################################
LN         ######################################################
MS         ######################################################
CC         ######################################################
$attrib
ADDR1              CHAR
ADDR2              CHAR
CC                 CHAR,UNIQUE,UPPER
CITY               CHAR
COMPANY            CHAR
COUNTRY            CHAR
DIVISION           CHAR
EFT#               DNOREAD,CHAR
EXCH               CHAR,UNIQUE,UPPER
FAXG3#             DNOREAD,CHAR,UNIQUE
FAXG4#             DNOREAD,CHAR,UNIQUE
GROUP              CHAR,UPPER,PSUPER
GSM#               DNOREAD,CHAR
ISDNTTX#           DNOREAD,CHAR,UNIQUE
KEYWORD            CHAR
LN                 CHAR,UNIQUE,UPPER
MS                 CHAR,UNIQUE,UPPER
NAME               CHAR
PREFERRED          CHAR,UPPER
PRIVFAX#           DNOREAD,CHAR
PRIVTEL#           DNOREAD,CHAR
REMARK             CHAR
SMS#               DNOREAD,CHAR
SMTP               CHAR,LOWER,UNIQUE
VOICE#             DNOREAD,CHAR,UNIQUE
ZIP                CHAR
$end

$mask USER
NAME       ######################################################
PASSWORD   ################################ PIN   ################
PRIVILEGES ############################### GROUP ########################

PREFERRED  ######################################################
MAILBOX    ######################################################
STAND-IN   ######################################################
CIT        ######################################################
```

```
FAXG3#     ################### FAXG3-ID      ###################
VOICE#     ################### FAXG3-HEADLINE ############################
FAXG4#     ################### FAXG4-ID      ######################
ISDNTTX#   ################### ISDNTTX-ID    ######################
EFT#       ###################
SMS#       ################### COSTINFO      ######################

SMTP       ######################################################
EXCH       ######################################################
LN         ######################################################
MS         ######################################################
CC         ######################################################

ZIP        ##########  CITY ###################################
COUNTRY    ######################################################
COMPANY    ######################################################
DIVISION   ######################################################
ADDR1      ######################################################
ADDR2      ######################################################
REMARK     ######################################################
PRIVTEL#   ######################     PRIVFAX#####################
GSM#       ######################     KEYWORD ####################

TCPIP      ######################################################
PIPE       ######################################################
SPX        ######################################################
PRINTER    ######################################################
PHONE#     ###################

PMI-SCHEDULE ######################################################
PMI-HOSTNAME ######################################################
PMI-USERNAME ######################################################
PMI-PASSWORD ######################################################

FAXG3      ###################
FAXG4      ###################
ISDNTTX    ###################
EFT        ###################
VOICE      ###################
SMS        ###################
GSM        ###################
PRIVTEL    ###################
PRIVFAX    ###################
PHONE      ###################
$attrib
ADDR1              CHAR
ADDR2              CHAR
CC                 CHAR,UNIQUE,UPPER
CIT                CHAR
CITY               CHAR
COMPANY            CHAR
COSTINFO           CHAR
COUNTRY            CHAR
DIVISION           CHAR
EFT                DNO,PSUPER,HIDE,CHAR,UNIQUE
EFT#               DNOREAD,CHAR
EXCH               CHAR,UNIQUE,UPPER
FAXG3              DNO,PSUPER,HIDE,CHAR,UNIQUE
FAXG3#             DNOREAD,CHAR,UNIQUE
FAXG3-HEADLINE     CHAR
FAXG3-ID           CHAR
FAXG4              DNO,PSUPER,HIDE,CHAR,UNIQUE
```

```
FAXG4#            DNOREAD,CHAR,UNIQUE
FAXG4-ID          CHAR
GROUP             CHAR,UPPER,PSUPER
GSM               DNO,PSUPER,HIDE,CHAR,UNIQUE
GSM#              DNOREAD,CHAR
ISDNTTX           DNO,PSUPER,HIDE,CHAR,UNIQUE
ISDNTTX#          DNOREAD,CHAR,UNIQUE
ISDNTTX-ID        CHAR
KEYWORD           CHAR
LN                CHAR,UNIQUE,UPPER
MAILBOX           CHAR,UPPER,UNIQUE
MS                CHAR,UNIQUE,UPPER
NAME              CHAR
PASSWORD          CHAR,UPPER,KRYPT,PSUPER,HIDE
PHONE             DNO,PSUPER,HIDE,CHAR,UNIQUE
PHONE#            DNOREAD,CHAR
PIN               CHAR,UPPER,KRYPT,PSUPER,HIDE
PIPE              CHAR
PMI-HOSTNAME      LOWER,CHAR
PMI-PASSWORD      CIPH,CHAR
PMI-SCHEDULE      CHAR
PMI-USERNAME      CHAR
PREFERRED         CHAR,UPPER
PRINTER           CHAR
PRIVFAX           DNO,PSUPER,HIDE,CHAR,UNIQUE
PRIVFAX#          DNOREAD,CHAR
PRIVILEGES        CHAR,UPPER,PSUPER,HIDE
PRIVTEL           DNO,PSUPER,HIDE,CHAR,UNIQUE
PRIVTEL#          DNOREAD,CHAR
REMARK            CHAR
SMS               DNO,PSUPER,HIDE,CHAR,UNIQUE
SMS#              DNOREAD,CHAR
SMTP              CHAR,LOWER,UNIQUE
SPX               CHAR
STAND-IN          CHAR,UPPER
TCPIP             CHAR
VOICE             DNO,PSUPER,HIDE,CHAR,UNIQUE
VOICE#            CHAR,DNOREAD,UNIQUE
ZIP               CHAR
$end
```

In the first portion (`$mask`) the mask layout is first “sketched”. The use of TAB’s is not allowed. The only rule is: the place holders (#-characters) must always follow and be on the same line as the field names.

In the second portion (`$attrib`) an attribute is declared for each field. Possible attributes are:

Attribute	Significance
`CHAR`	All characters are allowed (default). A field with a length of 1 and this attribute is a Checkbox. No characters are entered in this field, but it can be checked, whereby an X is inserted. If this field is non-existent or empty in a users database, it will be considered as being not checked.

Attribute	Significance
CIPH	This field is encrypted. The encryption can be reversed and is used e.g. for POP3 passwords. These fields are un-readable in the database but when required, can be transferred to the POP3 server in a non-encrypted form.
DNO	This field contains a dialing number. All characters other than digits are removed when stored in the database. These entries are also normed to an international format using the global regional settings. Reason: The administrator in the MRS Client, MS Exchange, Lotus Notes, … enters telephone numbers e.g. as (0241) 5432-567. The MRS Servers transforms these to an internationally normed format as 492415432567.
DNOREAD	This field contains a dialing number in a readable form. This entry stored in the database and returned in the manner in which it was entered. Data field names with the attribute DNOREAD should end with a #. A data field with the attribute DNO must also exist with the same data field name, but without the #. When data is entered in the DNOREAD field, a normed form of the data is written to the DNO field. Reason: The address (0241) 5432-567 is e.g. in the field FAXG3#. This field can be comfortably read as well as replicated. Modifications to the address are automatically normed and written in the field FAXG3
HIDE	Additional to PUSER, PSERV or PSUPER. Only users with the same or higher privilege may see this field.
KRYPT	The contents in this field are encrypted.
LOWER	Only lowercase characters.
PSERV	Can only be modified by a user with Service privileges.
PSUPER	Can only be modified by a user with Supervisor privileges.
PUSER	Can only be modified by a user with User privileges.
UNIQUE	The contents of this field must be declared in the database. No two data records exist with the same entry for this field.
UPPER	Only uppercase characters.

2.9 USER, SHORT and PROFILE Database fields of special significance

Whereas the layout of the user and short (alias) database can be customized to fit any application, certain fields should exist that are significant to the MRS Server. In the MRS Server Administration a description of all standard fields for the user and alias databases are given.

- The main key USER or SHORT cannot be specifically defined in the mask. The fields `USER ######` or `SHORT #######` are automatically generated and always stand alone in the first line of the mask.

The following fields are significant in that they are queried by various portions of the server and client:

Field	Significance
`NAME`	User name in plain text.
`PASSWORD`	Encrypted user password.
`PIN`	Encrypted PIN user number for Voicemail-Server.
`LMACCOUNT`	Domain\account for alternative login at the MRS Server via the Windows Account instead of via the MRS password.
`PREFERRED`	Name of the preferred services from the user/short database (e.g. FAXG3). Additionally used as preferred by incoming routing.
`GROUP`	User group name.
`PRIVILEGES`	Bit coded user privileges. In addition to the user privileges for this field are the privileges of the user defined as group `GROUP`. This entry corresponds to the key `USER` in group name. Privileges are currently coded in HEX. The most relevant privileges are Supervisor: `01000000000000000000000000000000` Service: `02000000000000000000000000000000` User: `04000000000000000000000000000000` All: `FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF` Privileges are meaningfully processed through use of a client application such as Communications or the Web Administrator that offer suitable names for each single privilege.

Further field descriptions are found in the *Server Administration.*

2.10 Voicemail Server Fields

More recent voice mail servers support the common database layout given below. These are among others Ergo, Phonemail (from MRS 5.0) and VMS (from MRS 5.1).

2.10.1 Announcement Directory

All announcements recorded by a user or system announcements recorded by an administrator are filed in a subdirectory in the `\\`<*MRS*>`\userdata` structure. Different voice mail systems can thus use a common or an individual directory each. Via the following entry in the correlation database the setting:

DOMAIN	CLASSNAME	CLASS	KEYNAME	KEY
<*Server*>/$SYSTEM	VM_FOLDERS	USER_DATA_SUB_FOLDER	<*Protocol Name*>	<*Folder*>

is performed. <*Protocol Name*> corresponds to the name of the voice mail server used and <*Folder*> corresponds to the subdirectory related to`\`<*MRS*>`\userdata`.

Through use of the protocol name instead of the script name a script could even be installed several times with a different protocol name and individual directories for recording could be assigned each. The default folder for all voice mail systems can be allocated via the following entry:

DOMAIN	CLASSNAME	CLASS	KEYNAME	KEY
<*Server*>/$SYSTEM	VM_FOLDERS	USER_DATA_SUB_FOLDER	#DEFAULT	<*Folder*>

If this entry is not present, voice mail servers without individual directory should use the `vmdata` default directory.

So that administative software such as the WebAdmin files a user's recording in the correct directory, the user needs to be assigned to a specific voice mail system. This is done via the following entry:

DOMAIN	CLASSNAME	CLASS	KEYNAME	KEY
<*Server*>	USER	<*User ID*>	VM_PROTOCOL	<*Protocol Name*>

2.10.2 Access Security

The PIN database field serves as default. Further options can be released here as well. They require regular PIN modification of save several PINs already used so that these cannot be immediately used again.

To activate checking older PINs already used, the following database entry must be present:

DOMAIN	CLASSNAME	CLASS	KEYNAME	KEY
<Server>/$SYSTEM	VM_PIN_UPDATE	*<Protocol Name>*	VM_STORE_PINS	*<Number of PINs>*

<Number of PINs> corresponds to the number of PINs previously used and to be saved. If this value is 0, the function is inactive. This corresponds simultaneously to the default of this value.

If a value *<Number of PINs>* were greater than 0, database entries VM_PIN_01 to VM_PIN_*<Number of PINs>* would be generated for each user for encoded saving of PINs previously used. If a newly entered PIN were identical with one of the PINs used, it would not be accepted.

The date of the last modification to a user's PIN database entry is set down in the following value:

DOMAIN	CLASSNAME	CLASS	KEYNAME	KEY
<Server>	USER	*<User ID>*	VM_PIN_UPDATED	*<Date>*

<Date> corresponds to date and time in the format YYYY-MM-DD-HH-MM.

So that this entry is evaluated and a PIN expires after a certain number of days, the following database entry must be present:

DOMAIN	CLASSNAME	CLASS	KEYNAME	KEY
<Server>/$SYSTEM	VM_PIN_EXPIRE	*<Protocol Name>*	VM_EXPIRE_DAYS	*<Number of Days>*

<Number of Days> corresponds to the number of days after which a PIN becomes invalid. With a value greater than 0 a PIN is considered invalid when the current date has exceeded the date entered for VM_PIN_UPDATED by *<Number of Days>*. If VM_EXPIRE_DAYS is 0 or not entered in the database, a PIN never expires.

Note that older clients do not know this mechanism, thus the PIN could be modified without updating the list of previous PINs and without updating the modification date.

2.10.3 Announcement and Name Recording

In the following database entries the greetings recorded by users are stored in the file specified in the KEY database field:

DOMAIN	CLASSNAME	CLASS	KEYNAME	KEY
<Server>	USER	*<User ID>*	VM_ANNOUNCE_*<XX>*	*<User ID>*_ANN_*<XX>*_*<Y>*.pcm

No statement about the use of the respective VM_ANNOUNCE_<*XX*> (example: VM_ANNOUNCE_01) is given since the context (example: info, greeting) is exclusively defaulted by the respective voice mail system.

The <*Y*> in the file name is required for re-recording an old announcement and replacing a current one while it is still played to callers of the voice mail system. The procedure within a voice mail system should be the following:

1. Current recording be MARKUS_ANN_01_7.pcm.
2. Determine the current value for <*Y*>, here thus 7, from the database.
3. Record new announcements in a temporal file and simultaneously enhance <*Y*> by 1.
4. Rename the temporal recording in MARKUS_ANN_01_8.pcm and file the corresponding store directory underneath of \\userdata.
5. Try to delete all older announcement versions probably available with the file names MARKUS_ANN_01_<*n*>.pcm except for MARKUS_ANN_01_8.pcm.

With name recordings proceed in the same way with the exception that the file name for the recording is stored in the following database field:

DOMAIN	CLASSNAME	CLASS	KEYNAME	KEY
<*Server*>	USER	<*User ID*>	VM_NAME	<*User ID*>_NAME_<*Y*>.pcm

2.10.4 System Recordings

If a recording/announcement record is to be commonly used for all users, a virtual user with ID SYSTEM is used. If this user account does not exist it is automatically generated by the voice mail system.

2.10.5 Deputy Numbers

A deputy number is a telephone number that can be specified by the voice mail system user. This number may serve as individual operator, thus can be for example a deputy within the same department. An announcement of the type “I'm currently not in the office, press '*' to talk to my deputy.“ would inform and enable the caller to connect to the deputy. Depending on e.g. time profiles various deputy numbers could be set for different periods.

DOMAIN	CLASSNAME	CLASS	KEYNAME	KEY
<*Server*>	USER	<*User ID*>	VM_DN_<*XX*>	<*Number*>

2.10.6 Notification Numbers

A notification number can be configured by the voice mail user, so that he/she is called by the voice mail system when a new message has arrived. The voice mail system must have a corresponding feature ("User Outcall") for this purpose.

DOMAIN	CLASSNAME	CLASS	KEYNAME	KEY
<Server>	USER	*<User ID>*	VM_NN_*<XX>*	*<Number>*

Do not confuse this feature with "Message Waiting Indication (MWI)" on page 84.

2.10.7 Time Profiles

Time profiles can be defined user-based so that for each user different settings can be performed. Several time profiles can be defined per user. The name of the currently active time profile is filed in the VM_TIMEPROFILE database field.

DOMAIN	CLASSNAME	CLASS	KEYNAME	KEY
<Server>	USER	*<User ID>*	VM_TIMEPROFILE	*<Profile Name>*

The *<Profile Name>* is freely selectable with the exception that it must not begin with the # character. Names beginning with this character are reserved for day profiles (see below).

Time Profile Structure

Time profiles define for each instance a status from date and time. For example a company could have a time profile in which from Monday to Friday the working hours stretch from 9:00 a.m. to 5:00 p.m. each. At all other times the company is closed. Thus Tuesdays at 10:00 a.m. the status would be WORKING, and during the whole Sunday NONWORKING.

The MRS Server differentiates two types of time profiles, **Day Profiles** for single days and **Calendar Profiles** that reference exactly one day profile for each day.

Day Profiles for voice mail systems are filed in the correlation database in the following manner:

DOMAIN	CLASSNAME	CLASS	KEYNAME	KEY
<Server>/$VM/*<User ID>*	VM_TIMEPROFILE	#*<Day Profile>*	*<From>*-*<To>*	*<State>*
<Server>/$VM/*<User ID>*	VM_TIMEPROFILE	#*<Day Profile>*	OTHERWISE	*<State>*

<Day Profile> is the name of the time profile that must begin with the # character.

<From>-*<To>* are start and end time in the format hhmm each.

<*State*> is a string which states the valid voice mail system behaviour for this time interval. The behaviour contains among other things: active announcement for internal and external callers as well as whether recording is possible at the time being or whether only an informal announcement is played.

The following <*State*> definitions are presently possible, each with <*Token*>=<*Definition*>. Several settings are separated by the | character:

Token	Definition/Description
AA	<*Alternative Announcement*>IUS Number for an alternative announcement with the additional, optional flags infobox (I), non-interruptable announcement (U) or system announcement (S). The number corresponds to the <*XX*> as occurs with announcement entries, see "Announcement and Name Recording" on page 72.
BA	<*Busy Announcement*>IUS Announcement number when the telephone was busy, with the additional, optional flags infobox (I), non-interruptable announcement (U) or system announcement (S).
IA	<*Intern Announcement*>IUS Announcement number for internal callers with the additional, optional flags infobox (I), non-interruptable announcement (U) or system announcement (S).
EA	<*Extern Announcement*>IUS Announcement number for external callers with the additional, optional flags infobox (I), non-interruptable announcement (U) or system announcement (S). If flag S were set, the corresponding announcement of the user account SYSTEM would be taken, otherwise the user's individual one. If flag I is not set, a voice mail can be recorded after an announcement. If flag U is not set, announcement playback can be interrupted by a caller. This is only considered useful when flag I is not set either. **Priority:** The announcement types are implicit in the sequence of their priority. AA before BA before IA/EA. This means that if AA is defined, this announcement is always used, independent from the type of caller or whether he/she has received a busy tone. Otherwise BA, IA or EA is used depending on the situation.

Token	Definition/Description
NN	*<Notification number>* Index number of the database field which is to be used for a call when new messages come in (User Outcall) (see “Notification Numbers” on page 74).
DN	*<Number of Deputy>* Index number of the database field which is used for forwarding to a deputy or individual operator (see “Deputy Numbers” on page 73).

Time profiles can overlap each other with the later one being preferred. Intervals must never exceed midnight or completely contain another one. Thus the intervals `0000-0900` and `0900-2359` would be legal with the minute from 9:00 to 9:01 belonging to the second interval, whereas the intervals `0000-2359` and `0900-1000` are not permitted. Using `2400` for the end of day is legal but not recommended.

If the current time is not contained in one of the defined day profiles, the *<State>* given in the `OTHERWISE` entry applies. If this entry does not exist, an empty *<State>* definition applies for all times outside the defined intervals.

Calendar Profiles are filed in the correlation database in the following manner:

DOMAIN	CLASSNAME	CLASS	KEYNAME	KEY
<Server>`/$VM/`*<User ID>*	VM_TIMEPROFILE	*<Profile Name>*	*<Day>*	*<Day Profile>*

<Profile Name> is the time profile name, *<Day>* is the definition of the day(s) for which this entry applies and *<Day Profile>* is the name of the day profile that is to be used for these days.

<Day>, sorted according to the precedence sequence, can be

- a single date, such as `20010225` for 25 February 2001.
- the same day in each year, such as `0225` for 25 February in each year.
- the same day in each month, such as `D25` for the 25th of each month.
- one day of a week, abbreviated by the first two letters, thus for example `SU` for Sunday.
- `OTHERWISE` for all days not defined by another entry.

Thus the database entries might appear as follows:

DOMAIN	CLASSNAME	CLASS	KEYNAME	KEY
COMPANY/$VM/JOE	VM_TIMEPROFILE	#NWDAY	0000-2359	IA=0I|EA=11I
COMPANY/$VM/JOE	VM_TIMEPROFILE	#WDAY	0000-0900	IA=0IU|EA=0I
COMPANY/$VM/JOE	VM_TIMEPROFILE	#WDAY	0901-1230	IA=1|EA=0|NT=B|DN=1

DOMAIN	CLASSNAME	CLASS	KEYNAME	KEY
COMPANY/$VM/JOE	VM_TIMEPROFILE	#WDAY	1231-1300	IA=1I|EA=2I
COMPANY/$VM/JOE	VM_TIMEPROFILE	#WDAY	1301-1700	IA=0|EA=11|NT=B|DN=1
COMPANY/$VM/JOE	VM_TIMEPROFILE	#WDAY	1701-2359	IA=0I|EA=11I
COMPANY/$VM/JOE	VM_TIMEPROFILE	JOES PROFILE	SA	NWDAY
COMPANY/$VM/JOE	VM_TIMEPROFILE	JOES PROFILE	SU	NWDAY
COMPANY/$VM/JOE	VM_TIMEPROFILE	JOES PROFILE	OTHERWISE	WDAY

The name of the time profile to be used is in this example JOES PROFILE.

2.10.8 Privileges

For some voice mail systems specific privileges were required that could not be handled via the MRS default privileges. These are represented in a <*String*> via capital letters.

DOMAIN	CLASSNAME	CLASS	KEYNAME	KEY
<*Server*>	USER	<*User ID*>	VM_AUTH_CODES	<*String*>

Common users should not be permitted to modify this value but only those with supervisor privilege or with a privilege code to be correspondingly defined. At present no voice mail system uses this feature.

2.10.9 User Options

For some voice mail systems specific options can be set on user level. These are represented in a <*String*> via capital letters.

DOMAIN	CLASSNAME	CLASS	KEYNAME	KEY
<*Server*>	USER	<*User ID*>	VM_USER_OPTIONS	<*String*>

The following letters are presently allocated and used by the voice mail system specified:

Letter	Description	Voice mail system
A	Short prompts are used for this user	PhoneMail
B	Fax Tone Reception OFF for this user	PhoneMail
C	Simple mode OFF for this user (prof. mode)	ERGO
D	User defined inbox sorting ON	ERGO

Letter	Description	Voice mail system
E	User defines message filtering ON	ERGO
F	User can mark message as confidential	ERGO
G	User can mark message as urgent	ERGO
H	Auto playback deactivated	ERGO
I	Mark message read flag after complete body play-back (otherwise at start)	ERGO
J	Instant delete (without confirmation)	ERGO
K	Disable reading subject of email	
L	Automatic Speech Recognition (ASR) enabled	ERGO
M	User accessable via cell phone	
N	Use message assistant menu in forward access	ERGO
P	Suppress option ’To reach the attendant dial 9’.	VMS

2.10.10 Specific Hicom PBX Fields

The fields described here are only considered useful in an environment with Hicom PBXs:

DOMAIN	CLASSNAME	CLASS	KEYNAME	KEY
<*Server*>	USER	<*User ID*>	VM_HI_PIN	<*Hicom PIN*>
<*Server*>	USER	<*User ID*>	VM_HI_DSP_NAM	<*Display Name*>

The <*Hicom PIN*> is a string filed uncoded and used e.g. by the VMS voice mail system.

The <*Display Name*> is used alternatively to the NAME field for filing and representing a name on the Hicom PBX display that is contracted according to the short display.

2.10.11 Login Informationen

These entries in the user database can be used to check whether a mailbox is still active. Inactive mailboxes could then be deleted after a certain period.

DOMAIN	CLASSNAME	CLASS	KEYNAME	KEY
<*Server*>	USER	<*User ID*>	VM_LAST_LOGIN	<*Date*>
<*Server*>	USER	<*User ID*>	VM_LOGIN_FAILED	<*Count*>

In <*Date*> the date of the last login to the voice mail server is filed so that a script or maintenance task may evaluate it and thus perform automatic deletion. The format is YYYY-MM-DD-HH-MM.

In <*Count*> the number of failed attempts during the last login are recorded. This field can be used to block access to the voice mail server after reaching a fixed maximum number of attempts. A voice mail server should issue a corresponding error message or warning when a user reaches the maximum number.

2.10.12 Filter Rules

Via these rules that each user can configure for themselves, messages offered per TUI via the voice mail system can be restricted. Since the MRS database allows a maximum number of 63 characters in KEY, the rule from VM_FILTER_01 is continued in VM_FILTER_02, etc. The final rule results from the complex rule consisting of all VM_FILTER_<*XX*> user ommands:

DOMAIN	CLASSNAME	CLASS	KEYNAME	KEY
<*Server*>	USER	<*User ID*>	VM_FILTER_<*XX*>	<*Filter Rule*>

The single rules are logically linked by "||" (Or), "&&" (And) whereby the And-link is evaluated before the Or-link. The following filter rules are currently defined:

Rule	Operations	Possible Values
SERVICE	==, !=	NATIVE, SMTP, SMS, VOICE, FAXG3, FAXG4
IMPORTANCE	<, <=, ==, !=, >=, >	LOW, NORMAL, HIGH
FORMAT	==, !=	Bitmask
READ	==, !=	0 or 1 (read)
FLAGGED	==, !=	0 or 1
RECEIVE_DATE	<, <=, ==, !=, >=, >	<*Date/Time*> (Format: YYYYMMDDHHMMSS)
SEND_DATE	<, <=, ==, !=, >=, >	<*Date/Time*> (Format: YYYYMMDDHHMMSS)
FROM_ADDR	==	<*MRS Address*>
REPLY_ADDR	==	<*MRS Address*>
TO_ADDR	==	<*MRS Address*>

Example

```
VM_FILTER_01="SERVICE!=VOICE&&SERVICE!=FAXG3&&READ==0||SERVICE==VOICE"
```

All voice messages and new (unread) e-mails are offered to this user via the TUI.

2.10.13 Message Folder

If users use folders and only specific folders with messages are to be offered via the TUI, these folders can be defined here:

DOMAIN	CLASSNAME	CLASS	KEYNAME	KEY
<Server>	USER	*<User ID>*	VM_FOLDER_COUNT	*<Number of Folders>*
<Server>	USER	*<User ID>*	VM_FOLDER_*<XX>*	*<Folder Name>*

In *<Number of Folders>* the number of folders supported by the TUI is filed, in VM_FOLDER_01 etc. store the name of the respective folder. If no message folders have been configured, only the INBOX folder is offered in each case. If other folders are to be offered as well, do not forget to configure the INBOX folder, too.

Example

```
VM_FOLDER_01=INBOX
VM_FOLDER_02=MySpecials
VM_FOLDER_COUNT=2
```

The INBOX and MySpecials folders are offered per TUI.

2.10.14 Sequence of Offered Messages

A user can set the sequence in which messages are offered per TUI via the rule specified here. The corresponding WebAdmin function should be used.

DOMAIN	CLASSNAME	CLASS	KEYNAME	KEY
<Server>	USER	*<User ID>*	VM_SORT_ORDER	*<Sort Order Rule>*

Sorting Criterium	Operations	Possible Values \src\shared\inc\mrsUMAttr.h
SERVICE	+ == (VOICE, FAX, EMAIL), - == (VOICE, FAX, EMAIL)	a_service
IMPORTANCE	+, -	a_importance
FORMAT	+, -	a_msgformat
READ	+, -	a_read_flg
FLAGGED	+, -	a_flagged_flg
RECEIVE_DATE	+, -	a_receive_date
SEND_DATE	+, -	a_send_date
FROM_ADDR	+, -	a_from_addr

Sorting Criterium	Operations	Possible Values \src\shared\inc\mrsUMAttr.h
REPLY_ADDR	+, -	a_reply_addr
TO_ADDR	+, -	a_to_addr

2.10.15 Trusted Phone Devices

If the voice mail server is called in control mode via one of the numbers set here (not more than 3), the PIN is not queried. These numbers can be configured by users themselves. Each configured number must be unique and thus a check must be performed as to whether it is already present before a trusted number is entered in the database.

DOMAIN	CLASSNAME	CLASS	KEYNAME	KEY
<*Server*>	USER	<*User ID*>	VM_TN_01	<*Phone Number*>
<*Server*>	USER	<*User ID*>	VM_TN_02	<*Phone Number*>
<*Server*>	USER	<*User ID*>	VM_TN_03	<*Phone Number*>

<*Phone Number*> is a normalized telephone number. This feature is presently supported by e.g. Ergo.

2.10.16 Fax and Print Devices

If a voice mail system supports e-mails and fax messages, an output device for such messages is required as well. Therefore the following database fields are intended for an internal fax device, an external fax device and a printer:

DOMAIN	CLASSNAME	CLASS	KEYNAME	KEY
<*Server*>	USER	<*User ID*>	VM_FAX_INT	<*MRS Address*>
<*Server*>	USER	<*User ID*>	VM_FAX_EXT	<*MRS Address*>
<*Server*>	USER	<*User ID*>	VM_PRINTER	<*MRS Address*>

Example

```
VM_FAX_INT = NVS:FAXG3/49123498765
VM_FAX_EXT = NVS:FAXG3/49432156789
VM_PRINTER = NVS:PRINTER/QMS
```

2.11 Distributed MRS Server

The MRS server was designed with the concept that all components could be distributed over various nodes.

There are two different methods of installation:

- Secure with NT-Security
- without Security

The following steps should be followed:

For a secure installation all services with an account must be started since the default system account has no access to the network. This account must have the privilege `LogOnAsService` and network access authorization. A service is assigned to an account through the Service Control Manager.

For an installation without NT Security, MRS services are not assigned accounts. All pipes and shares are automatically installed as Nullsession-Shares/Pipes. These are found in the

```
HKEY_LOCAL_MACHINE\System\CurrentControlSet\Services\
   LanmanServer\Parameters
```

under the *Value*s `NullSessionShares` and `NullSessionPipes`. The path to the folder and to the resource directory must be entered using UNC notation in the registry. The necessary shares may need to be installed as well as e.g. the `FolderDirectory=\\`<*Computer*>`\FOLDERS` if the complete directory `MRS\Folders` is released under the share name `FOLDERS`. The share name must then be entered in `NullSessionShares`.

Under the *Key*

```
HKEY_LOCAL_MACHINE\Software\PP-COM\MRS\Services
```

in the *Values* **Kernel** and **Access Protocol Layers** the names of the computer are given, from where the service is started. Service and name must also be separated by a comma. There must be at least one instance of `NameLoc` for each NT server that is started. Therefore, numerous lines with `NameLoc`, whereby the corresponding NT server name appears behind the comma.

Kernel REG_MULTI_SZ

Example:

```
NameLoc,NTSERVER1
NameLoc,NTSERVER2
XmrSvc,NTSERVER1
InfoStor,NTSERVER1
MTA,NTSERVER1
```

Access Protocol Layers REG_MULTI_SZ

Example:

MailApl,NTSERVER1
PipeApl,NTSERVER2
…

The *Key*

`HKEY_LOCAL_MACHINE\Software\PP-COM\MRS\MRS Globals`

must be manually reproduced on all participating computers. This *Key* contains all the information that must be known for all MRS operations. The `NameLoc` can be started on the satellite system in the following manner:

`NameLoc addnode -kernel=`<*Kernel-Computer*> `-dir=`<*Path*>

The MRS Server on the kernel computer must be running at this time! <*Kernel-Computer*> is the Windows NT name of the kernel computer. <*Path*> is the absolute path to the MRS System on the satellite system. At this time, all preexisting satellite systems are updated with the current version of the registry.

The directory tree <*MRS Root*>`\Res` must be manually reproduced on all participating servers in order to achieve an acceptable performance. Currently the `MRS\Res` contains only static files. Later this will occur automatically.

The corresponding APL configuration (as well as the NT Part under `HKEY_LOCAL_MACHINE\System\CurrentControlSet...`) and the MRS portion need only exist locally on the corresponding computer.

2.11.1 Firewalls between Nodes of a Distributed MRS

The following points should be observed if a distributed MRS Server is to be configured so that individual Nodes communicate across a firewall:

- TCP/IP must be used as the communications protocol. All other network protocols should either be completely removed from all MRS Nodes or it should be insured that only bindings to WINS (TCP/IP) are enabled.
- Make sure that nodes "see" one another, i.e. that net view \\nodename works from all nodes to all nodes. The LMHOSTS file may have to be used to accomplish this.
- The firewall must accept and forward request packets and the respective reply packets from node to node on the following destination ports:

  UDP 137 (nbname)
  UDP 138 (nbdatagram)
  TCP 139 (nbsession)
- Any other ports are not needed by NT or MRS for internal communication. For the use of the SmtpApl or TcpApl across a firewall, the respective ports must, of course, not be blocked.

2.12 Remote System Link with a NVS 2.20 Server

For Remote System Links to a NVS 2.20 Server, the following settings are required by the MRS Server under the *Key*

`HKEY_LOCAL_MACHINE\Software\PP-COM\MRS\MTA\`
`RemoteSystemLinks`

GlobalLink=`0`
AutoBiDirectionalLinks=`0`
ReportEncapsulation=`0`
LinkList=`NVS:TCPIP/`<*Hostname_of_QNXServer*>`;Csync=60,15`

The TCP/IP protocol should be used. Remote System Links to NVS versions earlier than 2.20 are possible with limited functionality but not supported.

Configuration of the NVS 2.20 Server:

The file `NVS.INI` is modified in the following sections:

```
[TCPIP]
...
GateRout1=NVS:TCPIP/<Hostname>;Csync=3600,15;
   Prot=NVS:<MRS Systemname>
...
[MAILGATE]
...
Rout2=NVS:<QNX Systemname>;SF,OUT,IN,GLOBAL;10;*
...
```

Remote System Links are displayed in the MRS Monitor as sub lines of the corresponding Transport APL.

2.13 Message Waiting Indication (MWI)

Through the use of CIT, incoming user messages are signaled over the telephone. This is accomplished either by sending a *Message Waiting Signal* (MWI) through the PBX or through routing as an SMS message.

The configuration is performed under the MTA configuration dialog in the MRS Monitor.

In order to be able to set a CIT signal, the MTA requires certian database fields from the user, for whom the *Message Waiting Signal* is to be set. The user must also be granted the appropriate privileges. The required database fields are `CIT_`<*Service*> and `CIT`.

When the signal is to be set, the MTA queries the database for the existence of the field `CIT_`<*Service*>, over which the incoming message is delivered. For the service Fax

G3 this would be the database field CIT_FAXG3. If this database field is missing or not filled in for the user, the database field CIT would be checked. If this field contains the required delivery information the signal would then be set.

As a prerequisite the user must have been granted privileges for CIT_<*Services*>. For e-mail services the privilege CIT_EMAIL is required. Through use of the privileges it can also be determined no Message Waiting Signal is to be set. Simply revoke the users privilege for the corresponding service.

Resetting the signal is also accomplished through the use of database fields. The fields XCIT and CIT are used for this purpose. As with signal setting the field XCIT is first checked and when empty the CIT field subsequently queried.

Signal sending Examples

- A FAXG3/23423 for user Mayer is received. The kernel will try to determine from the database field CIT_FAXG3 from user Mayer, the address to which the CIT signal is to be routed.

  If this address exists, then a message in the form of „Fax G3 from 234323 received" will be sent. If this field does not exist, then a field with the entry CIT will be searched for, and the message sent to the corresponding address.

  If the contents of CIT_FAXG3 or CIT contains a service (or a reference to another database field e.g. VOICE) would this field also be read in order to construct a complete address. If the entry has the form NODE/USER e.g. VOICE/33432 then this will be used to construct the CIT address.

  In addition to the existence of an address, the user must have the CIT_<*Service*> privilege set for the service in the user database. In the event the privilege is not set, then no message will be sent. In our example user Mayer requires the privilege CIT_FAXG3.

- User Mayer has all CIT privileges. Mayer receives a fax from FAXG3/2343223,which is rerouted from the MTA to NVS:NODE/MAYER.

  Entries from the user database Mayer:

  ```
  USER    MAYER
  CIT     SMS/0172234323
  ```

  It therefore follows, that Mayer receives a SMS message for every incoming message.

  Similar is the reference in the SMS field for a mobile telephone number:

  ```
  USER    MAYER
  CIT     SMS
  SMS     0172234323
  ```

  Here Mayer also receives a SMS message for each incoming message.

- A fax from FAXG3/2343223 is received for NVS:NODE/MAYER. User Mayer has in the database the following entries:

  ```
  USER         MAYER
  CIT_VOICE    SMS/0172234323
  CIT          CIT_BASIC/23432
  ```

  Mayer receives a SMS message for every incoming Voice-Message. All other incoming messages initiate a Hicom CIT signal.

  The SMS protocol and Hicom triggering must be installed through the V24APL.

Examples of signal resetting

- Mayer has read all fax documents received and the CIT signal should now be reset. The kernel attempts to ascertain from the database the address XCIT. If this address exists, then the message "CIT_OFF" is sent to the database field XCIT. In the event the database field does not exist, a search is made for the field CIT where the message finally is sent.

  The address that is formed from one of the two possible database fields is treated in the same manner as those by the setting of CIT. As by the setting of CIT, the corresponding authorities must also be given here.

Attention

Individual services that are by default configured so that *no* CIT_OFF is sent are found in the registry. Normally the transmission of a CIT_OFF to e.g. SMS or Voice is meaningless except in the case of D-Channel CIT. Here VOICE must then be taken from the list in the *Value* NoCitOffSignal for the specified service under

```
HKEY_LOCAL_MACHINE\Software\PP-COM\MRS\MTA\CIT
```

- Mayer has all CIT privileges and reads the mail. Data base entries are:

  ```
  USER    MAYER
  CIT     SMS/0172234323
  ```

  Mayer becomes NO CIT_OFF message because NoCitOffSignal is defined under SMS.

2.13.1 Counter Based CIT

Counter based CIT differentiates itself from the previously described CIT in that MRS caches the number of new messages that have not been read in the database field NEWMSGS. The CIT signal is reset only when this number returns to 0.

To switch on the counter based CIT the configuration dialog for the MTA must be opened in the MRS Monitor. In the tab **Advanced** should be selected and subsequently

the button **CIT Cache**. In this dialog the option **CIT reset when all messages are read or deleted** must be activated.

2.14 Quotas

Quotas are normally used to restrict the amount of resources (harddisk storage space) available to the user. Access to resources are denied when the user attempts to use resources in excess of those allotted. There is also a conceptual difference between quotas used on a File Server and those on a Mail Server.

Users on a Mail Server have only a limited control of how resources allotted to them can be used. The actions of the user (transmit message) as well as those actions of other users (receive messages), influence the users allotted resources. It is therefore possible that users may be denied transmission privileges when either a large number of messages, or several large-sized messages are found within their mailbox.

2.14.1 How do Quotas Function?

Two database fields are used; `QUOTA` and `QUOTAUSED`. The allocated amount of resources is given in the field `QUOTA`. An entry of zero indicates an unrestricted amount of resources. The field `QUOTAUSED` contains the amount of resources currently in use. When transmission attempt is made the sum of the message size and the amount in the field `QUOTAUSED` are compared with the amount in `QUOTA`. If the sum is greater than the amount in `QUOTA` the message will not be transmitted. As soon as the user actively deletes previously sent or received documents and reduces the amount in `QUOTAUSED` can the new document be transmitted. Message receipt is always possible.

`QUOTAUSED` is not modified through the transmission or receipt of messages. This occurs when the maintenance task `QUOTA` is call, so that allowances can be made for modifications made by other maintenance tasks. An active updating of `QUOTAUSED` would greatly reduce the speed at which numerous automatic deletion operations are executed. Therefore, `QUOTAUSED` does not always reflect the absolute amount of used resources.

2.14.2 Activating Quotas

To activate the quotas select the MTA Configuration dialog from the MRS Monitor. In the configuration tab **Advanced**, the option **User Quota checking** should be activated. When required, transmitted documents can also be added to the quotas.

Secondly, these two fields must be added to the database templates PROFILE and USER. Examples for this can be found in the section *User Database Adaptations* on page 347ff.

```
QUOTA      ############
QUOTAUSED  ############
```

With the attribute:

```
QUOTA         CHAR,PSUPER
QUOTAUSED     CHAR,PSUPER
```

In the field `QUOTA` the number of resources in bytes is allocated, whereas `QUOTAUSED` displays the number of bytes used.

2.15 Transactions

The Store-and-Forward resp. Dialog techniques previously used in MRS Servers had a distinctive disadvantage in that no “fast” communication was available between the various APL’s, unless first passing through the MTA. For this reason the MRS Transaction-Protocol was developed. This protocol allows “fast” communication APL’s without going through the MTA. APL’s are either a Transaction Provider or use the Transaction Services (Transaction Client).

Generally a standard set of transactions is available so that the same function is available regardless of the various hardware types, and without reconfiguring the Software Client.

2.15.1 Examples of Transaction Services

Computer Telephony Integration (CTI)

Transaction	Usage
`AGENT`	User status by ACD-applications.
`ALTERNATE`	Alternates between hold and connected states.
`ANSWERCALL`	Answers incoming call.
`CONFERENCE`	Conference call setup.
`CONSULTATION`	Sets active connection to hold and sets-up new call.
`DEFLECT`	Reroutes an incoming call to another device.
`DISCONNECT`	Disconnect.
`DISTURB`	Activates/deactivates “Do not Disturb” feature
`DIVERSION`	Activates device rerouting.
`FORWARD`	Blind transfer of a call to another device.

Transaction	Usage
HOLD	Hold.
MONITOR	Sets monitor point.
PHONECALL	Outgoing call set-up.
PHONESTATE	State request from a telephone device.
PHONETYPE	Device type e.g. Switchboard.

2.16 Server based Computer Telephony Integration (CTI)

CTI applications require access to telephony functions and databases. These functions are provided by the MRS Transactions Protocol. If existing CTI applications are to use the MRS Server as a basis, an APL must be implemented which translates CTI queries into a MRS Transaction Client query so that Transaction provider APL's can be called.

An existing transaction provider for CTI is for example the CTI APL which can be implemented with various PBX systems through the use of standard protocols (see page 309), the Hicom APL (see page 303) with its standard protocols, or the ISDN APL which offers limited CTI functionality through its "Supplementary Services".

Every CTI transaction provider reports a logical line NVS:CTI to the kernel which can be differentiated the their CLASS. Which transactions are possible with the various PBX systems is dependent upon the individual system. Every developer of CTI Client applications defining CTI transactions can refer to a list in the Knowledge Base indicating PBXs with which these transactions have been tested successfully.

2.17 Watchdog Processes

Locked-up or failed MRS Services can be restarted through use of the Watchdog processes. The Watchdog is integrated in the MRS.EXE program and continuously monitors all MRS Services within a distributed MRS System. In the event of e.g. memory protection fault by a service, the Watchdog will automatically attempt co correct the error.

To activate the Watchdog service the MTA configuration dialog should be selected in the MRS Monitor. In the Automatic Maintenance tab the Watchdog button should be selected and the option "Monitor NT services - automatically restart on failure" selected. Automatic monitoring of the system should begin within the next 30 seconds.

The standard 'Windows NT configuration does not immediately terminate a process due to an exception error. Instead, a dialog box is displayed informing the user of the

error. During this time the failed process is still resident in the memory and the Watchdog prohibits restarting of the process until confirmation by the user has been given.

So that the Watchdog can function properly, the user consideration must be switched off. This is done by deleting the value `Debugger` (after making a backup) in the registry key:

```
HKEY_LOCAL_MACHINE/Software/Microsoft/Windows NT/
  Current Version/AEDebug
```

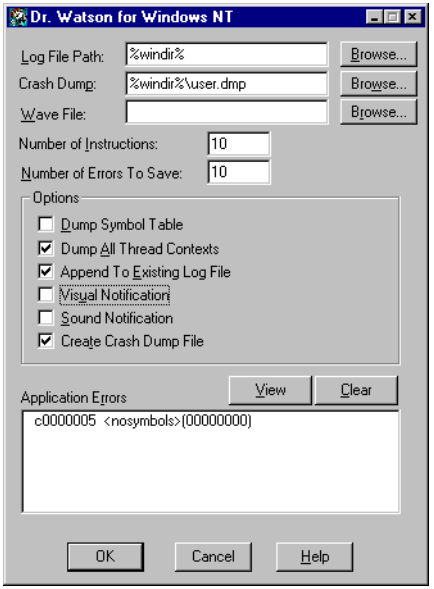
Now call-up

`drwtsn32 -i`

to install Dr. Watson.

Subsequently, the Dr. Watson configuration is called-up using `drwtsn32`.

The **Visual Notification** should be deactivated in this dialog. The Windows NT Service Pack 4 should now be installed since earlier Service Pack versions have problems with the suppression of error messages.



2.17.1 How the Watchdog functions

The Watchdog monitors the NT Services Control Manager on all computers within MRS Systems. Distributed MRS Systems are also monitored by the Watchdog.

For this purpose all processes that are automatically started by the MRS Service are included in the Watchdog monitoring. Also those processes that could not be started upon booting the MRS Server can be monitored at a later time after they have been started manually. This could be the case with a distributed MRS Server with the APL s on the non-kernel computers.

If an error occurrence is reported by an APL, the MRS Administrator will attempt to restart the APL up to ten times within an hour. In the event of an error occurring more than ten times in an hour, the Watchdog will no longer attempt to restart the APL and removes it from its list of services to be monitored.

If a kernel module should crash the complete MRS Server will be restarted. Three attempts will be made by Watchdog within a one hour period to restart the server. If more than three crashes occur within an hour the Watchdog will no longer try to restart the server.

To allow a cluster system (e.g. MSCS or VINCA) sufficient time to correct a problem itself, a waiting period can be configured before the APL or the MRS Server attempts a restart. The registry values `WatchdogRetryDelay` and `WatchdogRestartSystemDelay` (see on page 113) are used for this purpose. Furthermore the maximum number of reboot attempts can be configured via MaxRetries (see on page 114).

If the error is corrected within the waiting time e.g. corrected by the Cluster Administrator, the Watchdog would not be activated.

2.17.2 Watchdog Configuration

If an error is recognized, the Watchdog takes from the value in the registry key

`HKLM\Software\PP-COM\MRS\Services\Recover-`<*Service-Name*>

a list of commands that are to be executed prior to restart of the service. If the service is not found on the kernel machine, the value `Recover-`<*NT-Computername*> <*Service-Name*> is used.

If for example the Dialogic driver is to be shut down prior to the restart of the Dialogic APL so that it can also be restarted (done automatically by the Dialogic APL if running), the value (REG_MULTI_SZ) must be created

`HKLM\Software\PP-COM\MRS\Services\Recover-DlgApl`

containing:

```
net stop Dialogic
```

This command shuts down the Dialogic service prior to the restart of the Dialogic APL. Further commands may also be entered on a separate line.

If a kernel module should crash, command lines are executed from two registry entries: `Recover-`<*Service-Name*> and `Recover-Kernel`.

If the MTA should crash the command `Recover-MTA` must be executed first followed by the command `Recover-Kernel` before the complete MRS Server can be restarted.

2.17.3 Switching the Watchdog Temporarily Off

If services are manually stopped, they are normally restarted automatically by the Watchdog. However, through the use of the command “net pause mrs” and resp. “net continue mrs”, the watchdog can be temporarily stopped and restarted. The global settings of the MTA configuration are not affected by these actions, and can only be permanently shut-down from there. When shut-down temporarily, the Watchdog will always be automatically restarted when the MRS Server is restarted.

2.18 Speech Syntheses (SAPI)

In addition to the Text-to-Speech module from Lernout&Hauspie the MRS Server also supports the standardized Microsoft interface Speech API for speech syntheses. If a Text-to-Speech program which conforms to SAPI standards is installed and the appropriate license keys are present, text messages could be converted to a voice format and read over the telephone.

The configuration of the feature is done through the MTA configuration in the MRS Monitor.

2.19 Groups

Prior to MRS 5.1, groups were used to administer privileges in the user database. With MRS 5.1 a new group concept has been implemented, which allows more flexibility in their use. In addition to the previous group administration, new groups can now be used for Distribution Lists, Access Control Lists, Automatic Call Distribution group definitions for use in Call Center applications, etc.

Groups can consist of members and attributes. Group attributes, in reference to the group are global, and a member can be anyone from a MRS User account. Groups may also be hierarchically defined, thus containing other groups.

2.19.1 Correlation Entry Syntax

DOMAIN	CLASSNAME	CLASS	KEYNAME	KEY
<*Domain*>	GROUP	<*Groupname*>	<*Unique-id*>	<*Member*>
<*Domain*>	GROUPATTR	<*Groupname*>	<*AttributeName*>	<*AttributeValue*>

If a <*Member*> entry has the form GRP:<*Groupname*>, it is a sub-group. Sub-groups always have a <*Unique ID*>, which begins with a G so that quicker access to the group is possible.

A group can be global (<*Domain*>=<*Servername*>) or belong to a user (<*Domain*>=<*Servername*>/<*User*>).

In addition, a user (<*Member*>) can be a member of numerous groups. In this way a greater margin of control is possible e.g. through Access Control Lists to certain resources.

2.19.2 Access Control Lists (ACL)

Access Control Lists are groups with a special <*AttributeName*>:

DOMAIN	CLASSNAME	CLASS	KEYNAME	KEY
<*Domain*>	GROUPATTR	<*Object*>	PERMISSION	<*AttributeValue*>
<*Domain*>	GROUP	<*Object*>	<*Access*><*Unique-ID*>	<*Member*>

<*Domain*> GROUP <*Object*> G<*Access*><*Unique-ID*> GRP:<*Group*>

<*Object*> is formed from #<*Object Class*>[-<*Object ID*>] e.g. #PHONE for all telephones, or #PHONE-152 for the telephone with the extension number 152.

<*Access*> consists of a letter which control access: A (All), R (Read), W (Write), E (Execute).

<*Member*> and GRP:<*Group*> are the user accounts resp. sub-groups with the user account which have the corresponding access to the given <*Object*>. If an ACL group contained a further ACL group, the sub-group would have the <*Access*> privileges of the main group.

<*AttributeValue*> is not currently used with the ACL group.

2.19.3 Example

Distribution Lists

```
DOMAIN    CLASSNAME   CLASS   KEYNAME   KEY
MYSERVER  GROUPATTR   SALES   ADDRESS   NVS:FAXG3/491234567
MYSERVER  GROUP       SALES   12321     SALLY
MYSERVER  GROUP       SALES   12322     JOHN
MYSERVER  GROUP       SALES   12323     FRANK
MYSERVER  GROUP       SALES   12324     TOM
```

Nested Distribution Lists

```
DOMAIN    CLASSNAME   CLASS   KEYNAME   KEY
MYSERVER  GROUPATTR   MARKET  ADDRESS   NVS:FAXG3/491234567
MYSERVER  GROUP       MARKET  12321     MARY
MYSERVER  GROUP       MARKET  G12322    GRP:SALES
```

Access Control Lists (ACL)

```
DOMAIN    CLASSNAME   CLASS   KEYNAME      KEY
MYSERVER  GROUPATTR   #PHONE  PERMISSION
MYSERVER  GROUP       #PHONE  R12321       MARY
MYSERVER  GROUP       #PHONE  GA12322      GRP:SUPERVISOR
```

All members of the group SUPERVISOR have full access to all telephones within the company. MARY has only the Read privilege and may only e.g. query a status.

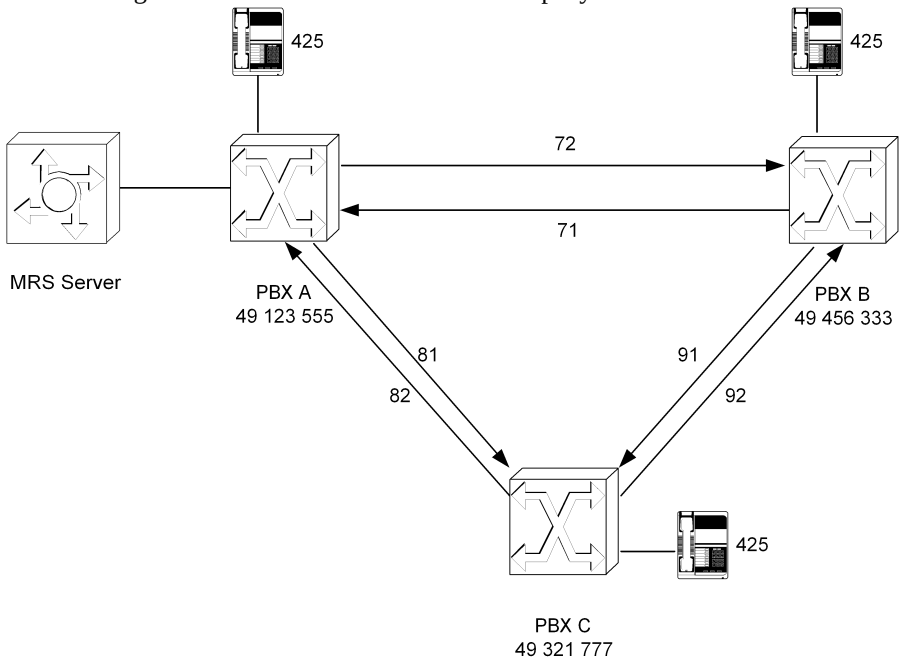
ACD Group

```
DOMAIN    CLASSNAME   CLASS     KEYNAME   KEY
MYSERVER  GROUP       HOTLINE   12321     MARY
MYSERVER  GROUP       HOTLINE   12322     JOAN
```

2.20 Multi Tenant (Enterprise Mode)

Scenario: A company has several interconnected PBXs at different sites with each PBX having its own external line and individual extension number (OAD).

There is, however, only one voice mail server at one of these PBXs in charge of administering the user mailboxes of the entire company.



In this example we have three sites: A, B and C. A is assumed the main site with the MRS Server as voice mail server. To reach the subscriber with calling number 425 at site C, a user at site A must dial 81425, and a user at site B 91425. Users at site C simply dial 425.

The voice mail server is configured via redirected numbers so that all subscribers have defined their telephone number as mailbox number as well.

A user that has recorded a message in his/her voice mail system wants to address it to someone at a different site the same way as making a call, thus by means of <*Tie Line Prefix*>+<*Extension*>.

To enable this the MRS System needs to know the corresponding extension and cross-connection numbers. A record of correlation database entries describes each PBX site in relation to all other sites.

The following entries are required for the PBX that is connected to the MRS Server:

DOMAIN	CLASSNAME	CLASS	KEYNAME	KEY
<Server>	SITE	*<<Server>>*	MULTITENANT	1
<Server>	SITE	*<<Server>>*	TYPE	MULTI_TENANT
<Server>	SITE	*<<Server>>*	*<Tie Line 1>*	*<Site 1>*
<Server>	SITE	*<<Server>>*	*<Tie Line 2>*	*<Site 2>*
<Server>	SITE	*<<Server>>*	...	...
<Server>	SITE	*<<Server>>*	*<Tie Line N>*	*<Site N>*

- The first entry activates the support for a voice mail server in a networked PBX structure.
- The second entry states the site definition type.
- Each of the following lines states for each configured cross-connection number (*<Tie Line x>*) the corresponding PBX (*Site x*).
- The name of the main node is given in pointed brackets.

For all further sites make the following entries:

DOMAIN	CLASSNAME	CLASS	KEYNAME	KEY
<Server>	SITE	*<Site x>*	TYPE	MULTI_TENANT
<Server>	SITE	*<Site x>*	PREFIX	*<Global OAD>*
<Server>	SITE	*<Site x>*	*<Tie Line 1>*	*<<Server>>*
<Server>	SITE	*<Site x>*	*<Tie Line 2>*	*<Site 2>*
<Server>	SITE	*<Site x>*	...	...
<Server>	SITE	*<Site x>*	*<Tie Line N>*	*<Site N>*

- The first entry states the site definition type.
- The second entry states the system calling number of the site.
- The third entry states the cross-connection number to the main PBX with the MRS Server.
- Each of the following lines states for each configured cross-connection number (*<Tie Line x>*) the corresponding PBX (*Site x*).

Example (see above graphic):

The name of the MRS Server at site A be DOC. The PBXs with an MRS Server represented in the above graphic thus would require the following correlation database entries:

DOMAIN	CLASSNAME	CLASS	KEYNAME	KEY
DOC	SITE	<DOC>	MULTITENANT	1
DOC	SITE	<DOC>	TYPE	MULTI_TENANT
DOC	SITE	<DOC>	72	B
DOC	SITE	<DOC>	81	C
DOC	SITE	B	TYPE	MULTI_TENANT
DOC	SITE	B	PREFIX	49456333
DOC	SITE	B	71	<DOC>
DOC	SITE	B	91	C
DOC	SITE	C	TYPE	MULTI_TENANT
DOC	SITE	C	PREFIX	49321-777
DOC	SITE	C	82	<DOC>
DOC	SITE	C	92	B

PREFIX states the respective system calling number. PBXs with MRS Server do not require this since in this case the global MRS Server OAD is assumed. PREFIX is also used to determine a caller's home site. If somebody whose number begins with one of the defaulted system calling numbers calls the voice mail server, he/she is assigned to this site. This also determines which cross-connection number the user must dial to reach a user at another site.

If you do not only want to restrict site determination to one PBX, insert a dash in the PREFIX. In this case only the portion to the dash would be used for site assignment determination. In our example this is the case for site C.

When you enter user voice mail numbers in the data base make sure to specify the entire number inclusive the system calling number in the VOICE# field. Otherwise these would be normalized with the global MRS Server OAD and thus be wrongly transmitted to the VOICE field for the other sites with different system calling numbers.

The Multi Tenant option has so far been supported by VMS and Phonemail.

2.21 Tools

The following tools are from the MRS SDKs (Software Development Kit) and not a part of the standard MRS installation. Some of these tools are helpful for system maintenance and analysis.

Lear APL

With LEAR server overload situations can be tested. Copy `Lear.exe` from the directory <*MRS Root*>\`SDKTools` to <*MRS Root*>\`bin` and `Learcfg.dll` to <*MRS Root*>\`Monitor`.

Next call up "`lear install`" and subsequently "`lear start`" in the directory <*MRS Root*>\`bin` per command line. The test module is not always automatically started with every server start but should be started from the command line if necessecary.

InfoMon

Infomon allows direct access to the global MTA journal. The functionality is bundled with the MTA administrative software.

Call (Local): `INFOMON node=`<*MRS Servername*>

Call (Remote): `INFOMON node=\\`<*NTServername*>

InfoTool

Call (Local): `INFOTOOL` <*Task*>

Call (Remote): `INFOTOOL node=\\`<*NTServername*> <*Task*>

Possible commands for <*Task*> are described in the section *Maintenance Script*. Exception: the parameter `record=` is abbreviated as `rec=` in the command line Utility InfoTool.

Example

The following command

```
INFOTOOL node=\\BIG IMPORT REC=CORREL FILE=CORREL.TXT
```

would be used to copy a user database to the remote NT server `\\BIG`.

Correlation data records can be deleted with the InfoTool by importing a file with the special `KEY <<<DELETE>>>`. In the following example the fax G3 address of user `TEST` would be deleted.

```
DOMAIN    CLASSNAME    CLASS   KEYNAME   KEY
SERVER    USER         TEST    FAXG3     <<<DELETE>>>
```

Through use of the command `InfoTool KillUser User=`<*Username*> a user and all data belonging to that user, address book entries, entries in distribution lists,

and all documents owned by the used would be deleted. This operation is similar to that of the Maintenance Task OldUserCleanup.

It is also possible to use a * as wildcard so that with the `'InfoTool KillUser User=abc*'` commmand all user accounts starting with `abc` can be deleted. In this case a security prompt appears for each user account to be deleted. This query can be switched off with the optional `batch` parameter.

ZombiDetect

This utility checks the integrity of the MRS Message Store, repairs inconsistencies, and automatically deletes files for which no reference exists.

ZombiDetect should be used prior to the update installation of MRS version 3.2.

This utility can be used on a running server. If this is not desired, the MRS Server can be shut-down and restarted in the following order:

```
NAMELOC start
XMRSVC start
INFOSTOR start
```

ZombiDetect can now be started.

Attention: ZombiDetect is not executable on cluster systems.

2.22 Kernel Registry Components

2.22.1 General

The following *Value* is found in the *Key*

`HKEY_LOCAL_MACHINE\SOFTWARE\PP-COM\MRS`

DocumentationMode REG_DWORD *0 or 1*

The MRS server writes only the most significant registry keys during the setup to the registry. If a value of `1` is set, then all registry keys for that server release will be recorded. This option should only be used for key documentation.

Default: `0`

2.22.2 Global Entries

These entries are reproduced from a distributed MRS server to all attached computers.

The following *Value* is found in the *Key*

`HKEY_LOCAL_MACHINE\SOFTWARE\PP-COM\MRS\MRS Globals`

AdminAccount REG_SZ *Windows NT Account*

Windows NT account used for installations with security options. This account is also used for starting services on non-kernel computers within a Distributed system.

BackupDirectory REG_SZ *Directory*

Backup directory. Backups generated by the Standard Maintenance Scripts are saved to this directory.

Example: `g:\mrs\Backup`

CheckForDateConsistencyOnStart REG_DWORD *0 or 1*

If active a check is performed upon starting the MRS Server as to whether the current date is between 1995 and 2038 inclusive. If this is not the case, booting the server is refused. This was designed to intercept BIOS errors with the year 2000 switch.

Default: 1

ClusterConfigurationActive REG_DWORD *0 or 1*

If set to 1 an MRS Server on a Cluster System is concerned.

Default: 0

DatabaseLayoutVersion REG_DWORD

Database Layout ID.

Dealer REG_SZ

With a test license of limited validity the MRS Server issues a warning on the MRS Monitor before the license expires:

> The license for this server will expire on <*Date*>, please contact <*Dealer*> at <*Phone*>

After expiration of the license a fatal error occurs indicated by the following message:

> The KERNEL LICENSE has expired!
> Please contact <*Dealer*> for an update of the license key version of MRS.
> Phone <*Phone*>, Fax <*Fax*>

<*Date*> corresponds to the license expiration date, <*Dealer*> is the first portion of the value entered here which includes the dealer´s name, telephone number and fax number separated by `|`.

Default: `Cycos AG|+49-2404-901-0|+49-2404-901-100`

FastAsyncKernelShutdown REG_DWORD *0 or 1*

All services are simultaneously shut-down when Windows NT is shut-down. Dependency is not taken into consideration when used. The database is securely shut-down, but some losses may occur if e.g. the MTA needs to write to the database. This method should only be used in emergenies.

FolderDirectory REG_SZ *Sharename or Directory*

The sub-directories Folder0 to Folder99 contain documents administered by the MRS server. The directory must be set as share in the event the MRS server is distributed over a number of NT servers. In this case the directory or share must be given in UNC notation. The setup automatically installs the network share `MrsFolders$`.

Default: `\\Computer\MrsFolders$`

InfoStorRecordIDs REG_SZ

List of the Record- and Update-IDs for the five databases `JOURNAL`, `CORREL`, `GEB`, `DISTRIB` and `RECH`. Modification of this value leads to database inconsistencies!

Language REG_SZ

The language in which status reports are given. This is for reports visible to the user in the journal or in other mail clients e.g. Microsoft Outlook. Available languages are: German, English, French and Dutch.

LocalSystemList REG_MULTI_SZ

All computers where MRS components are found, are listed here. Each line contains the computer name and the installation directory separated by a comma. The MRS Kernel must be found on one of the computers, therefore the third parameter `KERNEL`. On non-kernel computers the parameter system index (`SI=`) must be given as the third parameter. The index must be concise and indexes must numbered sequentially. The kernel computer automatically becomes the system index 0.

Example:

```
ULYSSES,d:\Mrs,KERNEL
DILBERT,d:\Mrs,SI=1
ACE488,g:\Mrs,SI=2
```

MaxWaitForNTShutdown REG_DWORD *Milliseconds*

Wait time in milliseconds. See NTShutdownFixActive.

Default: `1000`

MirrorDirectory REG_SZ *Directory*

Optional mirror directory for the documents directory. All documents are mirrored within this directory.

Example: `g:\mrs\mirror`

MrsBuildNumber REG_SZ

This string contains the internal Build number of the MTA.

MSClusterNodes REG_SZ

The names of computers on which InfoStor can run are entered here with an MRS Server installed on a Microsoft Cluster Server.

MultidocClient REG_DWORD *0 or 1*

All clients that are connected to the server can display messages in Multi Document Format (PMF) (`1`), and receive these in the respective format. Otherwise a representation is chosen that can be displayed by the client (`0`).

NonIntercativeServices REG_SZ

A comma separated list of all non-interactive services which never delete documents. This is used for the variable `$NONINTERACTIVE` in the Maintenance Scripts.

Example: `NVS:FAXG3,NVS:FAXG4,NVS:VOICE,NVS:SMTP`

NTShutdownFixActive REG_DWORD *0 or 1*

Since the NT 4 Service Control Manager subsequently notifies one service after another of a shutdown, so that a smooth shutdown can be executed by these services, it is possible that a service does not react to this notification and the Service Control Manager waits for the service's reaction.

All other services do not receive the shutdown notification and are at sometime terminated by Windows NT without correctly closing database, saving data, etc..

Since the solution to this problem was not resolved by Microsoft till Service Pack 3, an individual Console Control Handler was implemented for MRS. The Console Control Handler receives the shutdown notification from another source allowing the MRS Services to receive the correct `SERVICE_CONTROL_SHUTDOWN` unless

sent from the Service Control Manager within the time entered in MaxWaitForNTShutdown. The Console Control Handler is activated when set to 1.

Default: 1

ServiceStartDelay REG_DWORD *Seconds*

Time period in seconds in which the MRS Administrator waits before starting the Nameloc and other MRS Services. This is used when the automatic server start does not function when the computer is started, and a report is generated that the kernel module Nameloc could not be started.

Default: 0

SMIVerify REG_DWORD *0 or 1*

Must always be `0`. By a value of `1` is an extensive self diagnoses active.

Default: `0`

StatisticsClasses REG_MULTI_SZ

This value contains a category resp. subcategory per line, for which statistic information is to be collected. Each APL entered here should generate statistic messages for the specified subcategories.

The XMR service then writes these statistic messages in an individual log file of the Stat directory where they can be evaluated by the Report APL.

The syntax for each line is:

`[`<*Class*>`[,` <*SubClass*>`]]`

If only <*Class*> is entered then this APL polls information for all available subcategories. Instead of class an * (asterisk) can be entered which is then interpreted as “all categories”. However, we recommend not to use this type of entry (only meant for debug purposes) for an effect system.

SystemName REG_SZ

MRS server name.

Attention

Since this name is contained in the database records, it may not be changed after the installation. If modified after the installation the kernel will not be able to read the database records.

Example: `NADINE`

SystemShutDelay REG_DWORD *Seconds*

Waiting time in seconds. After receiving the last job, the MTA waits this amount of time before it terminates. It is determined through the waiting time, whether remaining jobs are in the system or not.

Default: `5`

TransportFormats REG_SZ

The formats listed here are recognized by the router as valid for the SMI Transport `MAILBOX`, `TCPIP`, `SPX`, `PIPE`, `ISDNSMI` and `MODEM`. If the option MultidocClient is set to `1` then the format `PMF` would also be appended to the default list as an additional format.

Default: `TLX,ASC,TXT,FG3,FG4,WAV,AS7,BIN`

Important

PCM Voice-files are converted here to Windows Wave format. These are currently (MRS Version 3.0) in conflict with existing VFS scripts. In the event VFS is used, the standard entry `WAV` should be changed to `PCM`.

UserDirectory REG_SZ *Sharename or Directory*

The user directory must be a share if the MRS server is distributed over various NT computers. In this case the directory or share must be entered in UNC notation. The setup automatically installs the administrative share `MrsUserdata`.

Default: `\\Computer\MrsUserdata$`

Version REG_SZ

Current Build Number of the MRS Server.

Format: *xx.yy.zz*

xx=Major, *yy*=Minor, *zz*=Build

Tokens are always separated with a '.'.

Major := 1-n

Minor := 00-n[alpha][|i|p] [(Debug)|(Checked)]

i := Unofficial Version (External Test)

p := Private Version (Developer)

<empty> = Official Version

Build := 1-n

Example:

```
3.02.260
3.5alphai.260
```

```
3.00p (Debug) .201
4.50 (Checked) .356
```

2.22.3 Converter

The following *Value*s are found in the *Key*

`HKEY_LOCAL_MACHINE\SOFTWARE\PP-COM\MRS\MRS Globals\Converter`

AllowPartialConversion REG_DWORD

Send only if document (Multi Format Document (PMF)) and all attachments can be converted (`0`). Otherwise send document *without* reference to missing pieces (`1`).

Default: `0`

AlwaysDefaultLanguage REG_DWORD *0 or 1*

With voice mails MRS attempts to recognize the language of a text to be given out (see DefaultLanguage). Set this value to 1 if you do not wish to utilize speech recognition. Consequently the default set language is then always used for voice mails.

Default: 0

AutodetectPostscript REG_SZ

Possible Values:

Value	Significance
`NONE`	No recognition of postscript in text file.
`NORMAL`	Recognition only if file is postscript.
`EXTENDED`	Recognition also, when first 30 lines are not postscript. This can occur with SMTP mail.

Default: `EXTENDED`

ConverterFont REG_SZ

Standard character set for text to fax conversion when Client 2.50 fax cover pages resp. templates are used. Otherwise the font set in the MTA configuration or defined with the generation of MRS Communications fax templates comes into effect.

Parameters are <CharType>, <SizeInPoints>, <Bold 0:No, 1:Yes>, <Left Margin>, <Top Margin>, <Width>, <Height>.

Default: `Lucida Console,18,0,5,0,0,0,0`

CoverDir REG_SZ *Directory*

Path to user dependent resources such as fax cover pages, speech files (announcements etc.).

Example: `g:\mrs\userdata`

DDESleep REG_DWORD *Milliseconds*

The application converter prints documents per DDE call-up for which some applications require more time. Therefore waiting time is inserted after the call-up which works with all known installations. Some very slow computers may require the definition of an even longer waiting time.

Default: `500`

DefaultLanguage REG_DWORD

If the speech recognition has failed to identify the language in which a text is to be emitted per Text-To-Speech one of the following default languages is used:

Value	Language
7	German
9	English
12	French
19	Dutch

EMailFaxWidth REG_SZ *400 to1700*

Fax width in pixels by the conversion to e-mail format (e.g. JPEG to MIME). This parameter enables resolution definition for fax documents.

Default: `800`

FaxG3Resolution REG_SZ *100 or 200*

Standard resolution by postscript to fax conversions for G3 fax.

Default: `200`

FaxG4Resolution REG_SZ *200, 300 or 400*

Standard resolution by postscript to fax conversions for G4 fax.

Default: `200`

fontHeight REG_DWORD

Font size with text to fax conversion. This is meaningless when fax templates resp. cover pages are used since it is already implicitly included there.

fontType REG_SZ

Font type with text to fax conversion. This is meaningless when fax templates resp. cover pages are used since it is already implicitly included there.

fontWeight REG_DWORD

Font weight with text to fax conversion. This is meaningless when fax templates resp. cover pages are used since it is already implicitly included there.

LogoGroup REG_MULTI_SZ

The MRS user account and originator address are given per line and are separated by comma. These users can then have a fax logo or cover page referenced to this address. All users whose originator address pattern is conform to that of a given LogoGroup definition, receive the corresponding user fax logo or cover page.

Example: `MSMAILUSER,NVS:MS.*/*`

margin_b REG_DWORD

Setting of the bottom margin with text to fax conversion. This is meaningless when fax templates resp. cover pages are used since it is already implicitly included there. The default value 200 corresponds to one inch (approx. 2,54 cm).

Default: 200

margin_l REG_DWORD

Setting of the left margin with text to fax conversion. This is meaningless when fax templates resp. cover pages are used since it is already implicitly included there. The default value 200 corresponds to one inch (approx. 2,54 cm).

Default: 200

margin_r REG_DWORD

Setting of the right margin with text to fax conversion. This is meaningless when fax templates resp. cover pages are used since it is already implicitly included there. The default value 200 corresponds to one inch (approx. 2,54 cm).

Default: 200

margin_t REG_DWORD

Setting of the top margin with text to fax conversion. This is meaningless when fax templates resp. cover pages are used since it is already implicitly included there. The default value 200 corresponds to one inch (approx. 2,54 cm).

Default: 200

MaxFirstPagePrintTime REG_DWORD

Time-out time. Time after which an application conversion procedure is determined as failed. If during an application conversion (e.g. WinWord to fax) a time-out occurs, one of the following reasons could be the cause:

- MaxFirstPagePrintTime is to short and the server requires more time to convert the first page to fax using the printer driver. In this case the value should be increased.
- More likely is that during the conversion by the MTA Service, the application (e.g. WinWord) itself is used by the MTA to convert the document to a fax. It is possible through interaction that a dialog box appears and at this point the printing operation is blocked until the time-out has expired. Corrective action: In the Service Control Manager the service set to "MRS Message Router (MTA)" / Startup / „Allow Service to Interact with Desktop". Subsequently the application is repeated. The MTA visibly starts the application and one can see where the printing operation stalls. Only two possibilities exist: a) The problem occurs only once (e.g. first time initialization) or b) The problem occurs continually. In the case of b) the application cannot be used for automatic conversion.

Default: `0x3c`

PartialConversionServices REG_SZ

A list of services can be entered here where partial conversions for the originator is allowed. If for example a Mailgate always attaches an object which is not convertible, fax transmission should still be possible.

Example: `CC,MS`

PatchLowResDcx REG_DWORD *0 or 1*

Fax G3 documents with a low resolution (200x 100dpi) would be converted to a higher resolution (200x 200 dpi) when set to 1 and the conversion target format is DCX. This is done since many DCX viewers cannot display the lower resolution fax documents.

Default: `1`

PcmIsEurope REG_DWORD *0 or 1*

Coding used for Voice format. 0 corresponds to µ-Law, which is used in the USA, and 1 to the European format a-Law.

PcmIsWave REG_DWORD *0 or 1*

Voice prompts always have the file extension `.pcm`, even when a wave is contained within. When set to 1 all voice prompts are stored as a 16 Bit 8000Hz mono wave

file. Depending upon which PcmIsEurope is defined in the set-up, these are stored either in a µ-Law or a-Law coding format.

PcmIsEurope	PcmIsWave	Voice-Ressource format
0	0	This mode is not supported. Requires self-made µ-law files with the ID 0x17171717.
0	1	µ-Law Wave.
1	0	Compatibility mode for older QNX Servers.
1	1	a-Law Wave.

Default: 1

PrintTextfileWithProgram REG_MULTI_SZ

Documents whose extensions are listed here, will not be faxed as text documents, but over a program to a fax printer. Examples are documents in RTF (Rich Text Format) or HTML (Hypertext Markup Language) who's formatting instructions are contained in the text.

Example:

```
rtf
html
htm
```

StartPrintingTimout REG_DWORD *Seconds*

Entire timeout for the conversion of an application document to fax. If the called application has not generated a fax document after the time set here, the job is cancelled. As soon as the next repetition, set at the fax protocol, is due, the next conversion attempt is started.

Default: 60

UnnecessaryToPrint REG_MULTI_SZ

File extensions for non-printable document types. One suffix is specified per line. `.vcf` (with dot!), given in the example, is used by some e-mail programs to attach some sort of business card to the e-mail. Since this business card cannot be printed, it can also not be sent to a fax device.

File attachments with suffixes specified here are ignored with a conversion to a fax message so that no *Partial Conversion Error* is generated.

Example: `.vcf`

UseForTextToFaxA4 REG_DWORD *0 or 1*

Paper format used in conversions from text to fax formats. 0 corresponds to the Letter format and 1 to A4 format.

UseG4ResolutionForExtension REG_MULTI_SZ

A page is displayed to the user on the monitor in the ideal format for resolution on the locally installed printer. Normally the application converter prints documents via the fax printer driver with a resolution of 200 dpi. This sometimes leads to a different pagebreak, e.g. an Excel table displayed to the user on one page is then printed on two fax pages.

Since Fax G4 enables a higher resolution this effect consequently occurs rarely and a conversion from Fax G4 to Fax G3 does not effect the page composition. Therefore files can be extended by means of a fax conversion to G4.

In this case the preset 200 dpi need to be replaced by a higher value of course. We recommend 300 dpi since in most cases 300 dpi or 600 dpi printers are installed so that the pagebreak comes closest to the display on the user´s monitor. Call up the MTA configurations in the MRS Monitor and alterate the resolution under **Fax Conversion** accordingly.

Example: `.XLS`

UseLHTTS REG_DWORD *0 or 1*

With the value 1 the proprietary installed and older Text-To-Speech system by Lernout & Hauspie is used. 0 corresponds to a Text-To-Speech system available according to the Microsoft Speech API (SAPI).

UseOCR REG_DWORD *0 or 1*

With the value 1 incoming faxes are saved in PMF file as WinWord document per OCR. Recognita must be installed.

Default: `0`

WaveCodec REG_SZ

This audio codec is used for the option `REMOVECONVERSIONS` in the command `DELDB` in maintenance scripts. This option should only be set through the MTA configuration in the MRS Monitor.

WaveFormat REG_BINARY

Most audio codecs support numerous compression rates. The format configured here is used with the audio codec configured under WaveCodec. This option should only be set through the MTA configuration in the MRS Monitor.

2.22.4 Fax Printer Applications

Under the *Key*

```
HKEY_LOCAL_MACHINE\SOFTWARE\PP-COM\MRS\MRS Globals\
   Converter\Faxprint
```

you can configure whether and how certain applications perform an application conversion to fax. For a certain application a REG_MULTI_SZ is entered which contains the following values:

Line	Value
1	0 or 1. With the value 0 no application conversion can be performed for the further specified file extensions. This is possible with 1.
2	0 or 1. With the value 0 the method "Print", with 1 the method "PrintTo" is used. The latter one is the default method of the application converter.
3 to 10	One file extension can be entered with preceding dot per line. Example: `.lwp`

This is what you do to receive the name of the REG_MULTI_SZ for a certain application:

1. Open the window to `HKEY_CLASSES_ROOT` via the registry editor (`regedt32.exe`) of Windows.
2. In this window look for the correct extension. As an example we take "`.doc`" and find the entry "`Word.Document.8`".
3. Now look for "`Word.Document.8`" in `HKEY_CLASSES_ROOT`.
4. Under the key `HKEY_CLASSES_ROOT\Word.Document.8` the key `shell\Print\command` or `shell\PrintTo\command` should be present. It contains the call to print out a document with the file extension "`.doc`" using the method "Print" or "PrintTo". Thus you can verify whether the application supports the selected method.
5. In this case the name of the REG_MULTI_SZ should be "`Word.Document.8`".

If the selected method does not work you can try another one. In the event both methods fail a different application can be defined, e.g. "`Wordpad.Document.1`" instead of "`Word.RTF.8`" for "`.rtf`"

The extension "`.lwp`" of a Lotus WordPro document is an example of the method "PrintTo" not working so that for this method with installed Lotus SmartSuite a regis-

try value must be generated for using the method “Print”. The value would appear like this:

WordPro.Document REG_MULTI_SZ

Contents:

1
0
`.lwp`

Thus allowing the application conversion for documents with the file extension “`.lwp`” with the method “Print” via the command entered under `HKEY_CLASSES_ROOT\WordPro.Documentshell\Print\command`

2.22.5 Licenses

The following *Values* are found in the *Key*

`HKEY_LOCAL_MACHINE\SOFTWARE\PP-COM\MRS\MRS Globals\Licence`

Licenses REG_MULTI_SZ

List of the installed licenses. The license numbers used in the example are not valid license numbers.

Example:

```
000-00-001; 1316-4661-7A01
000-00-003; 2943-5222-7E2C
000-00-004; 3213-5A63-7C04
000-00-005; 7B42-226F-750E
000-00-006; 0C1D-5463-7406
000-00-007; 056C-5441-7606
000-00-008; 171F-5562-7433
000-00-009; 5718-5783-4A02
000-00-00A; 97A7-EDBC-C4B7
000-00-00B; D8A0-EAAB-B3B3
000-00-00C; C6A1-EBDE-B361
```

Organization REG_SZ

Name of the licensing organization.

Example: `Big Brother and Co`

Owner REG_SZ

Optional name of the MRS Licensee.

2.22.6 Site Specific Entries

The following *Value* is found in the *Key*

`HKEY_LOCAL_MACHINE\SOFTWARE\PP-COM\MRS\MRS Globals\Location`

AccessCode REG_SZ

This number is taken as default for ISDN resp. modem connection. Individual configuration is possible for ISDN resp. modem access.

Example: `123456`

AreaCode REG_SZ

Area code without preceding zeros. Number is taken as default for the ISDN resp. modem connection. Individual configuration is possible for ISDN resp. modem access e.g. numerous service providers.

Example: `2404`

AreaCodeEscape REG_SZ

National prefix. This number is set preceding the area code of the recipient when a incountry number is dialed.

Example: `0`

City REG_SZ

Comma separated list of area codes within the Citybereich. Citybereich is a German Telekom tariff used in Least Cost Routing.

Country REG_SZ

The country for which the site specific parameters are configured. This data is required by the Setup, so that the correct country data is displayed by later MRS Server update since there is no absolute division of CountryCodes to the various countries. America and Antigua for example have the same CountryCode.

Example: `Germany`

CountryCode REG_SZ

Country code.

Example: `49`

CountryCodeEscape REG_SZ

International prefix. This number is set before the country code of the recipient when an international number is dialed.

Example: `00`

DateFormat REG_SZ *Template*

Template is date display format which is comprised of various Tokens:

Token	Description	Possible Values[a]
%W	Day of Week	[‘Sun’ .. ‘Sat’]
%D	Day	[1..31]
%M	Month	[1..12]
%N	Month	[‘JANUARY’ .. ‘DECEMBER’]
%n	Month	[‘January’ .. ‘December’]
%C	Century	[19..20]
%Y	Year	[70..38]

a.Text values are independent of the server language.

Example: `%W %D. %-3.3N %C%02Y`

DateFormatLong REG_SZ *Template*

Similar to DateFormat but can be selected for long date fomats for fax coverpages.

DialAlwaysArea REG_DWORD *0 or 1*

With 1 the area code is always dialed as well, thus especially in the individual local exchange network.

ExternalLinePrefix REG_SZ

External line.

Example: `0`

LocPrefixExtensions REG_MULTI_SZ

A list with dialing numbers or partial dialing numbers that by the normalization are not modified. Normally all numbers larger than 8 digits would be normalized to an international dialing number. Example: `0240412345` would be normalized to `49240412345`.

With corporate networks it is possible that dialing numbers such as `9992`<*Extension*> exist. One can enter the prefix `9992` here so that all numbers beginning with this prefix will not be normalized.

Example:

```
9992
0111
444
```

All numbers that begin with `9992`, `0111` or `444` will not be normalized.

MaxInternalLength REG_DWORD

Maximum length of an internal dialing number. All numbers longer than the MaxInternalLength will be interpreted as an international dialing number and normalized as such.

Default: `6`

Normalize_UseExtLinePrefix REG_DWORD

When set to 1 the DialNumber-Processor should also interpret "internally dialed" numbers, as well as those with outside dialing numbers. Since this option was built-in for Siemans compatibility, the side-effects with other PBXs are less than desirable, and therefore not used.

This option is not supported by CYCOS.

Default: `0`

Regio50 REG_SZ

A comma separated list containing the area codes in the Regio50 Bereich. The Regio50 Bereich was implemented by the German Telekom, and is an area with a 50 km radius, in which telephone rates are slightly higher than those of local calls. The AreaCodeEscape is not given with this entry. This data is also used for Least Cost Routing in Germany.

TimeFormat REG_SZ *Template*

Template is a time display format which is comprised of various tokens.

Token	Description	Possible Values
`%h`	Hour	[0..23]
`%m`	Minute	[0..59]
`%s`	Second	[0..59]

Example: `%02h:%02m`

TimeFormatLong REG_SZ *Template*

Similar to TimeFormat but can be selected for long date fomats for fax coverpages.

Example: `%02h:%02m:%02s`

2.22.7 The Router

The following *Value* is found in the *Key*

`HKEY_LOCAL_MACHINE\SOFTWARE\PP-COM\MRS\MTA`

AddSendJournalToQuota REG_DWORD *0 or 1*

The send journal is also evaluated in Quota computations.

Default: `1`

AccountingDatabase REG_DWORD *0 or 1*

When set to 1 charge information is written to the GEB database.

Default: `0`

AutolearnAllfromProperty REG_DWORD *0 or 1*

This option should be set to `1` in the event that *no* user data under MRS is to be administered, and personal fax ID's are desired for fax receipt. By the transmission of documents over Lotus Notes or Microsoft Exchange Gateways the personal data is taken from the address book (e.g. answer code, charge information etc.) and appended as properties to the document for use in transmission. Since a local address book does not exist, a personal fax ID by the standard installation is not available. This shortcoming can be overridden with the AutoLearn option: with `1` all answer codes that are used for document transmissions over gateways are retained in the MRS address book. These answer codes are now available for document reception. If the properties from other services are included with a document they will be retained and imported into the database.

In this way voice is also possible, as soon as the voice number is taken from the transmitted fax.

AutolearnOIDfromProperty REG_DWORD *0 or 1*

Similar to AutolearnAllfromProperty except when set to `1`, only the properties of the service being used are retained. When a fax is sent from Lotus Notes or Microsoft Exchange only the fax data will be retained by the MRS user database.

AutolearnSetPreferred REG_DWORD *0 or 1*

Information gathered by Autolearn is inserted in the database field `PREFERRED`

CheckQuotas REG_DWORD *0 or 1*

When set to 1 the user quotas are checked.

Default: `0`

ClassMangling REG_SZ

For the case of a redundantly coupled MRS server over a Remote System Link (also e.g. over TCP/IP and ISDNSMI) a ClassMangling parameter is required. Through the extension of the class the difference in the admission type is given to the router. Default is `%s@%3.3s%3.3s.` An address

```
NVS:NODE.CLASS/USER
```

would then be transformed to

```
NVS:NODE.CLASS@SSSTTT/USER
```

`SSS` are the first three letters of the server name. `TTT` are the first three letters of the transport name.

Example:

In the remote system `PERGAMON` the line `NVS:FAXG3.1` exists. This would be imported twice by the remote system link. Without the ClassMangling parameter the router cannot differentiate between the two lines.

```
NVS:FAXG3.1 (Transport: NVS:TCPIP/*)
NVS:FAXG3.1 (Transport: NVS:ISDNSMI/*)
```

So that the router can differentiate between the lines, the `CLASS`-section of the address (`.1`) is extended:

```
NVS:FAXG3.1@PERTCP
NVS:FAXG3.1@PERISD
```

CountUsers REG_DWORD *0 or 1*

If this value has been set to 1, a daily XMR report (Info/Always) appears in the log, stating the number of existing users. With a limited user license this information is checked by the Mail APL at the start, but with an unlimited user license an export of the Correlation database had to be performed and counting be executed by oneself. This value enables automatic counting by MRS each day and no database export is required then.

Default: 0

DialogEnabled REG_DWORD *0 or 1*

Dialog functions are switched on when set to 1.

Default: `1`

DnoServices REG_SZ

Here is a list of services that require dialing numbers. These services are checked for the privileges SYS_AMT, SYS_NATIONAL and SYS_INTERNAT.

Default:

```
FAXG3,FAXG4,VOICE,EFT,ISDNTTX,ISDNSMI,FAXG3REV,EFTREV
```

DocumentLifeTime REG_DWORD *1 to 1000*

Maximum calendar life of a document in days. This value sets the macro variable $(LIFETIME) in the maintenance script. Deletions are initiated after the number of days has expired. The variable can either be given as explicit number in the scripts or referenced in the registry key per $(LIFETIME). The value in DocumentLifeTime specifies the age limit, so that a document may be deleted by the standard script.

Default: 60

DocumentLifeTimeCompress REG_DWORD *1 to 1000*

Maximum document life in days. This value sets the macro variable $(LIFETIMECOMPRESS) in the maintenance Script.

DocumentLifeTimeEmail REG_DWORD *1 to 1000*

Maximum document life in days. This value sets the macro variable $(LIFETIMEEMAIL) in the maintenance Script.

DocumentLifeTimeInbound REG_DWORD *1 to 1000*

Maximum document life in days. This value sets the macro variable $(LIFETIMEINBOUND) in the maintenance Script.

DocumentLifeTimeOutbound REG_DWORD *1 to 1000*

Maximum document life in days. This value sets the macro variable $(LIFETIMEOUTBOUND) in the maintenance Script.

DocumentLifeTimePassthrough REG_DWORD *1 to 1000*

Maximum document life in days. This value sets the macro variable $(LIFETIMEPASSTHROUGH) in the maintenance Script.

DocumentLifeTimeService REG_DWORD *1 to 1000*

Maximum document life in days. This value sets the macro variable $(LIFETIMESERVICE) in the maintenance Script.

DocumentLifeTimeUserdefined REG_DWORD *1 to 1000*

Maximum document life in days. This value sets the macro variable `$(LIFETIMEUSERDEFINED)` in the maintenance Script.

EarlyOwnerRecipient REG_DWORD *0 or 1*

When set to `1`, the owner of a message (the recipient whose inbound journal contains the message) would be determined at the beginning of the `PREFERRED` evaluation instead of at the end of the routing process. The advantage of this strategy is that it functions even when the recipients address is not explicit, e.g. two users with the same TCP/IP address.

File Systems REG_MULTI_SZ

List of the directory tree over which MRS clients access the MRS file system. The directory `/update` is used for the automatic Client Software Update, `/userdata` contains individual user data (cover sheets, voice files, etc.), `/logging` contains MRS log files.

Required privileges can be attached. The first privilege is for reading and the second is for the writing of objects.

Example:

```
/update;D:\MRS\Client\Update
/userdata;D:\MRS\Client\Update
/logging;D:\MRS\Log;SYS_SERVICE;SYS_SERVICE
```

ForceLowerAddresses REG_SZ

List of addresses that are always comprised of lower case characters. In the example `NVS:TXSF/ASDFasdf` is transformed to `NVS:TXSF/asdfasdf`.

Example: `TXSF,TXDLG`

ForceUpperAddresses REG_SZ

List of addresses that are always comprised of upper case characters. In the example `NVS:MS/ASDFasdf` is transformed to `NVS:MS/ASDFASDF`.

Example: `MS,WP`

IntRout REG_SZ

List of protocols where an address transformation is not required. To prohibit recursion, the router generates a warning message if an address was not modified through a routing rule. This behavior is nevertheless desired by intermediate routing systems. In this case the protocol name (e.g. SMTP) should be entered here. Protocols are to be separated with a comma.

LinkenheilSlowDown REG_DWORD *Millisecond*

The transmission of a distribution list is delayed *n* milliseconds per entry in the list.

Default: `0`

LowerCaseAddresses REG_DWORD

Should always be `1`. With `0` the kernel does not use addresses with lower case characters.

Default: `0x1`

MaintenanceActive REG_DWORD *0 or 1*

Via this value you can deactivate the execution of the maintenance script. The script is performed by default.

Default: 1

MaintenanceDontTouch REG_DWORD *0 or 1*

The DELDB function changes the 'modification time' of all files in the document folders so that the remove function of the maintenance task is under no circumstances able to delete files before their expiry date. If a differentiated saving of these files is performed, all files are saved again though only the 'modification time' has changed. Setting this switch to 1 you can deactivate this behaviour for such cases.

Default: 0

MaintenanceLastStart REG_DWORD

The time of the last maintenance script performance is filed here with each run. This entry is used by MaintenanceMonitorDateTime and MaintenanceMonitorYear to detect abstruse differences between two start times.

MaintenanceMonitorDateTime REG_DWORD *0 or 1*

When active, performance of the maintenance script remains undone if more than three days passed between two timer calls. The time between two calls should normally be approx. one minute.

Default: 1

MaintenanceMonitorYear REG_DWORD *0 or 1*

When active, performance of the maintenance script remains undone if more than five years have passed since the last MaintenanceLastStart entry. This precaution was implemented in view to the upcoming year 2000 as previous tests revealed that some computers would be many years in the future after the turn of the year. In

such a case the maintenance script had otherwise immediately deleted the actually current documents.

Default: 1

MaintenanceScript REG_SZ

Location of the maintenance script which defines the periodical tasks of the MTA. See section *Maintenance Script* on on page 50ff. Note that with an MRS Server update a modified script would be overwritten again by the script default version. To avoid this, save the modified version under a different name in the *<MRS Root>*`\res\maint\` directory. This new name with complete path specification should be entered here then.

Example: `g:\mrs\res\maint\maint.scr`

MaxHopCount REG_DWORD

Maximum number of hops before mail is destroyed to prevent recursion. This value must be set high for complicated switching.

Default: `0xA`

MaxLockTime REG_DWORD *Seconds*

Maximum time a journal entry is allowed to be locked.

Default: `0xC`

MaxPrivateRules REG_DWORD

Maximum number of private rules that users can define.

Default: `0x200`

MaxRoutTargets REG_DWORD

Maximum number of logical lines that the router can administer.

Default: `0x400`

MinimumBusyTime REG_DWORD

Minimum time duration in seconds for redial if resources (e.g. lines) are busy.

Warning:

This value has a strong influence on the system performance during peak load periods. If the value is small and many jobs are in the system, then similarly numerous repeats must be attempted by the kernel which leads to meaningless basic load.

Default: `0x1E`

MinimumRejectTime REG_DWORD

Minimum time duration in seconds for an attempted repeat after a reject. If the kernel receives a job with a repeat request less than the defined value, then the value is taken from MinimumRejectTime. Minimum time is 10 seconds.

Default: `0x1E`

MinimumRepeatTime REG_DWORD

Minimum time duration in seconds for an repeat attempt. If the kernel receives a job with a request less than the defined value, then the value is taken from MinimumRepeatTime. Minimum is 10 seconds.

Default: `0x1E`

MonitorDiskUsageAlerts REG_DWORD *0 or 1*

Harddisk storage space surveillance (`1`) with alarm by storage shortages.

Default: `1`

MonitorMemoryUsageAlerts REG_DWORD *0 or 1*

Memory surveillance (`1`) with alert by memory shortages

Default: 1

MultiAddresses REG_MULTI_SZ

Normally this will restrict the router since a document is sent twice to a single address (e.g. two faxes to 02404906610). With some addresses it may be meaningful to allow simultaneous transmission. Address patterns can be stored in MultiAddresses that allow multiple addressing. The following Multiaddress types are defined by the kernel:

```
NVS:SPX/*
NVS:TCPIP/*
NVS:PIPE/*
```

NoOwnerOnNOPREFERRED REG_DWORD *0 or 1*

When this value is set to 1, documents flagged with `NOPREFERRED` are not assigned to the recipient and consequently do not appear in his inbound journal. In this way it can be avoided that e.g. an SMS, sent by MRS to a known recipient, is displayed in the recipient´s inbound journal.

Default: 0

NstDeltaTime REG_WORD *Seconds*

Number of seconds after which the Scheduler-Queue is examined for new entries. Only very slow computers should have a value higher than `1`.

Default: `1`

OptimizeQueue REG_DWORD *0 or 1*

Extreme scheduler algorithm that reallocates all lines optimally. The disadvantage is that it is very computation-bound. Since the MTA immediately reallocates all free lines, it is possible that a fax distribution list could block all lines and no lines would be free (unless specifically reserved) for inbound traffic.

Default: `1`

OptimizeQueueSize REG_DWORD

Number of allowable spooler entries that are RAM cacheable for queue optimization. The number is directly proportional to the computation time needed by the optimizer. For slower computers this value should be set to `128`.

Default: `1024`

ProxyOpenDelay REG_DWORD

Waiting time in milliseconds till the first occurrence of open proxy.

Default: `10`

ProxyRetryDelay REG_DWORD

Waiting time in milliseconds till a new attempt is made to open the proxy pipe. Maximum number of attempts is 10.

Default: `50`

Both proxy keys are used to circumvent a Windows NT bug, that does not allow direct opening of a remote-proxy on a system within a distributed network. A waiting time of approximately 1ms is required. To be safe, MRS uses (defined in ProxyOpenDelay) a default setting of 10ms. If the first attempt fails, then 10 repeat attempts are made with a 50ms interval between attempts.

QueueThresh REG_DWORD

Threshold value for database queuing. By default if more than one job is in the queue then the database is used for queuing.

May not be altered.

Default: `0x1`

RecursiveDistributionLists REG_DWORD *0 or 1*

Normally distribution lists are allowed within distribution lists. This value enables you to deactivate this default behaviour.

Default: 1

RecursivReRout REG_DWORD *0 or 1*

With the value `1` the routing rules are recursively applied till a modification of the target address no longer occurs. By a value of `0`, the routing rules are applied until the first applicable rule is found. Target address is final.

Default: `0x1`

RemoveFromCapaList REG_SZ

List of address types that are not to be sent to client.

RemovePropertiesOnCarbonCopy REG_DWORD *0 or 1*

When a carbon copy of a message is generated, the message´s properties fields are normally deleted on the copy. If you wish to retain these fields, alter the default setting of this value.

Default: 1

RepeatStandardDeviation REG_DWORD *0 to 100*

Standard deviation for kernel repeat strategy. This is a measure for the influence from random factors on the exact length of the repeat cycle. It is suggested that this option should not be used.

Default: `0`

ReRoutLevel REG_DWORD

Maximum allowable number of address transformations executed by the kernel during routing rule application.

Default: `0xA`

RoutHeuristic REG_SZ

Router heuristic. This value may not be modified!

Default: `FRB=10000;FAK=1000;FCN=50;FSQ=2500;FPE=1;FOR=10;FRA=1;FSET=5`

RoutOpt REG_SZ

This value may not be modified.

Default: `CHECKMULTI,COMBINEDOCS,NEWOWNER`

RoutStrat REG_SZ

This value may not be modified.

Default: `RANDOM`

StateTimeout REG_DWORD *Seconds*

The router maintains an internal list of all addresses currently in the queue, to prevent a second dialing attempt by another document. This value indicates the waiting time before a redial should be attempted, in the event that the address is not free.

Default: `3600`

StatWinSize REG_SZ

This value may not be modified.

SystemStartDelay REG_DWORD

The MTA is idle for SystemStartDelay `seconds` before the APL's are enabled. After a further SystemStartDelay `seconds` the system is running for the MTA and generates the message "system up".

Default: `60`

UnSecureSMI REG_DWORD *0 or 1*

Execution of forced validation on SMI transporters. Unsecure connections without validation when set to `1`.

Default: `0`

UseOriginalDocOnRout REG_DWORD *0 or 1*

With a value of `1` all conversions, cover pages, and logos are removed from documents prior to routing. The routed document consists only of the original document.

If the value is `0`, then the PMF representation (if present) of the document with all conversions, cover pages, and logos will be sent.

Default: `0`

UserRemovalExtension REG_SZ

If a program is given in this value it would be called-up if the user is to be removed per Maintenance Script (Task OldUserCleanup) or InfoTool (Option KillUser). This program receives as first command line parameter the user ID of the deleted user account.

VirusCheck REG_DWORD *0 or 1*

With the value of `1` all documents and attachments are checked for viruses. The virus checker impedes greatly the performance of the kernel.

In order to activate the virus scanner the command line version must be installed in the <*MRS Root*>`\Res\VirScan` directory. Thus copy Scan.exe (version 4.0.2 to 4.50 is presently supported) inclusive the required DLL s and the current `*.DAT` files to this directory. The virus scanner must be licensed!

Default: `0`

VirusCheckFileFormats REG_SZ

When the virus checker is enabled, all documents whose format is contained in the list are checked for viruses. Numerous formats may be appended when separated by a comma. So that the virus checker can also be applied to text documents the value needed to be altered to `BIN,TXT,AS7,ASC.` This would be required if e.g. VBS viruses such as “I Love you” were to be detected. But since a detection significantly lags behind in most cases, the VBS support in Outlook should be switched off. A list of possible formats is found “Supported Document Formats” on page 429

Default: `BIN`

WriteLoginStat REG_DWORD *0 or 1*

Current login statistics from client users are written to the correlation database when set to `1`. The corresponding key name is `LOGIN_STAT`, the entry is a time stamp in the "hh:mm:ss DD.MM.YY" format.

```
Classname    Class   Keyname      key
USER         MK      LOGIN_STAT   06:34:56 04.05.01
```

Disadvantage: Unnecessary database info replication with the client database at login in systems with numerous users.

This function can be used e.g. for maintenance purposes. In anonymus systems (MRS-for-ISP), a user´s last login must be identifiable. This enables deletion of user accounts that have not been used over a specific period.

Default: 0

2.22.8 Autoreporter

The following *Values* are found in the *Key*

`HKEY_LOCAL_MACHINE\SOFTWARE\PP-COM\MRS\MTA\AUTOREPORTER`

DefaultListSet REG_DWORD *0 or 1*

Default recipient for active alerts is set at the first start of the MTA. After this default is set, the value is set to `1` so that the default is not reset by the MTA even in the event of recipient list deletion.

LogReportPeriodicity REG_DWORD *Days * 86400 Seconds*

Number of days in seconds (multiple of 86400) after which the Log-Autoreport is sent.

Default: `86400`

MinimumTimeBetweenReports *Seconds*

Minimum time in seconds between report generations.

Default: `3600`

ReportList REG_MULTI_SZ

A semicolon separated list of report recipients with type and context of report. Every MRS address can be used as a recipient. Here emphasis is layed on the special “EventLog” address which, with simultaneous specification of the `EVENTLOG` type, writes the correspondingly matching log entries in the Windows Event Log.Two classifications of types are additionally available: `LOG` collects all log entries and sends them to the recipient. `ACTIVE` immediately sends all messages as long as they conform to the log entry filter conditions. The context of these reports is determined by the filter conditions for active alerts from the MRS Monitor. The `*` takes-in all log messages that meet the configured filter conditions. Words separated by a comma can also be used as search criteria for log messages that should be included in the report, when all words are found within the log message. If a word is prefixed with a `!`, the log message would only be included in the report when the word is **not** found within the log message. These words used as search criteria are a conjunction.

Example:

```
NVS:MRSSERVER/ADMINISTRATOR;LOG;*
NVS:MRSSERVER/ADMINISTRATOR;ACTIVE;ERROR,!DIALOG
EventLog;EVENTLOG;*
```

2.22.9 CIT – Computer Integrated Telephony

The following *Value* is found in the *Key*

`HKEY_LOCAL_MACHINE\SOFTWARE\PP-COM\MRS\MTA\CIT`

CitActive REG_DWORD *0 or 1*

With a value of `1` is CIT activated. A corresponding CIT protocol must also be defined. This could be done with the V24APL.

Default: `1`

CitCacheActive REG_DWORD *0 or 1*

CIT response is optimized through use of a cache when value is `1`.

Default: `1`

CitCacheActiveForNoCitOff REG_DWORD *0 or 1*

CIT protocol requests that require no CIT signal reset, are optimized through a cache when set to `1`.

Default: `1`

CitCacheSize REG_DWORD

CIT cache size.

Default: `0x80`

CitCounter REG_DWORD *0 or 1*

Counter based CIT switch on (1).

Default: `0`

CitMessage REG_SZ

Standard message by text capable CIT protocols (e.g. SMS). The text may contain following variables:

Variables	Significance
`{DATE}`	Date
`{DIGEST[,<Max>]}`	A portion of the text message is embedded in the CIT notification. The maximum length of this option can be set through the optional entry <*Max*>. The algorithms that forms the digest attempts to filter-out unnecessary information from the text. This could be e.g. empty lines, greeting macros, etc.

Variables	Significance
{FORMAT}	Inbound message format (e.g. voice, fax, or email) independent of the inbound service used.
{ORGNAME[,<*Max*>]}	A readable version of the originator address. If the message originator is contained within the alias database, the name of the originator could appear instead of the fax number. The maximum length of this option can be set through the optional entry <*Max*>.
{ORGNODE}	Incoming service
{ORGUSER}	Originator address
{RECNAME[,<*Max*>]}	A readable version of the recipient address. The maximum length of this option can be set through the optional entry <*Max*>.
{RECNODE}	Target service
{RECUSER}	Recipient address
{SUBJECT[,<*Max*>]}	Subject line of the message. The maximum length of this option can be set through the optional entry <*Max*>. If the actual length of the subject line is greater, it will be cut-off and "…" suffixed to entry.
{TIME}	Time

Example:

```
{ORGNODE} message received from {ORGUSER} at {TIME}.
```

CitMessageFile REG_SZ

Voice file used for CIT notification per ISDN voice protocol.

CitMessageMode REG_DWORD

CIT notification mode:

Mode	Significance
1	Text message
2	Voice file

CitUserBasedMessage REG_DWORD *0 or 1*

The voice resp. text file sent as CIT notification can be entered depending on the user. Enter the file containing the individual text resp. voice file of the respective user in the database field `CITFILE`. Text files must be suffixed with `TXT` for this purpose. The files are stored in the `UserData` directory tree of the MRS Server and files are thus entered in relation to this directory. This feature enables among other things CIT notification in different language versions.

Set value to 1 to activate this option.

Default: 0

CitUserIsOriginator REG_DWORD *0 or 1*

A customer wants to keep an account on all outgoing calls. The problem is that with SMS notification transmission no Calling Party Number is delivered. This, however, is done with sending normal SMS messages. The only difference is that when an SMS notification is sent, the originator is always “Autoreporter”. Via this switch you can set the originator of an SMS notification to mailbox owner (1) so that accounting can be properly performed.

Default: 0

HideCitMessages REG_DWORD *0 or 1*

All messages generated for CIT are indicated with the HIDE flag (1) so that they do not appear in the journal.

Default: 1

MaximumCacheTime REG_DWORD *Seconds*

Maximum CIT cache time.

Default: `0xe10`

MinimumCacheTime REG_DWORD *Seconds*

Minimum CIT cache time.

Default: `0x3c`

NoCitOffSignal REG_SZ

Protocols where a CIT reset is not required.

Default: `SMS,VOICE`

2.22.10 Line Cache

The following *Values* are found in the *Key*

`HKEY_LOCAL_MACHINE\SOFTWARE\PP-COM\MRS\MTA\LineCache`

CacheActive REG_DWORD *0 or 1*

MTA line cache on (`1`) or off (`0`).

Default: `1`

LineCacheVersion REG_DWORD

Version of the line cache.

LogicalLines REG_MULTI_SZ

All known lines and their states are recorded here by the MTA. These lines are discerned at the start of the MTA to prevent illegal address assignments during ensuing operations e.g. through the establishment of Remote System Links.

2.22.11 Remote System Links

The following *Values* are found in the *Key*

`HKEY_LOCAL_MACHINE\SOFTWARE\PP-COM\MRS\MTA\RemoteSystemLinks`

AddressUpdateID<MRS Address> REG_DWORD

When a remote system link address book is replicated a value is formed from the remote system MRS address and the last stored update ID. Through this procedure a complete address book synchronization is not necessary.

AutoBiDirectionalLinks REG_DWORD *0 or 1*

Remote system links are always directional. If a system builds a remote system link to another remote system, then mail can be sent to the remote system, but not received. If AutoBiDirectionalLinks `1` is entered then is the link automatically bi-directional. The remote system automatically creates a back-link.

EMailSecurityLevel REG_DWORD *0,1 or 2*

Its possible that by the configuration of a Remote System Link no privileges were assigned and incoming mail to this system would be denied. If set to 1 all email addressed to `NVS:`<*System*> would be delivered regardless of granted privileges. When set to 2 the address is checked for the privilege `SYS_USER`, thus ensuring a greater possibility that a user exists on the MRS Server.

Default: `0`

ForceAuthentication REG_DWORD *0 or 1*

When set to `1` every remote system link must be validated with a password.

Default: `1`

GlobalLink REG_DWORD *0 or 1*

A logical line (e.g. the email address `NVS:<Systemname>`) has the attribute `GLOBAL`. If the value for Global link is `1`, then all lines with the attribute `GLOBAL` can be reproduced over numerous hops.

A hop is a connection over a remote system link. If a server imports a line and then exports it via remote system link to another server, then two hops have occurred.

By default lines are only over one hop exported. With a value of `1`, document routing over numerous system hops is possible.

ImportedFields REG_SZ

Field names of the user database that with a Remote System Link have been imported from other systems are found in this field separated by a comma.

Importing rules are:

- Only the fields listed in ImportedFields are imported.
- Fields listed in NotImportedFields are principally not imported.

Default is empty for ImportedFileds, for NotImportedFields it is "`CIT, MAILBOX`".

LinkList REG_MULTI_SZ

Per line is one link listed to a remote system. The syntax is: connection address, synchronizations interval, number of redials, encrypted password, configured address book replication, and the optional imported logical line, all separated by a semicolon.

The best method of configuring a remote system link is through the MTA configuration in the MRS Monitor.

Example:

```
NVS:TCPIP/NVS20PPC;CSync=120,10;Rep=3;Pwd=3701913046;OPT=TIME
NVS:ISDNSMI/4924049066530;CSync=86400,30;Rep=3;Pwd=0;Prot=NVS:TXSF
```

Every 120 seconds a connection attempt is made to system `NVS20PPC` over TCP/IP transport. If the connection is made within a 10 second period, then the remote system link is established. If not, then another attempt would be made in 120 seconds later. After three unsuccessful attempts, no further attempts would be made to establish a connection. If the connection is successful, the encrypted password is sent. Entry of the password should be done through the MTA configuration in the MRS Monitor. Validation on the other side of the link is done through use of a

pseudo account. Lastly, the system time is set to that of the remote system. All logical lines on the server `NVS20PPC` would be imported.

In the second line the Remote System Link is over the `ISDNSMI` protocol of the ISDNAPL. Once daily (86400 seconds) a connection is attempted. If the other system answers within 30 seconds, then a Remote System Link is available for the MRS Server. An automatic exchange of telex documents is now possible. This is achieved through the use of the optional parameter `Prot=`, a list of logical MRS addresses separated by a comma that are to be exchanged. This connection is not protected with a password.

The available logical MRS addresses are those lines made available by the MTA.

MaximumReplicationRecordsPerTransaction REG_DWORD

Maximum number of database records that can be replicated per transaction.

Default: `500`

NotImportedFields REG_SZ

Field names of the user database that with a Remote System Link are not imported from other systems are found in this field separated by a comma. Via the field `CIT` you can control e.g. new message notifications that are exclusively to be initiated on the Home Server. Thus this field should not be imported.

Default: `CIT, MAILBOX`

RemoteLocalServices REG_DWORD

If the option “Adapt routing information” is selected, the information contained in the `PREFERRED` field of the remote system local user database would be incorporated for routing to the user during the address book replication.

Example: The database record “`USER XYZ PREFERRED TCPIP`” is replicated. On the local server the entry “`USER XYZ PREFERRED` <*Remote server name*>” and an additional entry “`USER XYZ` <*Remote Server Name*> `XYZ`” are created when the option “Adapt routing information” is used. The mail routing now occurs automatically to the remote system user `XYZ`.

Default: `TCPIP, SPX, IPX, MAILBOX, PIPE, STAND-IN`

ReportEncapsulation REG_DWORD *0 or 1*

Repeat options are not available for reports sent over a remote system link. With the value 0, reports will be lost if the first transmission is not successful.

By using the value `1` reports are encapsulated in a document, so that redialing is possible. The reports can then be processed by the remote system.

UseTrustedDomains REG_DWORD *0 or 1*

Remote systems links validate themselves (`1`) against each other using Trusted Domain User. Therefore a pseudo-user must be created, where the user name is the same as the system name of the remote system. This pseudo-user receives all required privileges as needed for documents transmission over the Remote System Link. Additionally the pseudo-user has the privilege `SYS_ACTASDOMAIN` ("Trusted Domain Group Rights"). This is needed for example when through routing other costs are incurred. In this case the originator must have the needed privileges required for transmission.

Attention

Trusted Domains User constitute a large security risk in that the identity of the remote system is not checked. A value of `0` deactivates this function.

2.22.12 Routing Rules

The following *Value*s are found in the *Key*

`HKEY_LOCAL_MACHINE\SOFTWARE\PP-COM\MRS\MTA\RULES`

Awake REG_MULTI_SZ

The awake rules. For the structure see section *Rule Structure* on on page 30ff.

AwakeCustomBackup REG_MULTI_SZ

Possible storage of a user defined set of awake rules. If during the setting of the MTA, a different set of awake rules is installed, these rules would be stored here. A later resetting of the user defined rules would assume these values.

AwakeType REG_DWORD

Internal awake rules type. These rules are set through the MTA configuration of the MRS monitor.

Value	Significance
`0`	No automatic new rerouting of documents
`1`	Unread incoming documents sent to Postmaster
`2`	User defined new rerouting rules

CarbonCopy REG_MULTI_SZ

Rerouting rules for the automatic creation of copies. These rules are only active if CarbonMode is entered.

CarbonCopyCustomBackup REG_MULTI_SZ

Possible storage of a user defined set of carbon copy rules. If during the setting of the MTA, a different set of carbon copy rules is installed, these rules would be stored here. A later resetting of the user defined rules would assume these values.

CarbonCopyType REG_DWORD

Internal carbon copy rules type. These rules are set through the MTA configuration of the MRS Monitor.

Value	Significance
`0`	No automatic carbon copy
`1`	Incoming fax documents to standard printer
`2`	Incoming fax documents to a user defined printer (database)
`3`	User defined rules for carbon copy

CarbonMode REG_SZ

No carbon copies will be created without an entry. This value defines when a value in the carbon copy rules should be applied. The following values may be entered multiply and separated by a comma:

Value	Significance
`DOC`	Apply to every document transmission
`REPORT`	Apply to final reports e.g. reports with status `OK` or `FAILURE`.
`REPEAT`	Use on all reports (also on e.g. redialing generated reports). This value is only meaningful when used with report.
`HIDE`	Applies rules to hidden transactions. Generally hidden transactions are generated by the system for documentation of system administration. By hidden transmissions the flag `HIDE` is set.

CarbonModeBackup REG_SZ

Possible storage of CarbonMode values for user defined settings.

MaxCarbonCopy REG_DWORD

Maximum number of carbon copy rules.

Default: `0x40`

MaxReRoutRules REG_DWORD

Maximum number of rerouting rules

Default: `0x40`

MaxStatRules REG_DWORD

Maximum number of statistic rules.

Default: `0x40`

PredictiveConversion REG_MULTI_SZ

Here a rule can be defined for each line. This rule has an early conversion into a given format performed for a certain target address.

Syntax: <*MRS Address*>=<*Format*>

Examples:

`NVS:FAXG3/*=FG3`

This line means that all messages addressed to `NVS:FAXG3/`<*Number*> are first (before routing is performed!) converted to `FG3`. If e.g. Microsoft Word documents were sent to the fax number of an MRS user, they would be transmitted as fax though due to routing optimization they would actually not be converted.

`NVS:SERVER/LST:FAX*=FG3`

Documents sent to a distribution list whose name begins with `FAX` are converted to fax *before* distribution to the single recipients is performed. This may result in a considerable performance advantage.

Privileges REG_MULTI_SZ

Addresses that correspond to those of the listed wildcards, also require the corresponding privileges. The standard privileges over DnoServices are a prerequisite for all Telematic services. Additional privileges required by addresses can also be stored here. Pattern matching is used for the given service and number. Many manufactures e.g. Teles use expensive 0190 numbers for customer support and software updates. Now, service personnel could, with the appropriate privileges download the newest software versions using Euro file transfer.

Example: `SYS_SERVICE,NVS:EFT/0190*`

Rerouting REG_MULTI_SZ

Rerouting rules, see chapter 2.4

ReroutingCustomBackup REG_MULTI_SZ

Possible storage for user defined routing rules sets. If during the setting of the MTA, a different set other than the user defined routing rules is installed, these

rules would be stored here. A later resetting of the user defined rules would assume these values.

RoutingType REG_DWORD

Internal routing rules type. These rules are set through the MTA configuration of the MRS monitor.

Value	Significance
0	User defined routing rules
1	Routing through the MRS address book
2	Routing through the Exchange address book
3	Routing through the Lotus Notes address book
4	SAP/R3 routing through the MRS address book
5	FMS routing through the FMS address book

2.22.13 Services

The following *Value*s are found in the *Key*

`HKEY_LOCAL_MACHINE\SOFTWARE\PP-COM\MRS\Services`

Access Protocol Layers REG_MULTI_SZ

List of the installed MRS APL's. As soon as the kernel is successfully started, the MRS administrator will uses this list to start-up the system. The computer where the service is started, may be entered as parameter after the comma. Default is the local computer.

Example:

MailApl,
PipeApl,
FiApl,
IsdnApl,

Kernel REG_MULTI_SZ

Kernel services started at the time of the server start. The computer where the service is started, may be entered as parameter after the comma. More information

over the procedure for distributed MRS server is found in section *Distributed MRS Server* on on page 67ff. Default is the local computer.

Default:

NameLoc,
XmrSvc,
InfoStor,
MTA,

MaxRetries REG_DWORD

Maximum number of attempts executed by the Watchdog to restart a process.

Default: 20

Recover-Kernel REG_MULTI_SZ

These commands are executed by the Watchdog prior to the restart of the MRS Server due to the crash of a kernel module. One command may be entered per line.

Recover-<NT-Name>-<Service> REG_MULTI_SZ

These commands are executed by the Watchdog prior to the restart of a <*Service*> on the computer <*NT-Name*> in a distributed MRS Server. One command may be entered per line.

Recover-<Service> REG_MULTI_SZ

These commands are executed by the Watchdog prior to the restart of a <*Service*>. One command may be entered per line.

WatchdogActive REG_DWORD *0 or 1*

Activate (1) or deactivate (0) Watchdog process.

WatchdogRestartSystemDelay REG_DWORD *Seconds*

Wait-time prior to system restart by the Watchdog process.

Default: 240 seconds by a cluster systems (e.g. MSCS or VINCA), otherwise 5.

WatchdogRetryDelay REG_DWORD *Seconds*

Wait-time prior to the restart of a service by the Watchdog process.

Default: 120 seconds by Cluster systems (e.g. MSCS or VINCA), otherwise 0.

2.22.14 Database

If database files (`*.DAT`) are contained in the Infostor directory which contain information over the individual database entries, a database recovery is possible. If a recovery is not possible due to a damaged Index file (`*IDX`), the file should be deleted from

the Infostor directory. The file will be created automatically at the new start of the server.

Attention

Depending upon the size of the database, the recovery could take from several minutes to several hours. During the database recovery the MRS Server may not be shut-down, since a recovery is no longer possible after an interruption!

The following *Values* are found in the *Key*

`HKEY_LOCAL_MACHINE\SOFTWARE\PP-COM\MRS\InfoStor`

CompressDatabaseDir REG_DWORD *0 or 1*

At the start of the Infostor administrator, the directory is set to compression, if the server uses the NTFS file system and if the value is set to `1`.

CreateDnoAliases REG_DWORD *0 or 1*

Flag between Setup and Infostor. When set to `1`, ISDN dialing numbers are automatically included by the import of user data on a Windows NT domain. For these purposes the ISDN defined dialing areas are used.

CreateMailAliases REG_DWORD *0 or 1*

Flag between setup and Infostor. When set to `1`, the user data is imported from a Windows NT domain is converted for use as a mail alias for SMTP, Lotus Notes and Microsoft Exchange in the corresponding fields of the user database.

DatabaseDirectory REG_SZ *Directory*

Location of the database directory

Example: `g:\mrs\InfoStor`

DatabaseImportMode REG_DWORD

Import mode for an empty database.

Value	Significance
0	Import from NT domain
1	Import from NT global group
2	Import from a correlation export file

DatabaseImportSource REG_SZ

Depending on the ImportMode this is the name of the domain (`0`), the global group (`1`), e.g `DOMAIN\GROUP`, or export file name (`2`).

ImportNTUsers REG_SZ

A list of NT domains can be combined with global groups for import in the MRS address book. Domains are separated by a semicolon. If the database contains no users, then all users in the list will be imported to the user database. As password the login name is used.

Example: `COMPANY\Development; COMPANY\Marketing`

JournalLayout REG_DWORD

Version number of the journal layout. If this database layout is modified the database must be updated accordingly. The version number is then used as flag to signify whether a possibly necessary update has been performed already.

LogDirectory REG_SZ

Log directory is currently not supported.

Example: `g:\mrs\InfoStor\Log`

MaintenanceDelay REG_SZ

This entry corresponds with the **Maintenance Priority** slide control for performing the Maintenance Script in the MTA configuration of the MRS Monitor.

MaxLockTime REG_DWORD *Seconds*

Maximum lock time for journal database entries.

Default: `0x3c`

2.22.15 Important User Accounts

The following *Values* are found in the *Key*

`HKEY_LOCAL_MACHINE\SOFTWARE\PP-COM\MRS\InfoStor\Accounts`

Administrator REG_SZ

Definition of the user (user name and encrypted password) that assumes the duties of the administrator. If the MRS database is fully deleted (directory `\mrs\infostor`), then this user would be automatically reentered. The user retains the password given at the time of the MRS installation. Additionally, this user name with the `$(ADMINISTRATOR)` variable is used in maintenance Scripts.

Example: `ADMINISTRATOR,-592113043`

Guest REG_SZ

General guest access. Used also as Euro file transfer access with corresponding rights. This registry entry should not be deleted. By the first installation the default name `GUEST` is entered with the password `GUEST`.

Example: `GAST,-582143053`

Postmaster REG_SZ

Definition of the user (user name and encrypted password) that receives all non-deliverable mail. If the MRS database is fully deleted (directory `\mrs\infostor`), then this user would be automatically reentered. The user retains the password given at the time of the MRS installation. Additionally, this user name with the `$(POSTMASTER)` variable is used in maintenance Scripts.

Example: `POSTMASTER,-592113043`

2.22.16 Name Locator

In addition to the installation of a Distributed Server as described on on page 67, two other possibilities are available for the Registry Replication of the sub-tree *MRS Globals*. One method is the Registry PushTime activate periodical replication, and the other through MonitorRegistry Changes of a replication when the kernel computer has changed something in the sub-tree. It should be noted that replications always go from the kernel computer to the satellites. For clustered server solutions the complete registry tree can be replicated.

The following *Values* are found in the *Key*

`HKEY_LOCAL_MACHINE\Software\PP-COM\MRS\NameLoc`

MonitorRegistryChanges REG_DWORD *0 or 1*

When set to 1 the complete Registry sub-tree *MRS Globals* is sent to all MRS satellites through the Name Locator on the kernel computer whenever a modification is detected.

Default: `1`

RegistryPushTime REG_DWORD *Seconds*

This value gives the time interval in seconds for which all relevant registry portions of the MRS sub-tree are transferred from the kernel computer to the satellite systems. When set to 0 no replication is executed. The minimum value for a periodical replication is 3600 seconds.

Default: `0`

ReplicateWholeRegistryTree REG_DWORD *0 or 1*

For clustered server solutions it is sometimes necessary to replicate not only the MRS global registry sub-tree, but the complete MRS registry tree. With a Microsoft Server Cluster (MSCS) it's advisable that this be done through use of the Microsoft software, but with the Vinca solution, replication should be via the MRS Server. When set to 0 only the MRS global keys are replicated. A value of 1 replicates the complete MRS registry tree with the exception of the Service Area. Since this sub-tree determines start-up of modules and the backup systems of various APLs it is not replicated.

Default: 0

WalkLocalSystemList REG_DWORD *0 or 1*

A search for further Name Locator instances is conducted over a NetBios broadcast when set to `0`. This functions only within a domain and most of the time within a network segment.

When set to `1` the LocalSystemList is searched for other Name Locator instances.

2.22.17 XMRSVC

The following *Values* are found in the *Key*

`HKEY_LOCAL_MACHINE\Software\PP-COM\MRS\XmrSvc`

AutoReportFilter REG_MULTI_SZ

Filter for the active alert reports generated by the MTA. The MTA uses the log entries generated by the MRS Server and passes through this filter for its active alert reports when they meet the criteria of its own filter. Log entry formats correspond to those described in the LogFileFilter.

LogFileFilter REG_MULTI_SZ

Filter for the MRS log file. Modules, topics, and filters that are to be entered in the log are written on a line and separated with a comma.

The filters are given by a character resp. digit: *Fatal Error* (`F`), *Error* (`E`), *Warning* (`W`), *Info-Message* (`I`), *Debug-Message* (`D`), *Debug Level 1 to 4* (`1`,`2`,`3`,`4`)

The log is found in the directory `Log` under the MRS installation directory. The installation directory can be found in the value `LocalSystemList`

Default:

```
*,*,FEW
*,,I
```

For all modules and topics *Fatal Error*, *Error* and *Warning* messages are written to the log. Additionally, info messages where no topic can be assigned are in the log.

LogFilePath REG_SZ *Path*

Path to the MRS main log files.

LogServer REG_DWORD *0 or 1*

When set to `1`, the topic “Log Server” is created by the XMR service. All reports appear under this topic that are sent with the program `LogServ` from the SDK utilities. This program can be used to write reports from Batch Jobs to the MRS Log, thus e.g. also from the MRS Maintenance Skript.

When `LogServ` is called without parameters, the various parameters are displayed.

Default: `1`

MaxLines REG_DWORD

Maximum number of lines administered by the MRS Monitor.

Default: 1024

3 TeleReg API

The TeleReg API administers registry entries for Telematic APL's. The TeleReg API is used by the Dialogic, ISDN, and Gamma APL's. The TeleReg API provides a uniform configuration for these telematic APL's, and a similar method of installation. Configuration data is transferred between the MRS Server and the MRS Monitor in a compressed form so that faster data transfer rates are achieved when performing Remote Administration over modem lines.

3.1 Registry Entries

The entry structure described here can be found in every APL which uses the TeleReg API.

3.1.1 General Entries

The following *Values* are found in the *Key*

`HKEY_LOCAL_MACHINE\Software\PP-COM\MRS\<`*APL*`>`

BuiltInDtmf REG_DWORD *0 or 1*

In most cases is the DTMF recognition performed by the communications board (`0`). Built-in software can also be activated for this purpose (`1`). Whereas these programs are very computation bound, consideration should be given prior to using this option.

Default: `0`

CfgCompress REG_DWORD *0, 1 or 2*

Data transferred between the APL and the CFG (MRS Monitor) is not compressed (`0`), or compressed (`1`). A value of 2 activates a test mode in which data to be transferred is compressed and subsequently decompressed to test the packing program.

Default: `1`

Checked*n* **REG_DWORD** *0 or 1*

The TeleReg provides four values (Checked1, …, Checked4) which can be defined by the various APL's. When used by an APL, a checkbox is provided in the configuration tab with the name of the corresponding service. Checkboxes are activated when set to 1.

Default: `0`

CLIMode REG_DWORD *0, 1 or 2*

Calling Line Identification. When an entry in the user database field CostInfo exists, this information would be taken as default (2). If no entry exists, the extension number of the user would be used as the CLI (1). If in addition to the extension number the complete normalized international of the user is to be sent as the CLI, the mode 0 must be set.

Default: 2

Cost REG_DWORD

Cost per charge impulse as $^{1}/_{100}$ of the local currency unit.

Default: `12`

DestNumberPlan REG_DWORD

Internal values used for ISDN/PABX connection tests.

Value	Significance
0	Unknown plan
1	ISDN numbering plan E.164
2	Telephony numbering plan E.163
9	Private numbering plan

DestNumberType REG_DWORD

Internal values used for ISDN/PABX connection tests.

Value	Significance
0	Number is sent en-bloc
1	International number
2	National number
4	Local (directory) number
5	Number is sent overlap

DlgFlags REG_DWORD

Internal flag that determines which setting tabs are displayed in the configuration dialog.

FaxLicences REG_DWORD

This is the number of allowable fax channels. Since this value is provided with licensing key, modification of this entry could result in a license infraction message.

Example: 12

FaxResources REG_DWORD

Number of fax channels as determined by hardware recognition.

LineLicences REG_DWORD

Number of allowed lines. A S0-Bus in this case would correspond to two lines. Since this value is provided with licensing key, modification of this entry could result in a license infraction message.

Example: 12

LineResources REG_DWORD

Number of lines as determined by hardware recognition. A S0-Bus has e.g. two lines. During the configuration the number of found resources will be entered in LineLicences.

OrigNumberPlan REG_DWORD

Internal values used for ISDN/PABX connection tests.

OrigNumberType REG_DWORD

Internal values used for ISDN/PABX connection tests.

QueryBilling REG_DWORD *0 or 1*

This switch is used to activate the billing option (`1`). If not activated, billing information is not displayed, even in the case of outgoing calls through the public exchange.

Default: `1`

SupportedDevices REG_MULTI_SZ

Device names given here will be displayed in the configuration tab of appropriate APL.

VoiceLicences REG_DWORD

This is the number of allowable full-duplex voice channels. Since this value is provided with the licensing key, modification of this entry could result in a license infraction message.

Example: 15

VoiceResources REG_DWORD

Number of voice resources (Full Duplex Voice Channels) as determined by hardware recognition. During the configuration the number of found resources will be entered in LineLicences

3.1.2 Blobs (Binary Large Objects)

Every registry entry administered by the TeleReg API may contain a 1reference to a Blob. Blobs are binary data ranges in which programer defined data may be stored.

Used Blobs can be found in the registry under the *Key*:

`HKEY_LOCAL_MACHINE\Software\PP-COM\MRS\<`*APL*`>\Blobs`

3.1.3 Hardware

Each board with one or more communication channels (lines) has in the *Key*

`HKEY_LOCAL_MACHINE\Software\PP-COM\MRS\<`*APL*`>\Devices`

an enumerated *Key_n*. In these *Keys* the following *Values* are found.

AddDialOutLen REG_DWORD

For outgoing calls it is possible to insert digits to a dialing number. If for example a PBX system has two cross connections 82 and 83, then a call from 8247 to 8311 is simply transferred internally and not through the public exchange. Numerous PBX systems do not have this function, and in such a case the call must be routed through the public exchange, and therefore these prefixed digits. In a case such as this, the number of prefixed digits must be entered here.

Default: `0`

Blob REG_DWORD

Index number of the Blob data range.

Default: `0`

Caps REG_DWORD

Each device administered by the TeleReg API has certain capabilities. These are listed as bitmasks with the appropriate capability:

Bit	Status (Bit set)
0x0001	Device is Voice capable.
0x0002	Device recognizes DTMF.
0x0004	Device can send and receive fax G3 documents.

Bit	Status (Bit set)
0x0008	Device can poll documents from fax on demand servers.
0x0010	Device can function as a fax on demand server.
0x0020	Device can send and receive fax G4 documents.
0x0040	Device can poll fax G4 documents from fax on demand servers.
0x0080	Device can function as a G4 fax on demand server.
0x0100	Device is Euro file transfer capable.
0x0200	Device is teletex transmission capable.
0x0400	Device can transfer raw data.
0x0800	Device can administer Message Waiting Indicators.

Channels REG_DWORD

Physical number of a device. Example: S_{2m} corresponds to 30.

Description REG_SZ

Optional device description.

FaxG3 REG_DWORD

Number of fax G3 lines on this board.

Example: 12

Handle REG_DWORD

Internal board handle.

Lines REG_DWORD

Number of physical lines supported by this board.

Example: 30

Name REG_SZ

Board description. This entry is also used for display in the MRS Monitor.

Example: D/300SC-E1

PrefixedANI REG_DWORD *0 or 1*

When set to 1 the number (Automatic Number Identification (ANI)) is used with the prefixed digit for outside dialing from the device. This information is required for uniform charge cost information gathering.

Default: `0`

Private REG_MULTI_SZ

Private data. Configuration data from the various APL's can be stored here.

PrivateMode REG_DWORD

Private data. Configuration data from the various APL's can be stored here.

SkipDialInfoLen REG_DWORD

The portion of the dialing number (by incoming calls) that is to be ignored. The following example depicts a situation that occurs often with a direct DSS1 configured as a PBX connection:

Given is the dialing number 49-2404-4711-xx. The extension information delivers the number 4711123 which when combined with the dialing number gives the number 49-2404-4711-4711123. In this case the first four digits of the extension information must be ignored (4711).

Default: `0`

State REG_DWORD

Every entry in the Registry administered by the TeleReg API has a "State". These entries are in the form of a bitmask and are described in the following table:

Bit	Status (Bit set)
0x01	Entry active.
0x02	This entry must be updated in the Registry. This bit is used by an internal configurations module.
0x04	This entry is deleted from the Registry unless the bit 0x08 is set.
0x08	This entry remains permanently in the Registry even when not active and when marked as deleted by a configuration module. This bit is used by certain standard protocols e.g. Fax G3.
0x10	This entry is already present in the Registry. This bit is internally used and modified by configuration modules.

Example: 0x11

Type REG_DWORD

Device Type

Type	Device type
0	S_{2m}-Device (Primary Rate Interface (PRI))
1	S_0-Device (Basic Rate Interface (BRI))
2	Analog device
3	Unknown device

3.1.4 Lines

A line is defined as a physical bidirectional communication channel. With S_{2m} ISDN-Boards this could be up to 30 Lines. Each line is assigned an Originator Address (OAD), and the same OAD could be used for more than one line. Furthermore, a line is bound with at least one protocol.

Under this *Key*

`HKEY_LOCAL_MACHINE\Software\PP-COM\MRS\<`*APL*`>\Devices\`*n*

an enumerated *Key_m* is found for each line on a board. In these *Keys* the following *Values* are found:

Baudrate REG_DWORD

Data transfer rate over logical lines. These values are used by the MTA for assigning line priorities.

Default: `0`

Blob REG_DWORD

Index number of the Blob data range.

Default: `0`

BoundProtocols REG_DWORD

This bitmask is set on protocols supported by this line. All supported protocols are assigned an enumerated *Key_n by TeleReg APL under the Key*

`HKLM\Software\PP-COM\MRS\<`*APL*`>\Protocols`

The bit 0x1 corresponds to the first executed protocol with the key `01`. If 7 protocols are available and supported by the line, the value of BoundProtocols would be 0x7.

Cost REG_DWORD

Cost per charge impulse as $^{1}/_{100}$ of the local currency.

Default: `12`

EndChannel REG_DWORD

End value when only a portion of available physical channels are used.

NumChannels REG_DWORD

Maximum NumChannels used in this line bundle.

OAD REG_DWORD

Every line is assigned a number (Originator Address, (OAD)). The TeleReg APL administers all available OAD numbers as enumerated *Keys_n* (01, 02, 03, …) under the Key `HKLM\Software\PP-COM\MRS\DlgApl\OADs`. Reference to the OAD that is be used with the line is accomplished through use of index numbers.

If the index number fails, than the OAD with the lowest index *n* number would be used.

Default: `0`

PermMask REG_DWORD

Value	Description
0	No restrictions
1	Inbound traffic only.
2	Outbound traffic only
3	Bi-directional traffic

StartChannel REG_DWORD

Start value when only a portion of available physical channels are used.

State REG_DWORD

See page 148.

3.1.5 Extension Number Ranges

All incoming dialed numbers must correspond with its extension in the ranges listed here. So that incoming calls are taken by the Dialogic APL, a protocol must be assigned to the range and bound to a line. Additionally, the line OAD must correspond with that of the number range. This mechanism can be used to assign certain ranges to

special lines. This could be implemented so that incoming fax documents are routed to a special line (OAD).

It the board delivers an ISDN Service Indicator it will be checked against a list of applicable protocols.

A minimum of one extension number is required for a supported service. These services are numbered and stored with their number under the *Key*

`HKEY_LOCAL_MACHINE\Software\PP-COM\MRS\DlgApl\Extensions`

as a separate *Key.* The first extension number range has the *Key* `01`, the second the *Key* `02`, … Each of these *Keys* contain the fixed *Values*

Blob REG_DWORD

Index number of the used Blob data range.

Default: `0`

Description REG_SZ

Comment or description for extension number ranges.

End REG_SZ

Upper boundary of the extension number range.

Example: 199

OAD REG_DWORD

See page 150.

Protocol REG_DWORD

All supported protocols are listed by the TeleReg API as enumerated *Key_n* under the *Key* `HKLM\Software\PP-COM\MRS\DlgApl\Protocols`. This number is used as a reference to a protocol.

Example: `1`

Start REG_SZ

Lower boundary of the extension number range.

Example: 100

State REG_DWORD

See page 148.

VarDigits REG_DWORD *0 oder 1*

Extension numbers in this extension range may have a variable amount of digits when set to 1. Calls with less digits would also be taken after a short waiting period for the next digit.

By voice applications it is helpful that the extension can be of varying length.

Default: `0`

The following *Value* is also found in the *Key*

`HKEY_LOCAL_MACHINE\Software\PP-COM\MRS\<`*APL*`>\Extensions`

EnableRegSz REG_DWORD

When set to `1` the Values found in Start and End of the extension number range are written as a REG_SZ in the registry. When set to 0 the values will be written as a REG_DWORD. This may be done for reasons of compatibility, but in most cases the REG_SZ entry should be used so that proceeding 0 can be used with the extension number ranges.

Default: `1`

3.1.6 Originator Address

Every line is assigned a number (Originator Address, (OAD)). The TeleReg APL administers all available OAD numbers as enumerated *Keys_n* (01, 02, 03, …) under the *Key*

`HKEY_LOCAL_MACHINE\Software\PP-COM\MRS\<`*APL*`>\OADs.`

Reference to the OAD that is be used with the line is accomplished through use of index numbers.

OAD numbers are used to determine the extension number of incoming calls. Simultaneously, the line can be validated for the extension number range.

AccessCode REG_SZ

Access code corresponding to the Value in

`Software\PP-COM\MRS\MRS Globals\Location`

When set this value will be used instead of the global value.

Example: `2404`

AreaCode REG_SZ

Area code without any proceeding zeros and parallel to the *Value* found in

`Software\PP-COM\MRS\MRS Globals\Location`

When set this value will be used instead of the global value.

Example: `2404`

AreaCodeEscape REG_SZ

National dialing number and parallel to the *Value* found in

`Software\PP-COM\MRS\MRS Globals\Location`

When set this value will be used instead of the global value.

Example: `0`

Blob REG_DWORD

Index number of the used Blob data range.

Default: `0`

CountryCode REG_SZ

Country code dialing number and parallel to the *Value* found in

`Software\PP-COM\MRS\MRS Globals\Location`

When set this value will be used instead of the global value.

Example: `49`

CountryCodeEscape REG_SZ

International dialing number and parallel to the *Value* found in

`Software\PP-COM\MRS\MRS Globals\Location`

When set this value will be used instead of the global value.

Example: `00`

Description REG_SZ

Description or comment.

ExternalLinePrefix REG_SZ

Outside line dialing number. This value corresponds to the *Value* in

`Software\PP-COM\MRS\MRS Globals\Location`

When set this value will be used instead of the global value.

Example: `0`

PbxCode REG_SZ

Cross connection number.

State REG_DWORD

See page 148.

3.1.7 Protocols

Protocols are supported services from the various APLs. There are various generic services such as FAXG3, VOICE, or VFS; and branched protocols from generic protocols (e.g. outgoing VFS with a coupled Script). Branched protocols may not have a Script assigned to them. Under the *Key*

`HKEY_LOCAL_MACHINE\Software\PP-COM\MRS\<`*APL*`>\Protocols`

an enumerated *Key_n* is found. In these *Keys* the following *Values* are found:

Attributes REG_MULTI_SZ

List of protocol attributes (MTA logical lines).

Attribute	Significance
AUTOLEARN	Message originators attributes are copied to the database (older AutoLearn mode).
AUTOREG	Automatic registration of new users in the Correlation database.
COST	Cost acquisition over this logical line is enabled in an outward direction only. Ensuing transmission costs will be stored in the Cost database.
DLG	These logical lines are capable of dialog operations.
DOCSYNC	Document-Synchronization.
GLOBAL	These lines are not exported to Clients.
IN	These lines are only allowed inbound traffic to the server.
LOCAL	Lines with this attribute will not be exported to systems connected by a Remote System Link. Lines without this attribute may be exported when queried by remotely connected MRSsystems.
OUT	These lines are only allowed outbound traffic from the server.

Attribute	Significance
PABX	Future extension.
PRIV	Privilege check is activated
RCIT	If “Read” report is received over this line the corresponding CTI reset signal will be sent.
SF	Store-and-Forward operations for documents is allowed on this line
SMITR	This line may be used as a SMI transport for Client connections or for Remote System Links.
TRANSACTION	This line supports transactions.
VALORG	Originator validation.
VALREC	Recipient validation.

Default:

```
SF
IN
OUT
```

AttributesAllowed REG_DWORD

All protocols administered by the TeleReg APL contain various attributes. This is a bitmask in which those attributes allowed for the protocol are stored. This entry is only valid when the attribute-bit is set by EditPerm.

Blob REG_DWORD

Index number of the used Blob data range.

Default: 0

CapMask REG_DWORD

Board characteristics bit mask. This bit mast allows the configuration module to determine if a protocol can be supported by the board. Possible values can be taken from the Caps table on page 146.

CheckMailbox REG_DWORD *0 or 1*

Calls are only accepted when a database entry exists for the number dialed (1).

ContMsg REG_SZ

This one line message is inserted as the first line in a fax whose retransmission is caused by an interruption.

Example: `Continuation of an interrupted message`

Description REG_SZ

Description or comment to a protocol.

DispPerm REG_DWORD

Bitmask that activates graphic user interface and window elements. This occurs by the corresponding APL. The individual configuration tabs are:

Bit	Configuration tab resp. protocol element
0x0001	ID tab
0x0002	Header bar for fax transmission in the ID tab
0x0004	ID for fax transmission in the ID tab
0x0008	Attribute tab (in expert mode only)
0x0010	Format tab (in expert mode only)
0x0020	Repetition tab
0x0040	Private tab
0x0080	Fax G3 tab
0x0100	Document chaining option in the Fax G3 tab
0x0200	Resending option in the Fax G3 page tab
0x0400	Fax G4 page
0x0800	Resending with Fax G3 after failed transmission option in the Fax G4 tab
0x1000	Using T.70 network layer option in the Fax G4 tab
0x2000	Fax receipt only for existing mailboxes option in the Fax G3 page

DocReps REG_SZ

Redial strategy. These parameters define how often and in which time intervals a repeat attempt is to be made by the router. The first parameter is the number of attempts that are to be made, and the second the time interval between attempts in

seconds. These are executed one after another and five various redial entries may be given. In the following example the first three attempts are made at sixty second intervals, the next two attempts in ninety second intervals.

Example: `3-60,2-90,0-0,0-0,0-0`

EditPerm REG_DWORD

Bit masks that allow modification of registry entries by the protocol

Bit	Modifiable Registry Entries
0x001	Name
0x002	FriendlyName
0x004	Description
0x008	Attributes
0x010	Formats
0x020	Private
0x040	ParamBlock
0x080	DocReps
0x100	ScriptName

EditPermGenerated REG_DWORD

The same as EditPerm but only for use with generated protocols (those created by other protocols).

FaxG3Chain REG_DWORD

Document chaining activation. Depending upon the APL, several transmission jobs may be chained (`1`) when sent in the Fax G3 transmission mode. A prerequisite for this option is that document recipient and document resolution must be the same.

Note:

Chaining functions only within a designated time interval. If for example fax data is transmitted to a fax device then further jobs designated for this device can only be transmitted when the ISDN APL is still sending data to the ISDN card. If the data has already been transmitted to the ISDN card, then disconnect-phase has been initiated and further chaining is not possible. Since the ISDN card can store a large amount of data, the disconnect phase can be received by the ISDN APL much quicker as from the FAX-T.30-protocol.

FaxG3Resend REG_DWORD

If a fax transmission is interrupted the fax will be retransmitted at the point where the interruption occurred at the next redial attempt (1). Complete document is retransmitted (0).

FaxG4FaxG3 REG_DWORD *0 or 1*

If a fax transmission job cannot be sent as fax G4 then an attempt will be made to send the document as a fax G3 at the next redial (`1`). The fax G3 protocol must also be installed, otherwise an error report will be sent (`0`).

FaxG4T70 REG_DWORD *0 or 1*

Either as Layer 3 or the older T70NL (`1`), or as ISO8208 (`0`). When in doubt the ISO8208 should be used since fax G4 with a T70NL connection cannot be sent to an ISO8208.

Default: `0`

FaxID REG_SZ

Default fax G3 ID. This ID must correspond to the standard T30. This standard recognizes only digits, spaces, and +. This ID is used only when no user specific ID is found in the database. For Fax G4 and ISDN telex the standard is F200.

This value is used when no user specified ID is found in the database.

Example:

(Fax G3) `+49 2404 9876543`
(Fax G4) `49-1234567890=FIRMA`

Formats REG_MULTI_SZ

List of documents and data formats valid for this logical line. These formats are described in Anhang 26.1 of this manual..

Example: TG3

FormatsAllowed REG_DWORD

Each protocol administered by the TeleReg API can process certain documents and file formats. These are bitmasks which contain the documents and file formats allowed by the protocol. These entries are only valid when the format is set by EditPerm.

FriendlyName REG_SZ

User readable protocol name. An unique FriendlyName must be entered for each protocol.

Example: Fax Group 3

Headline REG_SZ

Default fax G3 headline which appears on the top of every fax page. Maximum length of the headline is 32 characters.

Example: Sample Co.

MultiMaster REG_DWORD *0 or 1*

Numerous protocols can be branched from this protocol (`1`)

Default: `0`

Name REG_SZ

Node portion of the MRS Address.

Example: FAXG3

ParamBlock REG_SZ

Script parameters are given here.

Private REG_MULTI_SZ

Private data used by the individual APL's.

PrivateMode REG_DWORD

APL freely usable DWORD.

Default: `0`

ScriptName REG_SZ

File name of the protocols Script without extension.

Example: SFOD

SI REG_MULTI_SZ

The CAPI 2.0 CIP-Value.

State REG_DWORD

See page 148.

Type REG_DWORD

Protocol type.

Type	Protocol
0	Unknown protocol type
1	Fax G3 transmission and receipt

Type	Protocol
2	Fax G3 poll (call-back)
3	Fax G3 Fax-on-Demand Server
4	Fax G4
7	Euro-File-Transfer Server
8	Euro-File-Transfer Client
9	Voicemail transmission and receipt
10	Scripted protocol based on the language D
11	Scripted protocol based on the language E
12	Scripted protocol based on the language GSM
13	Message Waiting Indication
14	ISDN Teletex
15	SMI Transport
16	CTI Computer Telephony Integration

Example: 1

4 ISDN APL

The ISDN APL provides the MRS System with all available ISDN telematic services. In particular:

- Fax group 3 transmission and receipt
- Operation as fax concentrator (fax-fax conversion protocol)
- Fax group 4 transmission and receipt
- ISDN Teletex transmission and receipt
- Voice file transmission
- Euro file transfer server and client
- MRS Client/Server coupling over a SMI Protocol
- Programmable Voice and Fax-on-Demand systems.

These configurations are executed in the MRS Monitor, as described in the *MRS Server Administration.*

4.1 Supported ISDN Cards

All supported ISDN cards can be found in the release notes or in the hardware compatibility list (HCL). In this list an function overview of the various supported cards is found. A description of the functionalities of the supported cards can also be found in these references. The following cards are currently supported by the MRS Server.

- ITK ixbasic ISA V1.2
- ITK ixbasic PCI V1.1
- ITK ixocto
- ITK primary PCI
- ITK primary MultiModem
- AVM A1 ISA
- AVM B1 ISA
- AVM B1 PCI
- AVM B1 PCMCIA
- AVM Fritz! Classic
- AVM Fritz! PCMCIA
- Eicon Server BRI

- Eicon Server PRI
- Hypercope Hysdn Central4
- Hypercope Hysdn Metro4

Only cards of a single manufacturer should be installed on the MRS Server. When more than one ISDN card is to be installed in the server it is also suggested that the cards also be of the same type. The installation of various cards in a server has not been tested, and therefore not suggested. It is possible however to install different ISDN cards and a further ISDN APL installation in various computers within a distributed system. This may be necessary when the required functionalities can only be achieved through the installation of ISDN cards from various manufacturers.

The server hardware should be commensurable to that of the work load it is expected to process.

CAPI 2.0 is the supported interface.

4.2 Siemens Cornet-N Support

Via the D-channel protocol Cornet-N which is supported by Eicon cards when a corresponding Siemens DLL is available, specific features of Siemens PBXs can be addressed. This feature is only available with projects under Siemens as general contractor!

Displays of telephone terminal devices can be controlled and the mailbox lamp set. On display control: with E-scripts display control is automatically executed via the D-channel if it is available. With VFS scripts you should explicitly deactivate the corresponding AclUse switch to avoid the less efficient method via the Hicom APL. To set the mailbox lamp simply add the corresponding MWI protocol and as usual enter `MWI/`<*Number*> in the `CIT` field for the respective user.

Further scripts specially developed for Siemens, e.g. VMS, use the Hicom PIN for direct login and for billing purposes.

4.3 Stopping the APL Softly

The ISDN APL supports soft termination of the ISDN APL via the command line order

```
net pause isdnapl
```

After this command the ISDN APL does not accept any further calls while all existing connections are handled without interference until they are closed normally. As soon

as all connections are closed, the ISDN APL can be entirely terminated in the usual manner via

`net stop isdnapl`.

As an alternative you can also continue operating by means of

`net continue isdnapl`.

4.4 Registry Entries

The ISDN APL uses the TeleReg API for the administration of registry entries. The TeleReg API provides various functions which enables the effective administration of information by a telematic APL. Dependencies between various components is automatically checked by the TeleReg API.

All entries administered by the TeleReg API should only be modified through the appropriate Module in the MRS Monitor. Since all entries are cached and constantly checked by the Configuration Module, manually modified entries could be overwritten.

In the following, only those additional registry entries for the TeleReg API will be discussed. The registry entries of the TeleReg API are correspondingly marked and described in Chapter 3 of this manual.

4.4.1 General Entries

The following *Value*s are found in the *Key*

`HKEY_LOCAL_MACHINE\Software\PP-COM\MRS\IsdnApl`

ALawCoding REG_DWORD *0 or 1*

Discerns whether the DTMF recognition software (see BuiltInDtmf) expects either A-Law (Europe) µ-Law (USA) PCM-Data.

Default: `1`

AlcatelDiscKey REG_SZ

Special configuration for Alcatel PBX project. Do not modify.

Default: `0`

BuiltInDtmf REG_DWORD *0 or 1* *(TeleReg)*

DTMF recognition via hard or software. See page 143.

CfgCompress REG_DWORD *0 or 1* *(TeleReg)*

See page 143.

Checked*n* **REG_DWORD** *0 or 1* *(TeleReg)*

See page 143. Switch 1 is used to switch the ISDN CAPI trace on or off.

CLIMode REG_DWORD *0, 1 or 2* *(TeleReg)*

Calling Line Identification. See page 144.

Cost REG_DWORD *(TeleReg)*

Unit of charge in local currency units. See page 144.

DatusLeast REG_SZ

Older, obsolete switch. Retained for reasons of compatibility.

DefaultCli REG_SZ

When no originator ID is known, this number is then reported as “calling party number” with outgoing connections of the PBX telephone system. Used also for cost evaluation within the PBX telephone system.

DestNumberPlan REG_DWORD *(TeleReg)*

See page 144.

DestNumberType REG_DWORD *(TeleReg)*

See page 144.

DialInfoTimeout REG_SZ

When a MRS computer is called, a period of time in seconds is waited between the numerical input for the desired extension. If the time-out expires the call is then terminated.

Default: `10`

DialMode REG_SZ

Here the PIN-supervision is parametrized. The string is so modified that e.g. a PIN-code could be placed before a dialing number so that charge costs can be accounted. The string must not contain any blanks.

Example: `##4<DB(CostInfo),COST>%s`

DialPlan REG_DWORD

D-Channel dialing number type.

Default: 0x80

DlgFlags REG_DWORD *(TeleReg)*

Internal TeleReg API flag. See page 144.

DM REG_SZ

Debug bit-mask. Additional low level debugging information. Should *never* be used while system is on-line and operational.

Default: `0`

DO REG_SZ

Debug output file when the debug bit-mask `DM` is set. Should *never* be used while system is on-line and operational.

dt REG_SZ

Low level debug time-out in seconds. With a value of `0` (no time-out) the log file would be written till the hard disk is full. Otherwise, every `dt` seconds a new file is created.

DtmfPeriods REG_DWORD *1…5*

Number of 15 millisecond periods (1 corresponds to 30 milliseconds, 5 to 90 milliseconds) in which a DTMF tone is continually recognized, so that it can be reported as recognized. Operational testing has proven that a value of 1 provides optimal results. This value should not be changed.

Default: `1`

ECT REG_DWORD *0 or 1*

Explicitly activating call transfer (1). This function depends on the used ISDN card´s and PBX´s support. Furthermore you should test whether it works only on a bus and not on a fixed connection. The Eicon ISDN cards support this feature. As regards PBXs it has been tested with a Hicom 150 and a Tenovis Integral 33xE with the latter one not enabling operation with a fixed connection.

FaxLicences REG_DWORD *(TeleReg)*

Number of allowable fax channels. See page 145.

FaxResources REG_DWORD *(TeleReg)*

Number of detected fax channels. See page 145.

FilterSMSDialString REG_DWORD *0 or 1*

When this value has been set to 1, the ISDN APL also allows numbers with special characters in the dial string for the SMS protocol and filters these out. In principle all clients should actually deliver normalized numbers since the MTA routing rules may otherwise not come to effect, but this filter enables message delivery just with SMS from Outlook.

Default: 1

IgnoreOADType REG_DWORD *0 or 1*

With ISDN a transmitted calling number always consists of three parts: type, numbering plan and the actual number. The numbering plan determines the number´s structure. So if, according to the numbering plan, you receive a "National" number, this number must be delivered from the PBX to the ISDN APL without external prefix etc. Many PBXs modify the transmitted number in such a way that the caller can immediately be called back. Where applicable this is done by supplementing the number with the required external prefix. In this case the PBX must set the numbering plan to "Unknown". If this step is not executed this value can be set to 1 so that the MRS Server ignores the incorrect "National" indication.

A special feature of the ISDN card properties configuration is the option "Automatic number identification with external prefix", which can be activated for incoming calls. However, this option only becomes operative when the numbering plan has been forwarded as "Unknown". Also here this value then helps bringing to bear the setting made.

Default: 0

IncReject REG_DWORD

ETSI (DSS1) Reject Code.

Default: 0x15

IntlDialMode REG_DWORD *0 or 1*

The MRS servers expects all telematic numbers (more than 9 digits) to be in an international format (`1`). This can be switched off so that the ISDN APL accepts only extensions (`0`).

Default: `1`

LineLicences REG_DWORD *(TeleReg)*

Number of allowable lines. See page 145.

LineResources REG_DWORD *(TeleReg)*

Number of detected lines. See page 145.

LocPrefixExtensions REG_MULTI_SZ

A list with dialing numbers or partial dialing numbers that are not modified through normalization. Normally all numbers are normalized to an international dialing number (e.g. `0240412345` normalized to `49240412345`).

With corporate networks it is possible that dialing numbers such as `9992`<*Extension*> exist. One can enter the prefix 9992 here so that all numbers beginning with this prefix will not be normalized.

Example:

```
9992
0111
444
```

All numbers beginning with `9992`, `0111` or `444` would not be normalized.

This entry is only useful on this position when settings for the ISDN APL are to be configured differently than that of the global settings under `MRS Globals\Location\LocPrefixExtensions`.

MaxG3Speed REG_DWORD

Maximum transmission rate of a G3 fax document..

Value	Significance
`0`	Maximum Transmission rate
`1`	2400 Baud
`2`	4800 Baud
`3`	7200 Baud
`4`	9600 Baud
`5`	14400 Baud
6	33600 Baud

Default: `0`

OldCostInfo REG_DWORD

From MRS 3.5 Service Pack the error that the cost center number entered in the field `COSTINFO` is normalized (is attempted to be turned into an international dialing number) does no longer occur. Likewise the field `COSTINFO` is ignored if the configuration “Local Extension” is selected. However, in case the old incorrect behaviour is needed for compatibility reasons the value can be set to 1.

Default:0

OldStyleConnInd REG_DWORD *0 or 1*

This switch may be used with older CAPI 2.0 cards when portions of a dialed telephone number are missing.

Default: 0

OrigNumberPlan REG_DWORD *(TeleReg)*

See page 145.

OrigNumberType REG_DWORD *(TeleReg)*

See page 145.

PrioClass REG_DWORD

ISDN APL priority class. The default value (0x20, normal) should be used since a higher priority (0x80, High; 0x100, Realtime) could lock-up the complete Windows NT system. The ISDN APL does not function with the Idle-Priority (0x40).

Default: 0x80

PrioThread REG_DWORD

Priorities of several special threads that administer board events. This value must not be modified.

Value	Thread-Priority
2	Highest
1	Above Normal
0	Normal
-1	Below Normal
-2	Lowest

Default: 1

QueryBilling REG_DWORD *(TeleReg)*

Activates/Deactivates billing option. See page 145.

Default: 1

ReportVoiceOKAfterConn REG_DWORD *0 or 1*

The voice protocol is often used for putting out received voice messages at a telephone. If the recipient puts the phone down before having listened to the entire message, this message is reported as not correctly delivered and, as the case may be, the MTA initiates a repetition of the call. Setting this switch to 1 reports OK to the MTA already when the recipient answers the phone and thus listens to at least a part of the message.

Default: 1

Restart REG_DWORD *0 or 1*

When an error occurs the internal Watchdog will restart the card driver when set to 1. This feature is not supported by all ISDN cards. This value should only be used for testing purposes.

Default: `1`

ShowSecretNumber REG_DWORD *0 or 1*

With 1 also those numbers are displayed that have set the Bit for *Presentation restricted* in the *Presentation Indicator.* Thus this value can be used to evade calling number suppression.

Default: 0

SkipRedirectingDigits REG_DWORD

Here you can enter the number of the first *n* digits you wish to cut off the “Redirecting Number”. On the other hand there are PBXs that do not correctly transmit the Redirecting Number and with a negative offset entered here the correct number can be obtained. With e.g. a Tenovis system the “Redirecting Clause” element was not transmitted and this could be made up for with the value -1. For more information on the topic “Redirecting Numbers” see page 156.

Default: `0`

SmiShortHold REG_DWORD

This entry has the same significance as the private entry “ShortHold” of the ISDN SMI Protocol. The ISDN APL uses this entry in case the private one cannot be found.

Otherwise the entry exists only for compatibility reasons and should be deleted in favour of the private entry.

SimulResDw REG_SZ

Special switch used by quality assurance for error simulation.

SmsProviderList REG_MULTI_SZ

List of SMS Protocol accesses. Each line indicates the respective access number, the first digits of the dialing number and the accessible protocols. The example below shows this pattern for the access numbers +49-175 and +49-174.

Example:

491712521001, 49175, TAP, T90
491712521001, 0049175, TAP, T90
491712521001, 0175, TAP, T90
491722278000, 49174, UCP

491722278000, 0049174, UCP
491722278000, 0174, UCP

StdCharging REG_DWORD *0 or 1*

When set to 1 extension numbers from the user data field `COSTINFO` are used in billing information.

Default: `1`

SupportedDevices REG_MULTI_SZ *(TeleReg)*

ISDN cards entered here are displayed in the configuration dialog. See page 145.

UseCapiDll REG_DWORD *0 or 1*

Internal Debug switch. CAPI calls are either made through `CAPI2032.DLL` (`1`) or through the Kernel driver interface (`0`). As with all other internal debug switches, this switch should never be modified.

VarDwTimeout REG_DWORD

Time-out for the redial mode “variable length” in seconds. This parameter is of significance when the FFU protocol is in use.

Default: `3`

VoiceLicences REG_DWORD *(TeleReg)*

Number of full duplex voice channels. See page 145.

VoiceResources REG_DWORD *(TeleReg)*

Number of detected full duplex voice channels. See page 146.

WaitForGeb REG_SZ *0 or 1*

Should always be set to `1`. The ISDN APL waits until charge cost information has been received before releasing a logical line.

Default: `1`

4.4.2 Blobs (Binary Large Objects)

Every registry entry administered by the TeleReg API may contain a reference to a Blob. Blobs are binary data ranges in which programer defined data may be stored.

Used Blobs can be found in the registry under the *Key*:

`HKEY_LOCAL_MACHINE\Software\PP-COM\MRS\ISDNApl\Blobs`

4.4.3 Hardware

Each board with one or more communication channels (lines) has in the *Key*

`HKEY_LOCAL_MACHINE\Software\PP-COM\MRS\ISDNApl\Devices`

an enumerated *Key_n*. In these *Keys* the following *Values* are found.

AddDialOutLen REG_DWORD *(TeleReg)*

For outgoing calls it is possible to insert digits to a dialing number. See page 146.

Blob REG_DWORD *(TeleReg)*

Index number of the Blob data range.

Default: `0`

Caps REG_DWORD *(TeleReg)*

Each device administered by the TeleReg API has certain capabilities. These are listed as bitmasks with the appropriate capability. See page 146.

Channels REG_DWORD *(TeleReg)*

Number of physical lines. See page 147.

Description REG_SZ *(TeleReg)*

See page 147.

FaxG3 REG_DWORD *(TeleReg)*

Number of Fax G3 lines on the card. See page 147.

Handle REG_DWORD *(TeleReg)*

Unique CAPI handle used internally. See page 147.

Lines REG_DWORD *(TeleReg)*

Number of logical lines. See page 147.

Name REG_SZ *(TeleReg)*

Board description. This entry is also used for display in the MRS Monitor. This entry may not be modified! See page 147.

PrefixedANI REG_DWORD *0 or 1* *(TeleReg)*

When set to 1 the number (Automatic Number Identification (ANI)) is used with the prefixed digit for outside dialing from the device. See page 148.

Private REG_MULTI_SZ *(TeleReg)*

Private data. The ISDN APL uses this entry parallel to that of the INI configuration file under Windows 3.1. One specific entry per line is used by the ISDN APL.

Value	Significance
AutoDialNb<*n*>	Error correction for certain PBX units. Every x seconds the dummy number entered here is dialed from the ISDN card. After an undefined period of time, some older PBX units revert to a mode, where as master, do not convey this information back to the ISDN card. As a result the connection between the ISDN card and the PBX is terminated. Since no connection to the ISDN card exists, a busy signal is returned when inbound traffic is initiated to the server over this connection. Through the routine dial-up of the PBX from the ISDN card the connection remains intact and this condition is eliminated. The value <*n*> is a number from 1 to 4 so that four numbers may be entered. Example: `NVS:VOICE/47`
CheckFacility	This value can be set to 1 if the feature "Redirected Number" is required (e.g. tng.e script), together with the Siemens Hicom PBX. For this PBX, "Redirected Numbers" are added to the "CAPI Connect-Indication" message in the field **Additional Info→Facility data array**. A varity of information is available from the **Facility data array** in a coded ANS1 package. A CAPI trace should be run from the MRS Monitor to ensure that this information is available before this function is activated.
DebugItk	Special internal debugging switch for ITK ISDN cards (1). Connects a D-channel monitor.
DirectLine	This value must be set to 1 for mixed ISDN card operation, for PBX and ISDN cards that are connected directly to the exchange.
Infos	Information given here is taken from the ISDN network. Possible parameters are: `GEB` (Billing information), `DTMF` (Tone recognition), `DW` and `DISPLAY`.
Srv	All CAPI services that are supported by the card. Default is all possible services. Services should be deactivated when errors occur with the card.

Example:

```
AutoDialNb1=NVS:VOICE/47
DebugItk=1
```

PrivateMode REG_DWORD *(TeleReg)*

Used by quality assurance for the validation of new ISDN cards. Do not modify.

Default: `0`

SkipDialInfoLen REG_DWORD *(TeleReg)*

Portion of the extension number that can be omitted. See page 148.

State REG_DWORD *(TeleReg)*

See page 148.

Type REG_DWORD *(TeleReg)*

See page 149.

4.4.4 Lines

A line is defined as a physical bidirectional communication channel. With S_{2m} ISDN-Boards this could be up to 30 Lines. Each line is assigned an Originator Address (OAD), and the same OAD could be used for more than one line. Furthermore, a line is bound with at least one protocol.

Under this *Key*

`HKEY_LOCAL_MACHINE\Software\PP-COM\MRS\ISDNApl\Devices\`*n*

an enumerated *Key_m* is found for each line on a board. In these *Keys* the following *Values* are found:.

Baudrate REG_DWORD *(TeleReg)*

Transmission rate of the line. See page 149.

Blob REG_DWORD *(TeleReg)*

Index number of the Blob data range.

Default: `0`

BoundProtocols REG_DWORD *(TeleReg)*

Bitmask indicating which protocols are supported by this line. See page 149.

Cost REG_DWORD *(TeleReg)*

The cost per charge pulse in local currency unit. See page 150.

EndChannel REG_DWORD *(TeleReg)*

See page 150.

NumChannels REG_DWORD *(TeleReg)*

See page 150.

OAD REG_DWORD *(TeleReg)*

Each line is assigned an Originator Address (OAD). See page 150.

PermMask REG_DWORD *(TeleReg)*

See page 150.

StartChannel REG_DWORD *(TeleReg)*

See page 150.

State REG_DWORD *(TeleReg)*

See page 148.

4.4.5 Extension Number Ranges

All incoming dialed numbers must correspond with its extension in the ranges listed here. So that incoming calls are taken by the Dialogic APL, a protocol must be assigned to the range and bound to a line. Additionally, the line OAD must correspond with that of number range. This mechanism can be used to assign certain ranges to special lines. This could be implemented so that incoming fax documents are routed to a special line (OAD).

If the board delivers an ISDN Service Indicator it will be checked against a list of applicable protocols.

A minimum of one extension number is required for a supported service. These services are numbered and stored with their number under the *Key*

`HKEY_LOCAL_MACHINE\Software\PP-COM\MRS\ISDNApl\Extensions`

as a separate *Key*. The first extension number range has the *Key* `01`, the second the *Key* `02`, … Each of these *Keys* contain the following *Values*

Blob REG_DWORD *(TeleReg)*

Index number of the used Blob data range.

Default: `0`

Description REG_SZ *(TeleReg)*

See page 151.

End REG_SZ *(TeleReg)*

Upper boundary of the extension number range. See page 151.

OAD REG_DWORD *(TeleReg)*

Each line is assigned an Originator Address (OAD). See page 150.

Protocol REG_DWORD *(TeleReg)*

Protocol assigned to this extension range. See page 151.

Start REG_SZ *(TeleReg)*

Lower boundary of the extension number range. See page 151.

State REG_DWORD *(TeleReg)*

See page 148.

VarDigits REG_DWORD *0 or 1* *(TeleReg)*

Extension number range with variable length. See page 152.

The following *Value* is also found in the *Key*

`HKEY_LOCAL_MACHINE\Software\PP-COM\MRS\ISDNApl\Extensions`

EnableRegSz REG_DWORD *(TeleReg)*

See page 152.

4.4.6 Originator Address

Every line is assigned a number (Originator Address, (OAD)). The TeleReg APL administers all available OAD numbers as enumerated *Keys_n* (01, 02, 03, …) under the *Key*

`HKEY_LOCAL_MACHINE\Software\PP-COM\MRS\ISDNApl\OADs.`

These OAD numbers are used to determine the extension number from an incoming call. Simultaneously, the validity of the number range can be checked for the line over which the inbound call is initiated.

AccessCode REG_SZ *(TeleReg)*

Access number. See page 152.

AreaCode REG_SZ *(TeleReg)*

Area code w/o IDD Number. See page 153.

AreaCodeEscape REG_SZ *(TeleReg)*

IDD Number. See page 153.

Blob REG_DWORD *(TeleReg)*

Index number of the used Blob data range.

Default: 0

CountryCode REG_SZ *(TeleReg)*

Country Code. See page 153.

CountryCodeEscape REG_SZ *(TeleReg)*

IDD Number. See page 153.

Description REG_SZ *(TeleReg)*

Description or comment. See page 153.

ExternalLinePrefix REG_SZ *(TeleReg)*

Exchange number (outside line). See page 153.

PbxCode REG_SZ *(TeleReg)*

Cross connection number. See page 154.

State REG_DWORD *(TeleReg)*

See page 148.

4.4.7 Protocols

Protocols are a supported services from the various APLs. There are various generic services such as FAXG3, VOICE, or VFS; and branched protocols from generic protocols (e.g. outgoing VFS with a coupled Script). Branched protocols may not have a Script assigned to them. Under the *Key*

`HKEY_LOCAL_MACHINE\Software\PP-COM\MRS\ISDNApl\Protocols`

an enumerated *Key_n* is found. In these *Keys* the following *Values* are found:

Attributes REG_MULTI_SZ *(TeleReg)*

A list of protocol attributes. See page 154.

AttributesAllowed REG_DWORD *(TeleReg)*

See page 155.

Blob REG_DWORD *(TeleReg)*

Index number of the used Blob data range.

Default: 0

CapMask REG_DWORD *(TeleReg)*

Board characteristics bit mask. See page 155.

CheckMailbox REG_DWORD *0 or 1* *(TeleReg)*

Calls are only accepted when a database entry exists for the number dialed (`1`).

ContMsg REG_SZ *(TeleReg)*

This one line message is inserted as the first line in a fax whose retransmission is caused by an interruption.

Example: `Continuation of an interrupted message`

Description REG_SZ *(TeleReg)*

Protocol description or comment.

DispPerm REG_DWORD *(TeleReg)*

See page 156.

DocReps REG_SZ *(TeleReg)*

Redial strategy. See page 156.

EditPerm REG_DWORD *(TeleReg)*

See page 157.

EditPermGenerated REG_DWORD *(TeleReg)*

The same as EditPerm but only for use with generated protocols (those created by other protocols). See page 157.

FaxG3Chain REG_DWORD *(TeleReg)*

Document chaining. See page 157.

Default: `1`

FaxG3Resend REG_DWORD *(TeleReg)*

This switch determines whether a fax messages is resent due to an interruption. See page 158.

Default: `1`

FaxG4FaxG3 REG_DWORD *(TeleReg)*

Send as fax G3 if fax G4 fails. See page 158.

FaxG4T70 REG_DWORD *(TeleReg)*

Uses layer. See page 158.

FaxID REG_SZ *(TeleReg)*

Default Fax ID. See page 158.

Formats REG_MULTI_SZ *(TeleReg)*

Valid document and file formats for logical lines. See page 158.

FormatsAllowed REG_DWORD *(TeleReg)*

See page 158.

FriendlyName REG_SZ *(TeleReg)*

User readable protocol name. See page 158.

Headline REG_SZ *(TeleReg)*

Standard Fax G3 Headline. See page 159.

MultiMaster REG_DWORD *0 or 1* *(TeleReg)*

Numerous protocols can be branched from this protocol. See page 159.

Name REG_SZ *(TeleReg)*

Node portion of a MRS address.

Example: FAXG3

ParamBlock REG_SZ *(TeleReg)*

Script parameters are given here.

Private REG_MULTI_SZ *(TeleReg)*

Private data. The ISDN APL uses this entry parallel to that of the INI configuration file under Windows 3.1. Depending upon the protocol, one protocol specific parameter is used per line (Value =…).

Euro File Transfer

Value	Significance
GuestGroup	MRS user group which belongs to the Guest Account. This guest account is for Euro file transfer and is normally filed by default under …\InfoStor\Accounts. This allocation may also be assigned to other user groups.

Value	Significance
GuestName	MRS user name (description) for Euro file transfer guest access. This account is by default Guest User and filed under …\InfoStor\Accounts. This allocation may also be assigned to other user accounts.
GuestPrivileges	MRS privileges for Euro file guest access. This is account is by default Guest User and filed under …\InfoStor\Accounts. This entry refers to a comma separated list of EFT privileges.
GuestUser	MRS Login-Name for Euro file transfer guests access. This is by default the guest user filed under …\InfoStor\Accounts. This allocation may also be assigned to other user accounts.
UserDirCorrelField	Each user has by default an Euro file transfer folder. If this database field exists, folders can be created for numerous users in the database.
WelcomeText	File with the general greeting text which is copied to a user directory when created.

Fax G3

Value	Significance
CheckPageNumbers	When set to 1an OK report is only sent when the number of sent pages reported by the CAPI driver corresponds to the number of pages in the document. Otherwise it would be possible to receive an "OK (2 pages sent)" report for a four-page document.
DocChainIgnoreOrig	Only documents addressed to a single recipient and originating from a single sender may be chained when set to 0 in fax chaining for the fax G3 protocol. When set to 1 only the recipient address must be the same for the chained documents. In this case the originator address is not observed. If for example numerous fax documents are printer queue and two are addressed to the same recipient, both documents would be sent as a single transmission. In this case billing information is not processed.

Value	Significance
InsertMidHl	When set to 1 the message ID will be inserted into the headline. The headline may be up to 22 characters in length.
UseFaxIdAsOAD	Calling Line Identification (CLI) would be used as the originators OAD with inbound fax documents. If this field is empty while no CLI can be determined, the number in the fax ID will be used as CLI. When this value is set to 1 the fax ID will always be used as the CLI with inbound fax documents.

Fax Forward (Server) and **Fax Forward (Transparent)**

Value	Significance
FfuAmt	Only when the IntlDialMode is set to 0 can an exchange for Fax Forward Reports be configured. Normally LinePrefix would be used.
FfuSendErrRep	When set to 1 an error report will be sent to the transmitting device by the MRS Server when an error occurs in Fax Forward mode.
FfuSendMidInId	When set to 1 internal fax devices receive the message ID number as fax ID by fax forward.
FfuSendOkRep	When set to 1 an receipt report will be sent to the transmitting device from the MRS Server by successful transmissions in Fax Forward mode.
FfuSendRundRep	When set to 1 an receipt report (with all recipients) will be sent to the transmitting device from the MRS Server by successful transmission of a distribution list in Fax Forward mode.

ISDN SMI

Value	Significance
ShortHold	Short-Hold timer in seconds for SMI connections (Client/Server or Server/Server) via ISDN. After the number of seconds entered here the connection is abolished in case no transmission is performed. Exception: with an existing dialog the connection is only abolished after the dialog has been terminated. If the value is set to 0, this mechanism is principally deactivated. The connection is then consistent. Default: 60

SMS

Value	Significance
DefaultId	Default call recognition for SMS messages.
Digest	Transmitted text messages can be modified through the use of several variables: transmission time, etc. Possible variables correspond to those used in CIT notifications (see CiTMessage on page 127). Example: `{{DATE}, {DIGEST}}`

Voice

Value	Significance
FileToPlay	Default greeting file for incoming calls.
RecordTime	Maximum recording for incoming messages in seconds. Default: `120`
RemoteRecord	When set to 1 the remote recording mode is activated. Deactivate with 0.
StorePath	Path to where Remote Recorded files are stored.

PrivateMode REG_DWORD *(TeleReg)*

Not used by the ISDN APL.

ScriptName REG_SZ *(TeleReg)*

File name of the protocols Script into without extension.

SI REG_MULTI_SZ *(TeleReg)*

The CAPI 2.0 CIP value.

State REG_DWORD *(TeleReg)*

See page 148.

Type REG_DWORD *(TeleReg)*

Protocol type. See page 159.

4.4.8 Voice & Fax-on-Demand Systems

The *Values* for installed VFS scripts are found in the *Key*

`HKEY_LOCAL_MACHINE\Software\PP-COM\MRS\IsdnApl\Vfs`

AclAddress REG_SZ

MRS Address of the Hicom APL.

Default: `NVS:HICOMDLG/VFS`

AclDelayMessage REG_DWORD *Milli-second*

All display texts are collected and sent to the Hicom APL after *n* milli-seconds. Netload is reduced when numerous texts must be simultaneously displayed.

Default: 400

AclInternLen REG_DWORD

Together with AclInternLenMax, an extension number range is fixed. This is the minimum length of the extension number range. If the server is called and the length of the caller ID is within the range between AclInternLen and AclInternLenMax, the ACL-function would be used and the display text displayed on the callers telephone. No attempt is made to deliver an external callers text display.

Example: 4

AclInternLenMax REG_DWORD

See AclInternLen. This is the maximum length of the extension number range.

Example: 6

AclUse REG_DWORD *0 or 1*

When the Hicom APL is running as a part of the MRS Server, the ACL control functions of VFS can be switched on when a value of 1 is set. These function can be used by Scripts to e.g. display messages on the Hicom telephones.

Default: `0`

DisplayColumns REG_DWORD

Number of columns in the Hicom telephone display. This entry is required when text from a ACL function is to be sent to the Hicom telephone display.

Default: `24`

DisplayRows REG_DWORD

Number of rows in the Hicom telephone display. This entry is required when text from a ACL function is to be sent to the Hicom telephone display

Default: `2`

ErrDetect REG_DWORD

Internal debug switch for VFS script programming.

Log<n> REG_SZ

A individual log file can be written for every VFS script. A entry with following contents is created in the registry "Prg<*x*>,<*log-dir*>,<*log-intervall*>,<*head-line*>". <*n*> is a sequential number the id used to differentiate between the various log entries in the registry. <*x*> corresponds to the registry entry `Prg`<*x*>, whereas allocation of the log files to specific scripts is given. <*log-dir*> is the directory in which the log file are stored. <*log-intervall*> is interval at which new log files are created. Allowable are:

Parameter	**Significance**
<*x*>`D`	Every <*x*> days is created.
<*x*>`M`	Every <*x*> months is created.
<*x*>`h`	Every <*x*> hours is created.
<*x*>`m`	Every <*x*> minutes is created.

<*headline*> is an arbitrary string which is written in the headline of the log file.

The contents of the log file is controlled by the script. Specific entries in log files can be used by the script for which the file was created.

LogName<n> REG_SZ

Logname*n* can be created for every VFS script listed as Prg*n*. The index numbers (*n*) of Logname*n* and Prg*n* must correspond with another. The contents of Logname*n* is a logical program name under which the script can be addressed. As soon as a Logname*n* has been assigned the Script Prg*n* is addressed under the NVS:<LogName*n*>/4711.

PeakDuration REG_DWORD

If the VFS script calls the function VocRec() with the `VOC_RECMODE_CHECKFIRSTPEAK` mode, recording is only started when something else than silence (namely the "first peak") is recognized. This purpose serve the two values PeakDuration and PeakLevel. PeakDuration indicates in approx. 1/60 seconds how long the incoming audio signal must be above PeakLevel so that recording is started. This enables sensitivity control. Recognition becomes more sensitive when PeakLevel or PeakDuration are decreased. A higher PeakLevel value means that something "louder" must come in to be recognized as peak. The single bytes are converted via a table and the amount of the resulting value must be bigger than PeakLevel to be recognized as peak. If the amounts of the values are bigger than PeakLevel during a period indicated by PeakDuration, recording is started.

Default: 5

PeakLevel REG_DWORD

See PeakDuration.

Default: 32

Prg<n> REG_SZ

Up to 16 VFS scripts may be entered. Per script is a registry entry in the form of:

`Prg`*n*`=<`*Skriptname*`>` <*Parameter*>

Definition part	Significance
`Prg`*n*	The actual Value whose contents will be explained in the following. Each script has an index *n* beginning with `1`. A maximum of 16 scripts may be entered.
<*Scriptname*>	Script file name.
<*Parameter*>	Optional parameters for the script

Example: `mck.c`

SilentTime REG_DWORD

Time of silence in approx. 1/10 seconds after which recording is automatically terminated. This is, however, only applicable when the function VocRec() is called with the `VOC_RECMODE_CHECKSILENT` mode in the VFS script. This mode is used e.g. with the mck.c (standard voice/fax mailbox) script.

Default: 20

SoftFaxFilter REG_DWORD *0 or 1*

Enable software fax device recognition (`1`). Normally not required since ISDN cards recognize software fax devices.

Stat<n> REG_SZ

As with log files, statistical files can also be created for VFS-scripts. Therefore, a registry is is created with the following contents: "Prg<*x*>,<*dir*>,<*stat-time*>,<*headline*>,<*stat-class*>". <*n*> is a sequential number the id used to differentiate between the various statistical entries in the registry. <*x*> corresponds to the registry entry `Prg`<*x*>, whereas allocation of the statistical files to specific scripts is given. <*dir*> is the directory where statistical files are stored. The statistical file is an ASCII text file. <*stat-time*> is time (hour/min) at which the file was created. Statistical file creation should be scheduled for times of minimum traffic. <*headline*> is an arbitrary string which is written in the headline of the statistical file. <*stat-class*> is an arbitrary string used to represent the statistical class.

Principally a counter is found in the Correlation database for statistical classes. The counter is increased by 1 for every call of the function `IncStatCnt()` in the VFS script. The statistical function of the VFS script reads the data base entry and then creates a statistical file corresponding to the given class.

The entries in the statistical file have the form:

```
StatKey<\t>Counter<\n>
```

UseSpr REG_DWORD *0 or 1*

Use speech recognition (1).

XmrTopic REG_DWORD *0 or 1*

Topic areas "VFS" not displayed by the ISDN APL in the MRS Monitor 0.

Default: `1`

4.5 The AMIS Protocol

The Audio Messaging Interchange Specification (AMIS) is a protocol developed by the Electronic Messaging Association (EMA) for the exchange of voice messages

between two dissimilar voice messaging systems. Digital as well as analog protocols are defined.

The VFS script `amis.c` implements the analog version of the AMIS protocol in which protocol data is transferred through the use of DTMF (touch tone) over a standard telephone line. The actual voice message is played by one server and recorded by another.

More information over the execution of the AMIS protocol can be found in the Audio Messaging Interchange Specification (AMIS) – Analog Protocol Version 1, Issue 2, February, 1992 (Internet: info@ema.org, WWW: http://www.ema.org/ema/).

4.5.1 Installation of the amis.c script

As with all VFS scripts, the `amis.c` script must be installed in the `Monitor` directory as well as in the directory `res\vfs`. Both of these directories are found within the MRS installation directory. In addition the following registry entries are also required in the *Key*:

`HKEY_LOCAL_MACHINE\SOFTWARE\PP-COM\MRS\IsdnApl\Vfs`

Prg<n> REG_SZ

This *Value* must be set to "`amis.c` <*Parameter*>"

LogName<n> REG_SZ

This Value must be set to `AMIS`.

`amis.c` supports the following parameters:

`CC=`<*Country Code*>
`NDC=`<*National Destination Code*>
`SN=`<*Subscriber Number*>

The system number is comprised of these three parameters which the transmitting server conveys to the receiving server. Through use of the system number, non-delivery notifications can be sent to the originating server if necessary. Therefore it is important that the subscriber number in the extension defined for `amis.c` also be included.

Example:

```
CC  = 49
NDC = 2404
SN  = 12345678
```

`PATH=`<*Path*>

<*Path*> is the complete path to the directory in which voice files are stored that are used for non-delivery notifications. If this parameter is missing, then the standard

path (<*MRSDIR*>`\res\vfs\amis`) is assumed, which would result in a German language output.

Other paths may be given for other languages.

Language	Path
English	<*MRSDIR*>`\res\vfs\amis\uk`
French	<*MRSDIR*>`\res\vfs\amis\france`
Spanish	<*MRSDIR*>`\res\vfs\amis\spain`

<*MRSDIR*> is the directory in which MRS is installed.

`LANGUAGE=uk`

When set, this parameter causes all generated reports to be outputted in English. If this parameter is missing, then reports will be generated in the German language. Further languages are currently not supported.

4.5.2 Configuration of AMIS Mailboxes

In order to be able to configure a AMIS-mailbox one must first expand the user database to include the data field AMIS. Afterwards, each user is assigned an individual mailbox number (1-16 digits) which is then entered in the AMIS field of the user database.

The user can now receive or send AMIS messages.

4.5.3 Sending Voice Messages through AMIS

Voice messages are sent as an email through AMIS to the address `NVS:AMIS/`<*Servernumber*>`#`<*Mailboxnumber*>. <*Servernumber*> is the dialing number of the other AMIS server and <*Mailboxnumber*> the 1-16 digit AMIS-mailbox number of the recipient: Example: `NVS:AMIS/4912345678#4711`.

To avoid having to continually enter long addresses, an alias (short) list can be configured for frequently used addresses. In the PREFERRED simply enter AMIS, and in the field AMIS the address information.

Field	Contents
Preferred	AMIS
AMIS	4912345678#4711

4.6 The Skript dialer.c

The script `dialer.c` is used to dial two telephone connections and subsequently connect the two with one another. To accomplish this an email must be sent to the address:

`DIALER/`<*Caller telephone number*>`#`<*Called telephone number*>

The script `dialer.c` first dials the originators number. When the receiver is picked-up, the originator is notified that a connection is being made to the recipient. As soon as the connection has been established, `dialer.c` releases the connection and the users can telephone in the usual manner.

Possible uses are for example: electronic telephone books with connections per mouse click or functions in the client that enable users to answer voicemail messages.

Attention:

Since a MVIP-bus is needed to establish a connection, `dialer.c` does not function with every ISDN card. Such a bus is found for example on ITK Octo cards.

4.6.1 dialer.c Script Installation

As with all VFS scripts, the `dialer.c` script must be installed in the `Monitor` directory as well as in the directory `res\vfs`. Next the Script Protocol in the ISDN configuration in the MRS Monitor should be added.MRS. Furthermore the following registry entries are also required:

`HKEY_LOCAL_MACHINE\SOFTWARE\PP-COM\MRS\IsdnApl`

Prg<n> REG_SZ

This *Value* must be set to „`dialer.c` <*Path*>“.

<*Path*> is the complete path to the directory in which voice files are stored. The language is dependent upon the selected path. If this parameter is missing, then the default path (<*MRSDIR*>`\res\vfs\dialer`) would be used. The output would then be in the German language.

Language	Path
German	<*MRSDIR*>`\res\vfs\dialer`
English	<*MRSDIR*>`\res\vfs\dialer\uk`
French	<*MRSDIR*>`\res\vfs\dialer\france`
Spanish	<*MRSDIR*>`\res\vfs\dialer\spain`

<*MRSDIR*> is the directory in which MRS is installed.

LogName<n> REG_SZ

This Value must be set to DIALER.

4.7 What are Redirected Numbers aka Redirecting Numbers?

We assume that a call is made from the external telephone A to telephone B but if the call cannot be accepted it is rerouted from B to number CD. C is the number of the MRS Server and D the number of a voicebox.

The MRS Server receives information “A” in case a calling number is transmitted from A and also “D”. Looking for “D” in the database the server now decides which user the call is addressed to.

The main problem with this approach is that for an IVR system with 1000 users 1000 different calling numbers must be made available to the customer via the PBX.

This is, however, a different story when “Redirected Numbers” is supported by the PBX as well as by the used ISDN board:

The MRS Server now receives information “A”, “B” and “D”. In this case “B” is the so-called “Redirection Info Element”. So the “Redirected Number” is the calling number of the telephone from which calls are rerouted.

Finally the IVR system looks for the desired user on the basis of number “B” in the database. For this only a single number “D” to which users can reroute calls from their telephone is required and no longer a further number “D” for every user besides the existing number “B”. The E Script TNG has been able to employ both methods from the beginning whereas the older VFS Script MCK has been supporting Redirected Numbers not earlier than from MRS 3.5 SP1.

The requirements once again:

- The ISDN board must support Redirected Numbers. You can check on this by consulting the Hardware Compatibility List (HCL).
- The PBX must support this method.
- The Voicemail Script must be capable of it as well.

4.7.1 Why are not all ISDN Boards suitable for Redirected Numbers?

The delivery of Redirected Numbers to an application is embodied in the CAPI specification but the implementation is up to the individual board manufacturer. However, nearly all manufacturers of boards supported by us have implemented this feature. More detailed information is found in the Hardware Compatibility List (HCL).

4.7.2 Why are not all PBXs capable of handling Redirected Numbers?

Since this feature is optional it is up to the PBX manufacturer whether to support it in the system or not.

4.7.3 How can Redirected Numbers be tested?

By means of the following steps you can verify if Redirected Numbers are received or not.

1. An operative MRS Server and two telephone devices are required.
2. Make sure that the voice-mailbox can be called from both devices.
3. Configure the second telephone in such a manner that all incoming calls are rerouted to the voice-mailbox.
4. Generate a new log window for the ISDN APL in the MRS Monitor and activate all topics.
5. Call the second telephone from the first one. The call should be rerouted to the voice-mailbox.
6. Look at the log display. The number transferred to the ISDN APL should be the Redirected Number:
   ```
   24.16:27.10.564  IsdnAPL  Plci  3 Received redirected number info:
   len=5 ...
   24.16:27:10.564  IsdnAPL  Plci  I Redirected number <11>
   ```
   and later transmission to the script:
   ```
   24.16:27:10.694  IsdnAPL  VFS  D MCK.main()  redirected number = 11
   ```
   (in this example the second telephone has number 11)

   If these lines are not found in the log either the PBX has not transferred the Redirected Number to the ISDN board or the ISDN board has not transmitted the number to the ISDN APL.

4.7.4 Are there any known problems with PBXs?

Siemens´ Hicom 300E does not transmit the Redirected Number as expected. With this PBX a different method, not evaluated by ISDN boards, is employed.

It is, however, possible to use ISDN boards by Eicom. These ISDN boards transfer the information in a proprietary way to the application (ISDN APL).

For that purpose set the value CheckFacility to 1 in the “private” configurations. Please note that this *only* works with Eicon ISDN boards at the Hicom 300E. Whether the Hicom 300 is suitable as well has not been tested yet.

5 Dialogic APL

The Dialogic APL administers the integration of the Dialogic communications hardware in the MRS Server. Dialogic is one of America's leading manufacturers in computer supported telephony and fax.

When several Dialogic boards are used in conjunction, they can be coupled with one another through use of a ribbon cable to enable rapid communications between each other, and to free the CPU for other tasks.

The Dialogic hardware supports the PEB Bus as well as the SC-Bus. The PEB Bus is outdated and therefore not supported by the Dialogic APL. The SC-Bus, Dialogic implementation of the SCSA-Open-Standards[1], is a computer bus which allows the connection of various boards through use of a ribbon cable. Since the SC-Bus has become an industry-standard, the use of various boards from different manufacturers is also possible. This could be configured for example as a Dialogic PRI Line Interface and a fax board from GammaLink.

Due to the worldwide implementation of Dialogic hardware, all popular ISDN network protocols as well as analog operations are supported by Dialogic. The Dialogic APL is therefore independent of country specific ISDN protocols.

5.1 Hardware

Hardware required for the implementation of fax and voice services consists of two physical parts:

1. Dialogic Line Interface board with or without voice resources
2. GammaLink fax resources board

The SC-Bus is an implementation by Dialogic of the SCSA Open Standard Specification. Its purpose is to connect two or more telephony resources providing board to board signaling and data exchange. The SC-Bus provided with a multiplexer which supports up to 1024 time slots. Only one device can transmit data on a time slot at any given time, but all devices can listen to the time slot. Through this process conference switching is realized.

The Line Interface provides 30 digital channels and is available in two network connection variations to support either a RJ 48C (120 Ohm) or BNC (75 Ohm) connection. The BNC is used in conjunction with the DASS2 protocol which is used in England and Russia.

1. http://www.scsa.org/home.htm

Attention: The pin assignment of the RJ 48C is not the same as a standard ISDN RJ 45 connector.

Voice and fax resources are connected to the Line Interface through the SC-Bus. On-board voice resources are internally hard-wired thus eliminating the need of the ribbon cable for connection to the Line Interface. The main advantage to a configuration of this type is a reduction in required expansion slots.

The Line Interface is a generic Dialogic product and is available in numerous variations. Listed below are two 30 channel PRI boards

- D/300SC-E1 PRI Interface with 30 voice channels on-board
- DTI/300SC-E1 PRI Interface without voice channels
- D/240SC-T1 PRI Interface with 23 Voice Resources (USA)
- DTI/240SC-T1 PRI Interface without Voice Resources (USA)

The fax resource board is from the Dialogic subsidiary GammaLink and various models are available. Single boards are available in either a 4 or 6 channel version, and a double version is available with 12 channels. All these models require only one ISA slot.

To realize a full 30 channel solution one PRI Interface board, two CP/12 and one CP/6 fax resource boards are required. This solution requires 4 ISA slots in the computer. In the USA two GammaLink double fax boards are required since only 23 channels are available per PRI interface.

5.2 Functionality

The functionality of the Dialogic APL is comparable to that of the ISDN APL. The Dialogic APL is a telematic APL which provides various protocol services to the server. These services include the transmission and receipt of documents as well as voice functions.

The Dialogic APL's main area of employment is for high throughput rates in the area of fax and voice. Since the Dialogic hardware currently supports no data transfer protocols, is the use of a Dialogic board with standard CAPI based ISDN board an efficient combination. The Dialogic board covers the fax and voice areas, the ISDN board the remote data transmission and fax G4. A single mailbox for all these services is not possible.

5.3 Softly Terminating the APL

The Dialogic APL supports its soft termination via the

```
net pause dlgapl
```

command line instruction. After this command the Dialogic APL does not answer any calls any more while all other existing connections are handled without impairment until their normal termination. As soon as all connections have been cleared, the Dialogic APL can be completely and normally terminated via

`net stop dlgapl`.

Alternatively you can resume normal operation by means of

`net continue dlgapl`.

5.4 Registry Entries

The Dialogic APL uses the TeleReg API for the registry administration. This application provides several functions to effectively administer information needed by the telematic APL. Dependencies are automatically checked.1

5.4.1 General Entries

The following *Values* are found in the *Key*

`HKEY_LOCAL_MACHINE\Software\PP-COM\MRS\DlgApl`

BlockSize REG_DWORD *1024 to 16384*

The time performance of the Dialogic APL with reference to displays and recording lengths depends on this block size. Larger sizes improve the performance with CPU loading.

This value is enterd in bytes with Cycos recommending a value of 8192 for optimal performance. However, this only applies when no VFS scripts are used. VFS run time libraries do not agree with increased block sizes! When VFS scripts are used we recommend a value of 2560.

The default value of 1024 corresponds to the old value and thus maintains the compatibility to previous Dialogic APL versions. During the positioning inaccuracies may particularly occur with large block sizes but this is normally not noticed.

Default: 1024

BuiltInDtmf REG_DWORD *0 or 1*

In most cases is the DTMF recognition performed by the Dialogic board (`0`). Built-in software can also be activated for this purpose (`1`). Whereas these programs are very computation bound, consideration should be given prior to using this option.

Default: `0`

CallRestartErrors REG_DWORD

If through the calling of functions from the Dialogic SDK, the number of errors given here is returned, a restart of the CALL modules would be executed. All calls would be automatically interrupted and the physical lines restarted.

Default: `10`

Checked*n* REG_DWORD *0, or 1*

The TeleReg-API provides four tupels [(Checked1, CheckName1), …, (Checked4, CheckName4)] for self defined use by the Dialogic APL. Three of these tupels are used by the Dialogic APL for the services Dialogic, Gammafax, and Cornet-N. These services are started when the switch is set to 1.

Dialogic

Starts the Dialogic-Service.

Default: `1`

Gammafax

Starts the Gammafax-Service.

Default: 1

Cornet-N

When this switch is activated (1), it is assumed that the Dialogic driver is prepared for the use of Cornet-N protocols.

In this case the layer 2 access must be switched on. Therefore the parameter 0024's LSB must be 1. This parameter is found in the file `CTR4.PRM` which is normally in the directory `Dlgcdev\Dialogic\Data`. The directory is found under the registry value:

```
HKLM\SOFTWARE\Dialogic\SystemRelease 4.x\ConfigInfo
```

Default: `0`

CheckName*n* Reg_SZ

See Checked*n*

CLIMode REG_DWORD *0, 1 or 2*

Calling Line Identification. When an entry in the user database field CostInfo exists, this information would be taken as default (2). If no entry exists, the extension number of the user would be used as the CLI (1). If in addition to the extension number the complete normalized international number of the user is to be sent as the CLI, the mode 0 must be set.

Default: 2

ContinuousRecording REG_DWORD *0 or 1*

The Dialogic boards either constantly forward all inbound data to the Dialogic APL (1) or the APL explicitly controlls data polling from the board (0).

From MRS 5.0 the Dialogic APL reserves only one voice resource per B-channel. This resource is then either used for recording or playback. In this way it is not possible to play a warning tone when the maximum recording time has been reached. In such scenarios two voice resources must be reserved so that recording and playback can be performed simultaneously.

Besides that, two voice resources are required with old VFS scripts, speech recognition or when software DTMF recognition is used. In these cases set this value to 1.

The explicit control is recommended in newer environments, in which only E-scripts are used.

Default: 0

Cost REG_DWORD

Unit of charge in currency units

Default: `12`

DlgFlags REG_DWORD

Internal flag that determines which setting tabs are displayed in the configuration dialog.

DlgSessions REG_SZ

For future expansion of the dialogic services.

Default: `16`

DtmfPeriods REG_DWORD *1…5*

Number of 15 millisecond periods (1 corresponds to 30 milliseconds, 5 to 90 milliseconds) in which a DTMF tone is continually recognized, so that it can be reported as recognized. Operational testing has proven that a value of 1 provides optimal results. This value should not be changed.

Default: `1`

EarlyCloseBoard REG_DWORD *0 or 1*

When set to 1, the board connection is immediately closed after setting the EventMask. This must be executed when Cornet-N version 0.x is used to avoid two processes having an active trace, and causing the Dialogic software to crash due to an open connection.

The Dialogic APL makes the decision itself with MRS versions 3.1 Build 424 or greater.

Default: `0`

ExtFaxRestart REG_DWORD *0 or 1*

The external fax service (GammaFax see Checked*n*) is stopped and automatically restarted, in order to retain all resources (`1`). This is occasionally required when an application does not properly shut-down the fax resources.

Default: `1`

FaxLicences REG_DWORD

This is the number of allowable fax channels. Since this value is provided with licensing key, modification of this entry could result in a license infraction message.

Example: 12

FaxResources REG_DWORD

Number of fax channels as determined by hardware recognition.

GlExitSafe REG_DWORD *0 or 1*

If called more than once, the GammaLink function `gl_scexit()` will cause a crash. The function may be called (`1`) more than once for testing purposes.

Default: `0`

LineLicences REG_DWORD

Number of allowed lines. A S0-Bus in this case would correspond to two lines. Since this value is provided with a licensing key, modification of this entry could result in a license infraction message.

Example: 12

LineResources REG_DWORD

Number of lines as determined by hardware recognition. A S0-Bus has e.g. two lines. During the configuration the number of found resources will be entered in LineLicences.

MuteRecording REG_DWORD *0 or 1*

Message recording will not begin when e.g. an output (greeting/announcement) is in progress (`1`). This option prevents silence at the beginning of a recording while the caller waits for an announcement.

Default: `1`

PrioClass REG_DWORD

Dialogic APL priorities. This setting should not be changed. Higher priorities (0x80, high; 0x100, real-time), could block the complete Windows NT System. The Dialogic APL does not function with the idle priority (0x40).

Default: 0x20

PrioThread REG_DWORD

Priorities of several special threads that administer board events. This value should not be modified.

Value	Thread-Priority
2	Highest
1	Above Normal
0	Normal
-1	Below Normal
-2	Lowest

Default: 1

QueryBilling REG_DWORD *0 or 1*

This switch is used to activate the billing option (`1`). If not activated, billing information is not displayed, even in the case of outgoing calls through the public exchange.

Default: `1`

ReportVoiceOKAfterConn REG_DWORD *0 or 1*

The voice protocol is often used for putting out received voice messages at a telephone. If the recipient puts the phone down before having listened to the entire message, this message is reported as not correctly delivered and, as the case may be, the MTA initiates a repetition of the call. Setting this switch to 1 reports OK to the MTA already when the recipient answers the phone and thus listens to at least a part of the message.

Default: 1

RecordEnabled REG_DWORD *0 or 1*

Can be set to 0 for test purposes. Incoming Voice data will be ignored.

Default: `1`

TraceFile REG_SZ

ISDN Low Level Trace file. This is a compressed text file containing ISDN low level data traffic. This file is only of use to technicians. A decoding program from Siemens is required when Cornet-N is used.

Default: " "

TransferByJoin REG_DWORD *0 or 1*

For the feature Call Transfer by Join, which in connection with Cornet-NQ is used at specific PBXs in England, this value must be set to 1. In principle, a call transfer is established via two B-channels as with the TUI option "-nopbxswitch". Contrary to this, both connections are interconnected in the PBX and both B-channels are released again after the second connection setup. Since this feature is only rarely required for customer systems, no parameter exists in the script configuration dialogs, but configuration must be performed here in the registry.

First "-nopbxswitch" must be installed with the TUI used as usual. Then create *TransferByJoin* as DWORD and set it to 1. After rebooting the Dialogic APL this feature is active.

Default: 0

UIOSafe REG_DWORD *0 or 1*

When programers call a Dialogic user I/O function, this occurs in an internal *critical section* of the Dialogic software. Therefore, no critical sections should be created by the programer for either calling I/O functions or for calling functions from within a function.

If this problem is fixed by Dialogic, or if the programer is certain that the I/O function must be simulated, then this value may be set to `1`.

Attention: The Dialogic software can Dead Lock itself when this switch is set.

Default: `0`

UseInternalCritical REG_DWORD *0 or 1*

When this switch is active a special flag is used for all queries and signalization from data through user I/O functions. This flag signals the upper network layer that it should not wait until a critical section is released by a blocking thread.

If the function call TryEnterCriticalSection() fails, the data should be ignored by the protocol layer.

Default: `1`

VoiceLicences REG_DWORD

This is the number of allowable full-duplex voice channels. Since this value is provided with licensing key, modification of this entry could result in a license infraction message.

Example: 15

VoiceResources REG_DWORD

Number of voice resources (Full Duplex Voice Channels) as determined by hardware recognition. During the configuration the number of found resources will be entered in LineLicences

5.4.2 Blobs (Binary Large Objects)

Every registry entry administered by the TeleReg API may contain an reference to a Blob. Blobs are binary data areas in which programer defined data may be stored.

This mechanism is currently not used by the Dialogic APL. Used Blobs can be found in the registry under the *Key*:

`HKEY_LOCAL_MACHINE\Software\PP-COM\MRS\DlgApl\Blobs`

5.4.3 Hardware

Under the *Key*

`HKEY_LOCAL_MACHINE\Software\PP-COM\MRS\DlgApl\Devices`

is for every board with one or more communication channels (Lines) a numbered *Key_n*. In these Keys the following *Values* are found:

AddDialOutLen REG_DWORD

For outgoing calls it is possible to insert digits to a dialing number. If for example a PBX system has two cross connections 82 and 83, then a call from 8247 to 8311 is simply transferred internally and not through the public exchange. Numerous PBX systems do not have this function, and in such a case the call must be routed through the public exchange, and therefore these prefixed digits. In a case such as this, the number of prefixed digits must be entered here.

Default: `0`

Blob REG_DWORD

Index number of the Blob data area.

Default: `0`

Caps REG_DWORD

Each device administered by the TeleReg API has certain capabilities. These are listed as bitmasks with the appropriate capability:

Bit	Status (Bit set)
0x0001	Device is Voice capable.
0x0002	Device recognizes DTMF.
0x0004	Device can send and receive fax G3 documents.
0x0008	Device can poll documents from fax on demand servers.
0x0010	Device can function as a fax on demand server.
0x0020	Device can send and receive fax G4 documents.
0x0040	Device can poll fax G4 documents from fax on demand servers.
0x0080	Device can function as a G4 fax on demand server.
0x0100	Device is Euro file transfer capable.
0x0200	Device is teletex transmission capable.
0x0400	Device can transfer raw data.
0x0800	Device can administer Message Waiting Indicators.

FaxG3 REG_DWORD

Number of fax G3 lines on this board.

Example: 12

Lines REG_DWORD

Number of physical lines supported by this board.

Example: 30

Name REG_SZ

Board description. This entry is also used for display in the MRS Monitor.

example: D/300SC-E1

PrefixedANI REG_DWORD *0 or 1*

When set to 1 the number (Automatic Number Identification (ANI)) is used with the prefixed digit for outside dialing from the device. This information is required for uniform charge cost information gathering.

Default: `0`

SkipDialInfoLen REG_DWORD

The portion of the dialing number (by incoming calls) that is to be ignored. The following example depicts a situation that occurs often with a direct DSS1 configured as a PBX connection:

Given is the dialing number 49-2404-4711-xx. The extension information delivers the number 4711123 which when combined with the dialing number gives the number 49-2404-4711-4711123. In this case the first four digits of the extension information must be ignored (4711).

Default: `0`

State REG_DWORD

Every entry in the Registry administered by the TeleReg API has a “State”. These entries are in the form of a bitmask and are described in the following table:

Bit	State (Bit set)
0x01	Entry active.
0x02	This entry must be activated in the Registry. This bit is used by an internal configurations module.
0x04	This entry is deleted from the Registry unless the bit 0x08 is set.
0x08	This entry remains permanently in the Registry even when not active and when marked as deleted by a configuration module. This bit is used by certain standard protocols e.g. Fax G3.
0x10	This entry is already present in the Registry. This bit is internally used and modified by configuration modules.

Example: 0x11

5.4.4 Lines

A line is defined as a physical bidirectional communication channel. With S_{2m} ISDN-Boards this could be up to 30 Lines. Each line is assigned an Originator Address

(OAD), and the same OAD could be used for more than one line. Furthermore, a line is bound with at least one protocol.

Under the *Key*

`HKEY_LOCAL_MACHINE\Software\PP-COM\MRS\DlgApl\Devices\`*n*

an enumerated *Key_n* is found for each line on a board. In these *Keys* the following *Values* are found:

Baudrate REG_DWORD

Line data transfer rate.

Default: `0`

BoundProtocols REG_DWORD

Bit mask to the supported protocols of this line. Every supported protocol is listed by the TeleReg API as an enumerated *Key* under the Key `HKLM\Software\PP-COM\MRS\DlgApl\Protocols`. The bit 0x1 corresponds to the protocol listed first with the key 01. If seven protocols are available, and all are supported by the line, then the BoundProtocol entry would be 0x7.

Cost REG_DWORD

Charge cost factor in currency units.

Default: `12`

OAD REG_DWORD

Every line is assigned a number (Originator Address, (OAD)). The TeleReg APL administers all available OAD numbers as enumerated *Keys_n* (01, 02, 03, …) under the Key `HKLM\Software\PP-COM\MRS\DlgApl\OADs`. Reference to the OAD that is be used with the line is accomplished through use of index numbers.

If the index number fails, than the OAD with the lowest index *n* number would be used.

Default: `0`

State REG_DWORD

See page 201.

5.4.5 Extension Number Ranges

All incoming dialed numbers must correspond with its extension in the ranges listed here. So that incoming calls are taken by the Dialogic APL, a protocol must be assigned to the range and bound to a line. Additionally, the line OAD must correspond

with that of number range. This mechanism can be used to assign certain ranges to special lines. This could be implemented so that incoming fax documents are routed to a special line (OAD).

If the board delivers an ISDN Service Indicator it will be checked against a list of applicable protocols.

A minimum of one extension number is required for a supported service. These services are numbered and stored with their number under the *Key*

`HKEY_LOCAL_MACHINE\Software\PP-COM\MRS\DlgApl\Extensions`

as a separate *Key.* The first extension number range has the *Key* `01`, the second the *Key* `02`, … Each of these *Keys* contain the fixed *Values*

Blob REG_DWORD

Index number of the Blob data area.

Default: `0`

End REG_SZ

Extension number range upper limit.

Example: 199

OAD REG_DWORD

Every line is assigned a number (Originator Address,). The TeleReg APL administers all available OAD numbers as enumerated *Keys_n* (01, 02, 03, …). These *Keys* are found under the *Key* `HKEY_LOCAL_MACHINE\Software\PP-COM\MRS\DlgApl\OADs`. Reference to the OAD that is be used with the line is accomplished through use of index numbers.

If the index number fails, than the OAD with the lowest index *n* would be used.

Default: `0`

Protocol REG_DWORD

All supported protocols are listed by the TeleReg API as enumerated *Key_n* under the *Key* `HKLM\Software\PP-COM\MRS\DlgApl\Protocols`. This number is used as a reference to a protocol.

Example: `1`

Start REG_SZ

Extension number range lower limit.

Example: 100

State REG_DWORD

See page 201.

VarDigits REG_DWORD *0 or 1*

Extension numbers in this extension range may have a variable amount of digits when set to 1. Calls with less digits would also be taken after a short waiting period for the next digit.

By voice applications it is helpful that the extension can be of varying length.

Default: `0`

5.4.6 Originator Address

Every line is assigned a number (Originator Address, (OAD)). The TeleReg APL administers all available OAD numbers as enumerated *Keys_n* (01, 02, 03, …) under the *Key* `HKLM\Software\PP-COM\MRS\DlgApl\OADs`. Reference to the OAD that is be used with the line is accomplished through use of index numbers.

OAD numbers are used to determine the extension number of incoming calls. Simultaneously, the line can be validated for the extension number range.

5.4.7 Protocol

Protocols are a supported services from the Dialogic APL. There are various generic services such as FAXG3, VOICE, or VFS; and branched protocols from generic protocols (e.g. outgoing VFS with a coupled Script). Branched protocols may not have a Script assigned to them. Under the *Key*

`HKEY_LOCAL_MACHINE\Software\PP-COM\MRS\DlgApl\Protocols`

an enumerated *Key_n* is found. In these *Keys* the following *Values* are found:

Attributes REG_MULTI_SZ

List of protocol attributes (logical lines)

Attribute	Significance
IN	Line allows incoming traffic (with reference to the server)
OUT	Line allows outgoing traffic (with reference to the server).
SF	Line allows Store-and-Forward documents.

Default:

```
SF
IN
OUT
```

AttributesAllowed REG_DWORD

Every protocol administered by the TeleReg API possesses attributes. These are bitmasks which contain the attributes allowed by the protocol. These entries are only valid when the attribute is set by EditPerm.

Blob REG_DWORD

Index number of the Blob data area.

Default: 0

CapMask REG_DWORD

Board characteristics bit mask. This bit mast allows the configuration module to determine if a protocol can be supported by the board. Possible values can be taken from the Caps table on page 200.

Description REG_SZ

Protocol description.

DispPerm REG_DWORD1

Bitmasks which enable certain windows or window elements for the graphic interface.

DocReps REG_SZ

Redial strategy. These parameters define how often and in which time intervals a repeat attempt is to be made by the router. The first parameter is the number of attempts that are to be made, and the second the time interval between attempts in seconds. These are executed one after another and five various redial entries may be given. In the following example the first three attempts are made at sixty second intervals, the next two attempts in ninety second intervals.

Example: `3-60,2-90,0-0,0-0,0-0`

EditPerm REG_DWORD

Bit masks that allow modification of registry entries by the protocol.

Bit	Modifiable Registry Entries
0x001	Name

Bit	Modifiable Registry Entries
0x002	FriendlyName
0x004	Description
0x008	Attributes
0x010	Formats
0x020	Private
0x040	ParamBlock
0x080	DocReps
0x100	ScriptName

Default: `0`

EditPermGenerated REG_DWORD

The same as EditPerm but only for use with generated protocols (those created by other protocols).

FaxG3Chain REG_DWORD

Not used by the Dialogic APL.

FaxG3Resend REG_DWORD

Not used by the Dialogic APL.

FaxG4FaxG3 REG_DWORD

Not used by the Dialogic APL.

FaxG4T70 REG_DWORD

Not used by the Dialogic APL.

FaxID REG_SZ

Default fax G3 ID. This ID must correspond to the standard T30. This standard recognizes only digits, spaces, and +. This ID is used only when no user specific ID is found in the database.

Example: `+49 2404 9876543`

Formats REG_MULTI_SZ

List of documents and data formats valid for this logical line. These formats are described in Appendix 26.1 of this manual.

Example: TG3

FormatsAllowed REG_DWORD

Each protocol administered by the TeleReg API can process certain documents and file formats. These are bitmasks which contain the documents and file formats allowed by the protocol. These entries are only valid when the format is set by EditPerm.

FriendlyName REG_SZ

User readable protocol name. An unique FriendlyName must entered for each protocol.

Example: Fax Group 3

Headline REG_SZ

Default fax G3 headline which appears on the top of every fax page. Maximum length of the headline is 32 characters.

Example: Sample Co.

MultiMaster REG_DWORD *0 or 1*

Numerous protocols can be branched from this protocol (`1`)

Default: `0`

Name REG_SZ

Node portion of the MRS Address.

Example: FAXG3

ParamBlock REG_SZ

Script parameters are given here.

Private REG_MULTI_SZ

Private data.

Default:

PrivateMode REG_DWORD *0 or 1*

Caller defined private mode. Reserved for ISDN service indicator when set to 0. Normally used by Script based protocols.

Default: `0`

ScriptName REG_SZ

File name of the protocol´s Script without extension.

Example: SFOD

State REG_DWORD

See page 201.

Type REG_DWORD

Protocol Type.

Type	Protocol
0	Unknown protocol type
1	Fax G3 send and receive
2	Fax G3 polling
3	Fax G3 Fax-on-Demand Server
9	Voicemail send and receive
10	Script based protocol written in the programing language D
11	Script based protocol written in the programing language E
12	Script based protocol written in the programing language GSM
13	Message Waiting Indicator

Example: 1

5.4.8 Voice & Fax-on-Demand Systems

The Values for the installed VFS-Scripts are found under the *Key*

`HKEY_LOCAL_MACHINE\Software\PP-COM\MRS\DlgApl\Vfs`

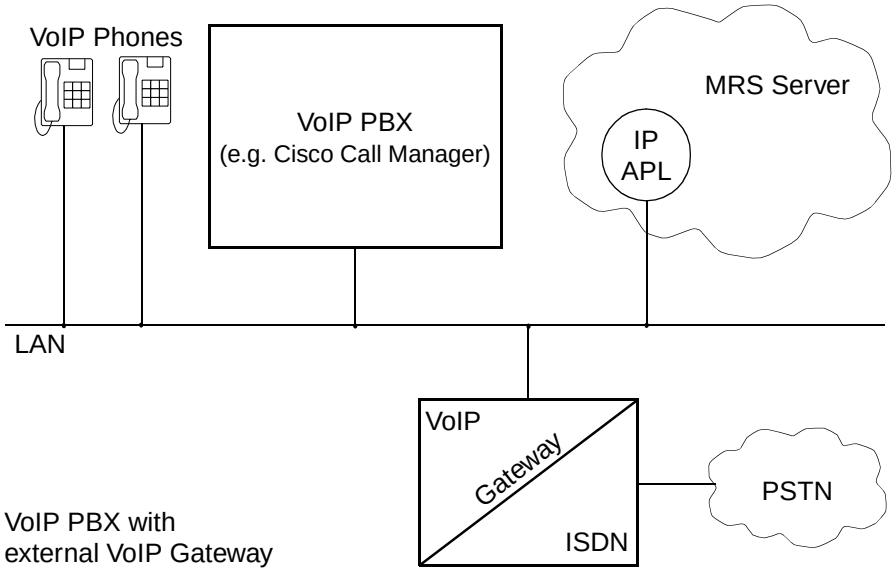
These correspond to those found on page 182 of the ISDN APL.

6 IP APL

The IP APL implements an access to protocols analog to telematic APLs such as the ISDN or Dialogic APL. In so far IVR script protocols registered in the IP APL can be used e.g. by means of Voice over IP (VoIP).

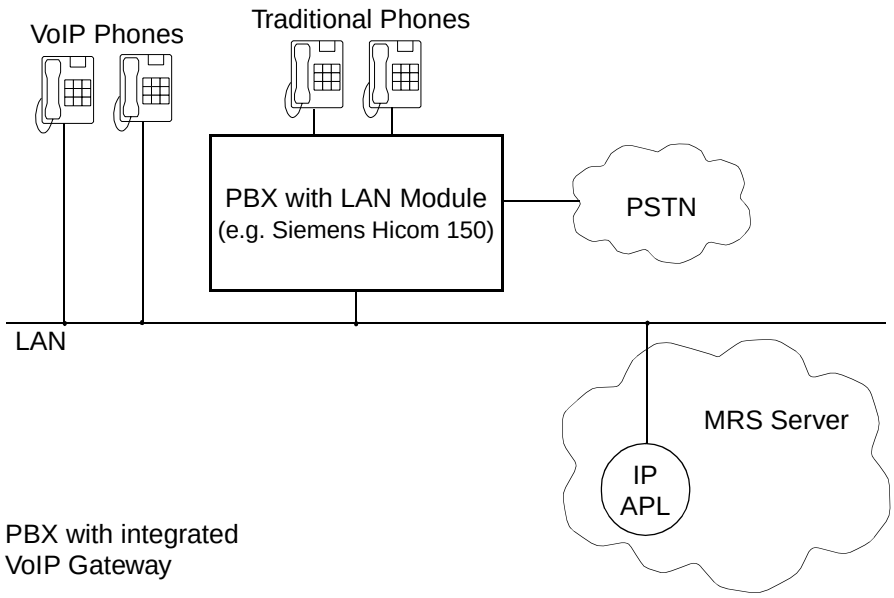
For that purpose the corresponding extension numbers are passed on to the IP APL in the used gatekeeper. Thus the IP APL starts protocols corresponding to the extension numbers assigned to the respective users, for example a voicemail application representing the user´s answering machine. In most cases this is realized by the IP APL configured as gateway at the gatekeeper, so that the gatekeeper forwards all unknown, thus not directly assigned addresses, to the IP APL.

There are basically two types of gatekeepers. On the one hand they can be pure VoIP solutions (for example Cisco “Call-Manager 3.0“), where transition of the public telephone network (PSTN) to the IP network is provided by a separate hardware solution not further considered here.



VoIP PBX with
external VoIP Gateway

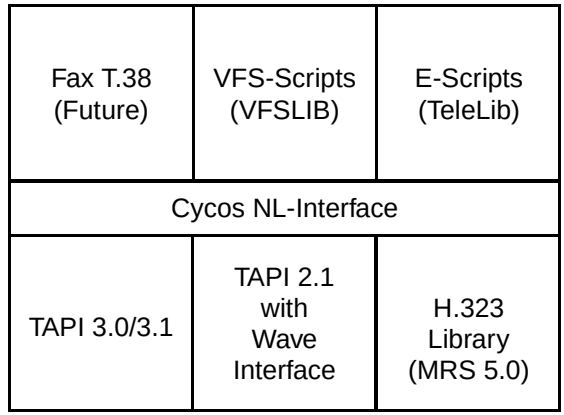
On the other hand gatekeepers can be integrated solutions as element of classic PBXs (for example Hicom 150 Office with HLB board). In this case transition from the public telephone network (PSTN) to the IP network is already an integral component of the functional range.



Connection of the IP APL to the gatekeeper occurs in different ways since various interfaces are available. The following are commonly used:

- **TAPI 3.0**
  Is either based on H.323 TSP (e.g. Innovaphone IP 400) supplied by Microsoft with Windows 2000, or the software publisher provides a corresponding TSP for their system, e.g. for Siemens´ Hicom 150 with HG 1500 (Hicom Lan Bridge).
- **TAPI 3.1**
  Is based on H.323 TSP, supplied by Microsoft with Windows XP. With TAPI 3.1, the TSP also supports the supplementary services of H.450.
- **TAPI 2.1 with Wave Interface**
  Here as well the software publisher needs to deliver a corresponding TSP. Examples of this connection are the Cisco Call Manager or the Siemens HiPath 5500.
- **Direct H.323 Interface**
  Direct connection via H.323 protocol stack. Intended from MRS 5.0.

Consequently the IP APL is a multi-protocol stack, downward supporting these interfaces. Upwards, VFS or E-scripts can be connected to the extension number ranges as protocols. In future, standard T.38 is to be supported as well so that fax documents can be received or sent via the IP APL, too. The opposite illustration is to clarify the internal, schematic structure of the IP APL.



6.1 General Configuration Instructions

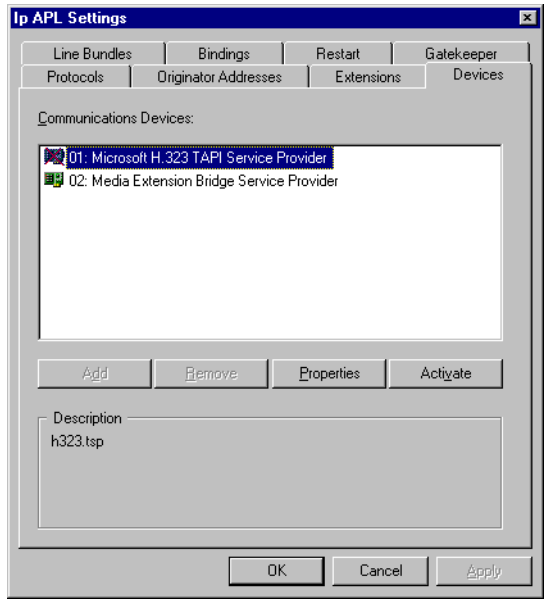
As usual the IP APL is configured from within the MRS Monitor using the TeleConfig-Library, so that basic configuration is performed analog to the ISDN or Dialogic APL. In the following you find the significant differences:

6.1.1 Devices

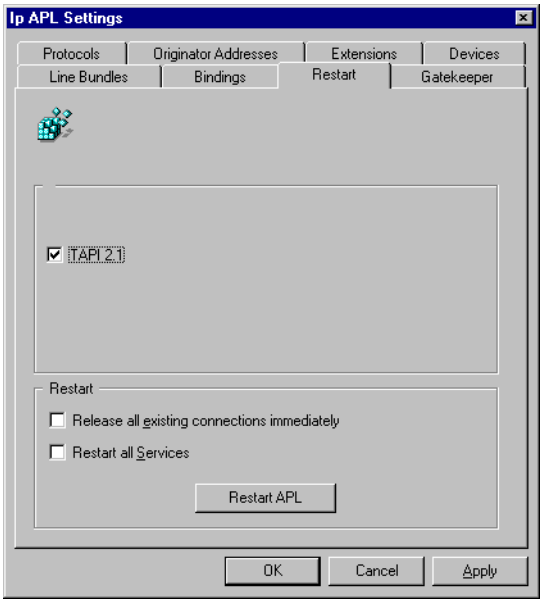
As devices no ISDN boards are available but the installed TAPI service provider.

For the time being the following are supported:

- **Cisco TSP**
  Cisco Call Manager
- **Microsoft H.323 TSP**
  Innovaphone IP 400
- **Siemens HiPath TSP**
  Siemens HiPath 5500
- **Media Extension Bridge**
  Siemens HG 1500



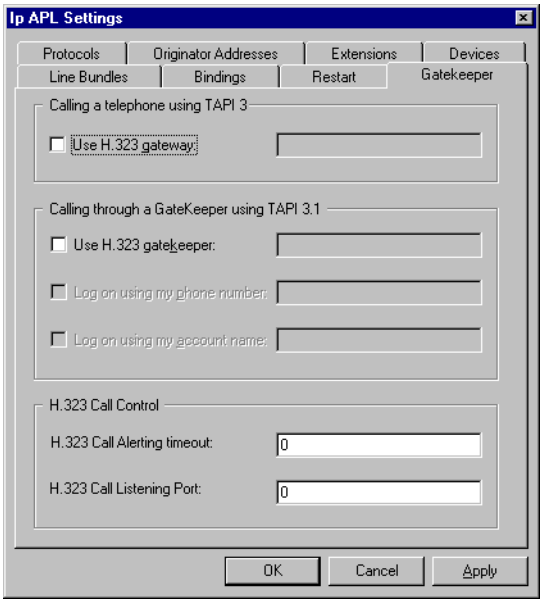
6.1.2 Restart



In this configuration tab you can decide whether to address a VoIP PBX via TAPI 2.1 with Wave interface or via TAPI 3.0.

For TAPI 3.0 the option **TAPI 2.1** must be deactivated.

6.1.3 Gatekeeper



In the portion **Calling a telephone using TAPI 3** you can select the option **Use H.323 gateway** to define the *<IP Address>* of a gateway via which the IP APL can handle outgoing calls. This definition is required e.g. with the Innovaphone IP 400 system.

The section **Calling through a Gatekeeper using TAPI 3.1** serves to register the IP APL at the gatekeeper. This functionality is not possible until TAPI 3.1, with TAPI 3.0 the IP APL must at any rate be configured within the gatekeeper with a fixed IP address and thus be introduced there. From TAPI 3.1 you can specify the IP address of a H.323 gatekeeper here. At the start the IP APL then either logs in at the gatekeeper with a **phone number** or via an **account name** so that the gate- keeper

knows the IP APL and correspondingly forwards calls addressed to this calling number or for this account to the IP APL. When an account is used, it can be assigned several calling numbers in the gatekeeper configuration. As customary, protocols can then be bound to these calling numbers.

H.323 Call Control

The value **H.323 Call Alerting timeout** indicates how long the callee´s telephone is to ring until the calling attempt is terminated. The default of 180000 corresponds to 3 minutes in miliseconds.

By means of **H.323 Call Listening Port** you can set the TCP/IP port for VoIP. The default 1720 should be kept in most cases.

6.2 Siemens HG 1500 Connection

The HG 1500 board for the Hicom 150, also known as Hicom Lan Bridge, must be correspondingly configured. It can then be used in e.g. call center environments to replace the common boards for announcements, voicemail and fax. For fax an individual APL, the HLBFax APL, is available which also requires the HG 1500 board with installed Media Extension Bridge. This, however, is exclusively sold by Siemens.

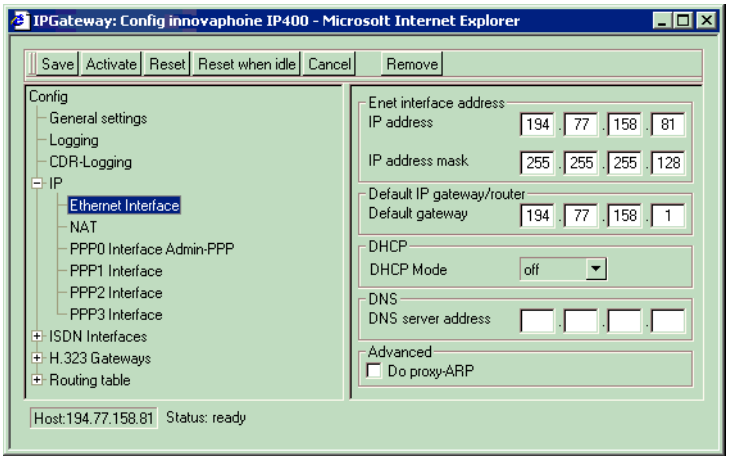
Install the Media Extension Bridge for the HG 1500 and bind the extension numbers defined in the Hicom to the corresponding protocols. As protocols for example *ACD-Loop* for call center announcements, *Agent Manager* for remote agent administration, *Phonemail* or another voicemail protocol and Vogue are supported.

Within the IP APL no further settings are required since the installed Media Extension Bridge is recognized and the correct settings are then automatically performed. In the **Gatekeeper** tab no options should be active, in the **Restart** tab the **TAPI 2.1** option should also be deactivated.

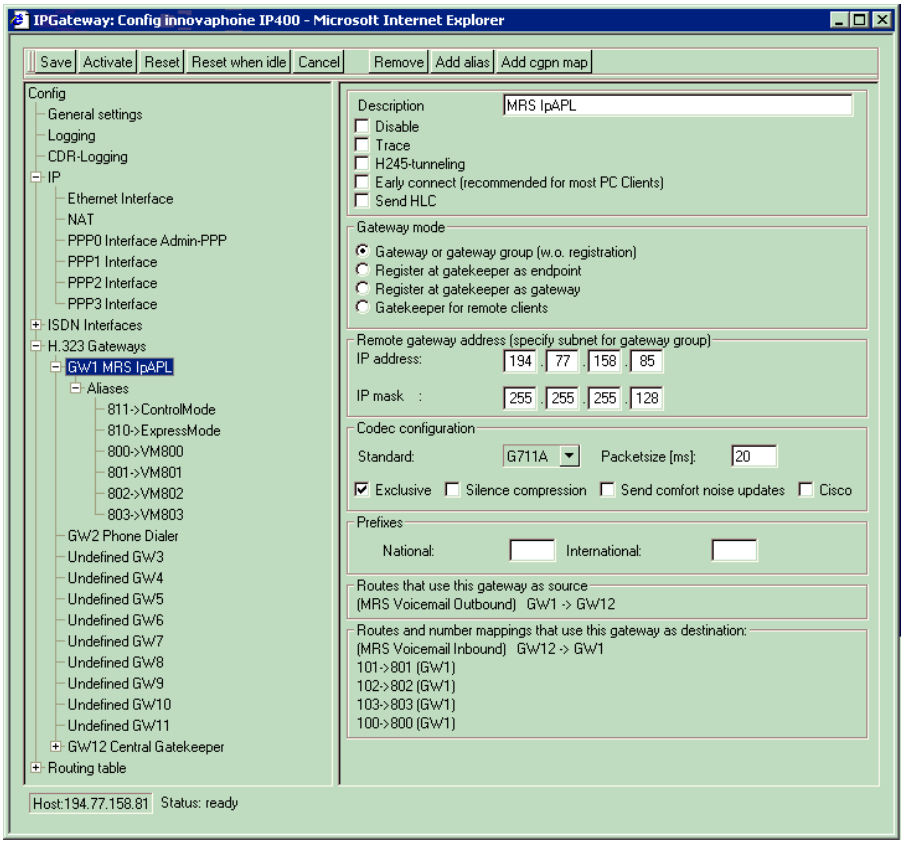
6.3 Innovaphone IP 400 Connection

In the following you find the most important aspects to be considered with connecting the IP APL to the Innovaphone IP 400 system. The Innovaphone IP 400 is configured via an HTTP interface.

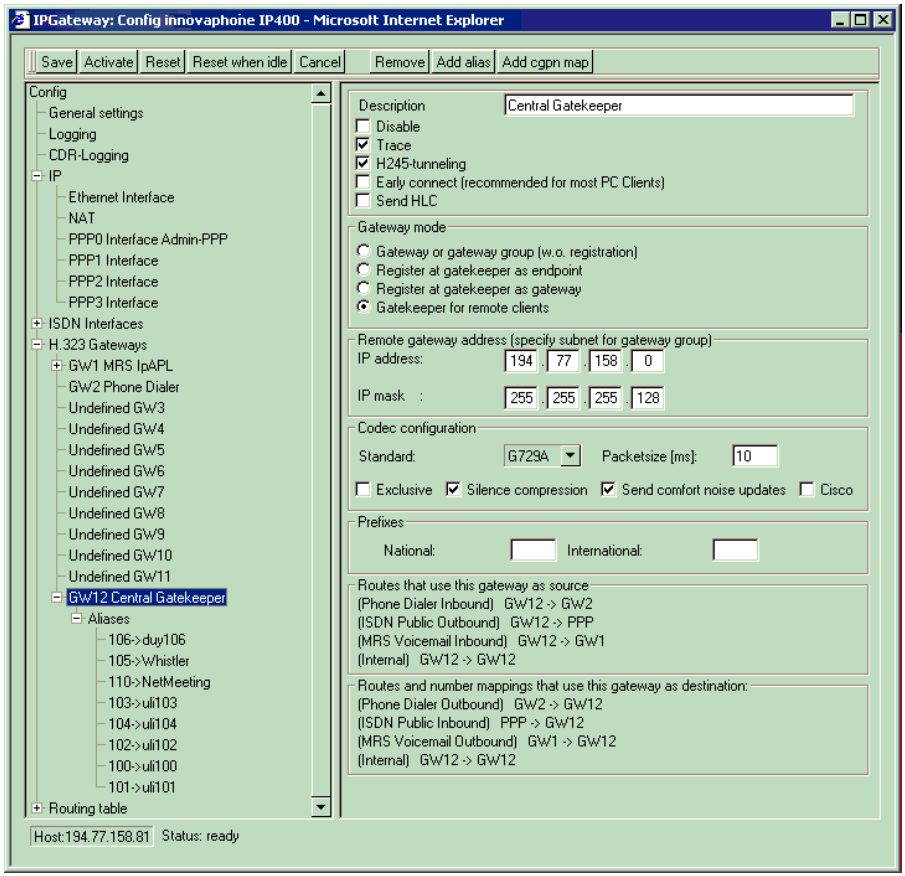
- In the IP configuration you first need to enter the IP address of Innovaphone IP 400 in the **Ethernet Interface** portion.



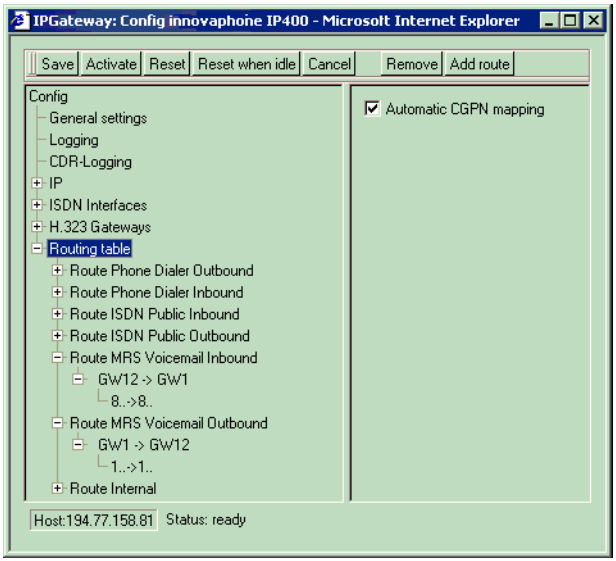
- Define the MRS IP APL as H.323 gateway with gateway mode **Gateway or gateway group (w.o. registration)**.
- Enter the MRS Server´s IP address as **Remote gateway address**.
- All supported extensions (numbers of voice mailboxes, control mode numbers, …) must be entered as alias (see following illustration).



- Enter Innovaphone IP 400 as H.323 gateway called **Central Gatekeeper** with Gateway mode **Gatekeeper for remote clients**.
- As IP address either enter XXX.XXX.XXX.0 if you want to register the end-points XXX.XXX.XXX.1 to XXX.XXX.XXX.255 at the gatekeeper. Alternatively you can enter 0.0.0.0 in case you want to have all end-points registered at the gatekeeper.
- All end-points to be registered at the gatekeeper must be entered in the gateway by name and E.164 address as alias.



- All routing rules required for a call arriving at or coming from the MRS Server must be entered in the routing table: Example:
  `GW12 -> GW1` : MRS Inbound Call rule
  `GW1 -> GW12`: MRS Outbound Call rule



- For further configuration details please refer to the Innovaphone manual.

6.3.1 IP APL Configuration

The following IP APL configurations remain to be executed:

- First add the desired protocols. The following protocols have been tested successfully :
  - MCK.c (Standard Voice/Fax-Mailbox). Voicemail only.
  - TNG.e (Alternative Voice Mailbox). Voicemail only.
  - PLAYWAVE.e (Plays voicemails via the telephone. This script is used by Outlook Forms, Notes Forms and Communications to put out voicemails at the telephone).
  - CVP.e (convenient replacement for the standard `VOICE` protocol).
- Deactivate the **TAPI 2.1** option in the **Restart** tab so that the Microsoft TAPI 3.0 protocol stack is used.
- In the **Calling a telephone using TAPI 3** section of the **Gatekeeper** tab checkmark the **Use H.323 gateway** option and enter the Innovaphone IP 400 <*IP Address*>as specified further above in the first step of the Innovaphone system configuration.

6.4 Stopping the APL Softly

The IP APL supports soft termination of the IP APL via the command line order

```
net pause isdnapl
```

After this command the IP APL does not accept any further calls while all existing connections are handled without interference until they are closed normally. As soon as all connections are closed, the IP APL can be entirely terminated in the usual manner via

```
net stop isdnapl.
```

As an alternative you can also continue operating by means of

```
net continue isdnapl.
```

6.5 Glossary

Gatekeeper

The gatekeeper is a unit taking on the assignment between IP addresses and telephone numbers. It is thus the central unit required for transition from the common telephone network to the IP network. Example: Cisco “Call Manager 3.0“.

H.323

ITU (International Telecommuncications Union) standard for telephony services in packet-switched networks. The IP network as special case of a packet-switched network is included and thus also the VoIP (Voice over IP) and FoIP (Fax over IP) services. Consequently H.323 includes various other standards, for example T.38 for fax transmission or H.450 for supplementary services such as Call Transfer or Call Diversion.

POTS (Plain Old Telephone System)

Common analog telephone network as it has existed for years. It is gradually replaced by digitalization, thus ISDN or broadband networks.

PSTN (Public Switched Telephone Network)

Well known public telephone network with public switching systems. It is made available by your telecommunications provider (for example British Telecom).

TSP (TAPI Service Provider)

Software module which, via TAPI, enables communication between an application and the PBX supported by this TSP .

7 V.24 APL

Clients and servers can be coupled to the MRS Server over the V.24 APL. Furthermore, the V.24 APL enables transmission, reception, and operational readiness (Fax-on-Demand Server) of fax G3 over class 2 fax-modems, as well as polling from other Fax-on-Demand servers.

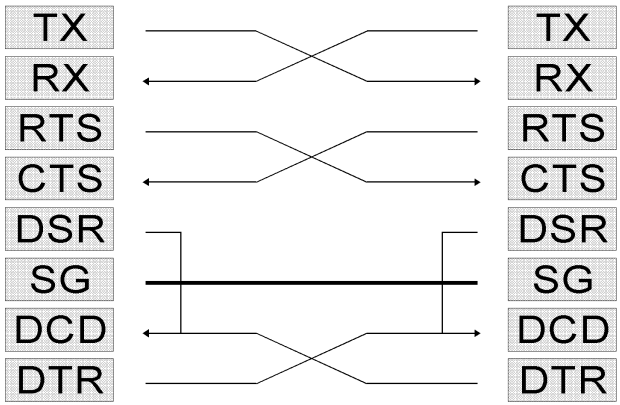
If during a fax transmission the connection is interrupted, a retransmission attempt will be made. The message “Continuation of an interrupted message” would be affixed to the remaining transmission.

In addition, protocols can be programmed over the Script. Currently, scripts exist for sending e-mails to Compuserve members (and for reception), Short Message Services (SMS) for messages of up to 160 characters to GSM networks, as well as CIT signaling transmission of new inbound message arrival.

A list with all supported modems can be found in the Hardware Compatibility List (HCL) of the MRS Server.

7.1 V.24 Dedicated Lines

A null modem cable is used for client coupling over dedicated V.24 lines. All handshakes must be wired:



7.2 Registry Entries

The following *Values* are found under the *Key*

`HKEY_LOCAL_MACHINE\Software\PP-COM\MRS\V24Apl`

ContIntFaxStr REG_SZ

This one line message is affixed to fax transmission continuations.

Example: `Continuation of an interrupted message`

DefFaxRecipient REG_SZ

Default recipient for undeliverable fax documents.

Example: `POSTMASTER`

DlgSessions REG_SZ

For future dialog service expansions.

Default: `16`

FaxConnTimeInJrn REG_DWORD *0 or 1*

Accumulated connection times for fax document transmissions are listed in the journal (`1`). No connection times are listed in the journal (`0`).

Default: `0`

Headline REG_SZ

Default fax G3 headline. A maximum of 32 characters in length is allowed.

Example: `Master Co.`

InsertMidHl REG_DWORD *0 or 1*

Document message ID is inserted into the headline. If used, a maximum of 22 characters for the headline is allowed.

Default: `0`

InstalledDrivers REG_MULTI_SZ

List of installed script files for modem triggering. The list is initialized (every new start of the V.24 APL) with reference to the driver scripts in the directory …`\res\sm`, and cannot be altered.

Example:

```
cpvpico.sm
creatix.sm
elink324.sm
elsa.sm
```

```
null.sm
usr_cou.sm
zyxel.sm
```

InstalledProtocols REG_MULTI_SZ

List of installed protocols for modem triggering. This entry cannot be altered. By each new start of the V.24 APL the list is re-initialized with reference to the available protocol scripts as well as the protocols `SMI Transport` (Client/Server coupling), `Fax G3` (reciept, transmission, and Fax-on-Demand), and `Fax G3 Poll` (fax polling).

Example:

```
SMI Transport;NVS:MODEM;1
FaxG3;NVS:FAXG3;1
FaxG3 Poll;NVS:FAXG3REV;1
GSM,cit_basic.sm;NVS:CIT_BASIC;1
GSM,cserve.sm;NVS:CSERVE;0
GSM,smsger.sm;NVS:SMS;1
GSM,smsbel.sm;NVS:SMSBEL;1
GSM,smsucp.sm;NVS:SMSUCP;1
```

OriginatorID REG_SZ

Default fax G3 ID. This ID must correspond to T.30 standards which allows only digits, spaces, and + for the ID.

Example: `+49 2404 9876543`

7.2.1 Device Settings

Under the *Key*

`HKEY_LOCAL_MACHINE\Software\PP-COM\MRS\V24Apl\Devices`

is for each installed serial port, a *Key* with the name of the port e.g. `COM1`, `COM2`, `COM3`. In each of these *Keys* the following *Values* are contained.

AreaCodeEscape REG_SZ

National prefix. This number is set preceding the area code of the recipient when an incounty number is dialed. If this entry is not set the V.24 APL uses the default value in MRS Globals\Location\AreaCodeEscape.

Example: `0`

Baudrate REG_DWORD

Serial port baud rate.

Example: `19200`

CanBePolled REG_DWORD *0 or 1*

Fax-on-Demand is supported by the modem (`1`).

Default: `0`

CanVoice REG_DWORD *0 or 1*

Voice is supported by the modem (`1`). This *Value* is currently non-functional.

Default: `0`

CountryCodeEscape REG_SZ

International prefix. This number is set before the country code of the recipient when an international number is dialed. If this entry is not set the V.24 APL uses the default value in MRS Globals\Location\CountryCodeEscape

Example: `00`

ExternalLinePrefix REG_SZ

External Line. If this entry is not set the V.24 APL uses the default value in MRS Globals\Location\ExternalLinePrefix.

Example: `0`

FaxPollFile REG_SZ

Pollable fax file.

Example: `default.fax`

LineName REG_SZ

Line name in the MRS Monitor.

Example: `Creatix COM3`

LocPrefixExtensions REG_MULTI_SZ

A list with dialing numbers or partial dialing numbers, that by the normalization are not modified. Normally all numbers larger than 8 digits would be normalized to an international dialing number.

Example: In Germany the number `0240412345` would be normalized to `49240412345`.

With corporate networks it is possible that dialing numbers such as `9992`<*Extension*> exist. One can enter the prefix `9992` here so that all numbers beginning with this prefix will not be normalized.

Example:

```
9992
0111
444
```

All numbers that begin with `9992`, `0111` or `444` will not be normalized.

This entry is only useful on this position when settings for the ISDN APL are to be configured differently than that of the global settings under `MRS Globals\Location\LocPrefixExtensions`.

PhoneNum REG_SZ

Telephone number of the modem. International prefixes, area codes, PBX number, and the extension of the modem are to be separated with a hyphen

Example: 49-1234-5678-90

Protocols REG_MULTI_SZ

Protocol bindings to the modem. Under the *Key*

`HKEY_LOCAL_MACHINE\Software\PP-COM\MRS\V24Apl\Protocols`

are all MRS addresses that are supported by this device, and listed there as a *Key.*

ShortholdTime REG_DWORD

Wait time in seconds after which an existing SMI connection over the V.24 APL is disconnected due to inactivity. If the Value is 0, no connection would be automatically disconnected.

Default: `60`

SMFile REG_SZ

Script file that contains the triggering and answer evaluation of the modem. This is one of the device drivers listed in InstalledDrivers.

Example: `creatix.sm`

TouchTone REG_DWORD *0 or 1*

Differentiation between pulse (0) and tone (DTMF) dialing.

Default: `1`

7.2.2 Protocols

Under the Key

`HKEY_LOCAL_MACHINE\Software\PP-COM\MRS\V24Apl\Protocols`

all protocols that are bound to a device through their MRS address are listed. As *Value* is the logical address given, which defines the device and the address to which the protocol is bound. The following protocols are available:

Protocol	Description
`SMITR`	Client/Server-Coupling over a SMI Transport.
`FAXG3`	Fax G3 Send/Receive/Fax-on-Demand Server.
`FAXG3REV`	Fax G3 Poll from a Fax-on-Demand Server.

`GSM,`[*Script-File*]	A General State Machine (GSM) script connection. The following GSM script language protocols are included:
	`cit_basic.sm`
	This protocol allows the setting of a MWI signal over a Siemens Hicom telephone system.
	`citmd110.sm`
	This protocol enables the transmission of MWI signals over an Ericsson MD 110 PABX.
	`cserve.sm`
	CompuServe Mail connection
	`smsger.sm`
	Short Message Service for the German GSM network (D1, D2, e-plus). If an agreement between providers exists, then SMS messages to foreign GSM users is possible.
	`smsbel.sm`
	Short Message Service for the Belgian GSM network Proximus.
	`smsnl.sm`
	Short Message Service for the Netherlands GSM networks Libertel and KPN Telecom.

Protocol **Description**

smsucp.sm

Transmission of SMS messages to D2 and international networks via UCP protocol. UCP supports mutated vowels and special characters. To apply the following rules must be added:

```
NVS:SMS.*/49172*=NVS:SMSUCP/49172*
NVS:SMS.*/0049172*=NVS:SMSUCP/0049172*
NVS:SMS.*/0172*=NVS:SMSUCP/0172*
NVS:SMS.*/49173*=NVS:SMSUCP/49173*
NVS:SMS.*/0049173*=NVS:SMSUCP/0049173*
NVS:SMS.*/0173*=NVS:SMSUCP/0173*
NVS:SMS.*/00*=NVS:SMSUCP/00*
```

Various parameters can be additionally appended to a fax protocol and separated by a semicolon. When possible, changes should only be made to repeat strategies.

`reps=` Repeat Strategy. This parameter defines how often and at which interval delivery attempts are to be made by the router. Delivery attempts are successively executed, whereby the first parameter is the number delivery attempts to be made and the second parameter the time interval in seconds between delivery attempts. A maximum of 5 different repeat strategies may be given.
Default: `rep=3-60,2-120,2-300`

`attr=` A comma separated list of line attributes.

`IN`

Line designated for inbound traffic only (in reference to the server).

`OUT`

Line designated for outbound traffic only.

`SF`

Line allowed Store-and-Forward operations.

`DLG`

Line allowed Dialog operations.

`COST`

Cost acquisition over this logical line is enabled in an outward direction only. Ensuing transmission costs will be stored in the Cost database.

`SMITR`

This line is designated as a SMI Transport.

`LOCAL`

Lines with this attribute will not be exported to systems connected by a Remote System Link. Lines without this attribute may be exported when queried by remotly connected MRSsystems.

`PRIV`

Lines with this attribute require a privilege check.

`speed=` Transmission rate for the router. The usage of this attribute is similar to that of "`COST`" so that a preference to lines can be assigned.

`cost=` Through the use of this parameter preferences can be assigned to logical lines used by the router. The greater the value of *cost*, the higher its preference rate, and the ofter its usage.
(-100 < *cost* < 100).

`frm=` This comma separated list defines valid document and file formats for the logical line. Since only Fax G3 services are recognized by the V.24 APL, changing this parameter is of no value. These formats are described in Appendix 25.1 of this manual.

Example: `FaxG3; reps=1-60, 2-120, 3-300`

7.2.3 Protocol Settings

Under the *Key*

`HKEY_LOCAL_MACHINE\Software\PP-COM\MRS\V24Apl\Protocols`

is (for every protocol which has further parameters in the registry) a *Key* with the name of the protocol. These are currently `cit_basic`, `smsbel`, `smsger`, `smsnl` and `smsucp`.

Under the Key `cit_basic` the following *Values* are found.

CIT_Off REG_SZ

This string is used together with the telephone number to turn off the MWI signal in the Hicom telephone system.

Default: `##8`

CIT_On REG_SZ

This string is used together with the telephone number to activate the MWI signal in the Hicom telephone system.

Default: `##7`

Under the *Key* `smsbel` the following *Values* are found.

DigestFormat REG_SZ

Entries with the form `{DIGEST,`<*Length*>`}`. Non-relevant portions such as greeting macros are removed from these entries so that more text is transmitted in SMS messages.

ProximusProviderNumber REG_SZ

Modem access to the Belgian cellular provider Proximus. SMS messages are transmitted to this number.

Default: `3275161622`

Under the *Key* `smsger` the following *Values* are found.

D1ProviderNumber REG_SZ

Modem access to D1. SMS messages are transmitted to this number.

Default: `491712092522`

D2ProviderNumber REG_SZ

Modem access to D2. SMS messages are transmitted to this number.

Default: `491722278030`

DigestFormat REG_SZ

Entries with the form `{DIGEST,`<*Length*>`}`. Non-relevant portions such as greeting macros are removed from these entries so that more text is transmitted in SMS messages.

EPlusProviderNumber REG_SZ

Modem access to e-plus. SMS messages are transmitted to this number.

Default: `491771167`

OriginatorNumber REG_SZ

Originator's telephone number displayed by SMS message receipt. This number is taken from the originators GSM database field. If no entry exists, the default number is used.

Example: `491234567890`

The following *Values* are found under the *Key* `smsnl`

LIBNumber REG_SZ

Modem access number to Libertel for the feed-in of SMS messages.

Default: 0654545000

PTTNumber REG_SZ

Modem access number to KPN Telecom for the feed-in of SMS messages.

Default: 0653141414

The following *Values* are found under the *Key* `smsucp`

DefaultOriginator REG_SZ

Originator's telephone number displayed by SMS message receipt. This number is taken from the originators GSM database field. If no entry exists, the default number is used.

Example: `491234567890`

DigestFormat REG_SZ

Entries with the form `{DIGEST,` <*Length*>`}`. Non-relevant portions such as greeting macros are removed from these entries so that more text is transmitted in SMS messages.

UcpProviderNumber REG_SZ

Modem access number to the German GSM provider D2 for the feed-in of SMS messages.

Default: `491722278020`

8 Gamma APL

Integration of the GammaLink analog communications hardware and the MRS Server is provided through the Gamma APL. GammaLink is subsidiary of Dialogics, which is one of Americas leading manufacturers in the area of computer supported telephony and fax.

Supported services include fax transmission and receipt, fax polling, and fax polling from foreign Fax-on-Demand servers. It should be observed that Direct Inward Dialing (DID) is not possible with the GammaLink Fax card. Therefore, the calling number must wait for the fax tone before a number can be entered per DTMF. This method of dialing is less than desirable for professional use. It should also be noted that in our experience has been, that the DTMF recognition of the GammaLink Fax card does not function reliably, and that a software recognition solution is not possible since DTMF signals are not passed through by the card.

The number of the Postmaster account must be assigned as the Fax G3 number to the card, and incoming faxes the distributed to the individual recipients.

8.1 Hardware

The following cards are all supported with a transfer rate of 1440 Bit/s and an Error Correction Mode (ECM).

- CPi/100 (ISA, 1 Fax Channel)
- CPi/200 (ISA, 2 Fax Channels)
- CP4/LSI SERIES II (ISA, 4 Fax Channels)
- CPi/200 PCI (PCI, 2 Fax Channels)
- CPi/400 PCI (PCI, 4 Fax Channels)
- CPD/220 (ISA, 2 Fax Channels, 2 inbound channels with DID support)

8.2 Registry Entries

The Gamma APL uses the TeleReg API for the administration of the registry. The TeleReg API provides various important functions necessary for the effective management of information required by Telematic APls. Registry key dependency is controlled automatically by the TeleReg API.

All entries administered by the TeleReg API should only be modified in the corresponding configuration module of the MRS Monitor. A description of the newly added entries is found in the following.

8.2.1 General Entries

The following *Values* are found in the *Key*

`HKEY_LOCAL_MACHINE\Software\PP-COM\MRS\GammaApl`

DialBreak REG_SZ

This character is inserted as a pause character, after the outside dialing number in a dialing string.

Default: `,`

IntlDialMode REG_DWORD *0 or 1*

Normally, every dialing number is internationally normed by the MRS Server. When a value of 0 is given, normalization of dialing numbers is switched off for outgoing calls.

TermDigitVar REG_SZ

If a variable extension number range was given, a DTMF character can be entered here which terminates the dialing of the extension number. As stated above, the quality of the DTMF recognition is less than desirable, and that direct dialing is not possible. Furthermore, the extension recognition is automatically terminated after a period of time commensurate to the length of the extension.

Example: #

9 Mail APL

9.1 Standard User Mailbox

All non-active document delivery is administered by the Mail APL. All users that are not connected with the MRS server through a SMI transport (Named Pipes, TCP/IP, V.24, SPX, ISDN etc.) receive their mail through the Mailbox administrator.

The following shows the minimum required user database entries (e.g.: TESTUSER).

Field	**Contents**
USER	TESTUSER
Password	#########
Group	USER
Preferred	MAILBOX
Mailbox	TESTUSER

The Preferred field always points to the database field which contains the preferred delivery address. Since MAILBOX has been given as the preferred routing instead of a delivery address (e.g. SMI transport), no active delivery occurs. The mail would be delivered to the mailbox of the user, and the user must poll the database for new messages.

9.2 Timed Copies

Mailbox administrator functions can be used to check whether documents have met specified age limitations, and if met, measures taken (e.g. Alarm copies) to ensure delivery to another user.

Alarm copies are defined through the Awake rules and are similarly defined as those of Carbon Copies. In addition to delivery conditions, the awake rules always have a time dependent condition. The time period can range from 10 seconds to 30 days before the appearance of a condition, that requires an action to be initiated. Typical actions are: automatic copying of unread mail, copying of received faxes after a certain time limit, etc. A listing of the corresponding rules are described in section 2.5 of this manual. The awake rules are administered by the Mail APL, but the actual rules are in the registry area of the MTA.

9.3 Mailing Lists

The Mail APL administers mailing lists similar to those used in the Internet. For this purpose there are three commands that can be used in a text message to the user `LISTPROC`.

`SUBSCRIBE Listname Name Surname`

Subscribe to a mailing list. The mailing list is used for sending messages to the various subscribers (email address).

Example: `SUBSCRIBE LP-DEVELOPMENT Joe User`

`UNSUBSCRIBE Listname`

Removes individual names from the mailing list. Messages will no longer be sent to these email addresses by the mailing list processor.

Example: `UNSUBSCRIBE LP-DEVELOPMENT`

`HELP`

With this command a message is returned with operational help and a list of all mailing lists existing on the MRS Server.

Internally mailing lists are treated as distribution lists that begin with the abbreviation "`LP`". The configuration and maintenance of mailing lists is done with the help of the Distribution Editor in the MRS Client.

To include a message in a mailing list it should be sent to

```
LST:Listname
```

The following rule must be used so that the user `LISTPROC` can also be accessed from the Internet:

```
NVS:SMTP/listproc*=NVS:$(NODE)/LISTPROC
```

With this rule all incoming SMTP queries destined for a listproc user are routed to the mailbox `LISTPROC` user who maintenances the MRS Mailing Lists. Without the rule all external queries addressed to LISTPROC would be routed to the Postmaster account.

9.4 Printer Embedded Codes

By means of printer embedded codes you can place information in a document to be evaluated by the MRS Server without any special installations on the client computers. Only a corresponding PostScript printer on the MRS Server is used as network printer by the clients.

The printer "HP LaserJet III PostScript Plus v2010.118" which is included in the Windows scope of supply and connected with the "MRS Server Fax Monitor" port must be

installed on the MRS Server. You can select an arbitrary printer name that ends with "EC" for "Embedded Codes". For example "MRS Server Printer with EC". "EC" must be preceded by a blank.

The Mail APL evaluates the embedded codes contained in the PostScript code of the print output and replaces these with blanks in the hardcopy.

The following embedded codes are supported with the precise syntax being configurable in each case. Normally available default:

Embedded Code Example	Significance
`@FAX=263/@`	Recipient fax number.
`@SMTP=xy@unbekannt.de/@`	Recipient Internet e-mail address.
`@FROMUID=MAM/@`	Individual MRS user ID.
`@FROMNAME=Mark Maier/@`	Individual name resp. originator name.
`@SENDTIME=13:30:00/@`	Send time for delayed transmission.
`@SENDDATE=17.06.2001/@`	Send date for delayed transmission.
`@PRIO=normal/@`	Message priority
`@SUBJECT=Testing PEC/@`	Message subject. With fax this can be displayed on the optional cover page.
`@TONAME=Thomas Crown/@`	Recipient name.

You can define an arbitrary number of different fax and Internet e-mail recipients per embedded code in a document. Each specified recipient receives a copy of the message then.

The syntax of an embedded code thus reads:

<BeginTag><Token><Separator><Content><EndTag>

<BeginTag>

Example: "@"

<Token>

The following tokens are available: `FAX`, `SMTP`, `FROMUID`, `FROMNAME`, `SENDTIME`, `SENDDATE`, `PRIO`, `SUBJECT`, `TONAME`.

<Separator>

Default: "="

<*Content*>

Depending on the <*Token*> used, the corresponding content is here entered by the user. See above table.

<*EndTag*>

Example: "`/@`"

9.5 Lightweight Directory Access Protocol (LDAP)

The rudimentary support of the LDAP protocol described here serves exclusively to send messages with the recipient being searched for in an LDAP directory service. From MRS 4.2 an LDAP APL is available which performs an address book replication, thus providing the recipient information already under MRS so that the features handled in the following can actually be considered obsolete.

If a connection from the MRS server to the Internet exists then the LDAP global directory is supported. The format `LDAP/`<*Name*> is used to send messages.

Example: `LDAP/Joe User`

In the Internet the LDAP directory is queried and the resulting email address is that of Joe User. If this address is a valid email address then the message is sent, otherwise the initiator would receive a list of all directory entries containing this name. If no recipient is found an error report will be generated.

If the address is not a valid address, then other filter conditions may set in RFC 1558 format in order to narrow the search area. This deals with a portion of the X.500 DAP whereby, a LDAP server does not have to be a part of the global X.500 directory.

Example: `LDAP/(& (cn=Joe User) (o=ACME Co.))`

One or more filter conditions (Qualifiers) may be given with a total length of up to 54 characters. Filter conditions can be combined through the use of `&` (logical AND), `|` (logical OR), and `!` (logical NOT).

If the LDAP server in the field `LdapRoutToken` (Default: `mail`) returns a MRS address in the form <*Node*>`/`<*User*>, instead of an email address <*SMTP-Address*>, then the message would not be sent to `NVS:SMTP/`<*SMTP-Address*>, but to `NVS:`<*Node*>`/`<*User*>. In this way the LDAP could be misused for the transmission of a fax when in the data record the form `mail=faxg3/491234567890` is returned.

9.6 Distrib Protocol

Files can be sent directly to the virtual file system of the MRS Server though use of the Distrib Protocol. Files that are to be used in the Fax-on-Demand system are automatically converted to the desired fax format.

Thereby, addresses with corresponding directories are defined. Allowable formats can additionally be assigned in which text files are automatically converted.

In the standard configuration the MRS Server recognizes the addresses `NVS:DIS`/<*File*> (arbitrary file), `NVS:FOD`/<*File*> (Fax-on-Demand file in PP-COM Fax G3 of Fax G4 format) and `NVS:TOD`/<*File*> (Fax-on-Demand file in TIFF-Format).

Further address types can be defined in the Registry.

9.7 The NIL Protocol

The Mail APL provides the logical line `NVS:NIL` for data transmissions. All documents sent over this line are immediately deleted by the MRS Server. Documents are replaced with a notice which contains information over the administrative deletion. Researching such a transaction in the global journal can only be done by an administrator.
The purpose of this protocol is to provide a means of automatically filtering out undesirable (Spam) messages, so that server resources are conserved.
This can be carried a step further by sending all messages to the address `NVS:NIL/ATOMIZE`. In this case the message is deleted completely, and no journal entries are made. Researching such a transaction is generally impossible since there is nothing to indicate that a message was sent to this address.

Example:

- If Spam mail continues to arrive from a single originator, these can be eliminated through use of a routing rule e.g.

  ```
  NVS:*.*/*[org=NVS:SMTP.*/*@spam.org]=NVS:NIL/ATOMIZE
  ```

  from a domain or a specific user.

- Another application of the NIL protocol could be for restricting the size of outgoing transmissions. A routing rule for this purpose would have the following appearance:

  ```
  NVS:*.*/*[org=NVS:$NODE/*;LEN>1000000]=
     NVS:NIL/TRASH[SUBJ=Mail too long - denied]
  ```

  Through the use of this rule, all email messages originating from the system that are larger than 1,000,000 bytes would not be sent. Subsequently, the document would be deleted and the subject line modified with a message to the originator.

  If this rule is used in together with a database query, specific users can be excluded from this rule.

- Sending a report to every originator is another solution for the above example:

  ```
  NVS:SMTP.*/*[org=NVS:$NODE/*;LEN>1000000]=
     NVS:NIL/FAIL[SUBJ=Mail too large - discarded]
  ```

Consequently all Internet emails larger than 1000000 bytes would not be sent. Subsequently, the document would be deleted and the subject line modified with a message to the originator. In this case the originator receives a failure report.

- A type of Robinson list via which transmission to specific recipients is prevented. For this purpose define a group (for example `ROBINSON`) and subsequently a rule such as:

  ```
  NVS:FAXG3/*[GROUP(REC)=ROBINSON]=NVS:NIL/FAIL
  ```

  All FAX G3 send jobs concerning recipients who are members of the `ROBINSON` group would consequently be reported to the originator as failed. Via the corresponding report forms this could be done in a more ingenious way to adapt the error report accordingly.

9.8 Address Book Consistency

The Mail APL registers itself by the Kernel for address book replication so that consistency checks can be performed. All changes to the address book, non-observed address book field attributes or new attributes in MRS 5.1 (`DNO` and `DNOREAD`), are automatically corrected by the Mail APL.

9.9 Server CTI Journal

The Mail APL administers a central CTI journal, in which information from various CTI Transaction providers is stored. For querying purpose the Mail APL configures a Monitor point through the CTI Transaction[1] `MONITOR` to all CTI Transaction providers. Routine status information is then forwarded to the Mail APL through the `MONITORSTATUS`,

Therefore, since all required status information is in the Server CTI Journal, CTI applications must not query CTI Transaction providers. This provides the advantage that this information is continually collected and not just when CTI applications are running. Furthermore, information in the central CTI Journal can be synchronized between numerous heterogeneous Clients.

The user database must be modified with the following fields (Mask `USER` and `PROFILE`) to activate the CTI Journal:

```
PHONE        DNO,UNIQUE
PHONE#       DNOREAD,UNIQUE
CTIJOURNAL   CHAR,UPPER
```

1. See page 88 for transaction concepts.

CTIJOURNAL has a length of 1 and is therefore a switch. A uppercase X activates the CTI Journal for this user and the local telephone number of the user is entered in PHONE#.

Next an APL is required that functions as a CTI Transaction Provider. A line must also be provided with the form NVS:CTI.* so that a monitor point can be configured.

MONITORSTATUS-Reports will now be written to the Correlation-Database, whereby one portion is the Journal Information and the other the current status of the telephone device. The Domain <*Servername*>/$CTIJOURNAL is always included for entries in the CTI Journal. <*Servername*> is the MRS SServer name.

Journal Entries

CLASSNAME	CLASS	KEYNAME	KEY
USER	<*Username*>	<*UniqueID*>	<*Type*>|<*OtherPartyNumber*>

<*Username*>

MRS user name (Login-Name).

<*UniqueID*>

Unique identification number with the format YYMMDDhhmmssnnn.
YY := Current year- 1990.
MM := Current month whereby 01 is used for January.
DD := Day of the Month.
hhmmss := Time in a 24-hour format.
nnn := Unique sequential number. 000 is assigned

The unique sequential number begins with 000 for the first call within a given second. This number is increased by 1 for each following call within the given second. Maximum number of calls per second is 1000.

<*Type*>

UI := Unsuccessful Incoming call
UO := Unsuccessful Outgoing call
SI := Successful Incoming call
SO := Successful Outgoing call

<*OtherPartyNumber*>

Caller telephone number or that of the number called.

Example:

```
USER    MK    090507120155000      UI|1234567890
```

A telephone call was placed to user MK on May 7, 1999 at 12:01:55 from the number 1234567890. The call could not be completed either because user MK was away from the workplace, or the line was busy.

Status Entry

`CLASSNAME` `CLASS` `KEYNAME` `KEY`
`USER` *<Username>* `STATE` *<Info>*

<Info> := *<State>*|*<Direction>*|*<OtherPartyNumber>*

<State>

`IDLE`, `CONNECTING`, `CONNECTED` or `BUSY`.

<Direction>

`I` for incoming calls, `O` for outgoing or undefined calls types.

<OtherPartyNumber>

Caller telephone number or that of number called.

Example:

```
USER    MK    STATE   CONNECTED|I|1234567890
```

User MK was called by 1234567890 and is currently connected.

9.10 Vanity Number Support

In addition to numerals you also find letters printed on telephone dial buttons these days. Instead of cryptic telephone numbers such as 0700-2926724 you are thus enabled to keep in mind numbers of the format 0700-CYCOSAG. Such letter representations of telephone numbers are called vanity numbers.

MRS can use such letter combinations for dialing by conversion from a database field to be specified, containing a numeral/letter string, into another database field. This field contains the number to be dialed then.

The assignment of letters to numerals on the dial buttons has been standardized by the ITU. However, there are two recommendations for this allocation, option A and B.

Option A

1	2 ABC	3 DEF
4 GHI	5 JKL	6 MNO
7 PQRS	8 TUV	9 WXYZ
	0	

Option B

1 QZ	2 ABC	3 DEF
4 GHI	5 JKL	6 MNO
7 PRS	8 TUV	9 WXY
	0	

Option A is mostly found in practice, therefore it is used by the MRS Server as default. The MRS Server additionally contains a conversion table that places some special characters on specific letters, thus converting them into the numerals assigned to these letters.

Since the correlation database includes the entries in the OEM character set (code page 437), the assignment occurs for characters with a value greater than or equal to 128 to the ASCII characters A to Z.

The following table contains the assignment:

Decimal	OEM	Assigned	Decimal	OEM	Assigned
128	Ç	C	146	Æ	AE
129	ü	UE	147	ô	O
130	é	E	148	ö	OE
131	â	A	149	ò	O
132	ä	AE	150	û	U
133	à	A	151	ù	U
134	å	A	152	ÿ	Y
135	ç	C	153	Ö	OE
136	ê	E	154	Ü	UE
137	ë	E	159	*f*	F

Decimal	OEM	Assigned	Decimal	OEM	Assigned
138	è	E	160	á	A
139	ï	I	161	í	I
140	î	I	162	ó	O
141	ì	I	163	ú	U
142	Ä	AE	164	ñ	N
143	Å	A	165	Ñ	N
144	É	E	225	ß	SS
145	æ	AE			

Please note that all characters not listed here except A to Z are not adopted. The names “Doe, John“, “DoeJohn“ or “DOEJOHN“ thus result in the same numbers.

Since the assignment of vanity numbers to users may not be unique e.g. via the user name, a corresponding dial mechanism in a client application must offer possible users for selection when a number is dialed formed as vanity number from the user name.

9.10.1 Vanity Number Generation

So that the MRS Server can transparently administer vanity numbers for each user/ contact, an automatic conversion is executed. A database field is defaulted in the VanityNumber registry value the content of which is always converted into a number according to the above convention. The converted result is found in the `VM_VANITY` field of the correlation database.

9.11 Registry Entries

The following *Values* are found in the *Key*

`HKEY_LOCAL_MACHINE\Software\PP-COM\MRS\MailApl`

AllowRecursiveAwake REG_DWORD *0 or 1*

If the awake rules are to be used recursively, then the value 1 (true) must be entered here.

Default: `0`

AutoAwake REG_DWORD *0 or 1*

If the mailbox administrator is to perform timed supervision of the Journal entries, the value 1 (true) must be entered here. The administrator accesses the database routinely.

Default: `0`

CitJournal REG_DWORD

Obsolete value.

Default: `-1`

CtiJournal REG_DWORD *0 or 1*

Activate Server CTI Journal (1). This normally occurs automatically when the first requirement concerning this arrives. One reason why you should not activate the documentation mode with a real server: this value would be written with default 0 and not automatically internally changed to value 1 any more.

Default: `0`

CtiJournalAllCalls REG_DWORD *0 or 1*

Calls are normally only logged in the CTI journal when the caller transmits a calling number. If you set this switch to 1, also those calls are included in the journal that were not accompanied with a calling number.

Default: 0

CtiLogBlackList REG_MULTI_SZ

Via this value an exclusion list can be defined so that for the numbers specified there no CTI journal entries are logged. An example would be the numbers of the individual Voicemail Server.

One number is entered in each line. Numbers can contain question marks as dummy characters representing arbitrary digits. 2?? would be a valid entry for all numbers beginning with 2 and consisting of a maximum of three digits.

CtiLogUnknown REG_DWORD *0 or 1*

With an activated CTI Journal entries that do not deliver calling numbers can be logged as well(1).

Default: 0

DatabasePollRate REG_DWORD *Seconds*

Polling rate in which the database is processed by the awake rules. The poll rate must always be less than the minimum value entered as the `AGE` condition. If an

AGE condition of 10 seconds was given then the polling rate must bet set to 1. If the AGE condition is set in days then a polling rate of 1 hour must be set.

DefaultAwakeAge REG_DWORD

If an awake rule uses the macro $(AGE) then this value will be used.

Default: 5

DistribDefaultSets REG_DWORD *0 or 1*

Automatically set to 1 by the Mail APL after the Default Distrib Setup has been installed.

DistribLinePathlist REG_MULTI_SZ

Paths are for every address defined under DistribLineProtocols. The directory can either be a logical directory within a share \\<*MRS Server*>\Userdata or a physical directory on the MRS Server.

When entering paths, the / (slash) is used as a separator for logical directories and a \ (backslash) for physical directories.

Example:

```
NVS:DIS,/userdata,LOGICAL
NVS:FOD,/userdata/fod/fod_pp,LOGICAL
NVS:TOD,/userdata/fod/fod_pp,LOGICAL
NVS:XXX,e:\temp,PHYSICAL
```

If a document was sent to NVS:XXX/old\test.doc this would be stored in the directory e:\temp\old\test.doc.

DistribLineProtocols REG_MULTI_SZ

A protocol is defined for every line. The format is as follows:
<*Line-Address*>;<*Attribute*>;<*Rate*>;<*Preference*>;<*Format*>

<*Line-Address*>

NVS:<*Node*>. <*Node*> is an specific protocol that is only used in conjunction with this line.

<*Attribute*>

Should be set to SF,OUT. Through this attribute the line is defined for outgoing traffic and store and forward services.

<*Rate*>

Transmission rate of the line. Since files are only transferred within a local network, a transmission rate of 2048000 can be entered.

<*Preference*>

Router line preference is set through the use of this entry. The larger the value of

the line <*Preference*>, the higher its rate of usage by the router (-100< <*Preference*> < 100).

<*Format*>

This comma separated list contains the valid document and file formats which can be transferred over the logical line. These formats are described in Appendix 26.1 of this manual. If wildcards (*) are used, the file remains unchanged and copied to its destination.

Example:

```
NVS:DIS;SF,OUT;2048000;0;*
NVS:FOD;SF,OUT;2048000;0;FG3,FG4
NVS:TOD;SF,OUT;2048000;0;TG3,TG4
NVS:XXX;SF,OUT;2048000;0;*
```

DlgSessions REG_SZ

For future expansion of dialog services.

Default: `16`

DoAddressBookConsistencyCheck REG_DWORD *0 or 1*

Switch on Address book consistency checks (1) or off (0).

Default: `1`

EnterDeflectCallinCtiJournal REG_DWORD *0 or 1*

With a call arriving at device A but being routed to device B via `DEFLECT` or `PICKUP`, the CTI journal of device A used to feature “not reached” as entry for the call before MRS 5.0. This was confusing since the call did reach a partner.

From MRS 5.0 no entry is made in the CTI journal with such calls per default. This, however, requires the following:

- The connection to the PBX must occur via Raw CSTA of the CTI APL.
- With “ConnectionCleared“ the PBX must state the reason for clearing a connection in the “CAUSE“ field.
- The extended CTI logging (NewCtiJournal = 1) is active.

Setting this value to 1 activates the former logging again.

Default: 0

LdapHosts REG_MULTI_SZ

A list of LDAP servers that should be used for LDAP address matches. The list is sequentially processed until a match is found.

Default:

```
ldap.four11.com
```

```
ldap.infospace.com
ldap.bigfoot.com
```

LdapRoutToken REG_SZ

The database field name in the LDAP data record that contains the target address. In most LDAP implementations this is the database field `mail`. Since there are other implementations in which other fields are used, this field name can be modified.

Default: `mail`

LdapSearchBase REG_SZ

Search basis can be given in X.500 syntax for LDAP queries. Older versions of LDAP servers in the USA require a constant reference to the USA (`c=US`), even when the search result is not within the USA.

Since most of the better known LDAP servers no longer require this reference, a default search base no longer exists. The old behavior can be re-installed through the use of the string (`c=US`).

MaxAwake REG_DWORD

Maximum number of awake rules. Memory is allocated for the number of awake rules entered here.

NewCtiJournal REG_DWORD *0 or 1*

Before MRS 5.0 the CTI journal could simultaneously administer only one call for each terminal device in the Mail APL. Therefore not all connections were entered in the CTI journal during a call and consequently there was no indication of e.g. a consultation being performed during a call or of a subscriber taking part in a conference.

From MRS 5.0 an extended CTI logging is active. Here all calls of a terminal device are entered as separate calls in the CTI journal. In other words, if a consultation is executed during a call, two calls are entered in the CTI journal. The former CTI journal structure did not provide the option to enter further information such as “consultation” or “conference”. Setting this switch to 0 activates the former type of CTI logging.

Default: 1

PhoneField REG_SZ

Before MRS 5.0 the device number was gathered from the variable `PHONE#` of the correlation database for the CTI journal. Since characters (`+ - / ( )`) other than numbers can be entered here as separators, problems occured. From MRS 5.0 the

device number is read in as default from the PHONE variable. This variable contains the normalized number.

This function is only active with the extended CTI logging (NewCtiJournal = 1). If you enter PHONE# here again, the Mail APL shows the former behaviour with respect to the database field used.

Default: PHONE

RefreshCtiMonitor REG_DWORD *300 to 86400 seconds*

All seconds specified here are newly set as CTI monitor points at the CTI provider (CTI APL, Hicom APL, ...). In this way the CTI journal is regularly restarted if e.g. the CTI provider does no longer know the monitor points set here because of a hard stop/start (crash). When a CTI provider stops/starts in a normal manner, the monitor points should not get lost.

Default: 3600

ResetCITonRead REG_DWORD *0 or 1*

Via this switch you can have the address NVS:MAILBOX logged in with the RCIT flag (1). Thereby the Message Waiting Indication (MWI) is also reset when a user has entered MAILBOX in the PREFERRED field, but reads the message e.g. under Exchange (inbox replication) or with the Web APL.

Default: 0

TumBackend REG_DWORD *0 or 1*

Determines whether (1) or not (0) the Mail APL as True Unified Messaging (TUM) Backend provides the corresponding functionality. If this entry is not present or set to 1, the TUM functionality is provided. If the value is set to 0, the TUM functionality is not available, neither dynamically upon request.

Default: 1

TumQueueSize REG_DWORD

Size of the transaction queue for TUM transactions.

Default: 128

TumWorkerThreads REG_DWORD *1…8*

Number of available workerthreads. An incoming TUM transaction is assigned to a (vacant) workerthread that processes the transaction then. The more threads are simultaneously available, the more requests can be processed parallel. The number of workerthreads has nothing to do with the number of simultaneous sessions.

Default: 2

VanityNumber REG_SZ

Source field for vanity number generation. See “Vanity Number Support” on page 238.

9.11.1 Printer Embedded Codes

These settings default the key values that can be entered in documents for the embedded codes (page 232). All settings can be conveniently performed via the MRS Monitor. Please note that all settings made here only apply to the user defined style (see style value).

The following *values* are stored in the *key*

`HKEY_LOCAL_MACHINE\Software\PP-COM\MRS\MailApl\PEC`

BeginTag REG_SZ

Initiates a PEC sequence.

Default: <

DateFormat REG_DWORD

There are currently three defaulted formats for selection with the token specified in DateSeparator to be placed in between for separation in each case:

Value	Format
0	YYYY MM DD
1	DD MM YYYY
2	MM DD YYYY

Default: 0

DateSeparator REG_SZ

Token which separates the single date components. With a dot thus e.g. 18.4.2002 for 18 April 2002.

Default: .

EndTag REG_SZ

Terminates a PEC sequence.

Default: >

Fax REG_SZ

Keyword to set a recipient´s fax number.

Default: `Fax`

FromName REG_SZ

Keyword to specify the originator´s name.

Default: `From`

FromUid REG_SZ

Keyword to specify the originator´s MRS log-in token.

Default: `Uid`

PrioHigh REG_SZ

Keyword to set a high send priority.

Default: `High`

PrioKey REG_SZ

Keyword to specify the priority.

Default: `Prio`

PrioLow REG_SZ

Keyword to set a low send priority.

Default: `Low`

PrioNormal REG_SZ

Keyword to set the normal send priority.

Default: `Normal`

PrioUrgent REG_SZ

Keyword to set the highest send priority.

Default: `Urgent`

SendDate REG_SZ

Keyword to set the send date.

Default: `SendDate`

SendTime REG_SZ

Keyword to specify the send time.

Default: `SendTime`

SepTag REG_SZ

This token separates the keyword from the assigned value in a PEC sequence.

Default: `=`

Sms REG_SZ

Keyword for a recipient´s SMS number.

Default: `Sms`

Smtp REG_SZ

Keyword for a recipient´s Internet e-mail address.

Default: `Smtp`

Style REG_DWORD

This value specifies the keywords. Value 3 means ’user defined’ and releases the remaining values entered in this registry key.

Default: 1

Subject REG_SZ

Keyword for the message subject.

Default: `Subject`

ToName REG_SZ

Keyword for a recipient.

Default: `To`

10 SAP R/3 APL

10.1 Introduction

The SAP R/3 APL provides a gateway to the MRS Server for R/3 systems through use of the SAPconnect interface. All of the services installed on the MRS Server are also available to the R/3 user as soon as their extension numbers are incorporated in the MRS user database.

10.2 The Global Environment Variable RFC_TRACE_DIR

The librfc32.dll is a part of the SAP GUI that is used by the SAP R/3 APL. This DLL records all transactions in Trace files. Normally this occurs in the Home-Directory of the SAP R/3 APL. Since this runs as a Windows NT service in system context, this would be the Windows NT System32 directory. Trace files are always generated, irregardless of all the options listed below.

With the global environment variable `RFC_TRACE_DIR` the directory may be predetermined where they are to be installed. Since Trace files are not required, it is suggested that they be placed in the TMP directory. If the environment variable is not defined, an appropriate warning would be given.

Example: `RFC_TRACE_DIR=c:\temp`

10.3 Registry Entries

All configuration entries for the SAP R/3 APL are found in the registry under the *Key:*

`HKEY_LOCAL_MACHINE\SOFTWARE\PP-COM\MRS\SapR3Apl`

MaxSystems REG_DWORD *1…n*

Maximum number of systems to be configured

Default: 8

QualifiedMRSHostname REG_SZ

Qualified TCP/IP Host name of the MRS Servers.

10.3.1 MRS Converter Entries

This *Value* is found in the Registry under the *Key*

`HKEY_LOCAL_MACHINE\SOFTWARE\PP-COM\MRS\SapR3Apl\Converter`

EmptyFaxOriginator REG_SZ

Documents without an originator are not accepted by SAP R/3. The SAP R/3 APL therefore inserts the default originator entry for documents missing an originator address.

Default: `"*XXX*"`

10.3.2 Debug Entry for the StructHandler

These *Values* are found in the registry under the *Key*

`HKEY_LOCAL_MACHINE\SOFTWARE\PP-COM\MRS\SapR3Apl\StructHandler`

DumpModeSXDOCCHGI1 REG_DWORD *0, 1 or 2*

Outputs information over object characteristics. `0`: Off; `1`: Full; `2`: Half.

Default: 0

DumpModeSXEXTRECI1 REG_DWORD *0, 1 or 2*

Outputs information over object recipients. `0`: Off; `1`: Full; `2`: Half.

Default: 0

DumpModeSXPCKLSTI1 REG_DWORD *0, 1 or 2*

Outputs information over object contents lists. `0`: Off; `1`: Full; `2`: Half.

Default: 0

DumpModeSXRECINFI1 REG_DWORD *0, 1 or 2*

Outputs information over object originator. `0`: Off; `1`: Full; `2`: Half.

Default: 0

DumpModeSXSYSDATI1 REG_DWORD *0, 1 or 2*

Outputs information over the RFC calls. `0`: Off; `1`: Full; `2`: Half.

Default: 0

10.3.3 System Specific Entries

A *Key* is provided for each system

`HKEY_LOCAL_MACHINE\SOFTWARE\PP-COM\MRS\SapR3Apl\System[n]`

n is for the first system 0, for the second 1, etc.

Active REG_DWORD *0 or 1*

This system is active and automatically started (`1`).

Default: 1

AutoLearn REG_DWORD *0 or 1*

The "Autolearn" mode must be activated (1) when under SAP canonical addresses (standard presetting under R/3) of the type `DE(2404)123-456` are used because replies/documents must be delivered again to the SAP user exactly in this manner. For this purpose the SAP R/3 APL must be able to take this format from the MRS database so that the correct address can be transferred to SAP R/3. If the numbers are conformably maintenanced in SAP MRS, the "Autolearn" mode is not required.

Through this option the originators are automatically copied from the SAP system to the MRS database and depending on the sent document the fax number and fax ID, the SMTP address or the SMS number is entered. Since with these three possible document types coming from the SAP system no correlation can be recognized, up to three "Autolearn" user entries would be generated in the MRS database.

Default: 0

Description REG_SZ *128 Characters*

Description of the line displayed in the MRS Monitor.

Name REG_SZ *8 Characters*

Line name is derived from this entry: SAPR3<*Name*>.

Attention: Routing Rules must be modified from hand so that the routing goes to SAPR3<*Name*> and not to SAPR3!

PrivCheck REG_DWORD *0 or 1*

Should this switch be activated (1) the document originator must be present in the MRS database and have the corresponding send privilege. One method to copy originators from the SAP system to the MRS database is the above Autolearn mode.

Default: 0

10.3.3.1 RFC Client Entries

The RFC Client is responsible for document transmissions and status information from MRS to SAP R/3. These *Values* are found in the registry under the *Key*

`HKEY_LOCAL_MACHINE\SOFTWARE\PP-COM\MRS\SapR3Apl\System[`*n*`]\`
`Client`

ApplicationServerHost REG_SZ

TCP/IP Host name or IP-Address of the SAP R/3 Server.

ConnectRetryDelay REG_DWORD *10…600*

Time in seconds for the execution of a reconnect attempt.

Default: `10`

Destination REG_SZ

Description of the connection data entered in the `saprfc.ini` for the RFC server. See also UseDestination

GatewayHost REG_SZ

TCP/IP Host name of the SAP Gateway, if available.

GatewayService REG_SZ

TCP/IP Service (Port).

Default: `sapgw00`

RfcClient REG_SZ

Corresponds to the RFC Client number as used in transaction `sm59`. Mandatory entry.

Default: 100

RfcLanguage REG_SZ

Use this entry to set the login language. Optional values are G for German and E for English or any other language abbreviation used by SAP. Hoewever, only those are reasonable that are installed on the SAP system.

RfcPassword REG_SZ

Corresponds to the RFC Client password as used in transaction `sm59`. Mandatory entry.

Default: topsecret

RfcTrace REG_DWORD *0 or 1*

RFC-Trace on or off

The trace files (*.trc) are installed by the librfc32.dll and are found in the installation directory of the DLL. This switch has nothing to do with the SAP R/3 APL debugging output.

Default: 0

RfcUser REG_SZ

Corresponds to the RFC Client user ID as used in transaction `sm59`. Mandatory entry.

Default: MRSC

SmtpExpress REG_DWORD *0 or 1*

If this option is activated, an express message notifies the SAP user about a new incoming Internet email.

Default: 0

Systemnumber REG_DWORD

SAP R/3 Index number

Default: `0`

UseDestination REG_DWORD *0 or 1*

Use the connection data entered in saprfc.ini under the above Destination value for connection setup to the SAPconnect RFC server (1). We recommend this mode.

10.3.3.2 RFC Server Entries

The RFC Server is responsible for document transmissions and status information from SAP R/3 to the MRS Server. These *Values* are found in the registry under the *Key*

`HKEY_LOCAL_MACHINE\SOFTWARE\PP-COM\MRS\SapR3Apl\System[`*n*`]\Server`

ConnectRetryDelay REG_DWORD *10…600*

Time in seconds for the execution of a reconnect attempt.

Default: `10`

Destination REG_SZ

Description of the connection data entered in the `saprfc.ini` for the RFC server. See also UseDestination.

FaxPollByToAnswer REG_DWORD *0 or 1*

If a fax document is sent from R/3 with the transmission attribute "answer required", it would be treated as a fax poll request when the value is set to `1`.

Default: `0`

GatewayHost REG_SZ

TCP/IP Host name of the SAP Gateway or SAP R/3 Server.

GatewayService REG_SZ

TCP/IP Service (Port).

Default: `sapgw00`

ProgramID REG_SZ

Corresponds to the configured SAP R/3 program ID.

Default: `sapr3apl.mrs`

RfcTrace REG_DWORD *0 or 1*

RFC-Trace on or off.

The trace files (*.trc) are installed by the librfc32.dll and are found in the installation directory of the DLL. This switch has nothing to do with the SAP R/3 APL debugging output.

Default: 0

StrictStatusReporting REG_DWORD *0 or 1*

Status reports are only sent when requested by R/3 in the structure `SXEXTRECI1` (`1`). When set to `0`, status reports are sent even when not explicitly requested. This is of significance since status reports are normally not requested by R/3 fax transmissions. The originator is never certain whether a fax has been sent or not. When set to `1`, the fields `NOTIF_DEL`, `NOTIF_READ` and `NOTIF_NDEL` of the structure SXEXTRECI1 are fixed so that the appropriate status reports are sent.

Default: 0

UseDestination REG_DWORD *0 or 1*

Use the connection data entered in saprfc.ini under the above Destination value for connection setup to the SAPconnect RFC server (1). We recommend this mode.

11 Internet Mail

The Internet Mail APL (SMTP APL) offers several services related to sending and receiving emails via the Internet.

11.1 SMTP (Simple Mail Transfer Protocol)

SMTP (Simple Mail Transfer Protocol) defines an international standard for email traffic in the global Internet. Messages are exchanged worldwide in a 7 Bit ASCII code.

An SMTP extension is MIME (Multipurpose Internet Mail Extensions), through which arbitrary data (images, voice mails, binary files, etc.) are transferred over SMTP. Since there are numerous extensions to the SMTP protocol, the term ESMTP (Extended Simple Mail Transfer Protocol) is generally used in association with Internet mail. Among these extended services, Delivery Status Notification (RFC 1891) is supported by the SMTP APL so that, depending on the server, delivery reports are sent to the message originator.

11.1.1 Authentication

11.1.1.1 SMTP after POP/IMAP

With SMTP after POP/IMAP[1], messages are accepted by an SMTP Client for a configurable time after a POP/IMAP connection of this client. The period can be set in seconds in the RelayAllowedSecs registry value. This is rather a makeshift procedure and you are advised to use one of the following procedures according to RFC 2554.

11.1.1.2 Authentication according to RFC 2554

Another ESMTP feature is the AUTH-Token which serves to authorize the SMTP originator by means of a password. Via this AUTH-Token the connected client is informed that the SMTP server has this feature and the client can thus use it. Several processes are available for transmitting the password. For incoming messages the MRS Server[2] offers the processes

- PLAIN (Plain login mechanism (single step) according to RFC 2595)
  The user password is transmitted base64 coded. This is a generally known, simple coding so that it could also be called clear text. Security is only achieved when for the actual SMTP connection a mechanism such as SSL is used.

1. Available from MRS 3.50 with service pack 1.
2. Available from MRS 4.10.

- CRAM-MD5 (Challenge Response Authentication Mechanism according to RFC 2195) With this process the transmitted user password is relatively safe by means of the MD5 (RFC 1321) process. A theoretic decoding approach exists, but in practise it would require a lot of computing capacity. When you relate the lifespan of MD5 to the lifespan of passwords, MD5 can be considered safe in the decades to come. We recommend to use this process if it can be set in the client.
- LOGIN (Plain login mechanism (two step))
  This is a non-standard process where the password is transmitted in the clear text. It is used e.g. by Microsoft Outlook. The process is only safe when for the actual SMTP connection a mechanism such as SSL is used.

For the CRAM-MD5 process the SMTP APL needs to know the passwort in the clear text. This, however, is not possible with the default database entry `PASSWORD`. Therefore the database `POP-PASSWORD` is used here which should be added to the user database with type `CIPH,CHAR` and a reasonable password length (approx. 40 characters) when the above feature is employed. If the `POP-PASSWORD` is not available, the alternative `SMTPAUTH-PWD` database field, which also needs to be installed with the `CIPH` and `CHAR` attributes, can be used. With the PLAIN and LOGIN process the `PASSWORD` entry is used alternatively to a not existing or empty `POP-PASSWORD` database field. The password transmitted by the client is internally encoded by the one-way algorithm used for `PASSWORD` and subsequently checked against it.

Please note that a possibly desired authorization as regards the SMTP server in the Netscape Messenger cannot be explicitly configured. The Netscape Messenger uses the automatic `PLAIN` process if it is offered.

In the event that no explicit authorization per password is desired, the `AUTH` function must be switched off via the registry.

11.1.2 Relay Authentification Strategy

Relaying means transmission of a message via another SMTP server. Direct delivery to the target SMTP server would be normal, but the originators may be behind a firewall or on-line only for a short while. Therefore they possibly transfer their emails to an SMTP server that is on-line permanent so that this server then sends the messages to the target SMTP server. In this case the MRS SMTP server would act as so-called Relay Host, defining via the following strategy when it can be used by an orginator for message transmission via another SMTP server.

- If neither firewall nor Trusted Domain entries have been defined, each originator is considered local and may thus use the SMTP server as relay.
- Firewall entries are compared with the originator´s physic IP address; Trusted Domains with the “Mail From” entries in the email header. If at least one firewall entry has been defined, all incongruous originators and those that match a corre-

sponding exclusion entry of the firewall entries are considered not local unless they have an entry as Trusted Domain. Originators not local must not use the SMTP server as relay.

- Through a successful verification by means of `AUTH` command or "SMTP after POP/IMAP", the originator is also considered local except he or she would be excluded via a firewall entry.

11.1.3 Mail Transmission via an SMTP Relay

With transmission via a relay host (see RelayHost registry value), the above authentication mechanisms according to RFC 2554 are possible. Since there are SMTP servers that differentiate between upper/lower case with user account and password and the `USER` database field only allows capital letters, you have the option to specify an alternative user name and a clear-text password via the `SMTPAUTH-USR` (attribute: `CHAR`) and `SMTPAUTH-PWD` (attribute: `CHAR`, `CIPH`) database fields. If `SMTPAUTH-PWD` is not available, the `POP-PASSWORD` (attribute: `CHAR`, `CIPH`) is taken next.

11.2 POP3 and IMAP4 Server

SMTP transmission protocol always attempts to deliver the messages directly to the recipient. Since the majority of computers are not in continuous operation, and few are directly connected to the Internet, the POP3 (Post Office Protocol Version 3) Server acts as an intermediate storage facility until POP3 clients pick-up their mail. Generally, when mail is queried by a POP3 mail client the mail is transferred to the client's computer.

The IMAP4 (Internet Message Access Protocol Version 4) serves the same purpose as POP3 but is more modern. Messages remain on the server and therefore, the deletion of messages are dependent on the servers configuration. IMAP4 offers several advantages since messages can be presorted to various mailboxes. This allows for a clear concise overview with large amounts of incoming mail. In most cases, the IMAP4 client retrieves only the header file when querying for new mail. The complete message is only retrieved when explicitly requested. As opposed to the POP3 client which retrieves all new messages, this method of retrieval allows users with lower transfer rates select only those messages immediately needed.

Computers where a WWW browser such as Netscape or Microsoft Internet Explorer is installed contain a POP3 or IMAP4 client which provides these features to the user.

11.2.1 Authentication

With POP/IMAP, clients normally transmit their user ID and password in the clear text. Both are checked via the `USER`/`PASSWORD` database fields. If the `POP-PASS-`

WORD database field exists with a user, it is used instead of PASSWORD. This process should only be used with an SSL-secured connection.

The MRS Server as POP3 server also supports the APOP process according to RFC 1939, where no clear text is transmitted but a string that identifies the desired message and an MD5 digest. On the MRS Server side the clear-text password must however be known, thus the POP-PASSWORD database field be maintained on the user side.

The MRS Server as IMAP4 server also supports the CRAM-MD5 process according to RFC 2095. This process works similarly to the APOP process and the POP-PASSWORD database field must thus be maintained on the user side.

Besides this process it is also possible to transmit the Windows user account in the format Domain\Account in the Intranet, thus using the Windows authentication. The LMACCOUNT database field must be maintained on the MRS Server for this purpose. See also the "Client Login via Windows User Account" section in the *Server Administration* manual.

11.3 POP3 Mail Import

For POP3 mail import the Windows NT remote data transmission service (RAS) must be installed. Internet mail from another POP3 server can be down loaded to the MRS Server using either a PPP or a RAS connection with the POP3 mail import. Either an Alias account is used under which all internet mail from the provider is pooled for the user, or each user is assigned a time frame in which a connection is to be made. If the account for which messages are being fetched has no entry in the user database, it will be treated as an Alias account for a complete User/Domain group.

At the time of the connection all new messages would be fetched and any outgoing messages sent.

11.3.1 New Database Fields

For POP3 mail import four new database fields are introduced into the user database. These are described in the following table:

Database field	Significance
PMI-SCHEDULE	Name of a schedule that determines at which times a connection to the POP3 server is to be established. (Attribute: CHAR)
PMI-USERNAME	User name for which emails are retrieved from the POP3 server. If this field is empty, the normal MRS user ID is used. (Attribute: CHAR)

Database field	Significance
PMI-PASSWORD	Password for logging in at the POP3 server for this user. (Attribute: CHAR, CIPH)
PMI-HOSTNAME	Host name of the POP3 server from which emails are to be retrieved. (Attribute: CHAR, LOWER)

These fields are either filled in for a pseudo user account (default: MAILIMPORTER) via which emails are retrieved from the POP3 server for all users of a company, or only for users for which an Internet email address has been defined at a POP3 server. A combination of these two options is conceivable as well. MRS recognizes such a pseudo user account with PMI fields by an empty GROUP user database field.

The SMTP APL searches the PMI-SCHEDULE database fields of the user database for each schedule and imports the Internet email for each user having an entry.

11.3.2 Authentication during Transmission

Available messages are sent simultaneously to message import. If the SMTP server of the Internet mail provider is used as relay, the following authentication mechanisms are possible:

- SMTP after POP
  Since authentication by the POP3 mail import has already taken place, the relay server accepts incoming messages for a specific period.
- Authentication according to RFC 2554
  One of the PLAIN, LOGIN or CRAM-MD5 processes is used if offered by the relay server. CRAM-MD5 would be preferred as it is the most secure of the three. Authentication occurs via the PMI-USERNAME and PMI-PASSWORD database fields.

11.4 Registry Entries

The following *Values* are found in the *Key*
HKEY_LOCAL_MACHINE\SOFTWARE\PP-COM\MRS\SmtpApl

AuthIncoming REG_DWORD *0 or 1*

When set to (1) the originator's privileges are checked. If the document address is e.g. NVS:FAXG3/4912345678@do.main, the originator is checked for fax G3 transmission privileges.

Upon activating this option a pseudo user with the SMTP identifier and the privileges "Internet Mail", "Trusted Domain", "e-mail" and USER is automatically defined. Without this pseudo user the SMTP APL is not enabled to forward exter-

nal messages to internal users. In the event that a user with this identifier already exists when this option is activated, a malfunction might be the result since this user is not automatically assigned the above privileges then.

Default: 0

BindAddress REG_SZ

IP address the SMTP Server is to bind itself to. Normally this is the computer´s default TCP/IP address. With a multi host system having several IP addresses the desired one can be entered here. Usage of this address is finally determined by the UseBindAddress option.

Via the entries Receive_BindAddress, Pop3_BindAddress and Imap4_BindAddress you can also bind the individual services SMTP, POP3 Server and IMAP4 Server to different IP addresses each.

BuildCC REG_DWORD *0 or 1*

If a message was sent to several recipients a corresponding cc-field displaying the addressees is enclosed in the message´s SMTP header so that each recipient of the message is informed about who else received a copy and beyond that can send a reply to these recipients.

If this behaviour is unwanted, set this option to 0 to deactivate the generation of the cc-header information.

Default: 1

DlgSessions REG_SZ

For future dialog service expansions.

Default: 16

DocReps REG_SZ

Repeated strategy. Through use of this option, the number of redial attempts and the interval between redials can be configured. Up to five different sequentially executed repeat counters can be set with varying time intervals.

Default: `3-60,4-3000,0-0,0-0,0-0`

DontRelay REG_MULTI_SZ

An Internet email address received by the MRS Server cannot be forwarded to another internal mailer when a Relay Host is configured. In this case an exception list can be defined here where per line one domain is specified that cannot be reached via the Relay resp. to which transmission is directly performed. Thus sending to the domains entered here occurs directly and not via the Relay Host.

ESMTP_Enable REG_DWORD *0 or 1*

The ESMTP protocol extension is enabled when set to (1).

Default: 1

HostName REG_SZ

Host name of the MX record for the SMTP server. This value is automatically given by default. If the Windows NT server where the APL is installed is also entered as MailServer in the DMS MX record, then only the TCP/IP domain should be entered.

Example:

NT Mailserver is pergamon.ppcom.de. If this computer is defined in the DNS by the MX record as MailServer, then `ppcom.de` should be entered as the value in the hostname. The MX record is as follows:

```
IN MX 1 pergamon.ppcom.de
```

MX records are specified in the file `named.hosts` on the DNS server of the domain (in the example `ppcom.de`).

Imap4_BindAddress REG_SZ

IP address the IMAP4 Server is to bind itself to. This is normally the standard TCP/IP address of the computer; with a multi host system with several IP addresses the desired IP addresses can be specified here.

Imap4_Enable REG_DWORD *0 or 1*

When set to (1) an IMAP4 server is enabled.

Default: `1`

Imap4_IgnoreCopy REG_MULTI_SZ

The Outlook setting ’Copy to “Sent Items”’ automatically generates copies of the sent documents. Since the MRS Server has a folder for all outgoing documents such copies are useless. Especially when accessed via older IMAP clients that cannot handle folders properly a sent document is displayed twice as the clients display all documents from all folders in a flat view. If the user activates the above setting copying of documents can be ignored for certain folders by specifying the name of the folder for which MRS is to ignore this option.

Imap4_JEntriesPerFetch REG_DWORD

Number of journal entries transmitted all at once. With very large journals, journal entry compilation may lead to a timeout, when the entries are first to be collected

and then transmitted in one go. This value enables an earlier transmission start and timeout is launched.

Default: 64

Imap4_MaxLogins REG_DWORD

Maximum number of simultaneous logins per user. Practically all currently known IMAP Clients carry out e.g. a login per user folder since this is the easiest way to parallel query the different folders.

Default: 8

Imap4_MaxPerIp REG_DWORD

A client (IP address) can occupy only half of the maximally assignable IMAP connections to the MRS Server per default. Further requests are rejected.

Default: Imap4_nThreads / 2, thus 8

Imap4_MaxMailboxes REG_DWORD

Maximum number of folders an IMAP user may generate on the MRS Server.

Default: 8

Imap4_nThreads REG_DWORD

Maximum number of IMAP logins that can occur at a time.

Default: 16

Imap4_Outbox REG_SZ

Name of the IMAP4 folder in which sent messages are stored.

Example: Sent Items

Imap4_Port REG_DWORD

Here you can switch the TCP port on which the SMTP APL answers incoming IMAP4 queries. Standard is Port 143.

Default: 143

Imap4_PortSSL REG_DWORD

Here the TCP port, on which the SMTP APL handles encrypted, incoming IMAP4 requests per SSL, can be adapted.

Default: 993

Imap4_PreLoginTimeout REG_DWORD *Seconds*

After connection build-up on the IMAP Port, the MRS Server delays login for the period defined here since otherwise the connection would be terminated again.

Without this timeout the normal timeout would come into effect, meaning a login delay of 600 seconds in most cases. Thus this parameter considerably improves the behaviour of the MRS Server in case of a Denial of Service attack.

Default: 10

Imap4_Timeout REG_DWORD *Seconds*

IMAP4 protocol timeout. After the expiration of this value an inactive connection is established by Server. Microsoft Outlook is default set on “Poll new messages every ten minutes”, thus every 600 seconds. For this reason a somewhat higher value has been preset here.

Default: `666`

Imap4_Trash REG_SZ

Name of the IMAP4 folder in which deleted messages are stored.

Example: Trash

LeaveMsgOnServer REG_DWORD *0 or 1*

When messages are polled by means of POP3 Mail Import, this switch can be used to determine whether the messages are to be deleted at the Provider (0) or retained on the Provider Server (1).

Default: 0

MxCacheMaxAge REG_DWORD *Seconds*

To execute a send job the SMTP APL normally fetches all MX entries for the target domain first. Subsequently these computers would be tried one after another according to their priority with the set repeat strategy coming to bear. If a lot of send jobs are to be simultaneously transferred, the SMTP APL registers via the time set here whether e.g. the host with the highest priority is currently not available and consequently would not consider it any more for the following messages sent to this domain. By means of this cache the following faulty behaviour of the previous versions is avoided from version 5.0:

Company X has 3 MX entries: A with priority 1, B with priority 2, C with priority 3.

Suppose MX A cannot be reached. However, for each transmission to company X the attempt would be made to reach A, after 60 seconds B would be tried. If you address a distribution list with a lot of recipients of company X, the outgoing mail traffic would practically come to a standstill as the attempt to send each message to A first takes time until it is cancelled.

With the cache this time is only wasted on the first send attempt, all other are immediately successful via the second available MX entry.

Default: 300

MxCacheMaxEntries REG_DWORD

Maximum number of entries in the cache of the MX entries. See MxCacheMaxAge.

Default: 512

MxCacheNumFailSkip REG_DWORD

Number of attempts skipped with an MX entry in the cache after a failed attempt. See MxCacheMaxAge.

Default: 5

NetMap REG_MULTI_SZ *Network,Netmask,Flag[,Comment]*

Similiar to Receive_AllowRelay. Used to define in which networks SMTP mail relaying is allowed. The syntax corresponds to that used by the TCP/IP APL and is described on page 304.

Some mail servers do not allow receiving messages from a mail server that is classified as so-called Open Relay via which messages can thus be sent by everyone. Such an Open Relay is at any rate a security problem enabling so-called spammers to send their mails via the individual mail server. In this way companies can incur considerable costs as the spammer simply sends one mail with the complete recipient list to the Open Relay which subsequently routes the message to all recipients at the company´s expense! For this reason we recommend to globally block relaying here and to give explicit permission only for networks where it is desired. Blocking receipt of mails from an Open Relay is normally done via lists available in the Internet. For example www.orbs.org maintains such a database which lists all servers that enable ralaying. If you have accessed the list because the corresponding security measures have not yet been taken, you can ask for another check on the respective Internet page to have the server removed from the list after the corresponding settings have been performed here. With Orbs you can accomplish this procedure in the presently fastest way via the link

`http://lookup.orbs.org/closed2.php3?address=`*<IP Address>*. *<IP Address>* is the IP address of the individual mail server concerned. Whether the individual mail server is an Open Relay can be checked e.g. under `http://www.abuse.net/relay.html`.

NoRelay REG_MULTI_SZ

Is used to configure exceptions for message relaying if a Relay Host has been defined. Furthermore you can optionally specify the transmission port for dedi-

cated addresses entered here. The entry `cycos.xyz:24` e.g. sends all messages to `cycos.xyz` via port 24.

Entry syntax: <*Hostname*> `[':'` <*Port*>`]`.

Pop3_BindAddress REG_SZ

IP address the POP3 Server is to bind itself to. This is normally the standard TCP/IP address of the computer; with a multi host system with several IP addresses the desired IP addresses can be specified here.

Pop3_Enable REG_DWORD *0 or 1*

When set to (1) a POP3 server is enabled.

Default: `1`

Pop3_MaxPerIp REG_DWORD

A client (IP address) can occupy only half of the maximally assignable POP connections to the MRS Server per default. Further requests are rejected.

Default: Imap4_nThreads / 2, thus 8

Pop3_nThreads REG_DWORD

Maximum number of users that can simultaneously use the POP3 Server.

Default: 16

Pop3_Port REG_DWORD

Here you can switch the TCP port on which the SMTP APL answers incoming POP3 queries. Standard is port 110.

Default: 110

Pop3_PortSSL REG_DWORD

Here the TCP port, on which the SMTP APL handles encrypted, incoming POP3 requests per SSL, can be adapted.

Default: 995

Pop3_Timeout REG_DWORD *Seconds*

POP3 protocol timeout. This value can individually be adapted by a corresponding user database entry. Generate a field of the same name in the user database and enter a higher value for users with a very slow connection.

Default: 30

Pop3Delete REG_SZ

Messages polled by the MRS POP3 Server are specially flagged `DELETE_POPPER` per default. Thus these messages are not polled anymore when the next query is performed with a POP3 Client. Another possible setting would be `RECIPIENT` so that the message, flagged "Deleted by Recipient", did not appear in any other client anymore.

This setting can be entered in the user database field `POP-DELETEFLAG` if some users prefer a behaviour deviating from the default.

Default: `POPPER`

Pop3FlgRead REG_DWORD *0 or 1*

Flags messages polled per POP client as read (1).

Default: 0

Pop3Formats REG_SZ

Default formats in which documents and attachments can be converted for POP3 and IMAP4 clients. This field `POPFORMATS` can be over written with an entry in the database. A description of the formats is found in the attached 26.1. Only one image and audio format can be selected for conversion in the fax or voicemail documents. The format `BIN` should *always* be included with the formats.

Default: `WAV,JPG`

Pop3MaxMsgs REG_DWORD

Maximum number of messages that can be transferred to a POP3 client with the GetMail request. Thus with an entry of `0`, no messages are transferred.

Default: `64`

Pop3MaxSize REG_DWORD *Bytes*

Maximum message size that can be transferred to a POP3 client. A value of `0` specifies no size limit.

Default: `0`

Pop3NonStdTo REG_SZ

In this field a keyword can be entered which is used like `To` (recipient), `CC` (Carbon Copy; copy recipient) or `BCC` (Blind Carbon Copy; recipient of a copy that is generated without other recipients´ knowledge). The keyword is then used with POP3 mail import.

Please note that all other delivery fields are neglected if this keyword is present in the message header. Thus a message destined for several recipients is only deliv-

ered to those who are entered in this special field. This step is necessary since otherwise a messeage would repeatedly be delivered to the same recipient.

Example: `X-RCPT-TO`

Pop3PollType REG_DWORD

When a POP3 Mail import is performed the MRS Server checks if the account has an entry in the field `GROUP` in the user database. If an entry is found the account is treated as an user when fetching mail. If no entry is found the account is treated as a pseudo account and mails must be distributed to the various users after being fetched. This behavior can be explicitly defined through the following values:

Value	Significance
0	Default as described above.
1	Mail-Import for each individual user.
2	Mail-Import for a complete Domain/User group.

Default: 0

Receive_AllowRelay REG_MULTI_SZ

This value is filled with the authorized domains, to restrict the relaying of SMTP messages to non-local users within authorized domains (one per line).

Example:

cycos.com
cycos.de

In this example, inbound SMTP mails will only be forwarded to other SMTP Mailers when the originator is from within the domains cycos.com or cycos.de. Legal addresses are for example:

some_body@cycos.com
every_body@sub.domain.cycos.de
bucket@host.cycos.com

Non-valid address could have the form:

intruder@other.domain.com
spam@psychos.de
bugs.bunny@nowhere

Messages from non-authorized originators on external addresses will be removed without any response.

Receive_AutoLearn REG_DWORD *0 or 1*

When set to 1 an alias will automatically be created in the database by the SMTP APL for originators of incoming messages.

Receive_BindAddress REG_SZ

IP address the SMTP Server is to bind itself to. This is normally the standard TCP/IP address of the computer; with a multi host system with several IP addresses the desired IP addresses can be specified here.

Receive_CheckUserExist REG_DWORD *0 or 1*

When this option is activated, the SMTP APL checks whether the recipient exists in the MRS user database. If this is not the case, message reception is refused.

This may result in the following problem: the SMTP APL checks the properties of the SMTP field in the user database. If the field has the attribute `LOWER` the addresses of incoming mails are normalized to `LOWER` and then compared with the SMTP field.

If the field has neither a `LOWER` nor an UPPER attribute and in the SMTP field the user´s mail address is present only in lower case letters, the message is rejected by the SMTP APL if the originator has used upper case letters or a combination of upper/lower case letters for addressing! Therefore one of these attributes should be assigned to the SMTP field in the user database if this feature is to be used.

Default: 0

Receive_Enable REG_DWORD

When set to (`1`) reception is enabled.

Default: 1

Receive_EnableAuth REG_DWORD *0 or 1*

Switches on or off the ESMTP `AUTH` mechanism.

Receive_LocalHosts REG_MULTI_SZ

One local domaine may be entered per line. Messages are never forwarded to other Internet Hosts from within a **Local Domain**. Messages are only transmitted internally within these domains. If the local domain has an MX-Record which points to the MRS Server, it will automatically be considered to be a local domain and must not be entered as such.

Receive_MaxPerIp REG_DWORD

An IP address can occupy only half of the maximally assignable SMTP connections to the MRS Server per default. Further requests are rejected.

Default: Imap4_nThreads / 2, thus 8

Receive_MaxSize REG_DWORD *Bytes*

If this value is not 0 the size of the message to be received is queried. In case the size exceeds the value entered here, message reception is refused.

Default: 0

Receive_nThreads REG_DWORD

Maximum number of receive channels.

Default: 16

Receive_Port REG_DWORD

Here the TCP port on which the SMTP APL handles inbound mail traffic can be altered. Default setting is 25 but when used behind a firewall another setting my be more appropriate.

Default: 25

Receive_Separator REG_SZ

This entry refers to the option to modify the SMTP address so that a fax coverpage or template can be configured. For this purpose the corresponding information can be inserted in the comment portion of the SMTP address:

`FAXG3/123456($FAXCOVER=x.dbl;dbo(NAME)=Mister)@mrssrv`

According to RFC 822 a comment has the form:

comment =”(“*(ctext / quoted-pair / comment) ”)”
ctext = <any CHAR excluding “(“,”)”,”\” & CR, including linear-white-space>
CHAR = <any ASCII character>

Thus ’;’ is a valid character to separate the MRS information within the comment. However, since the Microsoft Exchange IMC (Internet Mail Connector) cuts off addresses after the ’;’ a different character is to be used for separation which can be configured here. Because ’,’ is problematic with addresses like `…($dbo(NAME)=User, Rainer)` it is unsuitable as separator. As an alternative we recommend characters such as ’’.

Default: ;

Receive_Timeout REG_DWORD *Seconds*

Timeout for inbound SMTP messages.

Default: 30

Receive_UseFrom REG_DWORD *0 or 1*

The `MAIL FROM` field indicates the originator of a received message per default. However, at larger companies you mostly find the following information in the mail header:

```
MAIL FROM: <Originator_Hostname@domain.org>
DATA
From: "Username" <user@domain.org>
```

When you set this entry to 1, the address is taken from the `From` field so that a correct user authorization can be realized and also possible non-delivery reports would arrive at the recipient.

Default: 0

RelayAllowedSecs REG_DWORD *Seconds*

When set to 0, everybody permitted per relaying can send messages via the SMTP APL. However, in many cases relaying is switched off for practically all TCP/IP addresses. So that also users connected with the server per IMAP or POP can do their sending, a period can be defined here within which these users may send messages via the SMTP Server after a corresponding login per IMAP of POP.

Default: 0

RelayHost REG_SZ *TCP/IP Hostname*

Optional entry for a mail transfer computer. This could be for example a “firewall computer” which restricts access from the Internet.

Send_MaxOut REG_DWORD

Maximum number of transmission jobs that can be parallel or simultaneously sent. This value should not be set to high when only a relatively narrow bandwidth is available. Otherwise, it is possible that numerous terminations could occur due to extended waiting times by the recipient.

Default: 16

Send_Ras REG_SZ

Time template used for POP3 mail import.

Send_RequireSSL REG_MULTI_SZ

List of servers to which transmission may only occur via a connection secured per SSL/TLS. Entry syntax:<*Hostname*>':'<*Keystrength*>

Thus noone can palm oneself off as this server without having the required SSL certificate. In addition the servers entered here are checked as to whether the host name matches the host name specified in the certificate. Entry of <*Keystrength*> is optional.

Two conceivable attacks on a save connection, parried by this measure, were

- the interception of the `STARTTLS` command exchanged between the servers. The save connection would then not be set up. In this case establishment of an

unencrypted connection would be rejected, if the receiving station were specified here.

- the MX entry pointing to a host other than the recipient SMTP server. No unsecured connection would be established either.

SendFormats REG_SZ

If special formats are wished by transmission e.g. fax always sent as JPEG, these can be entered similarly to those in POP3. There should always one graphic, one audio, and one `BIN` format be declared. Through the entry `MIT`, the body can be sent as a "Mime-Quoted-Printable" which is transmitted as a 7-Bit ASCII text and guaranteed error free. Defaults are: MIT, TXT (8-Bit transmission).

Example: `MIT,BIN,WAV,JPG`

SendTimeout REG_DWORD *Seconds*

Timeout for outgoing SMTP messages.

Default: `120`

SSL_CertificateFile REG_SZ

Certificate file for SSL coding. This file is anticipated in <*MRS Root*>`\res\smtpap`.

SSL_Enable REG_DWORD *0 or 1*

Activating (1) or deactivating (0) SSL coding (Secure Sockets [SSL/TLS]) for IMAP, POP, SMTP transmission and receiving. The ports used are preset to those employed by Outlook 2000, thus for POP3 Port 995 and for IMAP4 Port 993. The command `STARTTLS` is supported for SMTP transmission and receiving.

With activation of Secure Sockets the registry entries SSL_CertificateFile, SSL_PassPhrase and SSL_PrivateKeyFile must contain reasonable values. The procedure to obtain the required files is analog to the WebAPL:

A certificate by an internationally recognized CA (Certificate Authority) is required. Such a CA is e.g. Verisign (www.verisign.com), however, also one of the most expensive. In order to obtain a certificate you should follow the procedure issued by the individual CAs.

Enter the **certificate file** received from the CA, the **private key file** and the **password for the private key**. The password must at any rate be entered via the cofiguration from within the MRS Monitor since it is stored here coded.

For the requisiton of the certificate or to create a simple test certificate which can be used to become familiar with the basic functionality, the program **OpenSSL**, to be found in the <*MRS Root*>`\SDKTools` directory, is required.

Example of the creation of a self-signed certificate to be used for testing resp. checking the basic SSL functionality:

```
openssl req -x509 -newkey rsa:1024 -keyout key.pem
   -out req.pem -config config
```

Two files are generated: the **private key file** `key.pem` and the **certificate file** `req.pem`. These files must be copied to <*MRS Root*>`\res\SMTPAPL\`.

Obtaining an officially signed certificate

A private key and a certificate signing request are needed. The request is usually sent to the CA that sign the certificate with their private key. First some random numbers are generated which are needed for the private key generation at a later date:

```
openssl md5 * > rand.dat
```

Next generate the private key and specify its password. This password should be a longer phrase, e.g. a sentence:

```
openssl genrsa -rand rand.dat -des 1024 > key.pem
```

or, if “triple DES” is to be used:

```
openssl genrsa -rand rand.dat -des3 1024 > key.pem
```

Now the private key `key.pem` has been generated. The password (phrase) should be kept in mind well as without it the private key cannot be used. Additionally a backkup copy of the private key should be created and best kept in a safe deposit. Never pass the private key on to someone else! If it gets lost, the certificate signed with it is no longer usable.

Finally a certificate signing request is generated and passed on to the CA. The authority signs the request and sends back a certificate that can be used in combination with the previously generated private key:

```
openssl req -new -key key.pem -out csr.pem
   -config config
```

Here `key.pem` is the above generated private key and `csr.pem` the desired certificate signing request. During the generation process you are prompted for the following informaton:

- The country code. It consists of two characters, standardized by the ISO (e.g. de for Germany, au for Australia, gb for Great Britain, mx for Mexico, etc.)
- Full name of the respective country.
- Name of the city resp. town
- Name of the organization. This should be the organization owning the domain name.

- Name of the individual department (e.g. marketing, sales, etc.)
- The qualified host name of the individual SMTP site (e.g. mail.cycos.com).

If you are queried for “extra attributes”, simply ignore it. The csr.pem contents shouldabout look like this:

```
-----BEGIN CERTIFICATE REQUEST-----
MIIBETCBvAIBADBXMQswCQYDVQQGEwJBVTETMBEGA1UECBMKU29tZS1TdGF0ZTEh
MB8GA1UEChMYSW50ZXJuZXQgV2lkZ2l0cyBQdHkgTHRkMRAwDgYJKoZIhvcNAQkB
FgFgMFwwDQYJKoZIhvcNAQEBBQADSwAwSAJBAL6nPTy3avNgbubx+ESmD4LV1LQG
fcSh8nehEOIxGwmCPlrhTP87PaA0XvGpvRQUjCGStrlQsd8lcYVVkOaytNUCAwEA
AaAAMA0GCSqGSIb3DQEBBAUAA0EAXcMsa8eXgbG2ZhVyFkRVrI4vT8haN39/QJc9
BrRh2nOTKgfMcT9h+1Xx0wNRQ9/SIGV1y3+3abNiJmJBWnJ8Bg==
-----END CERTIFICATE REQUEST-----
```

Example of a configuration file that makes the OpenSSL program query the above mentioned values. As the case may be, copy it as `config` file to the SDKTools directory.

```
[ req ]
default_bits      = 1024
default_keyfile   = privkey.pem
distinguished_name= req_distinguished_name
attributes        = req_attributes
x509_extensions   = v3_ca

dirstring_type    = nobmp

[ req_distinguished_name ]
countryName       = Country Name (2 letter code)
countryName_default= AU
countryName_min   = 2
countryName_max   = 2

localityName      = Locality Name (eg, city)

organizationalUnitName= Organizational Unit Name

commonName        = Common Name (eg, YOUR name)
commonName_max    = 64

emailAddress      = Email Address
emailAddress_max  = 40

[ req_attributes ]
challengePassword= A challenge password
challengePassword_min= 4
challengePassword_max= 20
```

```
[ v3_ca ]
subjectKeyIdentifier=hash
authorityKeyIdentifier=keyid:always,issuer:always
basicConstraints = CA:true
```

SSL_PassPhrase REG_SZ

Password for SSL coding. The password is entered here coded so that at any rate it must be specified via the configuration from within the MRS Monitor.

SSL_PrivateKeyFile REG_SZ

File with the private key for SSL coding. The file is anticipated in <*MRS Root*>`\res\smtpapl`.

SSL_VerifyClientCert REG_DWORD *0 or 1*

With 1 and the corresponding SSL connection the originator certificate is verified if the SMTP APL acts as recipient.

Default: 0

SSL_VerifyServerCert REG_DWORD *0 or 1*

With 1 and the corresponding SSL connection the certificate of the receiving SMTP server is verified if the SMTP APL acts as originator.

Default: 0

UseBindAddress REG_DWORD *0 or 1*

When this option is activated, the IP address entered under BindAddress is used, otherwise the computer´s default TCP/IP address.

Default: 0

UseReceivedFor REG_DWORD *0 or 1*

When set to 1 the ’For’ field from the ’Received’ header is used as recipient address with POP3 mail import. This option was requested by a customer where the faulty provider configuration could hereby be evaded.

Default: 0

11.4.1 POP3 Mail Import Schedule

Under the *Key*

`HKEY_LOCAL_MACHINE\SOFTWARE\PP-COM\MRS\SmtpApl\PopSchedules`

another *Key* is present, which contains the name of each defined schedule. In this *Key* the following values are found:

PhoneBookEntry REG_SZ

RAS Phone Book entry.

RasPassword REG_SZ

Encrypted RAS password.

TimeSched REG_BINARY

The actual schedule in a binary form. Changes to this value should be made in the corresponding editor in the SMTP APL configuration.

12 SMS APL

The SMS APL serves as interface of the MRS Server to mobile phone networks for sending and receiving SMS (Short Message Service) messages. For this purpose a mobile phone or GSM adapter is connected to the MRS Server via a serial data cable. Data are transmitted to the SMS service center by radio (GSM gateway). This is the difference between SMS transmission via SMSApl and ISDN APL. There the SMS service center of the corresponding mobile phone service provider is reached via the fixed network and receiving SMS messages is impossible.

So that the SMS can be used, the SMS APL must first be installed via the MRS Monitor configuration dialog.

12.1 Supported Hardware

Mobile phone devices tested and approved by Cycos:

- Nokia 7110
- Siemens M20 GSM Adapter

Mobile phone devices approved by MKS Systems, the original SMS APL producer; not tested by Cycos:

- coM.sat.DATA GSM adapter
- Falcom A2 GSM adapter
- Nokia 6210 mobile phone
- Siemens TC35 GSM adapter
- WaveCom P900 GSM adapter
- WaveCom WMOD2A-G900 GSM adapter
- WaveCom WMOD2B-G900/1800 GSM adapter V4.00.5 or higher

WaveCom WMOi3 GSM adapter V4.00.5 or higher

12.2 Trouble Shooting

- If no connection can be established to the adapter, terminate the SMS APL and check the interface with the terminal program (e.g. HyperTerminal). After entry of `AT` an OK must be received.
- You can also open Hyperterminal by doubleclicking the `*.ht` files provided in the <*MRS Root*>`\res\SmsApl` directory.

Description:

- `T9600_1.ht` Opening terminal program with baudrate 9600 at COM1.
- `T9600_1.ht` Opening terminal program with baudrate 9600 at COM2.
- `T19200_1.ht` Opening terminal program with baudrate 19200 at COM1.
- `T19200_2.ht` Opening terminal program with baudrate 19200 at COM2.

- Displaying signal quality in a terminal program with `AT+CSQ` or `AT+CSQ?`.

12.3 Configuration and Hardware Particularities

12.3.1 WaveCom P900 Adapter

Settings:

SerBaudRate: 9600
SerDataBits: 8
SerStopBits: 1
GsmDeviceType: 0

A 1:1 modem cable is required for connection, 9Pol SubD socket on 9Pol SubD plug.

12.3.2 coM.sat.DATA GSM Adapter

Settings:

SerBaudRate: 19200
SerDataBits: 8
SerStopBits: 1
GsmDeviceType: 1
GsmDeviceIndex: 1 (Modul A) oder 2 (Modul B)

The SIM board used must not be PIN code protected, since otherwise the adapter will never be ready.

Only messages arriving on module A are evaluated.

When the GSM adapter is exclusively used for SMS message transmission, activate the ISDN watchdog in the adapter configuration.

Tested firmware of the adapter 3.3.0 and 3.3.8

The adapter supports "SIM Phase2 and SimPlus boards", old Phase1 SIM Plugins are inept.

A 1:1 modem cable is required for connection, 9Pol SubD socket on 9Pol SubD plug.

12.3.3 WaveCom WMOD2 and WMOi3 Adapter

Settings:

SerBaudRate: 9600
SerDataBits: 8
SerStopBits: 1
GsmDeviceType: 2

Required accessories for WMOD2:

- Connecting cable 15Pol HD-SubD plug on 9 Pol SubD coupling (length max.1,5m).
- GSM arial with cable and 6,2mm SMA plug to connect the adapter, the maximum length of the arial cable is, according to the manufacturer, 8 meters.
- Stabilized power supply 12-13,8 volts / min. 1000mA with clamp connection.

12.3.4 Nokia 6210/7110 Mobile Telephone

Settings:

SerBaudRate: 19200
SerDataBits: 8
SerStopBits: 1
GsmDeviceType: 3

Required accessories for Nokia 6210/7110:

- Serial data cable telephone <-> PC, we recommend the genuine Nokia cable DLR-3.

12.3.5 Falcom A2 GSM Adapter

Settings:

SerBaudRate: 9600
SerDataBits: 8
SerStopBits: 1
GsmDeviceType: 2

12.4 Registry Entries

The following *values* are specified in *key*

`HKEY_LOCAL_MACHINE\Software\PP-COM\MRS\SmsAp.`

APLLineNumber REG_DWORD

Number of the logical line with which you can extend the logical line class. See also LogicalLineClassFormat.
Example: `NVS:SMS.GSM.1/1234567890`

Default: 1

GsmDeviceIndex REG_DWORD

GSM module to be used for sending and receiving SMS messages. This value is only used when GsmDeviceType coM.sat.DATA is set.

Value	coM.sat.DATA Module
1	Module A
2	Module B

GsmDeviceType REG_DWORD

GSM adapter type used.

Value	GSM Adapter
0	WaveCom P900
1	coM.sat.DATA
2	WaveCom WMOD2B-G900/1800 from 4.00.5
3	Nokia 7110 and 6210 from V4.00.6.001

Default: 1

GsmPinCode REG_SZ

Pin Code of the GSM SIM board if required.

LogicalLineClassFormat REG_SZ

Class portion of the MRS address. The class itself is with the SMS APL supplemented with the APLLineNumber, so that you either achieve a differentiation via the number specified there or via the text string stated here. This differentiation is considered useful for example when several adapters with different SIM boards are to be used for Least Cost Routing. For this purpose the SMS APL must either be

installed on an individual satellite system for each further adapter or registered under an individual service name several times. See also the corresponding procedure with the ABC-A APL.
Example: `NVS:SMS.GSM.1/1234567890`

Default: `GSM`

LogicalLineNode REG_SZ

Node portion of the MRS address. Example: `NVS:SMS.GSM.1/1234567890`

Default: `SMS`

PollRate REG_DWORD *Seconds*

Time interval for polling newly received messages.

Default: 90

SerBaudRate REG_DWORD *1200 - 115200*

Baudrate of the serial interface.

Default: 9600

SerComPort REG_DWORD

Portnumber of the serial interface. Only the number is specified, thus 1, not COM1.

Default: 1

SerDataBits REG_DWORD

Number of databits.

Default: 8

SerStopBits REG_DWORD

Number of stopbits. Value: 1 = 1 StopBit, 2 = 2 StopBits and 3 = 1,5 StopBits.

Default: 1

SmsDbInField REG_SZ

Description of the user database field via which received SMS messages can be assigned to a user.

Default: `SMS#`

SmsDigest REG_SZ

The sent text message can be modified with some variables to insert for example the send time etc. The possible variables correspond to those that can be used with a CIT notification (see CitMessage on page 127).

Example: `{{DATE}, {DIGEST}}`

If this entry, which can only be set via the registry, is present, it replaces the SMS APL default mechanisms for modifying the sent message. The influences possible via SMSSendSuffix, SMSSendPrefix, SMSSendUserName and SMSSendSubject are inactive then and not used.

SmsDontDeleteMessages REG_DWORD *0 or 1*

This parameter states whether received messages are to be deleted from the SIM board. For testing purposes it can be set to 1 so that the messages are maintained. In real operation this switch must be set to 0 since only a maximum of 15 messages can be saved on the SIM board.

Default: 0

SmsMsgCut REG_DWORD *0 oder 1*

When set to 0, messages comprising more than 160 characters are rejected and the originator is informed correspondingly. With 1 a message is cut after 160 characters and this portion is sent then.

Default: 0

SmsPostMaster REG_SZ

ID of the user who receives all incoming SMS messages without special user ID.

Default: `POSTMASTER`

SmsPrefix REG_SZ

If a prefix is to precede each sent message per SMSSendPrefix, it is filed here.

SmsSendPrefix REG_DWORD *0 or 1*

When set to 1 the text stored in SMSPrefix is prefixed to each sent message.

Default: 0

SmsSendSubject REG_DWORD *0 or 1*

When set to 0 the message content is transmitted, with 1 the subject line.

Default: 0

SmsSendSuffix REG_DWORD *0 or 1*

When set to 1 the text stored in SMSSuffix is attached to each sent message.

Default: 0

SmsSendUserName REG_DWORD *0 or 1*

When set to 1 the user ID of the actual SMS message is prefixed in pointed brackets.

Default: 1

SmsServiceCenter REG_SZ

SMS service center number of the mobile phone network provider. You can inquire about it at your provider.

SmsSuffix REG_SZ

If each sent message is to be suffixed per SMSSendSuffix, the suffix is filed here.

WaitOnComPortInit REG_DWORD *Milliseconds*

Waiting time in milliseconds until communication is started after initializing the Com Port.

Default: 1500

WaitOnLogIn REG_DWORD *Milliseconds*

Waiting time in milliseconds until communication is continued after logging in to the mobile phone device.

Default: 10000

13 Web Server (Web APL)

In front of the Web APL is a complete HTTP 1.0 web server which is used as an interface for the administration of user data, as access to user mailboxes via any HTML browser (Netscape Navigator, Microsoft Internet Explorer, WAP compatible mobile phone) and much more. The complete integration of the E-Script language on the server enables the realization of almost any scenario over a HTTP connection. The HTML pages sent to the Web Client contain MRS specific data which is delivered by the E-Script. This could be for example user documents, etc.

Besides the Web Server functionality the Web APL can also operate as Web Client and be controlled by other MRS components via transactions to automatically poll HTML pages from any Web Server. The information contained in these pages can be processed per script to e.g. readout certain quotations.

13.1 Registry Entries

In the *Key*

`HKEY_LOCAL_MACHINE\SOFTWARE\PP-COM\WEBAPL`

the following entries are found:

AuthIncoming REG_DWORD *0 or 1*

When set to 1, originator privileges are checked with messages coming in via the Web APL. 0 deactivates this option.

Default: 1

BindAddress REG_SZ

The IP address over which the Web Server is to be connected. In most cases this is the default TCP/IP address of the computer. In a multi-host system with numerous addresses, the desired address can be given.

CGI_Script REG_SZ

Object code of the compiled E-Script which is used for outgoing HTML document analysis and the delivery of MRS specific information.

Example: `C:\MRS\Res\WebAPL\cgi.vo`

HTTP_DefaultHTML REG_SZ

Default file sent by the Web Server when no specific files are requested.

Example: `index.html`

HTTP_KeyTimeout REG_DWORD

Users are validated on the MRS Server by entering their account name and corresponding password. After validation, a key is issued by the Web Server which governs the length of the login session. After the time (given in seconds) has expired, the user must be re-validated and a new key is issued.

This procedure increases security, so that likelihood of manipulation on the URL containing the key is reduced.

Default: 600

HTTP_MaxThreads REG_DWORD

Maximum number of simultaneously started threads. This value also determines the maximum number of simultaneous connections to the Web Server.

Default: 16

HTTP_Port REG_DWORD

The port on which the Web Server listens for HTTP queries.

Default: 80

HTTP_RootTab REG_MULTI_SZ

This entry contains the names of HTML root directories accessed by the Web Server. Since numerous sites can be accessed by the server, numerous addresses may be listed here; e.g. www.firma.com and www.firma2.de.

For each line a pattern is entered along with the address of the root directory separated with a colon (`:`). The pattern is given as a regular expression (see Rules for match patterns in *The E Programming Language*.

The lines are sequentially scanned, until a match is found for the address (e.g. www.cycos.com) requested by the WWW browser. The corresponding HTML page is subsequently transferred to the WWW browser. Prior to the transfer, the E-Script replaces portions of the HTML page e.g. the users inbound journal.

Example: `.*:c:\MRS\Res\WebAPL`

HTTP_Timeout REG_DWORD

Time-out in seconds after which the connection is terminated due to inactivity.

Default: 10

HTTPS_Port REG_DWORD

Port where the Web Server waits for HTTP queries secured per SSL coding.

Default: 443

ProtectedDirectories REG_MULTI_SZ

One password protected directory can be entered per line. Line syntax: <*Protected Directory*> ':' <*Dialog Display*>. <*Protected Directory*> must begin with a '\' and, depending on the queried URL and the Root directory configured in HTTP_RootTab for this URL, is to be considered relative to this directory.

<*Dialog Display*> is a normal text displayed in the password query dialog by the Web Browser.

SSL_CertificateFile REG_SZ

Certificate file for SSL coding.

SSL_Enable REG_DWORD *0 or 1*

Enable (1) or disable (2) SSL coding.

SSL_PassPhrase REG_SZ

Password for SSL coding. The password is entered here encrypted so that at any rate it must be specified via the configuration from within the MRS Monitor.

SSL_PrivateKeyFile REG_SZ

File with the private key for SSL coding.

UseTiffFormat REG_DWORD *0 or 1*

Setting for the fax image format sent to the Web Browser. JPEG (0) or TIFF (1).

Default: 0

WebCL_Script REG_SZ

The E-Script containing the Web Client functions.

Example: `C:\MRS\Res\WebAPL\WebClient\WebCL.e`

WebCL_Stacksize REG_DWORD

Size of stacks for the virtual machine. The virtual machine executes the E-Object Code of the Web Client script.

Default: 0x1000

13.1.1 Protocols

Under the *key*

`HKEY_LOCAL_MACHINE\SOFTWARE\PP-COM\WEBAPL\CGI_Protocols`

a key with the name of the protocol that contains the following entries is found for each configured protocol:

CGI_Script REG_SZ

Name of the E-Script belonging to this protocol. It is either suffixed with `.e` if it is an uncompiled script or with `.vo` if it is a script already delivered as Object Code. The latter case is default unless E-Scripts are self developed.

Example: `cgi`

CGI_ScriptParams REG_MULTI_SZ

Parameters handed over to the script.

Enable REG_DWORD *0 or 1*

This protocol is either active (1) or not (0).

IsDefault REG_DWORD *0 or 1*

Exactly one protocol is the default protocol used when the main URL is called, e.g. `www.cycos.com`. All other protocols would be available via `www.cycos.com/`*<Protocol>* in this example.

VM_StackSize REG_DWORD

Size of stacks for the virtual machine. The virtual machine executes the E-Script object codes.

Default: 0x2710

14 Print APL

Copies from incoming and outgoing documents can be automatically created and sent to a printer through the Printer APL. *CarbonCopy Rules* are defined for the creation and routing of documents. The flag `NOPREFERRED` should be set in this Rule, so that copies are not detoured by the Preferred rule.

Example

```
NVS:*.*/*[ORG=NVS:FAXG3.*/*;FLAG!=CARBONCOPY;
   FLAG!=NOPREFERRED]=NVS:PRINTER/<DB>[FLAG=NOPREFERRED]

NVS:*.*/*[ORG=NVS:FAXG4.*/*;FLAG!=CARBONCOPY;
   FLAG!=NOPREFERRED]=NVS:PRINTER/<DB>[FLAG=NOPREFERRED]
```

All incoming fax G3 and G4 documents (whose carbon copy and non-preferred flags are not set) would be sent to a printer, when a printer from the Print APL is entered in the field `PRINTER` of the recipient's user database.

Attention

The Print APL does not allow the installation of a printer whose name contains the string: "FAX G". This prohibits the inefficacious usage of the MRS fax printer driver.

14.1 Security Aspects

Accessing a network printer almost always requires the corresponding privileges. To furnish the Print APL with these privileges you can run this service in the security context of a user account that has the access privileges.

As administrator call the service administration and in the service properties access the **`Log On`** tab to specify the corresponding user account with the associating password.

With this user account log in at the server once and connect the desired network printer. Subsequently you can also check whether the user is really permitted to print.

You can recognize such an access problem e.g. by the following line in the MRS Server log file:

```
23.11:49:17.884 PrintApl  Printer  E StartDoc failed (Access is denied.)
```

14.2 Registry Entries

The following *Value Entries* are found in the *Key*

`HKEY_LOCAL_MACHINE\Software\PP-COM\MRS\PrintApl`

BadPrinterCreateDC REG_DWORD *0 or 1*

Some printer drivers show abnormal behaviour when the function CreateDC is called in the usual way which can lead among other things to a Print APL crash. If this is the case set this value to 1 and check whether the thus activated diversion is a sufficient corrective. At any rate the used printer driver is to be updated first!

Default: 0

EMailAddresses REG_MULTI_SZ

The following addresses are recognized by the Print APL as email addresses. In addition to those listed here the default address `NVS:<Servername>` is recognized. This is used for placement of the variable `%serv` with the word email instead of the cryptic address portion. This variable can be used in the DocInfoLine… for the printing of document information.

Default:

NVS:LN.*/*
NVS:EXCH.*/*
NVS:SMTP.*/*
NVS:MS.*/*
NVS:CC.*.*

RetryOnError REG_DWORD *0 or 1*

If this switch is set to 1 the Print APL activates a repeat strategy for failed print jobs. These jobs are then twice repeated after 30 seconds, subsequently twice again after two minutes if an error message is issued. This serves to avert an error of the Windows printer spooler that, under load, does occasionally not accept any documents any more.

14.2.1 Default Printer Settings

Under the *Key*

`HKEY_LOCAL_MACHINE\Software\PP-COM\MRS\PrintApl`

the default settings for all installed printers are found. These settings are used for the installation of new printers as well as for all other printers whose settings do not vary from those of the default.

Address REG_SZ

This entry is used by the MTA to check if the option "**Default Printer**" is available in the current version of the Print APL. This option allows the administrator to select a printer as default for all users. This value may not be modified.

Example: Default: `NVS:PRINTER/QMSDEFAULT`

DocInfoLine1 REG_SZ

Information to be given in the first line of the print out. The following variables can be used for the contents of the line:

Variable	Significance
%comm	Commentary line.
%cost	Charge costs.
%costid	Cost center.
%do	Date of receipt on server.
%dr	Date of the report. The report is generated after completion of the document transmission.
%frm	Format, e.g. Telex, ASCII, fax G3, etc.
%fullname	The complete user name or, if it is unknown, something like 'Unknown User'.
%len	Document length in bytes.
%mid	The message ID.
%oid	Originator ID e.g with a fax.
%oorg	Original originator for documents that are rerouted.
%orec	Original recipient for documents that are rerouted.
%org	Message originator.
%p	Actual page number.
%P	Total number of pages in document.
%rec	Message recipient.
%rid	Recipient ID e.g with a fax.
%serv	Transport service used.
%stat	Detailed message status.
%subj	Message subject.
%succ	Success or failure of the transmission: Undefined, Unknown, OK, ERROR, REJECT, REPEAT or DELAYED.
%to	Time of receipt on server.
%tr	Date of the report. The report is generated after completion of the document transmission.
%units	Number of units.

Variable	Significance
%worg	An attempt is made to find the originator in the user data base. If the originator is found, then the name will be used instead of the fax ID.
%wrec	An attempt is made to find the recipient in the user data base. If the recipient is found, then the name will be used instead of the fax ID.

Default: `%serv Nr: %mid from %org to %rec (Page %p of %P)`

DocInfoLine2 REG_SZ

Information to be given in the second line of the print out. If this line is to be blank, then this value must contain an empty string. Similar to DocInfoLine1

Default: `Date %do %to - Status: %stat`

DocInfoLine3 REG_SZ

Information to be given in the third line of the print out. If this line is to be blank, then this value must contain an empty string. Similar to DocInfoLine1

Default: `Subject: %subj`

DocInfoLine4 REG_SZ

Information to be given in the fourth line of the print out. If this line is to be blank, then this value must contain an empty string. Similar to DocInfoLine1

Default:

DocOverlapFooter REG_DWORD *0 or 1*

When set to `1` the information from the DocInfoLine is printed directly over the document. So, if the document is normally empty in the upper or lower portions, this would not affect the fax representation.

With a value of 0 is the document reduced somewhat in size and the information from DocInfoLine is printed either over or under the document.

Default: `0`

DocPrintInfo REG_SZ *Bottom, Top or None*

Information from DocInfoLine is printed either at the bottom, top, or not at all.

Default: `Bottom`

FaxPrintMode REG_SZ

There are various methods for optimal printing of a fax.

Mode	Significance
`FitToPage`	The fax is fitted to the printing page. A fax page is always fitted completely to the printing page. A fax with an over length would be reduced.
`PixelToPixel`	Output direct in printer resolution. A 200dpi fax is somewhat small when printed with a 600dpi printer.
`FitToWidth`	The fax is fitted to the width of the printing page. If the length of the fax is longer than the page, the rest will be printed on a new page. This is especially helpful by "never ending" fax documents.
`xOptimizedToPage`	This option assumes that the left and right margins of a fax are normally empty. This portion of the fax can be disregarded without any loss of the text by printing.
`OptimizedToPage`	This option is principally the same as the one above with the exception that the complete page width is used (A4 or US Letter). Areas outside the Windows NT printer drivers "printable area" are also used.

Default: `FitToPage`

Formats REG_SZ

List of formats separated by a comma which can be processed by the Print APL. A description of all documents can be found in the section Supported Document Formats on page 429ff.

Tip: If the Print APL is to be used for the printing of emails with attachments, the method should be used for printing attachments:

Register `FG3` and `FG4` only as formats. Afterwards, the MTA will make a conversion to `FG3` or `FG4` for emails through use of an application converter which includes the attachments.

Default: `TLX,ASC,TXT,FG3,FG4,AS7`

NumberOfCopies REG_DWORD *1 to 1000*

Number of copies to be printed.

Default: `1`

TelexBanner REG_DWORD *0 or 1*

When set to 1 has the appearance of a Telex document with a stripe on the side. MRS for Windows NT does not support its own Telex devices, but can access the telematic server NVS (based on Real Time Unix QNX) over a remote system link. For printing a special Telex font must be installed.

Default: `1`

14.2.2 Individual Printer Settings

Each printer has a *Key* under the *Key*

`HKEY_LOCAL_MACHINE\Software\PP-COM\MRS\PrintApl\Devices`

Each printer can be configured in the same manner as with the default printer. For that reason, only those entries that differ from those of the default printer have been listed below.

Address REG_SZ

Mandatory MRS address of the printer. Permanent component of the address is always "`NVS:PRINTER`." with the following `CLASS`. Separated by a slash (`/`), the user portion of the address follows the printer name. The printer name is used in the field `PRINTER` of the user database, as in the above example where the *Carbon Copy Rules* were applied to all incoming fax documents.

Example: `NVS:PRINTER.0102/QMS`

DeviceName REG_SZ

Mandatory printer name. With network printers the complete name of the Share.

Example: `\\OLYMP\QMS 1060 Print System`

IsDefault REG_DWORD *0 or 1*

This value may only be used for one printer and is set to 1 when the printer is declared as the default printer. If no printer is set as default, the first listed printer will be used and the value `IsDefault` returned to the registry.

If more than printer has been set as default, a warning is generated in the Log and the first listed printer used as default. A corrected value will be returned to the registry.

LineName REG_SZ

Mandatory entry for the displayed name of the printer in the MRS Monitor. Maximum length is 64 characters, but names with a lesser number of characters are recommended.

Example: `QMS 1060 Print System on OLYMP`

NovellNetworkPrinter REG_DWORD *0 or 1*

When set to 1 an attempt to query the global data of the printer will not be made. Apparently, this data is not available from Novell network printers and an error report is generated. To work around this the default value is used.

UseDefaults REG_DWORD *0 or 1*

Settings from the default printer are used when set to 1.

15 File Interface (FI APL)

This is some monster of the isle with four legs, who hath got, as I take it, an ague. Where the devil should he learn our language? I will give him some relief, if it be but for that. If I can recover him, and keep him tame, and get to Naples with him, he's a present for any emperor that ever trod on neat's leather.

The Tempest

The FI APL enables the execution of transmission and receipt processes using a definable header format through a file interface. The header format is defined for document and report transmissions from the MRS Server to another server. Conversely, incoming document headers are parsed using an E-script and a transmission job is created for the MRS.

15.1 Registry Entries

The following *Values* are found under the *Key*

`HKEY_LOCAL_MACHINE\SOFTWARE\PP-COM\MRS\FiApl`

ResPath REG_SZ

Path to the script resources. Especially in Cluster systems it is reasonable to set this path on a released directory since otherwise the script needs to be updated always on both systems.

Default: <*MRS Install*>`\Res\FiApl`

Protocols REG_MULTI_SZ

List of the active protocols. For every protocol there is an individual registry key under the key FIAPL containing the protocol name.The number of protocols is restricted to 32.

Example:

```
FiSAP
```

15.1.1 Protocol Specific Settings

Each protocol listed under *Protocols* has its own individual registry *Key* in the `FiAPL` *Key.* In each of these *Keys* the following *Values* are found.

BodyDelay REG_DWORD *Seconds*

Break between reading/writing of the header and the corresponding body file in seconds. This is to ease race conditions in certain Novell network environments.

CheckPrivileges REG_DWORD *0 or 1*

Through activation of this option the PRIV-attribute is set on this logical FI APL line. In this way the originator´s privileges are checked, e.g. whether he or she is authorized to send a fax document.

EnableIncoming REG_SZ *True or False*

By `True` the MRS Server is activated in the direction of the host. In this case the event `EvIncoming()`must be defined in the <*Protocol*>`.e` script . Only if this event does not exist, a document format is searched for in the file …`\Res\FIAPL\`<*Protocol*>`.IFM` for compatibility reasons.

EnableReports REG_SZ *True or False*

By `True` MRS Server reports are activated to the host. In this case the event `EvReport()`must be defined in the <*Protocol*>`.e` script . Only if this event does not exist, a report format is searched for in the file <*MRS Server*>`\Res\FIAPL\`<*Protocol*>`.RFM` for compatibility reasons.

In this case a report format in the file …`\Res\FIAPL\`<*Protocol*>`.RFM` must be present.

HdrInDir REG_SZ

Incoming document header directory.

HdrOutDir REG_SZ

Outgoing document header directory. This directory is polled for new documents by the host-system.

HdrPattern REG_SZ

Only headers whose file name correspond to this format would be processed.

Example: `*.hdr`

IncFaxFormat REG_SZ

Format in which an incoming fax from the MRS Server would be rerouted to the host.

Example: `TIF_MUL`

IncFileSuffix REG_SZ

File suffix for a fax from the MRS Server that can be used with the host.

Example: `TIF`

MaxPerPoll REG_DWORD

Maximum number of jobs that can be read in and processed all at once. Thereby the load with a very large job including hundreds of documents is temporarily distributed.

PollRate REG_DWORD

Interval in seconds in which the `HdrOutDir` is polled.

PrivData REG_SZ

Correlation information for report allocation to jobs.

Example: `{*,30},{*,30},{DOC,64}`

has 3 fields. These fields correspond to the variables `%PVD0`, `%PVD1` and `%PVD2`, which can be used in the format file. This data is returned in a MRS report and can be written to the ReportHeader from the same source. The first `{*,30}` denotes that `%PVD0` is a maximum of 30 bytes long. `{DOC,64}` designates that a maximum of 64 bytes from the document name (MRS-variable `DOC`) would be copied to the variable `%PVD2`.

The combined length of all `%PVD` fields cannot exceed 128 bytes. In the example above two variables with a length of 30 bytes were used and one with 64 bytes, for a total length of 124 bytes.

Alternatively, a global value can be replaced through a Script <*Protocol*>.`ORL`.

Example: `export const PrivData = "40,*;40,*;40,*";`

RemoveHeader REG_SZ *True or False*

With a value of `True` the header files will be deleted. This value should only be set to `False` for debugging purposes.

RepFileSuffix REG_SZ

File suffix used for reports from the MRS Server to the host.

Example: `REP`

SendFormats REG_SZ

This list displays the valid document and data formats for the logical line logged in by this protocol. The formats are described in 26.1. If a document is forwarded to this protocol by the MTA then, as the case may be, a conversion into one of the formats indicated here is performed. The PMF format should additionally be entered with documents carrying attachments. All format entries occur in upper case letters and separated with a semicolon.

Example: TG3;PMF

TxtInDir REG_SZ

Directory used for inbound document bodies.

TxtOutDir REG_SZ

Directory used for outbound document bodies.

15.2 Rules for outbound Documents

The programming language E is used to write scripts that parse files which contain transmission data. E and the specific functions of the FI APL are described in the manual *The E Programming Language*.

15.3 Description of the Format-Files

For the header file format resp. the report description , the script language E is used as well. For reports the event `EvReport()`and for incoming documents the event `EvIncoming()`must be defined in the <*Protocol*>`.e` script. With old scripts also document format definitions or report format definitions can exist in a <*Protocol*>.IFM resp. a <*Protocol*>`.RFM` file. The variables used in these files correspond to those described with the Print APL.

16 SMI Transporter

A SMI transport is used when a SMI interconnection is made between two servers (Remote System Link), or when a connection is created between a client and a server. In addition to those listed here, there are other types of SMI transports such as the ISDN APL. Those listed here are generally used for in-house connections (LAN) and have no further telematic functions.

16.1 Named Pipes

Named Pipes were created for the Internal Process Communication (IPC) in the LAN Manager. They are present as soon as a network protocol is installed under Windows NT. A common protocol on both client and server is a prerequisite for the connection over a Named Pipe. Several advantages to Named Pipes under Windows NT are:

- Implementation as a file system (NPFS), where joint features from the Windows NT file system such as caching can be automatically used.
- Connection to the local computer does not run over the network interface (the only transport where the MRS Windows Client can be connected to the MRS Server on the same computer).
- Named Pipes can also be used over the Remote Access Service (RAS) of Windows NT.

Attention: An active delivery with a 16 Bit client is not possible with *Windows for Workgroups* or *WinOS2* due to inherent insufficiencies. For more information please refer to the *Client Resource Kit*.

This protocol was especially developed for the use of an administrative client on a computer where the MRS Server is installed. Even when used for the connection of only a few clients within a network, this protocol requires massive amounts of resources in comparison to the transport protocols SPX or TCP/IP. Furthermore, dialog services do not function with this protocol.

The following *Value Entries* are specified under the *Key*

`HKEY_LOCAL_MACHINE\SOFTWARE\PP-COM\MRS\PipeApl`

PMF Allowed REG_DWORD *0 or 1*

When set to 1 the format `FRM_PMF` is inserted in the allowable formats for the line `NVS:PIPE` (independent of the predefined transport formats). This entry is obsolete through the MultidocClient and should no longer be used.

Default: `0`

TransferDirectory REG_SZ

Transfer directory for pipe communication. Installed by the APL and must be shared under the name `PIPEXFER$`. This share is set correctly during the installation.

Default: `<MrsRoot>\PipeBuff`.

The *Value Entry* NullSessionShares listed under the *Key*

`HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\LanmanServer\Parameters`

Since a user context for the services exists, this is not required in a secure environment for the MRS server with a pseudo account.

NullSessionShares REG_MULTI_SZ

This *Value Entr*y is used by Windows NT to grant a service share access with no user context. The user should refrain from making any changes to this *Value*!

16.2 SPX Protocol

The installation of the network protocol *NWLink IPX/SPX Compatible Transport* under Windows NT is a prerequisite for this transport.

16.2.1 SPX Lines

The following *Value Entries* are specified under the *Key*

`HKEY_LOCAL_MACHINE\SOFTWARE\PP-COM\MRS\SpxApl\Line`

DlgQueueSize REG_DWORD *16…128*

Number of dialog elements that can be stored by the transporter if transfer ratio of 1:1 is not possible.

Default: 32

HighWaterThreshold REG_DWORD *50…100 Percent*

When this value is reached the SMI queue sets all outgoing lines to busy till the value falls below that given in the LowWaterThreshold. During this time no further data is sent to the transport from the router. The percent value is in reference to the value SmiQueueSize.

Default: 85

LowWaterThreshold REG_DWORD *0…90 Percent*

See HighWaterThreshold.

Default: 45

MaxDlgPerLine REG_DWORD *2…16*

Maximum number of simultaneous dialogs on a line.

Default: 4

ShortholdTime REG_DWORD *15…3600, 0 = no Shorthold*

Connection time-out. If no data is transferred within the time entered here, a disconnect will be initiated. An entry of zero means no ShortHold.

Default: 60 Seconds

SmiQueueSize REG_DWORD *256…2048*

Number of SMI jobs that can be queued. The LowWaterThreshold and the HighWaterThreshold refer to this value.

Default: 64

16.2.2 Line Administration

The following *Value Entries* are specified under the *Key*

`HKEY_LOCAL_MACHINE\SOFTWARE\PP-COM\MRS\SpxApl\LineAdmin`

MaxLines REG_DWORD *4…4096*

Maximum number of lines.

Default: 64

ShowSubLineInfo REG_DWORD *0 or 1*

Determines whether individual connections are displayed below the SPX Line Information. Entries are ignored after the 256th line, as well as sub-line entries. This is done to reduce MRS Monitor workload. An appropriate warning is generated when MaxLines is greater than 256 lines and ShowSubLineInfo is set to `1`.

Default: `1`

16.2.3 SPX specific configuration

The following *Value Entries* are specified under the *Key*

`HKEY_LOCAL_MACHINE\SOFTWARE\PP-COM\MRS\SpxApl\NwPlugSpx`

IoPort REG_DWORD

The server monitors the SPX socket for connection requests. This value should never be modified since clients that are already configured, would not be able to find or establish a connection to the MRS Server.

SleepTimeWS32Rel REG_DWORD *Seconds*

This value defines the (release) time in seconds that WSACleanup() waits before *and* after a call-up to give Winsock sufficent time for cleaning up internal data structures. The value should not be modified.

Default: 1

16.3 TCP/IP Protocol

Dependent upon the network *TCP/IP Protocol*. The configuration of the network protocol under Windows NT should be completed prior to installation.

TCP/IP is a protocol also applicable for a Wide Area Network (WAN) e.g. connections to the Internet and network connections such as these can be made via the TCP/IP protocol.

16.3.1 Reverse Name Resolving

The following *Values* are specified under the *Key*

`HKEY_LOCAL_MACHINE\SOFTWARE\PPCOM\MRS\TcpApl\NameResolver`

Netmap REG_MULTI_SZ *Network,Netmask,Flag[,Comment]*

Up till now the problem existed that DHCP Clients could not log-in to the MRS Server over TCP/IP because their hostnames could not be resolved through the Name Server. This is applicable in most cases.

Why do IP addresses have to be resolved?

Since we're working with bidirectional sockets, only one connection between the MRS Client and the TCP/IP APL can exist. If the client 444s2.do.main is logged in to the MRS Server, the MRS address `NVS:TCPIP/194.77.158.81` would be generated from its IP address. This address is stored by the TCP/IP APL's Address-Manager. If a document is sent to the client through the TCP/IP APL, the address `NVS:TCPIP/944s2.do.main` is returned to the TCP/IP APL from the kernel. Since these are two dissimilar addresses for the Address-Manager, the I/O Manager would be requested to establish a new connection with the client. Because the client still has an active connection to the TCP/IP APL this is not possible and the Connect-Request from the TCP/IP APL cannot be answered. Therefore the document cannot be delivered to the client.

In order to prevent this situation, IP addresses are resolved into hostnames. The Address-Manager now knows that the transport addresses `NVS:TCPIP/194.77.158.81`, `NVS:TCPIP/944s2.do.main` and `NVS:TCPIP/944s2` all describe the same computer, and can be used for document delivery over the active connection.

Now these clients resp. (sub-)networks can be configured in the registry. Netmap contains the network, netmask, and activation flags for clients or managed networks whose name cannot be resolved in reverse.

If the computers 194.77.158.1 - 194.77.158.126 in the network 194.77.158.0 (network mask 255.255.255.128) are configured for example through DHCP, the entry would have the following appearance:

Netmap:

```
194.77.158.0,255.255.255.128,1,Name Resolver aktiv
```

It is now assured that host name resolution for all computers in this area is deactivated.

If there are other computers (194.77.158.81) within this network that are not configured over DHCP, then these must appear before the network definitions:

Netmap-Entry	**Significance**
194.77.158.81,255.255.255.255,0	194.77.158.81 is not a DHCP client
194.77.158.0,255.255.255.128,1	194.77.158.1 to .126 are DHCP clients

If no entry exists (e.g. the logged-in client doesn't match the network/netmask combinations) it is assumed that there is no automatic DHCP configuration and the IP address is resolved in this case by the TCP/IP APL.

Entries are sequentially processed until a pattern match is found for the connecting IP address.

16.3.2 Firewall Mechanism

The following *Values* are specified under the *Key*

`HKEY_LOCAL_MACHINE\SOFTWARE\PP-COM\MRS\TcpApl\Firewall`

Netmap REG_MULTI_SZ *Network,Netmask,Flag[,Comment]*

Connection to the MRS Server over TCP/IP can be denied to certain clients (or IP address areas) with this configuration. Access by other MRS Servers over a Remote System Link must be explicitly defined.

Other MRS Servers that wish to establish a Remote System Link must be explicitly granted access.

Every line in the Netmap contains a network with the corresponding netmask and a flag (access allowed (`1`) or access denied (`0`)) for IP address areas.

If all 128 IP addresses in the network 194.77.158.128 (Netmask 255.255.255.128) are to be denied access to the MRS Server, the entry would have the following form:

Netmap-Entry	**Significance**
194.77.158.128,255.255.255.128,0	forbidden 194.77.158.128 to .255
194.77.158.0,255.255.255.128,1	allowed 194.77.158.0 to .127

Those that do not fit the above description would be denied access. The above definition is identical with:

Netmap-Entry	**Significance**
194.77.158.128,255.255.255.128,0	forbidden 194.77.158.128 to .255
194.77.158.0,255.255.255.128,1	allowed 194.77.158.0 to .127
0.0.0.0,0.0.0.0,0,Default	all others prohibited(implicit)

If for example a Remote System Link is to function within this network (194.77.158.137), then it must be defined as “allowed” before it’s network.

Netmap:

Netmap-Entry	**Significance**
194.77.158.137,255.255.255.255,1	allowed 194.77.158.137
194.77.158.128,255.255.255.128,0	forbidden 194.77.158.128 to .255
194.77.158.0,255.255.255.128,1	allowed 194.77.158.0 to .127

Those that do not fit the above description would be denied access.

If no entry exist, then access from all computers is allowed. In the following entry:

Netmap:

Netmap-Entry	**Significance**
0.0.0.0,0.0.0.0,1,Allow access by all	All addresses are allowed access

If at least one entry is present, then all IP addresses must be explicitly allowed access.

No entry for the MRS Server will be present in the server list for those clients whose access is denied.

Entries are sequentially processed until a pattern match is found for the connecting IP address.

Default: `0.0.0.0,0.0.0.0,1`

16.3.3 Lines

The following *Value Entries* are specified under the *Key*

`HKEY_LOCAL_MACHINE\SOFTWARE\PP-COM\MRS\TcpApl\Line`

DlgQueueSize REG_DWORD *16…128*

Number of dialog elements that can be stored by the transporter if transfer ratio of 1:1 is not possible.

Default: 32

HighWaterThreshold REG_DWORD *50…100 Percent*

When this value is reached the SMI queue sets all outgoing lines to busy till the value falls below that given in the LowWaterThreshold. During this time no further data is sent to the transport. The percent value is in reference to the value SmiQueueSize.

Default: 85

LowWaterThreshold REG_DWORD *0…90 Percent*

See HighWaterTreshold.

Default: 45

MaxDlgPerLine REG_DWORD *2…16*

Maximum number of simultaneous dialogs on a line.

Default: 4

ShortholdTime REG_DWORD *15…3600, 0 = no Shorthold*

Connection time-out. If no data is transfered within the time entered here, a disconnect will be initiated. An entry of zero means no ShortHold.

Default: 60 Seconds

SmiQueueSize REG_DWORD *256…2048*

Number of SMI jobs that can be queued. The LowWaterThreshold and the HighWaterThreshold refer to this value.

Default: 64

16.3.4 Line Administration

The following *Value Entrie*s are specified under the *Key*

`HKEY_LOCAL_MACHINE\SOFTWARE\PP-COM\MRS\TcpApl\LineAdmin`

MaxLines REG_DWORD *4…4096*

Maximum number of lines.

Default: 64

ShowSubLineInfo REG_DWORD *0 oder 1*

Determines whether individual connections are displayed below the TCP/IP Line Information. Entries are ignored after the 256th line as well as sub-lines entries. This is done to reduce MRS Monitor workload. An appropriate warning is generated when MaxLines is greater than 256 lines and ShowSubLineInfo is set to `1`.

Default: `1`

16.3.5 TCP/IP specific configuration

The following *Value Entries* are specified under the *Key*

`HKEY_LOCAL_MACHINE\SOFTWARE\PP-COM\MRS\TcpApl\NwPlugTcp`

BindAddress REG_SZ *IP-Address*

If the MRS Server has several network cards or IP addresses, it is suggested that the TCP/IP APL be bound to a single IP address. If the computer has for example the IP address 192.168.9.44 (primary) and 194.77.158.10 (secondary), the TCP/IP APL would be bound to the primary IP address, since this represents the default IP address. Clients from the 194.77.158 network would not be able to login to the server. In this example the BindAddress would be set to 194.77.158.10.

A warning is generated by the TCP/IP APL at booting when a BindAddress is specified that does not exist on the computer. In this case there is no fall-back on the default IP address. The entry 0.0.0.0 corresponds to the default IP address of the computer.

Default: `0.0.0.0`

IoPort REG_DWORD

The server monitors the TCP/IP socket for connection requests. This value should never be modified since clients that are already configured, would not be able to find or establish a connection to the MRS Server.

SleepTimeWS32Rel REG_DWORD *Seconds*

This value defines the (release) time in seconds that WSACleanup() waits before *and* after a call-up to give Winsock sufficent time for cleaning up internal data structures. The value should not be modified.

Default: 1

17 Hicom APL

The Hicom APL enables the use of the ADL (Applications Connectivity Link) features of the Siemens Hicom 300-Series PBX. These features include switching, connecting, display control, and the management of rerouting. The physical coupling can be either through a LAN and use of a TCP/IP protocol or through a serial interface with a protocol converter (“Protum-Box). Both of these methods provide the same level of performance.

The Hicom APL provides the following services:

- Triggering of either a LED and/or a device with digital display (“Optiset”).
- End device and Hicom line monitoring.
- Use of all available performance features of other server components through dialogs and transaction interfaces.

The Hicom APL currently supports only the Hicom 300 series from version 3.4 and the Hicom 300 E series. Support for the Hicom 150 is presently not available. Likewise triggering of the LED lamps on the telephone is not possible over the ACL Interface.

The ACL has no network capabilities. Therefore, each Hicom in the network must be individually connected. When numerous Hicom PBXs are connected a configuration via the further below mentioned entry *HicomPorts* via Registry Editor is required.

17.1 Serial or TCP/IP?

The WAML interface for TCP/IP connections is only for use with the Hicom 300 E series PBX switch whereas the V.24 can be used with either the Hicom 300 or 300 E.

The most important factor to be considered when deciding which type of connection is to be used is that: The V.24 can theoretically transmit up to five messages per second as opposed to approximately 1000 by the TCP/IP connection. A single CTI transaction creates approximately 10 messages, and message transfer should not be handicapped due to a slow connection type. A general rule of thumb is that the V.24 should not be used when more than ten CTI users are in the system, and should never be used for Call Center applications. With a TCP/IP connection the Hicom itself is the limiting factor for transfer rates. The Hicom 300 E (internally described as Hicom 300) can only process about fifty ACL messages per second.

17.2 Hicom Configuration

The configuration batch of the Hicom 300E for ACL MSV1 (serial) is displayed in the following.

```
CONFIGURATION-CPSM:A1,BSCISO,DVAVERB,5,"MRS",NO,9;
CONFIGURATION-CPSM:A1,BSC,APPL,5,"MRSDGV","MRS","MRSDGV",9,0,"MRS";
CONFIGURATION-CPSM:A1,BSC,APPL,6,"MRSTDD","MRS","MRSTDD",9,3,"MRS2";
CONFIGURATION-TCSM:A1,BSC,KO,2,V24EBC,BSC1,6040,6041,6240,6241,6440,6441,6640,
   6641,3,1,2,24,,3,3,YES,,,YES,4040;
CONFIGURATION-TCSM:A1,BSC,ZU,2,3,9;

CONFIGURATION-LCSM:A1,V24,3,V29_,DTE,9600,EXT,60,VDX;

CONFIGURATION-DAPPL:05,"MRSDGV","MRSDGV","MRS",DGV;CHANGED-DAPPL:05,,,,CMS,DGV;
CONFIGURATION-DAPPL:06,"MRSTDD","MRSTDD","MRS",TDD,SINGLE,00&15;
CHANGED-DAPPL:06,,,,CMS,TDD;
```

The configuration batch of the Hicom 300E for WAML (TCP/IP) is displayed in the following.

```
CONFIGURATION-CPTP:DVAVERB,2,"MRS_TCP","194.77.158.2";
CONFIGURATION-CPTP:APPL,20,"DGV_TCP","MRS_TCP","MRSAPP",YES,102,5000,
   "MRSDGVR","MRSDGVS";
CONFIGURATION-CPTP:APPL,21,"TDD_TCP","MRS_TCP","MRSAPP",YES,102,5003,
   "MRSTDDR","MRSTDDS";

CONFIGURATION-DAPPL:20,"DGV_TCP ","MRS_TCP ","MRSAPP  ",DGV;
CHANGED-DAPPL:20,,,,CMS,DGV;
CONFIGURATION-DAPPL:21,"TDD_TCP ","MRS_TCP ","MRSAPP  ",TDD,SINGLE,00&15;

CHANGED-DAPPL:21,,,,CMS,TDD;
```

Instead of the TCP/IP address (`194.77.158.2`) as used in this example, the TCP/IP address of the MRS Server must be entered when configuring the Hicom PBX. The values 5000 resp. 5003 can be arbitrarily chosen, but may not coincide with values of other Hicom applications. The configuration of the TCP/IP connection in the ANO LANC routing (and an eventual firewall) must be performed in a likewise manner.

17.3 Supported Transactions

CTI

Supported CTI Transactions are:

`QUERY`, `PHONECALL`, `MONITOR`, `DIVERSION`, `DISCONNECT`, `DEFLECT`, `PHONESTATE`, `ANSWERCALL` and `FORWARD`.

These CTI transactions are used for control and setup of calls.

CIT

`QUERY`, `DISPLAY`, `SEARCH` and `CAPABILITIES`.

These CTI transactions are used for querying and triggering of the telephone display.

17.4 CTI Monitoring

For full CTI monitoring support, all phones and external lines must be constantly monitored. To monitor external lines a registry entry must be created under LineBundleIDs in which the ID of the external line is entered.

The entry has the appearance of: I02001 where I refers to ISDN, 2 to the number of the line bundle (in hex) and 001 to the number of lines (B-Channels) contained in the bundle (also in hex). If an outbound S_0-line with the bundle umber 12 is to be monitored, the entry would have the following appearance:

```
I0C001
I0C002
```

A S_{2m}-line with the bundle number 2 would be entered as so:

```
I02001
I02002
...
I0201E
```

If the lines of a server (cross connection) are to be monitored, their IDs must also be entered in a likewise manner with the exception that an N (Networking) would be used instead of an I.

To obtain the correct ID for a line the Hicom technician can be consulted or the line can be called from a telephone whose line is being monitored. The Hicom APL will then generate a report to the MRS Monitor (Debug topic “Calls”) which begins with “Event”. The first parameter is the line ID.

Important:

The number of monitor points that can be simultaneously set (up to 5000 with version 3.4) is configured in the Hicom PBX. Default is 255.

17.5 Registry Entries

17.5.1 Basic Settings

The following *Values* are found in the *Key*

`HKEY_LOCAL_MACHINE\Software\PP-COM\MRS\HicomApl`

ApplName REG_SZ

When a TCP/IP connection to the Hicom is used, a string of three characters is used to identify executable applications or servers. No two servers connected to the

Hicom may have the same ApplName, otherwise CTI monitoring will not be possible.

The Hicom APL TSAP IDs *xxx*`DGVR`, *xxx*`DGVS`, *xxx*`TDDR` and *xxx*`TDDS` for transmission and receipt over the service DGV resp. TDD. *xxx* is to be replaced by the ApplName. This entry must coincide with those entries in the Hicom CPTP and DAPPL configuration.

If the Hicom APL is connected to various Hicom PBXs these IDs must be identical in the various configurations.

Default: `MRS`

BindAddress REG_SZ

If the computer on which the Hicom APL runs has two or more network boards resp. addresses, you can use this optional parameter to specify the IP address via which the Hicom APL network traffic is to run.

Example: 192.0.2.25

HicomPort REG_SZ

Hicom ACL connection address.

For a serial connection over the "Protum-Box": `V24/`<*COM-Port*>.
Example: `V24/COM2`

For a LAN connection per TCP/IP: `TCP/`<*Hostname*> oder `TCP/`<*IP-Address*>.
Example:

```
TCP/hicom.firma.de
TCP/194.123.234.77
V24/COM2
```

HicomPorts REG_MULTI_SZ

If several connections to various Hicom PBXs are made, these addresses must, as with the HicomPort, be listed line for line for each Hicom ACL connection. If this value is set the HicomPort value will not be observed as well as the corresponding settings in the configuration modules. Syntax:

`V24/`<*Port*>	for a V.24 connection
`TCP/`<*Address*>	for WAML connection

With a Multi-Hicom-Configuration the Hicom APL needs to know which terminal device is connected to which Hicom. To optimize the performance the Hicom APL keeps this information in the correlation database under

```
DOMAIN      <System>/$PERFORM/HICOM
CLASSNAME   PHONE
```

CLASS	*<Extension>*
KEYNAME	PBX
KEY	*<Index of the line in HicomPorts, first line corresponds to 0>*

Unknown devices or those newly connected to another Hicom are searched for and detected at all connected Hicoms. This is performed depending on whether an LED lamp has been defined in the CIT database field. If so, the user´s telephone number is determined on grounds of this field, otherwise in the PHONE# field. This must contain nothing but the extension number of the telephone terminal device.

SearchPhones REG_DWORD

When set to 1, the search mentioned under *HicomPorts* is performed when the Hicom APL is started and at times specified under *CIT-RefreshTime.* With 0 the search occurs only at times specified under *CIT-RefreshTime*. New devices or those newly connected at another Hicom can only be used after a successful search run.

Default: 0

17.5.2 Message Waiting Indication (MWI) Settings

The Hicon APL logs in the logical line NVS:CIT_HICOM for MWI purposes.

For users that want to have an LED lamp configured on their telephone terminal device as visual incoming message indication, the entry CIT_HICOM/*<Number>* must thus be made in the CIT database field. *<Number>* corresponds to the extension number of the telephone terminal device.

CIT-Beep REG_DWORD *0 or 1*

Acoustic signal for new inbound messages. 0: no signal; 1: Beep signal

Default: 0

CIT-Display REG_DWORD *0 or 1*

Telephone display type for new inbound messages. 0: no display; 1: permanent display (till CIT_OFF); 2: Temporary display (appox. 5 sec.)

Default: 0

CIT-LED REG_DWORD *0…12*

LED number to be used with Message Waiting Indicator. 0: no CIT per LED, otherwise the number entered here should be between 1 and 12. The LEDs are arranged in vertical columns and numbered from top to bottom. Keys that have previous assignments by the Hicom PBX may not by used.

Default: 0

CIT-RefreshTime REG_SZ *hh:mm*

Unfortunately, the Hicom PBX does not register the state of LEDs either by a restart of a assembly unit (or the complete PBX), or by the resetting of a terminal device (pulling the plug out). Since the Hicom does not register when LEDs are again switched on, this information can be refreshed on a daily basis at a specified time.

17.5.3 Monitor Settings

LineBundleIDs REG_MULTI_SZ

Line bundles to be monitored per CTI. Each line must contain the number of the line bundle with the following format:

[Type][Bundle][Line]

[Type]is`I` for ISDN line,
`T` for analog lines or
`N` for Network connections to other Hicoms or Servers.

[Bundle] is number of the line bundle and consists of a 12 digit hexadecimal number if the bundle number is less than 256. Otherwise an encrypted alphanumeric combination is used (see Siemens Hicom ACL manual).

[Line] is the number of the line (B-Channel) contained within the bundle. A 3 digit hexadecimal number beginning with the value 001.

These values may not be set in a Multi-Hicom configuration!

Example:

```
N0A005
N0A006
I23001
```

PhoneNumRanges REG_MULTI_SZ

Extensions observed by the Monitor. Each line should contain an extension number range in the form of <from>,<to>, whereby both number ranges must have the same length. A correct example would be 000,999, an incorrect 12,9999. The length of the extension number is fixed by the Hicom at 6 digits.

These values may not be set in a Multi-Hicom configuration. It should also be noted that all extensions are evaluated at the start of the Hicom APL and the duration is approximately 100ms per number.

Example:

```
100,129
201,234
999,999
```

Set MonitorDelay REG_DWORD *Miliseconds*

If the Hicom APL is connected with a Hicom PBX via V.24 and a “Protum Box” and between five and ten telephones are to be monitored this option only works with some of the devices. No error message is generated by the Hicom PBX.

So either the “Protum Box” or the Hicom PBX is very slow and instead of sending an error message jobs that cannot be processed are simply cancelled.

The problem can be solved by setting the value to 250 miliseconds which instructs the Hicom APL to wait longer than the default set 100 miliseconds between status queries.

Default: 100

18 Computer Telephony Integration (CTI APL)

The CTI APL is the centralized CTI transaction provider in the MRS Server. It uses the protocol interfaces from various telephone exchanges and in turn provides all MRS Client applications with those functionalities contained within.

18.1 Protocol Interfaces

- Computer Supported Telecommunications Applications (CSTA). Standard CTI interface of the European Computer Manufacturers' Association (ECMA). This interface is normally provided by the PABX manufacturer.
- Telephony Services API (TSAPI) from AT&T and Novell. This is principally a software interface based on the CSTA Interface. Telephony API (TAPI) from Microsoft.
- Telephony API (TAPI) from Microsoft.

18.2 Telephone Exchanges

- Alcatel 4400
- Bosch Integral 33X
- Ericsson MD110
- Siemens/Deutsche Telekom Octopus-E[1]
- Tadicom Corel

These PABXs are all addressed over the standard CTI interface TSAPI/CSTA. Therefore, the CSTA Protocol/Link in the PABX must be enabled. Additionally, a licensed TSAPI driver from the PABX manufacturer must also be present on the MRS Server.

This driver is required by the CTI APL. A minimum of one Monitor point is set by the CTI APL per user or terminal device, which may have an effect on the required number of licenses.

TSAPI drivers provided by the PABX manufacturer communicate with the PABX over the CSTA-link, whereas the transport layer is different in almost every case:

- Alcatel 4400: Via Ethernet

1. The installation of the TSAPI/CSTA-driver has been fitted with some pitfalls by the manufacturer which have not explicitly been dealt with in the documentation of the PABX. Before installing the driver we strongly advise you to consult the respective passage in the MRS Knowledge Base of Cycos AG.

- Bosch Integral: Via the EICON-Diehl Server BRI ISDN Controller
- Ericsson MD110: Via the V.24-COM Port

All manufacturers offer a TSAPI based test program for TSAPI/CSTA link functionality which can be run independently of the MRS Server.

18.3 Registry Entries

In the *Key*

`HKEY_LOCAL_MACHINE\SOFTWARE\Cycos AG\CTIAPL`

the following values are found

ExceptionNumbers REG_MULTI_SZ

This value is used to switch off the MRS Server´s calling number normalization for certain calling numbers. Up to a certain length the numbers transmitted to the MRS Server are considered internal, all others external numbers. All external numbers receive a canonical format with international code through calling number normalization, thus e.g. 492404123456 with the area code (2404) for Alsdorf and the extension 123456 in Germany (49). If required, external prefixes etc. are added by the MRS Server when the number is dialed. Examples of numbers not to be normalized are emergency call numbers for fire brigade and police which of course are not handled as local numbers in the sense that they would be preceded by the area code of the MRS Server location. One calling number is entered per line. Up to 100 special calling numbers can be entered here.

Default:

```
0112
0110
```

ModifyLocation REG_DWORD *0 or 1*

When set to 1 the characters '#' and '*' are added to the area codes existing in *LocPrefixExtensions*. Thus numbers beginning with these characters would not be normalizedso that e.g. the cryptic special commands of the Hicom 150 could be dialed from within TrayPhone.

Default: 1

TransBreak REG_DWORD *Milliseconds*

TransMax transactions are executed within the period defined in *TransBreak* at the most.

Default: 25

TransMax REG_DWORD

See *TransBreak*.

Default: 3

Use<Protocol>_<Name> REG_DWORD *0 or 1*

The CTI link <*Name*>, which uses <*Protocol*> is either activated (1) or deactivated (0). For each installed CTI link a *key* with the name of the individual CTI link is generated in which the specific settings of this link are entered.

Example: UseTapi_MSTAPI

In this case TAPI is the <*Protocol*> and MSTAPI the <*Name*> which corresponds to the default presetting with a link to a Siemens Hicom 150.

18.3.1 Protocolspecific Values

Depending on the protocol a further *key* exists with the name of the <*Name*> CTI link:

`HKEY_LOCAL_MACHINE\SOFTWARE\PP-COM\CTIAPL\`<*Name*>

The following values are found in this key which are partly only used for certain PABXs. Further below the generic parameters that can be set with each protocol are listed.

18.3.1.1 CSTA Protocol for Alcatel 4200

CitSF REG_DWORD

Via the CTI APL logical line entered under CitSFAddr and by means of a telephone LED a user is notified about new incoming messages. When this value is set to 1, the logical line can be logged in at the MTA.

CitSFAddr REG_SZ

Name of the logical line via which the user is to be notified when a new message has come in.

Default: `NVS:MWI.ALCATEL4200`

CstaDll REG_SZ

DLL required for this protocol stack. With Alcatel 4200 the DLL is automatically-installed by Setup.

Example: apicsta.dll

GarbageCheck REG_DWORD *0 or 1*

If the PABX can deliver a current snapshot a regular check is executed as to whether an event has been lost and the CTI APL thus administers old calls that do

not exist anymore. The value is already correctly preset for the individual system with the installation.

HostName REG_SZ

IP address of the PABX.

MonitorTimeout REG_DWORD

Internal timeout for applets that, within this timeframe, have to confirm monitor statuses send to them so that they are not considered inactive.

18.3.1.2 TAPI Protocol

CitSF REG_DWORD

Via the CTI APL logical line entered under CitSFAddr and by means of a telephone LED a user is notified about new incoming messages. When this value is set to 1, the logical line can be logged in at the MTA.

CitSFAddr REG_SZ

Name of the logical line via which the user is to be notified when a new message has come in.

Default: `NVS:MWI.MSTAPI`

GarbageCheck REG_DWORD *0 or 1*

If the PABX can deliver a current snapshot a regular check is executed as to whether an event has been lost and the CTI APL thus administers old calls that do not exist anymore. The value is already correctly preset for the individual system with the installation.

LineSleep REG_DWORD *Milliseconds*

When the CTI APL is started all lines logged in are consecutively opened by means of LineOpen. This parameter defines a delay between each LineOpen that has only been required with the Elmeg PABX so far.

MonitorTimeout REG_DWORD

Internal timeout for applets that, within this timeframe, have to confirm monitor statuses send to them so that they are not considered inactive.

PabxManufacturer REG_SZ

Name of the PABX manufacturer.

Example: Siemens

PabxModel REG_SZ

Name of the PABX

Example: HICOM 150

PhoneSetStatus REG_DWORD *0 or 1*

1 switches to a Hicom 150 mode obsolete by now.

Default: 0

UniqueCallId REG_DWORD *0 or 1*

When set to 1 the TAPI adopts the Call ID by means of LineGetRelatedCallID. The Call ID is used as UID in the MRS MonitorStatus transaction.

UseAcdProxy REG_DWORD *0 or 1*

Use the Hicom 150 ACD Proxy (1) or not. Is required a call centers.

UseLines REG_MULTI_SZ

When this value is not set, all lines logged in to the TAPI are used. Otherwise the number of the desired line can be entered per line if not all lines are to be used.

18.3.1.3 TSAPI Protocol

CheckTimeValue REG_DWORD *Seconds*

If the PABX can deliver a current snapshot a regular check is executed every *CheckTimeValue* seconds as to whether an event has been lost and the CTI APL thus administers old calls that do not exist anymore.

Default: 60

CitSF REG_DWORD

Intended for future extensions of the TSAPI protocol stack of the CTI APL to deliver Message Waiting Indications to the PABX.

CitSFAddr REG_SZ

Intended for future extensions of the TSAPI protocol stack of the CTI APL to deliver Message Waiting Indications to the PABX.

CstaDll REG_SZ

Name of the CSTA DLL provided by the PABX manufacturer.

Example: `CSTA32.DLL`

FirstLoadDelay REG_DWORD *Seconds*

Delay when the monitor points are set for the first time.

Default: 2

LoadBackupDelay REG_DWORD *Seconds*

When the CTI APL is started the monitor points set last are read in again. This value defines the corresponding delay prior to the start of this procedure.

Default: 5

LoginID REG_SZ

Name of the account used by the CTI APL to log in to the PABX.

MaxMonRange REG_DWORD

Maximum number of static monitor points within a range. This is to protect ranges from being to large.

NumMaxConnections REG_DWORD

Maximum number of connections.

NumMaxMonitors REG_DWORD

Maximum number of monitor points to be set in the PABX.

NumMaxTrans REG_DWORD

In the TSAPI stack, transactions are limited in a list. This list is thus static.The parameter specifies how many transactions can be simultaneously in process.

This value thus concerns e.g. the maximum possible monitor points of all simultaneously active TrayPhone applications. Example: 30 users have Trayphone in active state and added 10 extensions to their Trayphone event bar each. In the morning, all users boot their Trayphone which results in 300 transactions at one go, exceeding the default of 256. So the first 25 users can see all extension statuses in Trayphone, the 26th user only receives six statuses (the remaining extensions feature a red exclamation mark as the limit of 256 has been reached), and the residuary users see nothing but red exclamation marks.

PabxManufacturer REG_SZ

Name of the PABX manufacturer.

Example: `Ericsson`

PabxModel REG_SZ

Name of the PABX.

Example: `MD110`

Password REG_SZ

Password for the account mentioned under LoginID to log in to the PABX. So far it was not used during all our tests resp. an empty password was sufficient. This however depends on the configuration of the PABX.

PrivateProfile REG_DWORD

Internal bit form.

ServerID REG_SZ

Server ID to log in to the driver of the PABX. It is in most cases reasonably defaulted.

StatMonitors REG_MULTI_SZ

An entry of the form <from>-<to> is indicated per line which indicates the static monitor points to be set in the PABX. Later on a CTI-Client can only set monitor points in the CTI APL for which a static monitor point was set in the PABX already.

Example:

```
100-150
200-299
```

18.3.1.4 Generic Entries

AccessCode REG_SZ

Extension number. Analog to the corresponding *value* in

```
Software\PP-COM\MRS\MRS Globals\Location
```

If set and furthermore *LocalLine* is 1, this value is used instead of the global one.

Example: 1234

AllowedNumberChars REG_SZ

When the CTI APL performs calling number normalizations it checks whether the received calling number only contains the characters indicated here. Otherwise malfunctioning may occur since not all applications can handle e.g. letters. If this string is empty, the check is dropped.

Default: `01234567890*#`

AreaCode REG_SZ

Area code without the leading 0. Analog to the corresponding *value* in

```
Software\PP-COM\MRS\MRS Globals\Location
```

If set and furthermore *LocalLine* is 1, this value is used instead of the global one.

Example: 2404

AreaCodeEscape REG_SZ

National call. Analog to the corresponding *value* in

`Software\PP-COM\MRS\MRS Globals\Location`

If set and furthermore *LocalLine* is 1, this value is used instead of the global one.

Example: 0

CallId REG_DWORD

Intermediate storage of the Call ID used last. This value must not be modified!

Capabilities REG_MULTI_SZ

The global options of this CTI link are itemized here. If there are terminal devices that support one of the options, this option is specified. It is presently impossible to list these capabilities according to different terminal devices. For example, with a Hicom 300, the `DEFLECT` command is possible for "RCG devices" but not for normal OptiSet terminal devices. So that CTI applications do not offer this command you can remove it here from the list.

CorrField REG_SZ

If MonTakeCorrel is 1, set a monitor point for all users having their telephone number entered in the database field defined here.

Default: `PHONE`

CountryCode REG_SZ

Country code analog to the corresponding *value* in

`Software\PP-COM\MRS\MRS Globals\Location`

If set and furthermore *LocalLine* is 1, this value is used instead of the global one.

Example: 00

DialAlwaysArea REG_DWORD *0 or 1*

When set to 1, the area code is always dialed as well particularly in the individual local network. Analog to the corresponding *value* in

`Software\PP-COM\MRS\MRS Globals\Location`

If set and furthermore *LocalLine* is 1, this value is used instead of the global one.

DontLocalize REG_DWORD *0 or 1*

When set to 1, the calling numbers to be dialed are not normalized.

Default: 0

ExternalLinePrefix REG_SZ

External line prefix analog to the corresponding *value* in

```
Software\PP-COM\MRS\MRS Globals\Location
```

If set and furthermore *LocalLine* is 1, this value is used instead of the global one.

Example: 0

ExtPrefix REG_SZ

Most PABXs transmit correct numbers to the CTI APL, thus e.g. 012345678 with 1234 being the area code and 0 the external line prefix. Some systems also deliver the dial number prefix, thus in our example 0012345678. To remove the additional 0 you can enter it here.

If the system delivered the numbers entirely without the preceding 0, thus e.g. 12345678, the corresponding calling number type had to be transmitted by the system as well. Otherwise a correct normalization could not be performed. For example a mobile phone number such as 171-654321 would be handled as international number from the USA if the system did not transmit the calling number type. With a correct calling number type the national prefix would simply be added and the number handled correctly.

LinkMaster REG_DWORD

In an environment with several CTI links it is ideal when all CTI requests are transferred to the CTI APL in normalized form since otherwise they cannot be assigned to a PABX. In many cases however there is a major system delivering the local resp. internal numbers. The CTI link to this system can be defined via this value so that all localized CTI requests can be handled via this CTI link. For this purpose set this value to 1 with the corresponding CTI link, with all other CTI links this value must be set to 0 accordingly.

LocalLine REG_DWORD

This value must be set to 1 when with this defined CTI link a location information deviating from the global location information is given via the **Expert Parameter**.

LocPrefixExtensions REG_MULTI_SZ

List of calling numbers or portions of these numbers that must not be modified with the normalization. In most cases the entire number is normalized to an international dial number (Example: 0123456789 becomes 49123456789).

With Corporate Networks it may happen that calling numbers such as 9992 <*further numbers*> have to be dialed. Then the prefix 9992 can be entered here so that all numbers beginning with this prefix are not normalized.

Example:

```
9992
0111
444
```

All calling numbers beginning with 9992, 0111 or 444 are not normalized.

This entry is only reasonable here if deviations from the global settings are to be configured for the CTI APL under `MRS Globals\Location\LocPrefix-Extensions`.

MaxInternalLength REG_DWORD

Analog to the corresponding *value* in

`Software\PP-COM\MRS\MRS Globals\Location`

If set and furthermore *LocalLine* is 1, this value is used instead of the global one. Maximum length of an internal calling number. All numbers exceeding *MaxInternalLength* are considered international calling numbers and are normalized accordingly.

Default: 6

MaxInternalLengthTrunks REG_DWORD

Is used to call another normalizing algorythm when numbers arrive via the trunk lines coming from the individual local network without area code. Otherwise these numbers would possibly be considered international numbers and incorrectly normalized.

MinInternationalLength REG_DWORD

This value is used for the correct assignment of incoming numbers. If e.g. local numbers are delivered from the individual area with external line prefix (example: 054321) they could also be interpreted as a national number with the corresponding area code. As distinctive feature you can enter the minimum length from which such a number is no longer considered a local number from the individual area.

Default: 9

MonDelay REG_DWORD *Milliseconds*

If *MonTakeCorrel* is 1, call the individual database entries delayed by *MonDelay* from the Correlation database.

Default: 200

MonTakeCorrel REG_DWORD *0 or 1*

When set to 1, take the data for monitor points to be set from the Correlation database.

NormInternalNumbers REG_DWORD *0 or 1*

When set to 1, internal numbers are forwarded to applets in normalized form.

Default: 1

NumberRangeStart REG_SZ

Beginning of a calling number range. This range is exactly and exclusively required when there is an additional CTI link to another PABX with the same extension number and a different extension number range.

NumberRangeStop REG_SZ

End of the calling number range. This range is exactly and exclusively required when there is an additional CTI link to another PABX with the same extension number and a different extension number range.

NumMaxXmrLines REG_DWORD

Mamimum number of lines displayed in the MRS Monitor.

Default: 0x40

PbxCode REG_SZ

Cross Connection number if *LocalLine* is 1.

ReplaceNumbers REG_MULTI_SZ

Some customers have their PBXs networked and can dial the other sites with code numbers. When a call comes in from another site, the code and extension number of the caller is displayed to the recipient. The databases used for searching contact information mostly contain the internationalized calling number so that the caller cannot be found.

Therefore you can realize a conversion table via this parameter, containing one entry of the following format per line:

<code number>=<prefix>

Example:

Code number is *115, prefix 49123456. A call arrives at extension 118 in the following format: *115118. The code number is now replaced with the set prefix and the resulting number normalized by the MRS Server, thus the number 49123456118 can be searched for in the contact information.

19 Notification APL (NOTAPL)

19.1 General Overview

The Notification APL provides functions used for the creation of notifications on any incoming messages. Notifications are server generated and can be sent to arbitrary terminal devices to draw a user´s attention to new messages. This may, for example, occur per MWI (Message Waiting Indication; often described as LED on the telephone), SMS or by means of the TUI, calling the user (User Outcall). In the latter case you can also directly play back the message or, for example, forward it to a local fax device. You can freely define for which type of message a notification is generated and where it is to be sent to.

The Notification APL is connected to the kernel via an E-module. This type of implementation has the following advantages:

1. It enables a flexible, user defined setting.
2. The notification service can be adapted to various voicemail scripts.

The Notification APL provides the following options for defining notifications:

- Notifications can be created independently from the message type.
- Definition of a period. Within this period no further notifications occur once the user has been notified, even if new messages come in.
- Definition of a notification target. In this way single devices can be addressed or several ones parallel.

  You can set two alternative target definitions that are activated in succession if the notification failed.
- For each message type you can define whether a notification is only generated with messages labelled “urgent”.
- Definition of periods in which notifications are sent.

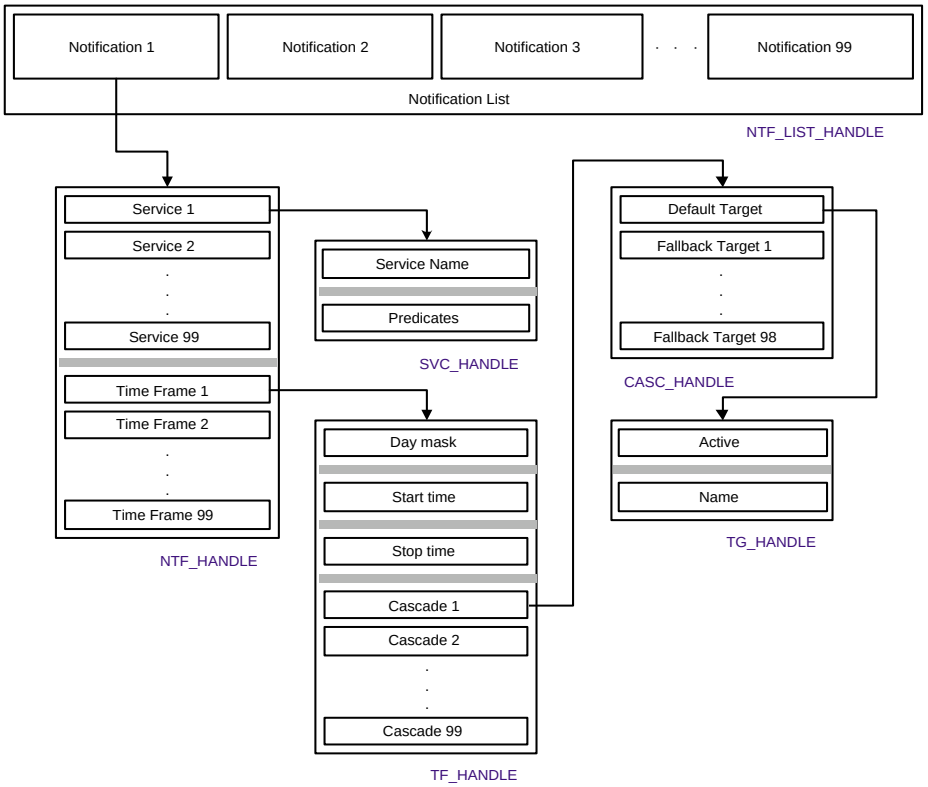
19.2 Operating Requirements

The Notification APL is a server element. Release of the function during the server installation requires licensing via the CIT feature.

The standard CIT notification via the MTA must be deactivated if the Notification APL is to take on notification processing.

19.3 The Notification Function

The following overview illustrates the structure of the notification function.



The overview shows all database fields available on the server side. The entry options currently implemented via the WebAdmin are restricted in some areas (for example you can only define two fallback targets via the WebAdmin).

19.3.1 Notifications

The single notifications are summarized in a notification list. A list can contain a maximum of 99 entries.

The single notifications have the following structure: starting from the message type (service) and a time definition (time frame), notification target groups are selected. The target groups contain the notification targets (cascades). The notification targets are defined via service and address. Here you can specify further alternative targets (fallback targets), if notification to the first target (default target) fails.

Which target address is eventually selected for the notification always depends on where the first valid entry is found in the process.

- Message type (service):

  Selection for which type of message (e-mail, fax, voice messages etc. or all) a notification is to be generated. In addition, notification can be made dependend on whether an incoming message is labelled “urgent”.

- Time definition (time frame):
  - Determination of one or several periods in which notifications are to be sent within the course of a day (start/stop time),
  - Determination on which days the notification is to occur.
- Notification target groups:

  Here the (multiple) notification targets are stored cascaded.

- Notification target (cascade):

  The first entry determines the preferred notification target (default target). You can also specify additional devices as alternative targets here. The targets are addressed in succession if transmission to one device fails.

- Target

  The service required for transmission is defined by the device entry (mobile phone, MWI etc.). The device itself is specified by its address.

  The following services can be used for addressing:
  - Mobile phone (SMS)
  - MWI/LED (MWI)
  - E-mail (SMTP)
  - Pager (PAGER)

  and for User Outcall voicemail systems
  - Phonemail
  - VMS

  The service used for notification is stated in brackets each. If, for example, another protocol than MWI is to be used for setting an LED on the telephone, this change must occur by a routing rule to be correspondingly created. With the MWI protocol an additional notification text is written in the telephone display.

19.4 Configuring Notifications

The individual user privileges determine which notifications can be activated. Notification configuration occurs from the **WebAdmin** (menu option: **Notification**).

How to perform notification settings is described in the*WebAdmin user manual*.

19.5 Registry Entries

The following *values* are found in the *key*

`HKEY_LOCAL_MACHINE\SOFTWARE\PP-COM\MRS\NOTAPL`

MaxScheduleTimeout REG_DWORD *5…60 seconds*

Here you can set the time in which the APL internal processor inquires whether a notification is due. This point in time, predefined by the user, is compared with the current UTC time which results in the transmission time. So that no notification is missed, the transmission time must be less than 60 seconds. The default value of 20 seconds should not be modified. It makes sure that the processor checks the user mailbox three times a minute for notifications to be sent.

Default: 20

MaxTumSessions REG_DWORD *1…24*

This registry entry defines the maximum number of TUM sessions simultaneously opened by the Notification APL. These sessions are required to access the message store in True Unified Messaging environments via transactions. Particularly in Exchange and Lotus Notes environments a TUM session may require some seconds, in exceptional cases even minutes. Therefore this value should, if at all, only be modified cautiously and in moderate steps to the maximum value of 24. Note that upgrading this value leads to a higher number of opened sessions (= threads), which might result in a significant system load increase.

On the other hand you can, in case of performance problems, set an acceptable compromise between system load and simultaneously opened TUM sessions by gradually minimizing this value (to the minimum value of 1). Normally the default setting should not be modified.

Default: 16

SignalAnyChange REG_DWORD *0 or 1*

When set to 0, MWI notifications are only sent with a decreasing number of waiting messages or with no waiting messages. With 1, MWI notifications are also sent after any change in the monitored inbox. This allows e.g. counter displays on the telephone as enabled by the ABC-A APL for Alcatel 4400 PBXs.

Default: 0

20 ABC APL

The ABC APL serves as interface to the Alcatel 4400 PBX for notifying a user about new messages (MWI). When new messages are available, the LED at the Alcatel system telephone is activated. Reading the messages deactivates the LED again. No further functions are supported.

To read or manipulate messages, a user should employ common client products such as Outlook, Communications, Web Client, etc. or call his/her mailbox.

The name ABC APL derives from the Alactel protokol ABC-A used. Communication with the PBX occurs via LAN by means of TCP/IP

So that the MWI service to the Alcatel 4400 can be used, the ABC APL must first be configured once via the configuration dialog in the MRS Monitor. A description of this process is found in the *MRS Server Administration* manual.

Prerequisite for message waiting indication is an entry for each user in the `CIT` database field of the correlation database. This entry contains the routing address of the Alcatel PBX for the MTA with the corresponding extension. The MWI address of the ABC APL is: `MWI.4400`. A complete entry for a user with extension 123 thus reads: `MWI.4400/123`.

20.1 Telephone Display Support

To have the type (e-mail, fax, voice mail, SMS) and number of new messages displayed on the telephone, the SignalAnyChange switch must be activated in the Notification APL. This occurs automatically with the initial ABC-A APL start.

Since this mechanism in the Notification APL leads to an increased system load, this switch can be deactivated when this feature is not required.

The text that displays the message type can be modified via the DisplayName* registry values.

20.1.1 Waiting Message Retrieval

When you press the LED, the correct number of waiting messages is displayed. After pressing the system key under this entry again, the type and number of messages appears in the display. Putting down the phone or pressing the back key terminates the menu.

20.2 Several PBXs

To address several PBXs a connection must be established to each of these systems. The ABC APL can only address one system each. The problem can be averted by installing the implemented APL under a different name as service under Windows several times.

Register the ABC APL from the <*MRS Install*>`\bin`-directory with the following command line call once more:

```
ABCApl install -name=ABCApl2
```

For each further registration the parameter `-name=`<*Name*> is adapted. Via the <*Name*> parameter the registry key for this ABC APL instance is adapted and also the name defined under which the instance is displayed in the MRS Monitor for configuration, thus for entering the PBX IP address.

The logical line must be individually adapted for each further ABC APL instance, which can only be done via the registry. Modify the LogicalLineClass value for this purpose.

Attach the entry `ABCApl2` to the list for automatically starting the new service in the registry under `HKLM\Software\PP-COM\MRS\Services\` in the value `Access Protocol Layers`.

So that a new message notification is routed to the correct PBX, the logical line class must be additionally maintained in the user `CIT` field. Thus `MWI.4400/4711` instead of `MWI/4711`.

Attention: When using the Web Administrator for configuring notifications, this entry is always made there without class.

20.3 Registry Entries

The following *Values* are specified in *key* `HKEY_LOCAL_MACHINE\Software\PP-COM\MRS\AbcApl`.

Address REG_SZ

PBX IP address.

Default: 0.0.0.0

DisplayNameEmail REG_SZ

Name for messages of type e-mail displayed in the telephone menu.

Default: Email

DisplayNameFax REG_SZ

Name for messages of type fax displayed in the telephone menu.

Default: Fax

DisplayNameSMS REG_SZ

Name for messages of type SMS displayed in the telephone menu.

Default: SMS

DisplayNameVoice REG_SZ

Name for messages of type voice mail displayed in the telephone menu.

Default: Voice

Port REG_DWORD

Port number for the ABC-A protocol at the Alcatel PBX.

Default: 2533

MrsNodeName REG_SZ

With this name the ABC APL registers at the Alcatel PBX.

Default: Content of MRS Globals\SytemName

LogicalLineNode REG_SZ

Node portion of the logical line that is registered at the MTA by the ABC APL.

Default: `MWI`

LogicalLineClass REG_SZ

Class portion of the logical line that is registered at the MTA by the ABC APL.

Default: `4400`

21 VM APL

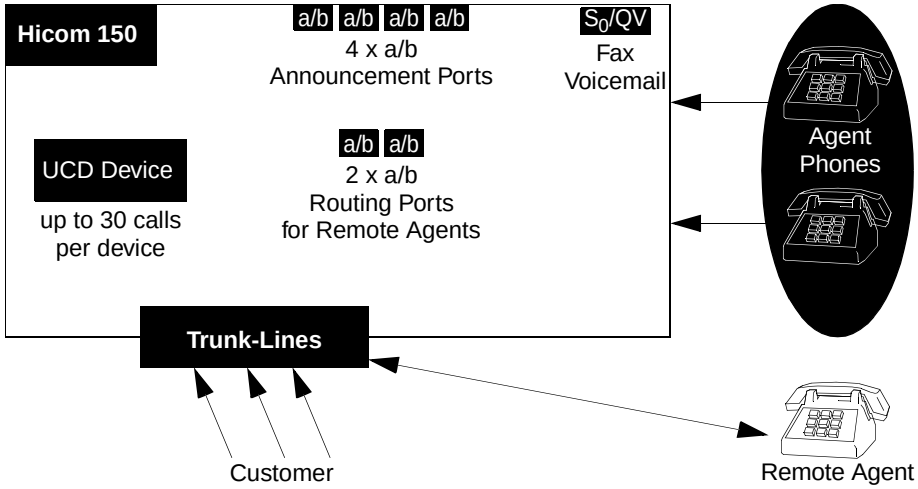
The VM APL contains a virtual machine executing E Scripts. Such a script is ACD.e (Automatic Call Distributor), which takes on the entire queuing logic and agent control at a call center. At first a survey shall be given of the architecture of the call center realized by MRS followed by an overview of the resources used by the ACD and the configuration modes in the VM APL context.

21.1 Call Center System Architecture

The description of the call center architecture is in the main divided in two parts: the PBX side and the MRS Server side. Then resources used by the ACD follow as reference.

21.1.1 The Hicom 150 E Side

At a call center incoming calls are rerouted to the corresponding agent. If some calls cannot be answered directly they are queued in the PBX until the agents in charge can take them. The below illustration displays a Hicom 150 E PBX and components used at call centers:



Telephone calls reach a call center via trunk lines. Agents either work in-house in which case their telephones are directly connected with the Hicom 150 E PBX or they are remote agents pursuing their job from home or their devices are connected to another PBX. If a call cannot instantly be routed to an agent it is queued in a UCD device until an agent has become available. Each UCD group can hold up to 30 callers

in a queue. Above the UCD groups on the right you can see four a/b ports. These are needed for playing announcements to a waiting caller to make him holding the line. For this purpose the inherent routing logic is withdrawn from the UCD groups by the MRS Server as they would otherwise independently rout on the calls. In this case this task is taken over by the MRS Server ACD. Further a/b ports are required for directing calls to remote agents. A caller that is to be routed to an external agent is at first set in the consulting mode at this a/b port. Then the MRS Server initiates a call to the remote agent. If a connection can be established the waiting caller is put through to the corresponding agent.

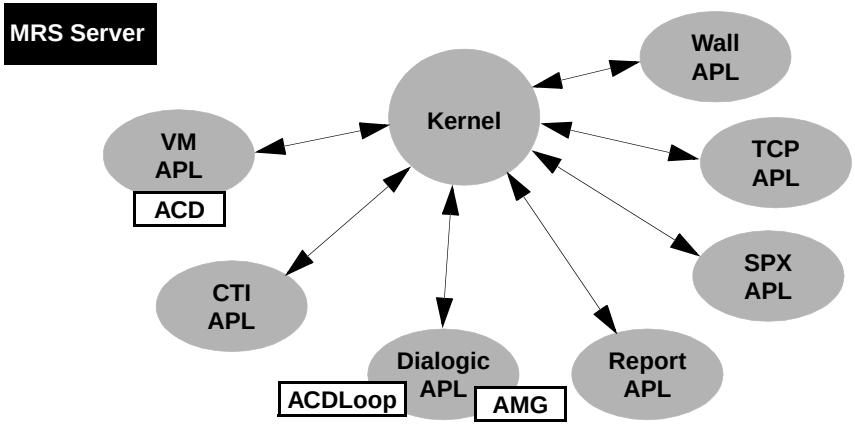
21.1.2 The MRS Side

Within the scope of a call center the MRS Server as well as a number of client applications are used. Some of them were specially developed for the call center scenario, others adapted to its specific requirements.

First the MRS Server components and their tasks will be discussed, followed by the client application functionality in the ensuing section.

21.1.2.1 The MRS Server

The MRS Server employs various services to enable call center functionalities. In the MRS terminology these services are called Access Protocol Layers (abbr.: APL). APLs serve to access the MRS Server via various protocols. The below illustration schematically shows a MRS Server with APLs used in the scope of a call center:



The central MRS Server component is the Kernel represented by the large circle in the center of the illustration. The MRS Kernel controls message routing and enables activating and monitoring the various services. In addition the Kernel is in charge of administering the various MRS databases and the MRS file system.

The various APLs that enable access to the MRS Server via different, normal communication protocols are coupled up the Kernel.

For call center application the following APLs are elementary:

- VM APL (Virtual Machine APL):

  The VM APL contains a virtual machine executing E Scripts. These scripts are implemented in the E programming language. The VM APL also executes the ACD Script which takes on call distribution.

- CTI APL (Computer Telephony Integration APL):

  The CTI APL enables using telephone services with the MRS Server such as monitoring telephones, connecting subscribers, setting display texts and much more.

- Dlg APL (Dialogic APL):

  The Dlg APL provides the telematic functions of the Dialogic hardware. Among these are voice and fax services. Like the VM APL also the Dlg APL can bind E Scripts meaning it employs a script as communicaton protocol. The two scripts ACDLOOP and AMG are for call center use with ACDLOOP controlling announcements for queued up callers. The AMG Script is mostly used by remote agents in order to log in to the system or to alter their status.

  Rep APL (Report APL):

  Data collected in the database for statistic survey can be edited and visualized with the Report APL.

- TCP APL (Transmission Control Protocol/Internet Protocol APL):

  This APL is for communication of client applications with the MRS Server via TCP/IP.

- SPX APL (Sequences Packet Exchange APL):

  This APL is for communication of client applications with the MRS Server via the SPX Protokoll.

The following APL is optional and is only used in connection with wall displays:

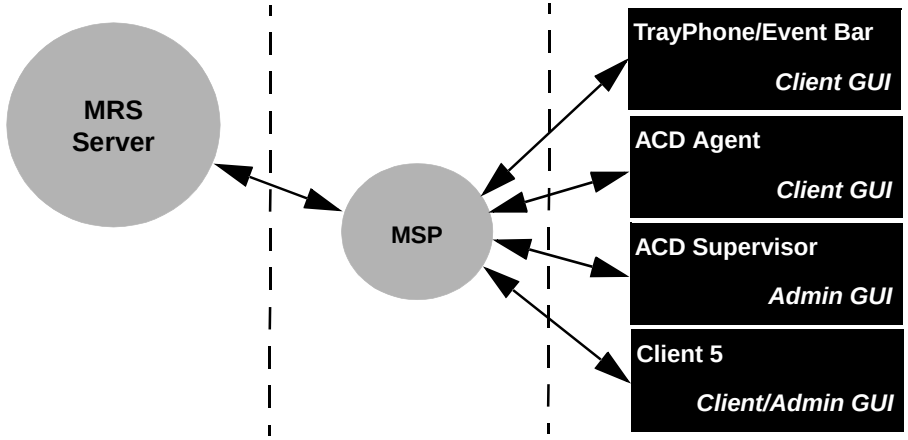
- Wall APL (WallDisplay APL):

  This connection layer is able to send specific texts to wall displays.

21.1.2.2 MRS Client Applications

All client applications communicate with the MRS Server by means of the MRS Service Providers or short MSP. This provider is the interface for client software to the MRS Server. As communication protocols TCP/IP and SPX are available.

The below illustration shows the connection of the client software required for the MRS Server call center application and its connection to the MRS Server via MSP.



The following client applications are required in connection with the MRS call center:

- **ACD Agent**

  Agent GUI for logging in and off at the system and for status alteration. Furthermore it can be used to signal the readiness to receive message and campaign jobs. If such jobs have been assigned to an agent a corresponding display appears on the interface. Group membership and important information on the current call are displayed as well. Beyond that an agent can alter his telephone number or after call work time using this interface. Additional options are automatic call acceptance and the optional display of text on the agent phone LCD.

- **MRS Communications 5**

  With MRS Communications all MRS services (email, Internet mail, fax, SMS, …) and the CTI functionality can be used. If the Communications user has administrative privileges in the database he can define and administer agents, user groups, skill groups and ACD groups.

- **ACD Supervisor**

  The ACD Supervisor is the call center monitoring interface. It enables supervising all properties and values concerning an ACD resource. With the supervisor software so called thresholds can be defined. Crossing them changes the call center behaviour.

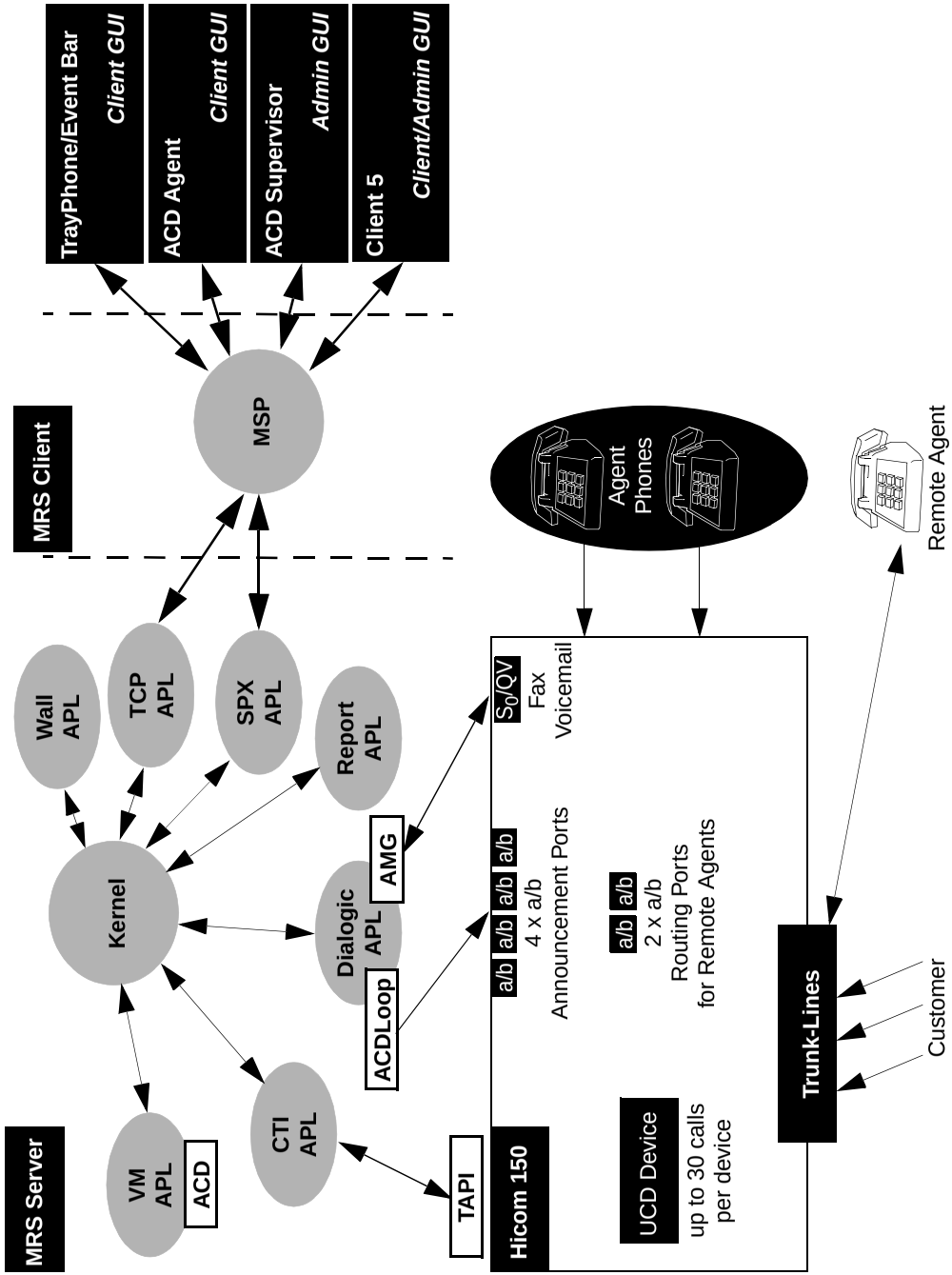
- **TrayPhone**

  TrayPhone is the CTI version of a convenient telephone. Directly from the screen you can initiate calls and monitor other telephones. An event bar displays the real name of entered MRS users and the status of your telephone. By this means you

can see e.g. whether a call is just coming in or whether a connection has already been established. With TrayPhone calls to the individual telephone can be rerouted, immediately rejected or redirected to a voice box (if available) .

21.1.3 Overall Picture

The below illustration shows the individual components described in the previous sections connected. Based on this illustration the entire architecture and the component´s interplay shall be explained.


TrayPhone/Event Bar
Client GUI
ACD Agent
Client GUI
ACD Supervisor
Admin GUI
Client 5
Client/Admin GUI
MRS Client
MSP
Agent Phones
Remote Agent
Wall APL
TCP APL
SPX APL
Report APL
Kernel
Dialogic APL
AMG
ACDLoop
S_0/QV
Fax
Voicemail
a/b
4 x a/b
Announcement Ports
2 x a/b
Routing Ports
for Remote Agents
UCD Device
up to 30 calls
per device
Trunk-Lines
Customer
MRS Server
VM APL
ACD
CTI APL
TAPI
Hicom 150

The MRS Server is connected to the Hicom 150 E at several points. The connecting strand most important to the call center is the CTI Link. In order to perform CTI and call center functionalities the CTI APL is connected to the PBX via the TAPI Service Provider (TSP) and the ACD Proxy. Another interface between PBX and MRS Server is the Dialogic hardware which can be used via the MRS Server´s Dialogic APL. At the call center the Dialogic APL uses two types of boards: an analog one called D/4PCI (four analog channels) and a digital board called BRI/2VFD (altogether four B-channels). The analog board is used for playing announcements to queued up callers from time to time. At the call center the digital BRI boards are used for making available voice and fax functionalities. The VM APL provides the MRS Server with the main call center functionality: performing a practical call distribution (ACD). For this purpose it uses the CTI APL. Furthermore it ensures announcements to be played at the right time to the right caller. This is accomplished through the Dialogic APL which, based on information from the VM APL, plays back the correct announcement. Additionally the VM APL controls texts to appear on a wall display or on the telephone terminal device. Altogether three APLs are directly provided with information by the VM APL: CTI APL, Dialogic APL and WallDisplay APL. Information exchange is executed by means of transactions.

21.2 Registry Entries

One consecutively numbered key exists per installed script under

`HKEY_LOCAL_MACHINE\PP-COM\MRS\VMapl`

For the first script it is the key `01`, for the second one `02` etc. This key contains the following values:

OwnThread REG_DWORD

Bool's value that determines whether the script runs in an individual thread. This is necessary e.g. for the ACD Script so that always a 1 must be entered.

ParamBlock REG_MULTI_SZ

The structure of this entry corresponds to a Windows INI configuration file which contains the actual configuration data for the script indicated under ScriptName. For each script the possible entries are explained below.

ScriptName REG_SZ

Name of the script that is configured in this VM APL key.

Example: `acd.e`

21.3 Automatic Call Distributor (ACD.e)

The ACD Script is an Automatic Call Distribution application, or in other words, it automatically routes incoming calls to the agents thus being the central call center component. Contrary to standard call centers the MRS Call Center can also forward inbound messages (email, fax, voicemail) to agents for processing and via so called campaigns agents can initiate calls as well. Campaigns can be marketing activities or implementing an option in a website for customers to call back

21.3.1 Resources

The ACD Script uses the following central resources:

- **ACD Groups**
  Telephone number to reach an ACD Group, e.g. a hotline service number, or a taxi control center, or…
- **Agents**
  work in a call center and have as main duties to process incoming calls, messages and campaign orders assigned to them. An agent is a normal MRS user with some extended attributes describing his activities.
- **Skills**
  Skills are qualifications an agent must have to belong to a specific ACD Group. Besides the direct assignment of agents to ACD Groups this is another way to determine an agent´s group membership.
- **Queues**
  Incoming calls that cannot instantly be answered are queued until they can be assigned to a reachable agent.
- **Campaigns**
  or rather calling lists with *n* telephone numbers of subscribers to be called by the agents (marketing campaigns etc.)
- **Thresholds**
  serve as resource control within the call center. As soon as certain controlled threshold values have been reached appropriate measures can be taken. For example if a call center is congested new callers can be routed to an IVR system so that they can leave their messages and be called back later.
- **Time Profiles**
  The ACD Script uses time profiles to control the call center´s behaviour at specific times. This might be the distinction whether the call center is now opened and agents are thus be reachable.

21.3.1.1 Agents

Agents are normal MRS user accounts with the following additional information resp. entries in the user database, usually entered in the Correlation Database in the format

DOMAIN	CLASSNAME	CLASS	KEYNAME	KEY
<Domain>	USER	*<Agent>*	*<Name>*	*<Value>*

.

<Name>	**Significance**	
ACD_PHONE	Number of the agent´s telephone terminal device.	
ACD_ID	Unique numerical agent´s Id used by IVR Scripts or directly by the PBX. This Id is mandatory. **Attention**: With the Hicom 150 this Id must be within a range from 100 to 249.	
ACD_STATUS	Current agent status. The possible predefined ones are:	
	INACTIVE	The agent is unknown.
	LOGOUT	The agent is logged off and cannot receive any calls or messages for processing.
	LOGIN	The agent is logged in. Depending on his status for message and campaign processing he might assign this type of work but he does not receive any calls.
	READY	The agent is ready for answering calls. This is also often called “Available”.
	BREAK	The agent does not answer any calls since he is having a break.
	WORKREADY	This status is not used!
	WORKNOTREADY	After call work. The agent is still busy processing the last call and therefore currently not reachable.
	DEVERROR	An unknown error has occurred with the agent´s telephone terminal device.

<Name>	**Significance**
	Beyond that nine statuses (USERDEF1 to USERDEF9) are freely definable by the ACD Supervisor which can be used e.g. for statistic registration of various “Break” modes.
ACD_LOGINREADY	Switch. If an uppercase X is entered in the database the agent is immediately set to “Ready” after logging in.
ACD_BRAFTERCALL	Automatic after call work time in seconds.
ACD_OFFSTATUS	Agent status for message processing. This status is only valid if the agent has not simultaneously the ACD Status INACTIVE or LOGOUT. Possible statuses are ON — The agent can assign messages (email, fax, voicemail) for processing. OFF — The agent does not accept any messages.
ACD_DISPLAY	Switch. If an uppercase X is entered in the database the display control resp. the display on the telephone terminal device is activated, otherwise switched off.
ACD_ONLREADY	Agent statuses with assigning incoming calls. This entry should not be modified! Default: READY
ACD_AUTOANSWER	Switch. If an uppercase X is entered in the database a call assigned to an agent is automatically answered at the agent´s telephone so that a connection to the caller is immediately established. For this purpose a headset needs to be connected to the agent´s terminal telephone device.
ACD_MAXSFJOBS	Maximum number of messages an agent can be assigned at once. Default: 1
ACD_ONLLINEARPO	Agent position as number when the linear distribution of jobs is activated for calls. See also page 387ff.
ACD_OFFLINEARPO	Agent position as number when the linear distribution of jobs is active for messages. See also page 387ff.
ACD_CAMLINEARPO	Agenten position as number when the linear distribution of jobs is active for campaigns. See also page 387ff.

21.3.1.2 ACD Groups

An ACD Group in this sense is a MRS group which can have two different types of members. These are:

- **Agents;**
  Agents as permanent members of the ACD Group.
- **Skills;**
  that an agent must have to become a member of the ACD Group. Skills are realised via special groups again which have agents as members. Thus by means of the membership a skill is assigned to an agent. If an agent has all skills required for an ACD Group then he becomes a member of this group.

Besides that an ACD Group is reachable from outside via a calling number and can receive messages as well.

All this information is stored in the Correlation Database. In the following definition *<ACDAddr>* is thus an ACD Group filed in the database as MRS group. To ensure optimal access an *<ACDAddr>* should always begin with the string `#CEA`. First come the skills as *<ACDAddr>* subgroups:

DOMAIN	CLASSNAME	CLASS	KEYNAME	KEY
<Domain>	GROUP	*<ACDAddr>*	1	*<GRP:Skill 1>*
<Domain>	GROUP	*<ACDAddr>*	2	*<GRP:Skill 2>*
to				
<Domain>	GROUP	*<ACDAddr>*	N	*<GRP:Skill N>*

followed by the permanently assigned agents that are, independent from their skills, members of the *<ACDAddr>* group:

DOMAIN	CLASSNAME	CLASS	KEYNAME	KEY
<Domain>	GROUP	*<ACDAddr>*	<N+1>	*<Agent 1>*
to				
<Domain>	GROUP	*<ACDAddr>*	<N+M>	*<Agent M>*

Furthermore there are various group attributes of the format

DOMAIN	CLASSNAME	CLASS	KEYNAME	KEY
<Domain>	GROUPATTR	*<ACDAddr>*	*<AttributeName>*	*<AttributeValue>*

which determine the features of this ACD Group.

<AttributeName>	**Significance**
ACD_DEVICE	This field is for future expansions and must be empty with call center application based on the Hicom 150.

<AttributeName>	**Significance**
ACD_LOOP	Reference to the waiting loop or group of waiting loops assigned to this ACD Group. Example: GRP:<*LoopList*> or <*Loop*>
ACD_ROUTMODE	Here the routing mode is defined. Valid values are LONGESTIDLE, CYCLE or LINEAR. Unlike the global settings all these modes can, separated by a comma, be combined with INTERN (only internal agents are accepted) or EXTERN (only external, remote agents are accepted). The assignment mode is already globally preset by the ACD Script and should only be set here if a different strategy is to be used for this ACD Group. A description of the ACD Script routing strategy is found with the parameter **RoutMode** on page 387. Examples: LONGESTIDLE CYCLE,EXTERN
ACD_ROUTPOINTS	<*RoutingPoints*> are a list of factors that summed up result in the individual agent value. Thus in the first step this value is specified for each agent in the <*TopList*> which is an internal list of agents that can presently assign calls. Based on this evaluation the ACD Script distributes calls and messages to agents from the <*TopList*>. If several agents have the same value another assignment criteria such as „LongestIdle“ or „Cycle“ (see also ACD_ROUTMODE) is used accordingly. The individual factors in <RoutingPoints> are <*Skill*> This value is later on multiplied by the average of the corresponding agent skills (0-100) if the agent has become an ACD Group member due to his skills. Thus <*Skill*> * (amount of skills/ number of skills) Default: 2

<AttributeName>	**Significance**	
	<FixAgent>	Points if the agent is dedicated to the ACD Address. Default: 150
	<InternalAgent>	Points if the agent is an internal one. Default: 500
	<ExternAgent>	Points if the agent is a remote one. Default: 100
	<StateReady>	Points if the agent is currently in `Ready` status . Default: 800
	<StateWorkReady>	Points if the agent is currently in `WORKREADY` status. This status is not used for the time being. Default: 700
	<StateWorkNotReady>	Points if the agent is currently in `WORKNOTREADY` status. Default: 600
	<StateBreak>	Points if the agent is currently in `BREAK` status. Default: 0
	<StateUserDef1> *<StateUserDef2>* *<StateUserDef3>* *<StateUserDef4>* *<StateUserDef5>* *<StateUserDef6>* *<StateUserDef7>* *<StateUserDef8>* *<StateUserDef9>* *<StateUserDef0>*	Points if the agent is currently in "Break" status for a specially defined reason (`USERDEF`*n*). Altogether ten different "Break" statuses can be defined by the ACD Administrator. Default: 0
	Thus the following values are entered as default for `ACD_ROUTPOINTS`: "2,150,500,100,800,700,600,0,0,0,0,0,0,0,0,0,0,0"	
`ACD_STATUS`	The status of this ACD Group can either be active (`ACTIVE`) or inactive (`INACTIVE`).	

<*AttributeName*>	**Significance**
CEA	This MRS group, also called "Call Event Address", is an ACD Group. As <*AttributeValue*> an arbitrary value can be entered.
MAILBOX	ACD Group mailbox as known from normal MRS users. If this attribute remains empty <*ACDAddr*> is default set. Additionally a user account must exist for this mailbox where at first all Store&Forward messages are routed to. Inbound messages are then copied from this account and forwarded to an agent for processing. This user account must refer to the field ACD, which then contains the name of the respective ACD Group, in the field PREFERRED. Thereby incoming messages are rerouted to the address NVS:ACD/<*ACDAddr*> so that also reports arrive at the ACD Script which is thus informed about the status of the agents´ message processing. By specifying the mailbox of this account the ACD Script is enabled to take the messages belonging to this ACD Group. Especially upon starting messages can already be in the mailbox and thus actively be polled first.
NAME	A description or name of this ACD Group.
PRIO	ACD Group priority. 0 is the highest one. In ACD client applications this priority is displayed ranging from 0-100 with 100 being the highest priority there. For that client applications simply deduct the value set here from 100. The result is the here configurable range of values from 0-100 with 100 accordingly being the lowest priority. If this entry does not exist in the database 0 is assumed.

<AttributeName>	**Significance**
SERVICELEVEL3 SERVICELEVEL4 SERVICELEVEL5 SERVICELEVEL6 SERVICELEVEL7	The service levels 3 to 7 specify 5 periods indicating the ratio of the number of callers that were connected to an agent and and the total number of calls within this period. This rate can later continuously be monitored by the administrator. The default values for the 5 periods are: Servicelevel 3: 30 Seconds Servicelevel 4: 60 Seconds Servicelevel 5: 120 Seconds Servicelevel 6: 180 Seconds Servicelevel 7: 240 Seconds Furthermore the service levels 1 and 2 are also available for each ACD Group but since no periods are specified, according values cannot be set here.
SLEVELINTERVAL	Service levels are integrated via a certain period which is set here. In other words, if service level 3 is considered, thus the number of callers that could be connected with an agent within 30 seconds, then the period set here is taken into consideration. Values range from 30 to 3600 seconds. Default: 300 seconds
RANGEWAITTIME	The **ACD Supervisor** displays the average waiting time of callers in the waiting loop. This value is averaged out over the period specified here which is normally the last hour (entered in minutes). Default: 60
WALLDEVICE	Wall display address for this ACD Group. The address is the USER portion of a wall display MRS address automatically generated by the Wall APL assigning 0 to the first connected device, 1 to the second etc.

21.3.1.3 Skills

Skills are realised via special MRS groups which have agents as members. Thus skills are assigned to an agent through membership. Additionally you can specify whether an agent only partly masters a skill.

Thus in the Correlation Database agents are members of a skill group.

DOMAIN	CLASSNAME	CLASS	KEYNAME	KEY
<Domain>	GROUP	*<Skill>*	1	*<Agent 1>*

<*Domain*>	GROUP	<*Skill*>	2	<*Agent 2*>
to				
<*Domain*>	GROUP	<*Skill*>	N	<*Agent N*>

The numeric KEYNAME can, separated with a comma, be complemented by the entry SL=<*Level*>. <*Level*> ranges from 1 to 99 and indicates in percent to what extent an agent masters a certain skill. Without this indication 100% is assumed. Example for such an entry:

DOMAIN	CLASSNAME	CLASS	KEYNAME	KEY
<*Domain*>	GROUP	<*Skill*>	1,SL=50	<*Agent x*>

Furthermore there are various group attributes of the format

DOMAIN	CLASSNAME	CLASS	KEYNAME	KEY
<*Domain*>	GROUPATTR	<*Skill*>	<*AttribName*>	<*AttribValue*>

that determine the features of the skill group..

<*AttribName*>	**Significance**
NAME	A description or name for this ACD Group.
NOTMANDATORY	Switch. If an uppercase X is entered in the database this skill is optional and an agent need not have it in order to be assigned to an ACD Group. But as member of an ACD Group with this skill he would receive more points in the determination of <*RoutingPoints*>.
SKILL	This group defines a skill. As <*AttribValue*> an arbitrary value can be entered.

21.3.1.4 Waiting Loops

The following definition refers to an arbitrary waiting loop or a device for playing announcements. The Correlation Database contains waiting loop defining entries with the following syntax:

DOMAIN	CLASSNAME	CLASS	KEYNAME	KEY
<*Domain*>	LOOP	<*LoopName*>	<*AttribName*>	<*AttribValue*>

<*LoopName*> is a designator defining pairs belonging to a waiting loop from <*AttribName*> and <*AttribValue*>. For <*LoopName*> normally the same name is selected as for the <*ACDAddr*> this waiting loop belongs to. Thereby the correlation

is also apparent in the database without looking for the corresponding group attribute ACD_LOOP of an <*ACDAddr*>.

<*AttribName*>	**Significance**
ACD_DEVICE	Telephone or internal device number of a PBX to reach this waiting loop. Example: 440 440 is the default number of the first UCD device with a Hicom 150.
ACD_MAXCALLS	Maximum number of calls in a waiting loop. Example: 6
NAME	Descriptive name of the waiting loop.

PLAYBACKFILE1
PLAYBACKFILE2
PLAYBACKFILE3
PLAYBACKFILE4
PLAYBACKFILE5
PLAYBACKFILE6
PLAYBACKFILE7
PLAYBACKFILE8
PLAYBACKFILE9
	Here announcements (play back files) can be defined which are then played in the sequence of their definition. In addition you can optionally specify the time between files to be played and whether the announcement is to be repeated in another run.
	Example:
	`PLAYBACKFILE1 Greetings.pcm,30`
	`PLAYBACKFILE2 PleaseWait.pcm,20,X`
	In this case a caller would initially be greeted (`Greetings.pcm`), then listen to "Music on Hold" for 30 seconds followed by the play back file `PleaseWait.pcm`. Subsequently another 20 seconds of "Music on Hold" would be played before starting all over again. Now the `X` flag comes into effect as it determines that the file be repeated. Consequently the play back file `PleaseWait.pcm` is played every 20 seconds until the caller is put through.
	
	The play back files referenced here are found in the <*MRS Root*>\RES\E\ACDLOOP\<*Language*> directory. Since these files are usually adapted to each ACD Group they should actually be contained in the <*MRS Root*>\USERDATA\ACDLOOP\<*Language*> directory. An according modification is planned.

<*AttribName*>	**Significance**
PLAYBACKDEV	For the call center solution with the Hicom 150 four analog announcement ports are used. These are already globally configured by the script configuration (see ACD Script parameter **PlayDev** on page 386). If for a certain ACD Group only specific announcement ports different from the global configuration are to be used the appropriate settings can be made here. Enter the announcement ports separated by a comma as follows: <*Device*>[=<*MaxCalls*>:<*WaitTime*>] <*Device*> is the number for reaching this announcement port. <*MaxCalls*> is the maximum number of callers that can simultaneously be switched to the announcement port so that the same announcement is played to these callers the same time. <*WaitTime*> is the period the ACD Script waits to collect further callers that are to hear the same announcement. Example: 8246, 8247, 8248, 8249
UCD_DEVICE	Switch. An uppercase X in the database is an indication for a Hicom 150 with UCD Device. In this case the so called “Host-Control-Bit“ must be set in the Hicom. This switch is automatically set by the ACD Script and should never be modified!

Waiting Loop Group

In the event that an ACD Group requires more than one waiting loop a group of waiting loops can be formed and assigned to an ACD Group via the group attribute ACD_LOOP. An example is Siemens´ Hicom 150 PBX which has so called UCD Devices each of wich is connected to a waiting loop. Each of these UCD Devices can administer up to 30 callers within the Hicom. If an ACD Group needs to hold more callers in a waiting loop at the same time another UCD Device with accompanying waiting loop is used.

In the Correlation Database waiting loops are thus members of a waiting loop group:

DOMAIN	CLASSNAME	CLASS	KEYNAME	KEY
<*Domain*>	GROUP	<*LoopList*>	1	<*Loop 1*>
<*Domain*>	GROUP	<*LoopList*>	2	<*Loop 2*>

to

<Domain>	GROUP	*<LoopList>*	N	*<Loop N>*

The designator of a waiting loop group *<LoopList>* starts like all groups without persons as members with the '#' character. Furthermore there are various group attributes of the format

DOMAIN	CLASSNAME	CLASS	KEYNAME	KEY
<Domain>	GROUPATTR	*<LoopList>*	*<AttribName>*	*<AttribValue>*

which determine the features of this waiting loop group.

<AttribName>	**Significance**
NAME	Descriptive name of the waiting loop group.
LOOPLIST	This MRS group defines a waiting loop group. As *<AttribValue>* an arbitrary value can be entered.

21.3.1.5 Campaigns

Campaigns are calling lists that can be connected with one or several ACD Groups. The corresponding agents can take on jobs from these calling lists which are then automatically inaccessible for other agents so that a multiple processing of the same job is avoided. Besides this, from the agent´s point of view, active mode also a passive mode is available which automatically assigns jobs to agents. Whether agents are in active or passive mode with campaigns is determined by the **ACD Agent** as client application. Campaigns appear within the MRS Server as MRS Groups and are stored in the Correlation Database accordingly:

DOMAIN	CLASSNAME	CLASS	KEYNAME	KEY
<Domain>	GROUP	*<Campaign>*	1	*<Item 1>*
<Domain>	GROUP	*<Campaign>*	2	*<Item 2>*
to				
<Domain>	GROUP	*<Campaign>*	*N*	*<Item N>*

The designator of a *<Campaign>* starts like all groups without persons as members with the '#' character.

The *<Item>* syntax of a campaign is structured as follows:
<Phone> | *<State>* | *<Agent>* | *<MID>* | *<Schedule/End>* | *<Logout>* | *<Comment>*

<Phone> is the telephone to be called by the agent.

<State> is the current status of this *<Item>*. Possible statuses are:

<State>	**Significance**
U	(Undefined) This job is still open and needs to be processed.

<*State*> **Significance**

L	(Locked) This job has been locked by the <*Agent*> for processing. If the agent has not finished working on the job within the time limited by <*Schedule/End*> or <*Logout*> has been set to 1 because the agent has logged himself off his call center workstation this <*Item*> is set to "Undefined" again and can be assigned to another agent.
R	(Ready) This job has been finished by the <*Agent*>. In <*Schedule/End*> the point of time is entered when the agent completed processing the job.
S	(Scheduled) This job is to be executed within the time specified in <*Schedule/End*>.
F	(Failed) Execution of this job failed. A possible reason for this could be a wrong number.

<*Agent*> contains for the statuses "Locked" and "Ready" the MRS user account of the agent to execute the job or who has executed it.

<*MID*> is the MRS message ID of a message belonging to this job. If e.g. an email form with a call-back option can be filled in on a website this option could be realised as campaign job with the email form attached to it. Thus the agent can read why the customer wants to be called back before acting accordingly.

<*Schedule/End*> contains a date depending on <*State*>.

<*Logout*> can be set with an assigned job if the corresponding agent loggs off before accomplishing the job. This enables the ACD Script to assign the job to another agent.

<*Comment*> includes an arbitrary comment on this job. Please note that the maximum length for a KEY in the MRS Correlation Database is 64 characters.

Example: `492404901141|U||0|0|1|Important customer call`

As soon as an agent has assigned a job further entries can, depending on the status, optionally be added to the Correlation Database.

DOMAIN	CLASSNAMECLASSKEYNAMEKEY
<*Domain*>	GROUP<*Campaign*>*N*,REPLY<*ReplyAddress*>
<*Domain*>	GROUP<*Campaign*>*N*,STATUS<*Message*>

<*ReplyAddress*> is the MRS address for replies to be sent to with status "Locked" jobs.

Jobs with the statuses "Ready" or "Failed" can be accompanied by a <*Message*>. Here an agent could enter e.g. "Invalid Number" with a status "Failed" job.

Beyond that there are various group attributes in the format

DOMAIN	CLASSNAME	CLASS	KEYNAME	KEY
<*Domain*>	GROUPATTR	<*Campaign*>	<*AttribName*>	<*AttribValue*>

that determine the features of this campaign group.

<*AttribName*>	**Significance**
DESCRIPTION	Optional indication or description of this campaign.
MID	Optional message ID if the campaign has been generated by a message.
PRIO	Optional campaign priority. The priority is specified within a range from 0-100 with 0 indicating the highest priority.
CAMPAIGN	This MRS group defines a campaign group. An arbitrary value can be entered as <*AttribValue*>.

ACD Group Assignment

Since each campaign can be bound to one or several ACD Groups the groups need to know which and how many campaigns they have to work with. For this purpose further subgroups of the following format are added to the ACD Groups:

DOMAIN	CLASSNAME	CLASS	KEYNAME	KEY
<*Domain*>	GROUP	CAMP-<*ACDAddr*>	1	<*CampList 1*>
<*Domain*>	GROUP	CAMP-<*ACDAddr*>	2	<*CampList 2*>
to				
<*Domain*>	GROUP	CAMP-<*ACDAddr*>	*N*	<*CampList N*>
<*Domain*>	GROUPATTR	CAMP-<*ACDAddr*>	CAMPLIST	xxx

This group attribute specifies this MRS group as campaign collection. KEY is meaningless in this case and can contain an arbitray value but must not be empty.

21.3.1.6 Thresholds

Thresholds are used to define special modes of behaviour for ACD Groups. Thus the call center behaviour can be reported e.g. depending on specific time profiles or the administrator can be alerted when these thresholds have been reached. Besides that special greetings/announcements to be played to the caller can be defined. It is also possible to specify redirections so that callers can leave messages in a voice mailbox (answering machine).

Thresholds can be globally defined for the entire call center or for individual ACD Groups. Global ACD Script settings are thus valid for all ACD Groups that do not define their own thresholds. This means in particular that an ACD Group with a set threshold for undefined domains does not copy global thresholds.

The correlation database contains entries with the following syntax, defining thresholds:

DOMAIN	CLASSNAME	CLASS	KEYNAME	KEY
<*Domain*>	THRESHOLD	<*Name*>	<*Item*>	<*ThresholdDescription*>

<*Name*> is either the name of the ACD Group for which this threshold is valid or GLOBAL if the entry is to be valid for all ACD Groups without individual thresholds.

<*Item*> is a consecutive number so that an unambiguous KEYNAME exists.

<*ThresholdDescription*> contains a condition each that depending on the internal resources can be fulfilled for an ACD Script. If the requirement is met there are one or several activities to be performed. The syntax of <*ThresholdDescription*> is in detail:

<*Resource*> **|** <*ValueCondition*> **|** <*TimeProfileCondition*> **|** <*ActionList*>

<*Resource*> is the ACD Group resource to be monitored. This applies to the following resources:

Resource	Significance
SL1 SL2 SL3 SL4 SL5 SL6 SL7	ACD Group service level 1 to 7. In <*ValueCondition*> the exact service level value that needs to be achieved to trigger an activity is entered. Service level is the percentage of calls answered within a previously defined period. Example: 80 percent of calls answered within 15 seconds. SL1 means connected with an agent in proportion to the total number of calls. SL2 means directly connected callers (without waiting) in proportion to the total number of calls. SL 3 to SL 7 means connected within a certain period in proportion to the total number of calls. The periods for these service levels can be set individually for each ACD Group.
AGENTS	Number of agents that can answer a call for the ACD Group. In <*ValueCondition*> the minimal value is preset.
CALLDUR	Period in seconds that a caller has to wait until he is put through.
NEWCALL	New incoming call.
WAITCALLS	Number of callers in the waiting loop.
TRUNKS	Trunk status (independent from the ACD Group).

Resource	Significance
GROUP	Number of agents that according to their status can presently answer a call for the ACD Group. Corresponds in principle to AGENTS and is used when semantically the ACD Group is meant and not the agents.

<ValueCondition> is an optional mathematic term that must be fulfilled to trigger an activity. The following operators are possible:

Term	Significance
>=*X*	Value bigger than or equal to *X*.
<=*X*	Value smaller than or equal to *X*.
<*X*	Value smaller than *X*.
>*X*	Value bigger than *X*.
=*X*	Value equal to *X*.
IN(*X*,*Y*)	Value bigger than *X* and smaller than *Y* with *X* having to be smaller than or equal to *Y*.
OUT(*X*,*Y*)	Value smaller than *X* or bigger than *Y* with *X* having to be smaller than or equal to *Y*.
IN=(*X*,*Y*)	Value bigger than or equal to *X* and smaller than or equal to *Y* with *X* having to be smaller than or equal to *Y*.
OUT=(*X*,*Y*)	Value smaller than or equal to *X* or bigger than or equal to *Y* with *X* having to be smaller than or equal to *Y*.

<TimeProfileCondition> is an optional link to a time profile which has to be in a specific status. In many cases it is only useful to monitor thresholds when the call center is in a certain status, e.g. OPEN. Therefore a time profile of the following type can be entered in each threshold.

Term	Significance
<TimeProfile>(OP)	*<TimeProfile>* must have status OPEN.
<TimeProfile>(CL)	*<TimeProfile>* must have status CLOSED.
<TimeProfile>(BR)	*<TimeProfile>* must have status BREAK.

<*ActionList*> is a sequence of activities executable when <*ValueCondition*> as well as <*TimeProfileCondition*> is fulfilled. The following activities have been implemented so far:

Activities	Significance
FORWARD=<*DestNumber*>	Redirect calls to <*DestNumber*>.
ALVARIABLE=<*Attribute*>&<*VarName*>	Change the ACD variable attribute (see page 370) of a ACD Group. Valid attributes: RED, REDFLASH, YELLOW, YELLOWFLASH, GREEN, GREENFLASH. These variables can be indicated in the **ACD Supervisor** as well as on the wall display. The corresponding attribute displays this value in the appropriate colour and possibly also flashing in order to instantly alert the supervisor.
ALCEA=<*Attribute*>&<*AnyAlarmText*>	Write the text <*AnyAlarmText*> in the ACD variable LAS (see page 370). Additionally the attribute of this ACD variable can be set. See also the activity ALVARIABLE.
ALWALL=<*StateInWallCtrlFile*>	Activating a specific alarm status in the wall display control file. For the structure of this control file see page 380.
ALDISPLAY=<*StateInDisplCtrlFile*>	Activating a specific status in the telephone terminal device display control file. For the structure of this control file see page 373.
ROUTING=<*NewRoutingMode*>	Modifying the routing mode of this ACD Group. Valid values are LONGESTIDLE, CYCLE or LINEAR. For the significance of these modes see page 387.
PLAYBACK=<*PlayBackFile*>	An announcement usually played would be stopped and replaced by the one given here.

Activities	Significance
TIME	Executing all activities belonging to the profile <*TimeProfileCondition*>.
WALL=<*StateInWallCtrlFile*>	Activating a specific alarm status in the wall display control file. For the structure of this control file see page 380.

Instead of the long form entered in the table also the first three characters can be used. Example: ROU=CYCLE instead of ROUTING=CYCLE.

Examples

The following examples are all global for all ACD Groups thus DOMAIN, CLASSNAME, CLASS are always the same:

DOMAIN	CLASSNAME	CLASS	KEYNAME	KEY
<*Domain*>	THRESHOLD	GLOBAL	*n*	<*ThresholdDescription*>

Therefore only the variable portions of this example threshold definition are mentioned here:

```
KEYNAME KEY
1       SL3|<50|CustomerProfile(OP)|ALV=YELLOW&RSL3
```

If service level 3 is under 50% and the call center is accessible (time profile "CustomerProfile") change the colour of the ACD variable RSL3 to yellow. The variable will instantly be indicated in the **ACD Supervisor** and on the wall display in this colour.

```
KEYNAME KEY
2       CALLDUR|>120|Test(OP)|PLA=HighWater.pcm,FOR=124
```

In case a caller is waiting longer than 120 seconds and the call center is accessible (time profile "Test") then the announcement file "HighWater.pcm" is played and subsequently the caller is routed to 124.

```
KEYNAME KEY
3       NEWCA||GlobalProfile(OP)|TIME
```

Only with new calls the time profile "GlobalProfile" is checked whether this ACD Group is currently active (OPEN). If so the corresponding time profile activities are executed.

```
KEYNAME KEY
4       AGENTS|<3|Test(OP)|ALC=RED&Agents too low!
```

If the call center is accessible (time profile "Test") and the number of agents drops below 3 issue the red alert message "Agents too low!" in the **ACD Supervisor**.

```
KEYNAME KEY
5       GROUP||Test(BR)|WALL=SystemBreak
```

Indicate "Break" on the wall display.

21.3.1.7 Time Profiles

Time profiles are global resources of the MRS Server usable by various applications within the server. The call center is such an application.

General Structure of Time Profiles

Time profiles define a status from date and time for each instance. At a company a time profile could define working hours e.g. Mondays to Fridays from 9:00 a.m. to 5:00 p.m. The company would be closed at all other times. Tuesdays at 10:00 a.m. the status would be `WORKING` and the whole Sunday e.g. `NONWORKING`.

The MRS Server differentiates between two types of time profiles: **Day Profiles** for single days and **Calendar Profiles** referencing a day profile for each day.

Day Profiles are stored in the Correlation Database in the following way:

DOMAIN	CLASSNAME	CLASS	KEYNAME	KEY
<*Server*>/$SYSTEM	TIMEPROFILE	#<*DayProf*>	<*From*>-<*To*>	<*State*>

or

<*Server*>/$SYSTEM	TIMEPROFILE	#<*DayProf*>	OTHERWISE	<*State*>

<*DayProf*> Time profile name that must begin with the # character.

<*From*>-<*To*> Start and end time each in the format hhmm.

<*State*> is a string indicating the status valid for this time interval. The string is thus an indication for the current status optionally followed by the `|` character and further parameters defined by the application that uses the time profile. Legal <*State*> definitions would be e.g. "`OPEN`" and "`CLOSED|prompt=holiday.wav`".

Time profiles can be overlapping with the later one being preferred. Intervals must never exceed midnight or completely include another interval. Thus the intervals `0000-0900` and `0900-2359` would be legal with the minute from 9:00 to 9:01 belonging to the second interval, whereas the intervals `0000-2359` and `0900-1000` are not allowed. Using `2400` for the end of a day is legal but not recommended.

If the current time is not included in one of the defined day profiles the <*State*> specified in the OTHERWISE entry applies. In case this entry does not exist an empty <*State*> definition is valid for all times outside the defined intervals.

Calendar Profiles are stored in the Correlation Database in the following way:

DOMAIN	CLASSNAME	CLASS	KEYNAME	KEY
<*Server*>/$SYSTEM	TIMEPROFILE	<*Calendar*>	<*Day*>	<*DayProf*>

<*Calendar*> is the time profile name, <*Day*> defines one or several days for which this entry is valid and <*DayProf*> is the name of the day profile to be used for these days.

<*Day*> can, sorted according to the precedence order, be

- a single date e.g. 20000225 for 25 February 2000.
- one day of a year e.g. 0225 for 25 February of each year.
- one day of a month e.g. D25 for the 25th of each month.
- one day of a week abbreviated by the first two characters e.g. SU for Sunday.
- OTHERWISE for all days not defined by another entry.

So the database entries of the above example could have the following appearance:

DOMAIN	CLASSNAME	CLASS	KEYNAME	KEY
COMPANY/$SYSTEM	TIMEPROFILE	#NWDAY	0000-2359	CLOSED|<*Action*>
COMPANY/$SYSTEM	TIMEPROFILE	#WDAY	0000-0900	CLOSED|<*Action*>
COMPANY/$SYSTEM	TIMEPROFILE	#WDAY	0900-1159	OPEN|<*Action*>
COMPANY/$SYSTEM	TIMEPROFILE	#WDAY	1200-1259	BREAK|<*Action*>
COMPANY/$SYSTEM	TIMEPROFILE	#WDAY	1300-1659	OPEN|<*Action*>
COMPANY/$SYSTEM	TIMEPROFILE	#WDAY	1700-2359	CLOSED|<*Action*>
COMPANY/$SYSTEM	TIMEPROFILE	WORKTIME	OTHERWISE	WDAY
COMPANY/$SYSTEM	TIMEPROFILE	WORKTIME	SA	NWDAY
COMPANY/$SYSTEM	TIMEPROFILE	WORKTIME	SU	NWDAY
COMPANY/$SYSTEM	TIMEPROFILE	WORKTIME	NAME	<*Description*>

The time profile name to be used in this example is WORKTIME.

Time Profiles within the ACD Script

The ACD Script uses time profiles to control the behaviour of the call center resp. of specific ACD Groups.

In doing so it utilizes the statuses OPEN, CLOSED and BREAK within its day profiles. As <*Action*> the same commands are supported as with thresholds. Useful time profiles are in particular:

FORWARD=<*ForwardNumber*>

Calls are redirected to another number e.g. a voice mailbox.

`ROUTING=`*<NewRoutingMode>*

Modifies the internal routing mode. `LONGESTIDLE`, `CYCLE` and `LINEAR` are allowed.

`PLAYBACK=`*<PlayBackFile>*

Activates a special announcement to replace the first greeting.

21.3.1.8 Special Routing Rules depending on the Caller (A-ID Routing)

Depending on the caller´s telephone number the A-ID routing allows influencing the assignment of calls to the agents of an ACD Group. In principle this is an extension of the assignment decision taken via skills

An example of applying these rules would be a sales center with representatives for various regions which preferable are to receive calls from these regions. Depending on the regional codes additional skills could be defined which an agent needed to have besides those required for the ACD Group. Or these additional skills are defined as non mandatory and the corresponding agents are only assigned more points for the assignment decision via the skill. (see page 387 for the ACD Script parameter Rout-Mode). In the above example an agent responsible for a certain region would thus be preferred and if he is not ready another agent selected so that the call would not get lost.

Another example would be a differentiation depending on the country code so that calls would be routed to agents with the corresponding language knowledge.

The A-ID routing is realized in the Correlation Database via:

`DOMAIN`	`CLASSNAME`	`CLASS`	`KEYNAME`	`KEY`
<Domain>	`AIDROUT`	`GLOBAL`	*<Item>*	*<A-IDRoutingInfo>*
or				
<Domain>	`AIDROUT`	*<ACDAddr>*	*<Item>*	*<A-IDRoutingInfo>*

In the first case this A-ID routing entry is valid for all call center ACD Groups that do not have individual entries of the second format whereas the second entry is only valid for specifc ACD Groups.

<Item> is a consecutive number to provide an unambiguous KEYNAME for each entry.

<AIDRoutingInfo> is the actual A-ID routing definition:

<A-ID Number> **|** *<RequiredSkill>*

Examples:

DOMAIN	CLASSNAME	CLASS	KEYNAME	KEY
<*Domain*>	AIDROUT	GLOBAL	1	4989|BAVARIAN

The agents require the additional skill BAVARIAN for all callers whose telephone number begins with “4989“ (Munich). In the event that BAVARIAN is a non mandatory skill each agent of the dialled ACD Group can receive the call but it is more likely that it would be routed to agents with the skill BAVARIAN. If BAVARIAN is a mandatory skill then only those agents of the dialled ACD Group that have this skill would receive the call.

DOMAIN	CLASSNAME	CLASS	KEYNAME	KEY
<*Domain*>	AIDROUT	#CEA-INTER	1	44|ENGLISH
<*Domain*>	AIDROUT	#CEA-INTER	2	49|GERMAN

These A-ID routing entries are only valid for the ACD Group #CEA-INTER. If a call is initiated from “44xxx“ (Great Britain) the skill ENGLISH is required additionally; with calls from “49xxx“ (Germany) the skill GERMAN.

21.3.2 ACD Variables

21.3.2.1 Global Variables

These variables refer to the entire call center. They can be indicated in the **ACD Supervisor** or on the wall display.

Variable	Significance
NTC	Number of occupied trunk lines.
NTL	Number of trunk lines.
LTL	Trunk lines list.
NAR	Number of reachable agents.
NNA	Number of agents not available.
NCA	Number of calls in the ACD System.
NLC	Number of calls in the waiting loops.
NAC	Number of callers currently connected to agents.

21.3.2.2 ACD Group Variables

The variables refer to the respective ACD Group. They can be indicated in the **ACD Supervisor** or on the wall display.

Variable	Significance
DLAC	Last ACD call date.
SNWL	Waiting loop name.
NACD	Average call duration in seconds.
NACW	Average waiting time in waiting loop.
NAT	Number of agents in the TOP list.
NWL	Number of calls in the waiting loop.
NCC	Number of currently connected callers.
NCD	Number of ACD calls today.
NCW	Number of ACD calls this week.
NCM	Number of ACD calls this month.
LTA	List of TOP-List agents.
LCA	List of all campaigns.
NCA	Number of all campaigns.
RSL1	Service Level 1.
RSL2	Service Level 2.
RSL3	Service Level 3.
RSL4	Service Level 4.
RSL5	Service Level 5.
RSL6	Service Level 6.
RSL7	Service Level 7.
NSFV	Number of waiting voice messages for this group.

Variable	Significance
NSFF	Number of waiting fax messages for this group.
NSFE	Number of waiting emails for this group.
NVD	Number of voice messages today.
NFD	Number of fax messages today.
NED	Number of emails today.
LAS	List of group alarm messages.
NAR	Number of reachable agents.

21.3.2.3 ACD Agent Variables

These variables refer to call center agents. They can be indicated in the **ACD Supervisor** or on the wall display.

Variable	Significance
DLLI	Last login date.
DLLO	Last logoff date.
DLAC	Last call date.
DCC	Start of the last resp. current call.
SCID	ID of the current caller.
SCEI	Callee´s ID.
SCEA	Address of the called ACD Group.
NCA	Average call duration.
NCD	Number of callers today.
NCW	Number of callers this week.
NCM	Number of callers this month.
NAAC	Average ACD call duration.

Variable	Significance
NACD	Number of ACD calls per day.
NACW	Number of ACD calls per week.
NACM	Number of ACD calls per month.
LAID	List of calls for this agent.
LCEA	List of all ACD Groups where this agent is member.
NLWT	Caller waiting time.
NWC	Waiting calls of all ACD Groups where this agent is member.
NCEP	Current call priority.
NSFV	Number of voice messages for the agent.
NSFF	Number of fax messages for the agent.
NSFE	Number of emails for the agent.
NWS	Number of waiting message jobs of this agent´s ACD Groups.
AWT	Average waiting time for all ACD calls.
NOC	Number of open campaign jobs.
NSC	Number of scheduled campaign jobs.
NACA	Number of assigned campaign jobs.
SRDI	Redirected number of the current call.

21.3.2.4 ACD Waiting Loop Variables

These variables refer to waiting loops. They can be indicated in the **ACD Supervisor** or on the wall display.

Variable	Significance
DLAC	Last ACD call date.
NCL	Number of waiting callers.

Variable	Significance
NCA	Average waiting time in the waiting loop.
LAID	List of all callers with A-ID.
NCD	Number of calls today.
NCW	Number of calls this week.

21.3.2.5 ACD Campaign Variables

These variables refer to campaigns. They can be indicated in the **ACD Supervisor** or on the wall display.

Variable	Significance
NIT	Number of campaign items.
LCI	List of all campaign entries.
NPR	Campaign priority.
SDE	Campaign description.
NMI	Possible message ID if generated per email.
NOI	Number of open items.
NLI	Number of locked items.
NSI	Number of scheduled items.

21.3.3 Display Control of the Terminal Telephone Device

The file …`\res\acd\TelDispl.ini` contains descriptions for the information output on the display of the agent´s terminal telephone device. For various agent statuses and assigned calls or with states of alarm triggered when thresholds are crossed the corresponding “events” can be polled which then describe the display output. Within this description the above described ACD variables can also be used (see page 369).

This is what an event syntax looks like:

<Section>
```
   {
```

<*Command*>
...
}

<*Section*> is either preset by the ACD Script (always starts with the string “Event“) or a new <*Section*> which is jumped at through triggering a threshold or from an “Event”. Such a new <*Section*> is a string that should not match one of the predefined “Event” strings.

<*Command*> is a formatting command with the text to be displayed and additional control commands can be given separated by a semicolon. Within the text portion the above described ACD variables can be used as well. Possible commands are:.

Command	**Significance**
`ScrollLeft=`<*msec*>	The text is scrolled to the left in <*msec*> millisecond rates. This function should not be used with a Siemens Hicom PBX !
`ScrollRigh=`<*msec*>	The text is scrolled to the right in <*msec*> millisecond rates. This function should not be used with a Siemens Hicom PBX !
`Off`	Deletes the display.
`Rep`	Repeat this line as soon as the entire <*Section*> is worked out. A <*Section*> is repeatedly worked out until a change to another <*Section*> is made by a new event. The lines without `Rep` are worked out only at the very first time.
`Center`	Writing the text centered in the display.
`Right`	Writing the text right justified in the display.
`Flash=`<*msec*>	Flashing the text in <*msec*> millisecond rates. This function should not be used with a Siemens Hicom PBX !
`Cond=`<*Condition*>	Condition. The text is only displayed if the specified condition applies. In this way the ACD variables can be checked and depending on their value various texts displayed. <*Condition*> corresponds to <*ACD Variable*>==|>|>=|<|<=<*Value*>
`Goto=`<*Section*>	Skipping to another <*Section*> and executing the instructions given there.
`Time=`<*Seconds*>	Text display duration in seconds.

The following examples are adapted to the display of a Hicom 150 system telephone with an indication of one line and 24 columns.

Event Group Agent Statuses

```
EventLogout
   {
   Center;Time=3; "! LOGOUT !"
   OFF
   }

EventLogin
   {
   Center;Time=3;      "! LOGIN !"
   Center;Time=2;      "Welcome Agent:"
   Center;Time=3;      ".. '&AG' .."
   Center;Time=3;      "Logged in OK"
   Center;Time=1;      "You are member of:"
   Center;Time=1;      "'&LCEA'"
   Rep;Center;Time=4;  "Please switch to READY"
   Rep;Center;Time=2;  "'&NWC' calls in loop"
   Rep;Center;Time=2;  "Av. wait-time: '&AWT'"
   Rep;Center;Time=4;  "Agent: '&AG'"
   }

EventReady
   {
   Center;Time=3;         "! READY !"
   Center;Time=1;         "You are member of:"
   Center;Time=1;         "'&LCEA'"
   Rep;Center;Time=2;     "Agent: '&AG'"
   Rep;Center;Time=3;     "is READY for calls"
   Rep;Center;Time=2;     "'&NWC' calls in loop"
   Rep;Center;Time=2;     "Av. wait-time: '&AWT'"
   }

EventBreakSystem
   {
   Center;Time=3;      "! SYSTEM BREAK !"
   Rep;Center;Time=3;  "Agent '&AG'"
   Rep;Center;Time=3;  "didn't pickup a call!!"
   Rep;Center;Time=5;  "System switched to break"
   Rep;Center;Time=2;  "'&NWC' calls in loop"
   }
```

```
EventBreak
   {
   Center;Time=3;      "! BREAK !"
   Rep;Center;Time=2;  "Agent '&AG'"
   Rep;Center;Time=3;  "is in BREAK"
   Rep;Center;Time=2;  "'&NWC' calls in loop"
   Rep;Center;Time=2;  "Av. wait-time: '&AWT'"
   }
EventWorkReady
   {
   Center;Time=3;      "! AFTER WORK (R)!"
   Center;Time=1;      "You are member of:"
   Center;Time=1;      "'&LCEA'"
   Rep;Center;Time=2;  "Agent: '&AG'"
   Rep;Center;Time=3;  "is in AFTERWORK/READY"
   Rep;Center;Time=2;  "'&NWC' calls in loop"
   Rep;Center;Time=2;  "Av. wait-time: '&AWT'"
   }
EventWorkNotReady
   {
   Center;Time=3;      "! AFTER WORK !"
   Rep;Center;Time=2;  "Agent: '&AG'"
   Rep;Center;Time=3;  "is in AFTERWORK/NOTREADY"
   Rep;Center;Time=2;  "'&NWC' calls in loop"
   Rep;Center;Time=2;  "Av. wait-time: '&AWT'"
   }
EventUserDef1
   {
   Center;Time=3;      "! &UD1 !"
   Rep;Center;Time=2;  "Agent: '&AG'"
   Rep;Center;Time=3;  "is in state"
   Rep;Center;Time=3;  "'&UD1'"
   Rep;Center;Time=2;  "'&NWC' calls in loop"
   Rep;Center;Time=2;  "Av. wait-time: '&AWT'"
   }
EventUserDef2
   {
   Center;Time=3;      "! &UD2 !"
   Rep;Center;Time=2;  "Agent: '&AG'"
   Rep;Center;Time=3;  "is in state"
   Rep;Center;Time=3;  "'&UD2'"
   Rep;Center;Time=2;  "'&NWC' calls in loop"
```

```
   Rep;Center;Time=2;  "Av. wait-time: '&AWT'"
   }
EventUserDef3
   {
   Center;Time=3;      "! &UD3 !"
   Rep;Center;Time=2;  "Agent: '&AG'"
   Rep;Center;Time=3;  "is in state"
   Rep;Center;Time=3;  "'&UD3'"
   Rep;Center;Time=2;  "'&NWC' calls in loop"
   Rep;Center;Time=2;  "Av. wait-time: '&AWT'"
   }
EventUserDef4
   {
   Center;Time=3;      "! &UD4 !"
   Rep;Center;Time=2;  "Agent: '&AG'"
   Rep;Center;Time=3;  "is in state"
   Rep;Center;Time=3;  "'&UD4'"
   Rep;Center;Time=2;  "'&NWC' calls in loop"
   Rep;Center;Time=2;  "Av. wait-time: '&AWT'"
   }
EventUserDef5
   {
   Center;Time=3;      "! &UD5 !"
   Rep;Center;Time=2;  "Agent: '&AG'"
   Rep;Center;Time=3;  "is in state"
   Rep;Center;Time=3;  "'&UD5'"
   Rep;Center;Time=2;  "'&NWC' calls in loop"
   Rep;Center;Time=2;  "Av. wait-time: '&AWT'"
   }
EventUserDef6
   {
   Center;Time=3;      "! &UD6 !"
   Rep;Center;Time=2;  "Agent: '&AG'"
   Rep;Center;Time=3;  "is in state"
   Rep;Center;Time=3;  "'&UD6'"
   Rep;Center;Time=2;  "'&NWC' calls in loop"
   Rep;Center;Time=2;  "Av. wait-time: '&AWT'"
   }
EventUserDef7
   {
   Center;Time=3;      "! &UD7 !"
```

```
   Rep;Center;Time=2;  "Agent: '&AG'"
   Rep;Center;Time=3;  "is in state"
   Rep;Center;Time=3;  "'&UD7'"
   Rep;Center;Time=2;  "'&NWC' calls in loop"
   Rep;Center;Time=2;  "Av. wait-time: '&AWT'"
   }
EventUserDef8
   {
   Center;Time=3;      "! &UD8 !"
   Rep;Center;Time=2;  "Agent: '&AG'"
   Rep;Center;Time=3;  "is in state"
   Rep;Center;Time=3;  "'&UD8'"
   Rep;Center;Time=2;  "'&NWC' calls in loop"
   Rep;Center;Time=2;  "Av. wait-time: '&AWT'"
   }
EventUserDef9
   {
   Center;Time=3;      "! &UD9 !"
   Rep;Center;Time=2;  "Agent: '&AG'"
   Rep;Center;Time=3;  "is in state"
   Rep;Center;Time=3;  "'&UD9'"
   Rep;Center;Time=2;  "'&NWC' calls in loop"
   Rep;Center;Time=2;  "Av. wait-time: '&AWT'"
   }
EventUserDef0
   {
   Center;Time=3;      "! &UD0 !"
   Rep;Center;Time=2;  "Agent: '&AG'"
   Rep;Center;Time=3;  "is in state"
   Rep;Center;Time=3;  "'&UD0'"
   Rep;Center;Time=2;  "'&NWC' calls in loop"
   Rep;Center;Time=2;  "Av. wait-time: '&AWT'"
   }
```

Event Group Call Statuses

```
EventCallAlerting
   {
   Rep;Center;Time=3;  "'&SCID' is calling .."
   Rep;Center;Time=3;  "Redirected: '&SRDI'"
   Rep;Center;Time=3;  "Prio '&NCEP'"
   Rep;Center;Time=3;  "Wait-time: '&NLWT'"
   }
```

```
EventCallConnected
   {
   Rep;Center;Time=3;  "Partner: '&SCID'"
   Center;Time=3;      "Redirected: '&SRDI'"
   Center;Time=3;      "Prio '&NCEP'"
   Center;Time=3;      "Wait-time: '&NLWT'"
   Rep;Center;Time=3;  "'&NWC' calls are waiting"
   Rep;Center;Time=3;  "Av. wait-time: '&AWT'"
   }
EventCallHold
   {
   Rep;Center;Time=5;  "'&NWC' calls are waiting"
   Rep;Center;Time=4;  "Av. wait-time: '&AWT'"
   }
EventCallConferenced
   {
   Rep;Center;Time=5;  "'&NWC' calls are waiting"
   Rep;Center;Time=4;  "Av. wait-time: '&AWT'"
   }
EventCallRinging
   {
   OFF
   }
```

Event Group Alarm Statuses

```
AlarmSL3
   {
   Rep;Center;Time=2;  "   SL3 Alarm "
   Rep;Center;Time=5;  "Service Level 3 too low!"
   Rep;Center;Time=3;  "'&NWC' calls in loop"
   Rep;Center;Time=3;  "Av. wait-time: '&AWT'"
   }
AlarmExtremSL3
   {
   Rep;Center;Time=2;  "!! SL3 Alarm !!"
   Rep;Center;Time=5;  "!SL3 dangerous low!"
   Rep;Center;Time=3;  "'&NWC' calls in loop"
   Rep;Center;Time=3;  "Av. wait-time: '&AWT'"
   }
AlarmAgents
   {
```

```
Rep;Center;Time=2;  "!! Agent Alarm !!"
Rep;Center;Time=5;  "too few agents logged in"
Rep;Center;Time=3;  "'&NWC' calls in loop"
Rep;Center;Time=3;  "Av. wait-time: '&AWT'"
}
```

21.3.4 Wall Display Control

The file …`\res\acd\TelDispl.ini` contains descriptions for the information output on the display of the agent´s terminal telephone device. For various agent statuses and assigned calls or with states of alarm triggered when thresholds are crossed the corresponding “events” can be polled which then describe the display output. Within this description the above described ACD variables can also be used (see page 369).

This is what an event syntax looks like:

<*Section*>
{
<*Command*>
…
}

<*Section*> is either preset by the ACD script (always starts with the string “Event“) or a new <*Section*> which is jumped at by triggering a threshold or from an “Event“. Such a new <*Section*> is a string that should not match one of the predefined “Event” strings.

<*Command*> is a formatting command with the text to be displayed and additional control commands can be given separated by a semicolon. Within the text portion the above described ACD variables can be used as well. Possible commands are::

Command	**Significance**
`Scroll=`<*msec*>	The text is scrolled to the left in <*msec*> millisecond rates. This function should not be used since it effects the readability on the wall display.
`Off`	Deletes the display.
`Rep`	Repeat this line as soon as the entire <*Section*> is worked out. A <*Section*> is repeatedly worked out until a change to another <*Section*> is made by a new event. The lines without `Rep` are worked out only at the very first time.
`Center`	Writing the text centered in the dislplay.

Command	Significance
`Right`	Writing the text right justified in the display.
`Flash=`<*msec*>	Flashing the text in <*msec*> millisecond rates.
`Cond=`<*Condition*>	Condition. The text is only displayed if the specified condition applies. In this way the ACD variables can be checked and depending on their value various texts displayed. <*Condition*> corresponds to <*ACD Variable*>`==|>|>=|<|<=`<*Value*>
`Goto=`<*Section*>	Skipping to another <*Section*> and executing the instructions given there. It is also possible to replace <*Section*> by `LASTSTATE` through which you jump back to the <*Section*> previously displayed.
`Time=`<*Seconds*>	Text display duration in seconds.
`Color=`<*Color*>	Changing the display colour. Possible values for <*Color*> are `RED`, `GREEN`, `ORANGE`, `YELLOW`, `DRED`, `DGREEN`, `DORANGE` and `RAINBOW`.
`Gong=`<*GongOptions*>	The wall display can also generate sounds. Possible options for the respective tone are `LOUD`, `SOFT`, `NORMAL`, which can be combined, using a & character, with the entries `SINGLE`, `DOUBLE` or `TRIPLE`. Example: `NORMAL&DOUBLE`

The following examples refer to a wall display with an indication of one line and 16 columns.

Standard Events

```
EventStart
   {
   Gong=LOUD;Color=Rainbow;Time=5;    "'&ACD'"
   Color=Rainbow;Time=5;              "Time: &ST"
   Goto=EventNormal
   }
EventNormal
   {
   Rep;Color=Green;Time=5;  "W &NWL   C &NCC   L &RSL3%"
   Rep;Time=5;              "T &NACW   D &NACD   A &NAR"
   Rep;Time=5;              "V &NSFV   F &NSFF   E &NSFE"
```

```
   }
EventAgentChanged
   {
   Gong=SOFT&SINGLE;Color=Yellow;Time=5;"Agent changed"
   Goto=LASTSTATE
   }
EventVoicemail
   {
   Gong=SOFT&SINGLE;Color=Yellow;Time=5;
                           "Voicemail received"
   Color=Yellow;Time=5;     "V &NSFV   F &NSFF   E &NSFE"
   Goto=LASTSTATE
   }
EventFaxmail
   {
   Gong=SOFT&SINGLE;Color=Yellow;Time=5;   "Fax received"
   Color=Yellow;Time=5;     "V &NSFV   F &NSFF   E &NSFE"
   Goto=LASTSTATE
   }
EventEmails
   {
   Gong=SOFT&SINGLE;Color=Yellow;Time=5;"Email received"
   Color=Yellow;Time=5;     "V &NSFV   F &NSFF   E &NSFE"
   Goto=LASTSTATE
   }
EventCampaign
   {
   Gong=SOFT&SINGLE;Color=Yellow;Time=5;
                           "Campaign received"
   Color=Yellow;Time=5;     "&NCA campaign in group"
   Goto=LASTSTATE
   }
```

Special Events “BREAK“, “CLOSED“ and “OPEN“

These events are freely defineable and activated by a threshold. Here this is accomplished through considering the time profile and a subsequent message for the call center statuses Open, Closed and Break.

```
SystemBreak
   {
   Gong=Normal&DOUBLE;Color=Orange;Time=5;
```

```
                              " .... Break ...."
   Rep;Color=Orange;Time=5;   "Time: &ST"
   Rep;Color=Orange;Time=5;   "W &NWL   C &NCC   L &RSL3%"
   Rep;Color=Orange;Time=5;   "T &NACW   D &NACD   A &NAR"
   Rep;Color=Orange;Time=5;   "V &NSFV   F &NSFF   E &NSFE"
   Rep;Color=Orange;Time=5;   " .... Break ...."
   }
SystemClosed
   {
   Gong=Normal&DOUBLE;Color=Orange;Time=5;
                              " .. Group closed .."
   Rep;Color=Orange;Time=5;   "Time: &ST"
   Rep;Color=Orange;Time=5;   "W &NWL   C &NCC   L &RSL3%"
   Rep;Color=Orange;Time=5;   "T &NACW   D &NACD   A &NAR"
   Rep;Color=Orange;Time=5;   "V &NSFV   F &NSFF   E &NSFE"
   Rep;Color=Orange;Time=5;   " .. Group closed .."
   }
SystemOpen
   {
   Gong=Normal&DOUBLE;Color=Orange;Time=5;
                            ". Group is open ."
   Color=Orange;Time=5;     "Time: &ST"
   goto=EventNormal
   }
```

Event Group Alarm Statuses

These events are freely defineable and activated by a threshold.

```
AlarmSL3
   {
   Gong=Normal&SINGLE;Color=RED;Flash;Time=5;   "SL is low"
   Color=RED;Time=5;        "S-Level 3 -> &RSL3%"
   Rep;Color=RED;Time=5;    "W &NWL   C &NCC   L &RSL3%"
   Rep;Color=RED;Time=5;    "T &NACW   D &NACD   A &NAR"
   Rep;Color=RED;Time=5;    "SL is low"
   }
AlarmExtremSL3
   {
   Gong=Loud&TRIPLE;Color=RED;Flash;Time=5;
                            "! SL too low !"
   Color=RED;Time=5;        "SL dangerous &RSL3%"
   Rep;Color=RED;Time=5;    "W &NWL   C &NCC   L &RSL3%"
```

```
   Rep;Color=RED;Time=5;    "T &NACW   D &NACD   A &NAR"
   Rep;Color=RED;Time=5;    "! SL too low !"
   }
AlarmAgents
   {
   Gong=Loud&Double;Color=RED;Flash;Time=5;
                            "! Agent Alarm !"
   Color=RED;Time=5;        "! too few agents !"
   Rep;Color=RED;Time=5;    "W &NWL   C &NCC   L &RSL3%"
   Rep;Color=RED;Time=5;    "T &NACW   D &NACD   A &NAR"
   Rep;Color=RED;Time=5;    "! Agent Alarm !"
   }
```

Global Walldisplay

Besides the above control file for wall displays each bound to an ACD Group it is also possible to bind a wall display for global call center data directly to the call center. For this purpose the control file …`\res\acd\GlobalDispl.Ini` is used. The control file structure corresponds to the one just described. However, here only two events exist which are structured per default as follows:

```
EventStart
   {
   Gong=LOUD;Color=Rainbow;Time=5;    "CC: '&SN'"
   Color=Rainbow;Time=5;              "Time: &ST"
   Goto=EventNormal
   }
EventNormal
   {
   Rep;Color=Green;Time=5;  "Ag  R &NAR   N &NNA"
   Rep;Time=5;              "Ca  A &NCA   L &NLC   C &NAC"
   Rep;Time=5;              "Tr  L &NTL   U &NTC"
   }
```

21.3.5 ACD Script Parameter

The actual script parameters are stored in the registry value ParamBlock. Per line one parameter is stored in the format

<*Parameter*>=<*Value*>

In the following find all possible ACD Script parameters and their significance. Most of them can also be set via the MRS Monitor´s graphic user interface per configuration of the VM APL.

AcdAddr=<*MRS Address*>

Call center MRS Address itself. This line logs the ACD Script on to the MRS Server to receive e.g. messages (email, fax and voicemail) for the individual ACD Groups. Must not be altered!

Default: `NVS:ACD`

BusyDev=<*Number*>

Hereby a calling number can be set to which the call center can rout calls to signal the status "busy" to the respective callers. In priciple this is an analog terminal device with the receiver permanently picked up.

The number specified here is the extension number assigned to the E script protocol `Busy.E`.

XmrTopic=<*String*>

Topic under which ACD Script entries are displayed in the MRS monitor as VM APL subdomain.

Default: `ACD`

CtiAddr=<*MRS Address*>

MRS address where the ACD Script sends transactions to in order to take on the control and monitoring of the call center PBX. With the Siemens Hicom 150 this is e.g. the CTI APL which enables this functionality via the TAPI driver by Siemens.

Default: NVS:CTI

DlgAddr=<*MRS Address*>

MRS address where the ACD Script sends transactions to in order to have announcements played. This is usually performed via the script protocol `ACD-LOOP` which with the Siemens Hicom 150 call center solution is installed e.g. via the Dialogic APL.

Default: `NVS:ACDLOOP`

WallAddr=<*MRS Address*>

MRS address where the ACD Script sends transactions to in order to address the wall display.

Default: `NVS:WALL`

TrunkDev=<*Number*>**,**<*From*>**-**<*To*>

Comma separated list of numbers or number ranges under which the PBX can be reached from outside. These lines must be monitored in order to e.g. register the duration of a telephone conversation with a remote agent.

Default: 7831-7832

RoutDev=<*Number*>**,**<*Number*>

The ACD Script uses two analog ports within the PBX to direct calls to a remote agent. Since it is unknown whether the remote agent is not busy on another line when the assignment is made the call is at first routed to one of these switching ports immediately followed by a “consultation” of the remote agent´s telephone. If the agent is reachable via this telephone he receives the call from the switching port. Otherwise the call could be taken away from the switching port again and assigned to another agent. In this way callers will not hear an engaged tone after the assignment.

Default: 124,125

PlayDev=<*Number*>**,**<*Number*>

For a call center several announcement ports are used via which a caller e.g. hears a greeting. With the Hicom 150 solution e.g. four analog announcement ports are used which are configured here. If you wish to use only specific or other announcement ports deviating from this global configuration for a certain ACD Group the corresponding configuration can be performed with the ACD Group.

The announcement ports are defined separated by a comma in the flollowing way:

<*Device*>`[=`<*MaxCalls*>`:`<*WaitTime*>`]`

<*Device*> is the number under which this announcement port can be reached.

<*MaxCalls*> is the maximum number of calls that can simultaneously be switched to this announcement port thus the same announcement is played in each case.

<*WaitTime*> is the period the ACD Script waits to collect further calls where the same announcement is to be played.

Default: 126,127,128,129

DisplFile=<*File*>

Control file for the agent telephone display. The entry is relative to path <*MRS Root*>`\RES\`. (see page 373).

Default: `acd\TelDispl.Ini`

WallDispl=<*File*>

Control file for the wall display of call center ACD Groups. The entry is relative to path <*MRS Root*>`\RES\`.(see page 380).

Default: `acd\WalDispl.Ini`

GlobalDispl=<*File*>

Control file for the call center gobal wall display. The entry is relative to path <*MRS Root*>`\RES\`. (see page 384).

Default: `acd\GlobalDispl.Ini`

GlobalWall=<*Number*>

Wall display address which can be used for the output of global call center data. The address is the USER portion of a wall display MRS address. Generation of the wall display address occurs automatically by the Wall APL which assigns 0 to the first connected device, 1 to the second etc.

Default: "" (empty, no wall display)

CampKeys=<*String*>

Is used internally if campaigns are to be generated per email. Do not modify!

Default: `CAMPAIGN`

PickTimeout=<*Seconds*>
TimeoutState=<*Status*>

If an agent does not answer a call assigned to him after *PickTimeout* seconds (default: 15 seconds) the call is redirected and the agent is set to status *Timeout-State* (default: `BREAK`) as he is apparently not 'Ready'. The possible statuses are described further above with ACD_STATUS (see page 349).

RoutMode=<*Mode*>

Here the standard assignment mode is specified. Valid values for <*Mode*> are `LONGESTIDLE`, `CYCLE` or `LINEAR`. This assignment mode can individually be adapted for each ACD Group later on.

Default: `LONGESTIDLE`

The MRS ACD Script controls a number of assignment modes:

- Based on the agents´ skills.
- Based on agents permanently assigned to an ACD Group.
- Longest Idle
- Cyclic assignment

- Linear assignment
- Assignment to local or remote agents.
- Assignment depending on the agent´s status.

Internally the VM APL executes the assignment of jobs to agents in three steps:

- Generating the internal <*TopList*> of available agents.
- Determining the <*RoutingPoints*> when a job or call comes in and needs to be assigned.
- Selecting an agent from the possible ones by means of “Longest Idle“, “Cyclic“ or “Linear“.

Generating the internal <*TopList*> **of available agents**

Because the ACD Script supports the skill based assignment we do not have a 1:N link of the ACD Groups with agents but a N:M link.

In order to be fast and to provide the ACD Supervisor with the best possible overview of available agents the ACD Script administers these in an individual internal list for each ACD Group. These lists are called <*TopList*>. They are generated when the system is started and updated whenever an agent changes his status, e.g. logs in or logs off.

Determining the <*RoutingPoints*>

With incoming calls the ACD Script checks the corresponding <*TopList*>. Subsequently it determines a value for each possible agent, in other words his <*RoutingPoints*>. For the individual factors that are considered in this process see page 352. All these factors can individually be adapted for each ACD Group.

Furthermore the following conditions must be fulfilled:

- The agent must be in a valid status, see also the database field ACD_ONLREADY.
- The automatic after call work time is not running. This condition becomes meaningless through the appropriate selection of ACD_ONLREADY.
- The agent has a valid and active internal monitor point or he is a remote agent.
- The agent is not processing another call. This condition becomes meaningless through the appropriate selection of ACD_ONLREADY.

The appropriate selection of factors for internal and remote agents enables the preferred assignment of calls to the corresponding agents. An agent preference can also be performed when an ACD Group consists of permanent members and of agents assigned to this group due to their skills.

After this assignment phase it is likely that several agents have the same value. This requires taking the following step.

Final Agent Determination

During the first assignment phase each agent received a value and it is quite likely that several agents emerged from this process with the same one. Just consider a group of agents with the same skills and status.

Therefore another assignment phase is necessary. In this phase three modes are supported by the ACD Script which on the one hand are globally predefined but on the other hand can also individually be adapted for each ACD Group.

- **Longest Idle**
  Each agent has a time stamp set by his last ACD job. This time stamp is independent from the ACD Group. So if an agent is assigned to several ACD Groups he has the same time stamp for all of them. The time stamp is set when the agent hangs up the phone after the last answered call.

  When a new call comes in it is assigned to the agent with the oldest time stamp.
- **Cyclic Assignment**
  The ACD Script picks in turn the next agent in a loop. In the event that this agent cannot answer the call because the caller hung up the phone before the agent could react the next call is not necessarily assigned to this agent again.
- **Linear Assignment**
  The administrator can assign a position to each agent in the user database per numeric value (see `ACD_ONLLINEARPO` on page 350). If several agents with the same value have been found the one with the lowest position is assigned the call.

The assignment mode can at times be changed by thresholds or time profiles!

Assigning Messages resp. Campaigns

Assigning message or campaign jobs is done in a similar way as with calls. Here as well a value is at first determined for each agent and in a second phase the agent is selected. The differences are:

- Fewer factors are taken into account to determine the <*RoutingPoints*> : <*Skill*>, <*FixAgent*>, <*InternalAgent*>, <*ExternAgent*>
- Definition of the agent´s “Ready” status:
  The agent must be logged in and accept “messages” resp. “campaigns”. Furthermore he must not exceed the maximum number of the corresponding jobs (`ACD_MAXSFJOBS`, `ACD_MAXCAMPJOBS`).
- In the “Longest Idle“ mode each user has his own time stamp for call, message and campaign jobs. So if an agent has just finished processing a call he might well assign the next incoming message if he is the one not having received a call longest.

All these time stamps are stored in the database fields `ACD_LASTACTION`, `ACD_LASTOFFACT` and `ACD_LASTCAMPACT` for each agent.

RoutMask=<*Internal*>

Internal mask for factors that are to be taken into account for routing definition. Since the individual factors can be set to 0 for each ACD Group, thus being made ineffective, modifying this parameter should never be necessary.

PbxType=<*PBX*>

PBX used for a call center. Because each supported PBX requires special adaptations not any type can be used. Supporeted PBXs:

Value	PBX
HICOM150	Siemens Hicom 150

Default: HICOM150

22 Report APL

The Report APL provides an easily configurable means for accessing internal MRS Server data. This data is compiled in an easy to read format and can be sent to any MRS Address.

The Report APL uses the program Crystal Reports from Seagate-Software for the creation of report layouts and for static editing. The preparation of new report layouts is accomplished through the use of the Crystal Reports Designer. The layouts are based on database tables, but contain only the name of the database field as place holder for data that is to be processed. The data preparation is done through use of a Runtime module which is used by the Report APL. An existing database is required for the creation of the layout, but the database does not necessarily have to contain any data.

Data can be assigned to these layouts at a later time by the Report APL, and depending upon the configuration, be prepared for export and dissemination. For this procedure the Crystal Reports Runtime Engine, which was included in the Report APL installation is used. The Crystal Reports Designer is not required.

Report creation possibilities is directly dependent upon the type and availability of data. The MRS Databases `CORREL`, `JOURNAL` and `GEB` are currently available for reporting.

22.1 DBase Export Database Description

The internal MRS databases are partially exported as DBase databases so that they can be used in Crystal Report layouts. The various fields are described in the following sections.

22.1.1 The CORREL.DBF database

This database contains correlation data records from the internal MRS database `CORREL`.

Basically, Each data record defines a field in an address book entry, and is used for the storage of various types of correlation information (address books, user privileges, privilege lists, fax cover sheet data, etc.), and their relationship to one another.

Example

Correlation data records represent various portions of an object. In an address book for example, the user `(USER)` “Mayer” could be identified either through the (NAME)

"Bill Mayer" or the assigned fax G3 (FAXG3) number "4912345678". Two correlation data records describe the relationship:

Field/Column	Data Record1	Data Record 2
DOMAIN		
CLASSNAME	USER	USER
CLASS	MAYER	MAYER
KEYNAME	NAME	FAXG3
KEY	Bill Mayer	4912345678

The following table describes the individual fields resp. tab separated columns of a correlation data record:

Field/Column	Description
DOMAIN	The address book context in which this data record is stored. This field remains empty by several current SMI 2.0 applications. The MRS kernel automatically delivers a default domain entry. Data records with the class name USER, RUND (distribution list) or GLIST are assigned DOMAIN <*Nodename*>, all other data records with an empty DOMAIN field are assigned <*Nodename*>/$SYSTEM.
CLASSNAME	CLASSNAME, CLASS, KEYNAME and KEY define an element of a correlation information object. Example for CLASSNAME: USER, PRIVILEGES, FAXCOVER.
CLASS	A further sub-classification for information given under CLASSNAME. If for example CLASSNAME contained the entry USER, a MRS user name would also be found in CLASS e.g "MAYER".
KEYNAME	A further sub-classification for information given under CLASS. The triplet CLASSNAME, CLASS and KEYNAME are unique and therefore define an unique data record.
KEY	Values are also assigned the unique triplet CLASSNAME, CLASS and KEYNAME. These values are not unique, so that they can be assigned various triplets consisting of CLASSNAME, CLASS and KEYNAME.

22.1.2 The GEB.DBF Database

This database contains correlation data records from the internal MRS database `GEB`. Billing information is stored in this database. If the billing options of the MRS Server are activated, a `GEB` data record is created for all transmission jobs. The following table describes the individual fields resp. tab separated columns of a `GEB` data record:

Field/Column‘	**Description‘**
`G-ORIGIN`	Owner/Originator of a transmission job, thus the MRS address of the originator. This field is used as a database key to determine the outbound journal of users. Example: `NVS:SERVER/POSTMASTER`
`RECIPIENT`	Owner/Originator of a transmission job, thus the MRS address of the originator. This field is used as a database key to determine the inbound journal of users. Example: `NVS:FAXG3/491234567890`
`COSTOWNER`	Cost center.
`COST`	Local currency used in billing computations.
`GEBEH`	Number of pulses registered during a transmission job.
`TIME`	Start time of transmission.
`DURATION`	Duration of transmission in seconds.
`FLAG`	Can be used for marking internal billing status.
`GMID`	Associated message ID. (See `MID` in `JOURNAL.DBF`).

22.1.3 The JOURNAL.DBF Database

This database contains those data records found in the global server journal. The following table describes the individual fields resp. tab separated columns of a JOURNAL data record:

Field/Column	Description
MID	Data record message ID. Message IDs are assigned by the kernel and are unique. Since all documents are sent through the kernel, even received documents forwarded to another user are considered a transmission job and assigned an individual message ID. Message IDs are also required for all reports and references in a journal entry. The MID field is set to 0 by the transmitting APL when a message is sent and a unique message ID subsequently assigned by the kernel.
ORIGINATOR	MRS Address of the message originator after any rule modifications. The fixed portion of the MRS Address “NVS” is not saved in the journal.
OWNORIG	Original MRS Address of the message originator. The fixed portion of the MRS Address “NVS” is not saved in the journal. This field is used as a database key to determine the outbound journal of users.
RECIPIENT	MRS Address of the message recipient after any rule modifications. The fixed portion of the MRS Address “NVS” is not saved in the journal.
OWNRECIP	MRS Address of the message recipient. The fixed portion of the MRS Address “NVS” is not saved in the journal. This field is used as a database key to determine the outbound journal of users.
SUCCESS	Transmission job status code TS_SUCCESS. 0 – TS_SUCCESS_UNDEFINED To date no report sent. 1 – TS_SUCCESS_UNKNOWN To date reports were sent for informational purposes only. The transmission job success status is unknown. A typical example of these reports is: “Started sending...”

Field/Column	Description
	2 – TS_SUCCESS_OK Document successfully delivered to the recipient. 3 – TS_SUCCESS_FAILURE Original transmission and all re-transmission attempts have failed. 4 – TS_SUCCESS_REJECT Due to missing resources, the APL is currently not able to complete the transmission job and the kernel should attempt to retransmit the document at a later time. The repeat counter is not increased through a report of this type. If this report is continually returned to the kernel, the kernel will repeatedly retransmit the transmission job to the APL. A typical example of a REJECT report is when the internal initializing of an APL is not complete and a transmission job is received from the kernel. Since the kernel exclusively handles all REJECT reports, an APL may generate a REJECT report but will never receive one. 5 – TS_SUCCESS_REPEAT A transmission job fails due to an external error. The kernel will attempt to retransmit the job at a later time in accordance with those criteria set forth in the repeat strategy. The number of repeat attempts is limited so that when the maximum number of attempts has expired, a FAILURE report will be sent to the message originator by the kernel. An example of this could be a busy signal by the intended recipient when a document is to be transmitted. Since the kernel exclusively handles all REJECT reports, an APL may generate a REJECT report but will never receive one. 6 – TS_SUCCESS_DELAYED A SMI transport attempts to deliver a document to a client which is not online. In this case a FAILURE report would not be generated since the document is in the inbound journal of the client. This state will not be changed to OK until the document is transferred to the client.
TIME	Time at which the document was sent. This time is set by the APL which sends the document.

Field/Column	Description
STATE	Transaction state as text message in the server language.
FORMAT	Document format. A list of possible formats can be found on page 429.
LENGTH	Length of the file in bytes.
DELFLAG	A mask from type T_DELETE with DELETE_* markers. Various DELETE_* markers represent various views of the delete state of a document. If message originators delete a document from the outbound journal the marker DELETE_ORIGINATOR would be set. If the recipient deletes a document from the inbound journal the marker DELETE_RECIPIENT will be set. 0xFFFF – DELETE_PHYSICAL Read: All data records Delete: In addition to setting the marker the data record is physically deleted. Should only be implemented by an experienced administrator! 0x0001 – DELETE_SOFT Not used in journal entries. Read: Only data records not marked with the DELETE flag. Delete: Marks the data record as deleted. 0x0001 – DELETE_ORIGINATOR Only for journal data records. Read: Documents not deleted by the originator. Delete: Deleted by document originator. 0x0002 – DELETE_RECIPIENT Only for journal data records. Read: Documents not deleted by the recipient. Delete: Deleted by document recipient. 0x0004 – DELETE_ARCHIVIST Only for journal data records. Read: Data records not filed to an archive. Delete: Data records are filed to an archive. 0x0008 – DELETE_POPPER Only for journal data records. Read: Only documents not polled by a POP3 client. Delete: Documents polled by a POP3 client.

Field/Column	Description
FLAGS	Status code TS_FLAGS. A logical OR is used by the kernel for new flags with existing flags. Once a flag is set it cannot be reversed. 0x00000001 – TS_FLAGS_READ Document read. 0x00000002 – TS_FLAGS_ARCHIVE Document filed to archive. 0x00000004 – TS_FLAGS_PRINTED Document printed. 0x00000008 – TS_FLAGS_COST Document has been booked in the billing database. 0x00000010 – TS_FLAGS_CARBONCOPY Document is a carbon copy. 0x00000020 – TS_FLAGS_EXLINE Document is given with an explicit CLASS portion in the MRS address. 0x00000040 – TS_FLAGS_CIT CIT Signal is set. 0x00000080 – TS_FLAGS_EXTERNCOPY Document is copied through the router. 0x00000100 – TS_FLAGS_HIDE Hidden document. 0x00000200 – TS_FLAGS_DONTFORWARD Document is not forwarded. 0x00000400 – TS_FLAGS_NODELMID Message ID is externally created. 0x00000800 – TS_FLAGS_NODELDO Document is not deleted after physical removal from the journal. 0x00001000 – TS_FLAGS_FORM These documents are created as a template.

Field/Column	Description
	0x00002000 – TS_FLAGS_MAXREPSFAIL Document status is FAILURE. Maximum number of repeat attempts has been reached.
	0x00004000 – TS_FLAGS_AUTOTIMECPY Document created through an AWAKE-Routing Rule.
	0x00008000 – TS_FLAGS_FLAG1 User configurable routing rule flag.
	0x00010000 – TS_FLAGS_FLAG2 User configurable Routing Rule flag.
	0x00020000 – TS_FLAGS_VFSROUT Document routed by a VFS-Script protocol.
	0x00040000 – TS_FLAGS_XVFS Obsolete. No longer used.
	0x00080000 – TS_FLAGS_GATE Document was routed through a MRS gateway (Remote System Link).
	0x00100000 – TS_FLAGS_OWNRECNRT Recipient determined by MTA.
	0x00200000 – TS_FLAGS_CONFIDENTIAL Document is marked as confidential.
	0x00400000 – TS_FLAGS_ISLOCALUSER Target address must be a local user.
	0x00800000 – TS_FLAGS_VFSAUTODEL Document deleted by VFS Script after successful delivery.
	0x01000000 – TS_FLAGS_NOPREFERRED *Preferred*-Routing Rule no is longer in use.
	0x02000000 – TS_FLAGS_ADMINDELETE Document deleted by a maintenance task to free harddisk resources.
	0x04000000 – TS_FLAGS_PARTIALCONVERSION This document may be partially converted.

Field/Column	Description
	0x08000000 – TS_FLAGS_FLAGGED This document marked as received from a IMAP4 client.
	0x10000000 – TS_FLAGS_NOTRECENT This document polled by an IMAP4 client.
	0x20000000 – TS_FLAGS_RESETCIT CIT signal reset by receipt of this report.
	0x40000000 – TS_FLAGS_MERGED OK and READ-Reports have been merged into one report. No separate delivery or read reports.
	0x80000000 – TS_FLAGS_DONTREPORT No reports created for this document.
SUBJECT	Email subject line.
COSTINFO	Transmission costs in local currency for send job.
COSTOWNER	Cost center.
PRIORITY	Delivery priority of type TS_PRIORITY.
	1000 – TS_PRIORITY_URGENT Highest standard priority.
	4000 – TS_PRIORITY_HIGH High standard priority.
	5000 – TS_PRIORITY_NORMAL Standard priority
	6000 – TS_PRIORITY_LOW Low priority.
	10000 – TS_PRIORITY_NIGHT Priority which allows Routing Rules to determine most cost effective transmission time (night).
FINALREPS	Number of redial attempts.
PAGESEND	Number of sent fax pages.
PAGERECIVE	Number of received fax pages.
ORIGSRVC	NODE portion of the MRS address (Originator).

Field/Column	Description
SOURCE	USER portion of the MRS address (Originator).
RECIPSRVC	NODE portion of the MRS address (Recipient).
DEST	USER portion of the MRS address (Recipient).

Remark

The syntax of MRS addresses can be found on page 25 of this manual. The fixed portion (NVS) of a MRS address is not stored in a journal database entry. The maximum length of a MRS address (SMI_ADDRESSLEN-1) is currently 63 characters. The maximum length of the NODE.CLASS portion (SMI_KEYNAMELEN-1) is 15 characters.

22.2 Registry Entries

22.2.1 Data Basis

The following *Values* are found in the *Key*

HKEY_LOCAL_MACHINE\Software\PP-COM\MRS\RepApl\DB

Time Selections REG_MULTI_SZ

Format: *Digits,Path,Century,Year,Month,Day,Hour,Minute,Second,Timezone,Century,Year,Month,Day,Hour,Minute,Second,Timezone,*

The first parameter *Digits* identifies database exports which are found under the second parameter *Path*. The other parameters define the time range of the report.

Use Foreign Exports REG_DWORD *0 or 1*

This value defines whether foreign database exports should be included when caching.

22.2.2 Jobs

The following *Values* are found in the *Key*

HKEY_LOCAL_MACHINE\Software\PP-COM\MRS\RepApl\Job

JID REG_DWORD

The highest ID number of all currently defined report jobs.

Job List REG_MULTI_SZ

List of all currently defined report jobs.

22.2.3 Configuration of the Individual Jobs

Every job has the *Key*

`HKEY_LOCAL_MACHINE\Software\PP-COM\MRS\RepApl\Job\<`*JID*`>`

which contains the following *Values*.

CR Export Destination REG_SZ *Path\Filename*

This value defines where the completed job is stored, and how it is to be named. The file extension is automatically appended and is dependent upon the selected export format.

Example: `d:\mrs\res\crw\out\output`

CR Export Format REG_DWORD

This value defines the export format of the report job.

Value	Export Format	Extension
0	Rich Text Format	RTF
1	Hypertext Markup Language	HTM
2	Tab Separated Values	TSV
3	Comma Separated Values	CSV
4	Text	TXT
5	Winword Document	DOC
6	Excel 5 Sheet	XLS
7	Fax G3	FG3
8	Fax G4	FG4
9	Fax G3 TIFF	FAX
10	Fax G4 TIFF	FAX

CR Export Mode REG_DWORD

Export is by default to a file. Reports can also be directly exported to either Lotus Notes or Microsoft Exchange.

Value	Export to
0	File
1	Lotus Notes - Currently not implemented.

Value	Export to
2	Microsoft Exchange - Currently not implemented.

CR Layout REG_SZ *Path\Filename*

The Report Layout file is configured here. This file was created by Crystal Report Designer

Example: `d:\mrs\res\crw\Dbase.rpt`

DB Data Sources REG_DWORD

Used data source. When more than one source is used, the source values are added together.

Value	Data Source
1	Correlation
2	Journal
4	Charge

DB Export Destination REG_SZ *Path*

Files that were created by the export from the data source are stored here. The path must end with a *Backslash*.

Example: `d:\mrs\res\crw\in\`

DB Export Hidden REG_DWORD *0 or 1*

Hidden journal entries would also exported when set to `1`.

DB Export only REG_DWORD *0 or 1*

When set to 1, only one instance of a data source is exported. This is useful for establishing a basis for new report layouts.

DB Time Select Fixed Offset REG_DWORD

Through the selection of a time range, only data from the data source that falls within this range would be exported. This applies only to data sources where a meaningful application exists.

This offset is required when DB Time has a value between 6 and 10. In other words, when a fixed unit of time is configured. With a value of 0, no access to a cached database can occur.

Value	Offset from Time
0	Current
1	Last complete
2	Next to last complete
…	etc…

DB Time Select from REG_SZ

Format: *Century,Year,Month,Day,Hour,Minute,Second,Timezone,*

All values must be comprised of 2 digits. This entry is required when DB Time Select Mode has a values of 1, 2, or 5. This entry fixes the start time within the time range.

DB Time Select Mode REG_DWORD

This entry sets the mode of the time range definition. No caching is available for values where the current time is involved.

Value	Mode
0	All available data records are exported
1	Start time till end time
2	Start time + offset
3	End time - offset
4	Current - offset
5	Start time till current time
6	Time unit in hours
7	Time units in days
8	Time units week
9	Time units months
10	Time units years

DB Time Select Range REG_DWORD

This entry is required when DB Time Select Mode has a value of 2, 3, or 4. This entry fixes the offset of the time range.

DB Time Select to REG_SZ

Format: *Century,Year,Month,Day,Hour,Minute,Second,Timezone,*

All values must be comprised of 2 digits. This entry is required when DB Time Select Mode has a values of 1 or 3. This entry fixes the end tine within the time range.

Description REG_SZ

Text description of the report.

Error Handling REG_DWORD

Error handling for failed reports. This option is currently not implemented.

ID REG_DWORD

This number is the unique job identification. This ID simultaneously forms the representation of this key in the Windows NT registry. A list of all configured jobs can be found in the value Job List.

Last Result REG_DWORD

This value is only set for those report jobs that are repeated at regular intervals. This value shows the status of the last executed run.

Value	Status
0	Error
1	None
2	Active
3	Executing
4	Finished
5	Canceled
6	Hold

Name REG_SZ

Report job name

Recipients REG_MULTI_SZ *0 or 1,<MRS Address>,*

Report job recipients are listed per line. Addresses can be individually activated through this flag.

Repeat Custom Days REG_DWORD

For use with user defined repeat intervals. This offset is expressed in days.

Repeat Custom Hours REG_DWORD

For use with user defined repeat intervals. This offset is expressed in hours.

Repeat Custom Minutes REG_DWORD

For use with user defined repeated intervals. This offset is expressed in minutes.

Repeat Mode REG_DWORD

Repeat mode for these report jobs. An entry of None signifies that the report job would only be executed once. A value greater than 0 must be present for any on the three user defined repeats modes.

Value	Repeat Mode
0	None
1	Hourly
2	Daily
3	Weekly
4	Monthly
5	Yearly
6	User defined

Start Now REG_DWORD *0 or 1*

When set to 1 the report job is immediately executed or the value from Start Time would be used.

Start Time REG_SZ

Format: *Century,Year,Month,Day,Hour,Minute,Second,Timezone,*

All values must be comprised of 2 digits. This is the start time at which report jobs are executed.

Status REG_DWORD

A report job has a definite status, at every point in time. With the exception of Last Result, the status “None” does not occur.

Value	Status
0	Error
2	Active
3	Executing
4	Finished
5	Canceled
6	Hold

22.2.4 Default Layouts

The following *Values* are found in the *Key*

`HKEY_LOCAL_MACHINE\Software\PP-COM\MRS\RepApl\Layout`

Count REG_DWORD

Number of existing default layouts.

Location REG_SZ *Path*

All default layouts must be in this directory. It should be observed that the path must always end with a back slash (\).

Example: `d:\mrs\res\work\crw\`

22.2.5 Default Layout Configuration

For each default layout there is a *Key*

`HKEY_LOCAL_MACHINE\Software\PP-COM\MRS\RepApl\Layout\`
<Layout Nr>

with the following Values.

Comment REG_SZ

Comment to the default layout.

Data Sources REG_DWORD

All data sources that are used in the report are given here. When more than source is used, the values would be added together.

Value	Data Source
1	Correlation
2	Journal
4	Charge

Name REG_SZ

Default layout name. The file extension must be `.RPT`.

Example: `SysDsn.RPT`

23 Remote Administration of a MRS Server

In comparison to QNX based NVS systems, is the remote maintenance of a MRS Server not possible with internal MRS tools, but with the services provided by Windows NT.

Windows NT has the capability to temporarily connect two physical networks with one another. Currently this is only possible over a modem or ISDN card.

The remote connection functions of MRS Servers that are to be remotely administered should be thoroughly tested prior to their delivery. Errors in the Server configuration can only be corrected on site with help of the local system administrator.

“Remote Access Services” must be installed on the computer of the service technician as well as on the server that is to be maintained. The following points should be observed:

- The computer of the service technician should only be configured for outgoing traffic by remote access. This will prohibit any security breaches.
- On both the technicians computer as well as the server the protocols TCPIP and SPX/IPX should be installed. Problems could arise by the Windows name resolution if the TCP/IP is only available as a shared protocol.
- A local account should be installed on the MRS Server for the technician with all administrative authorities. This account should be the only one that can access the MRS Server per remote access.
- To satisfy the security requirements of the customer, a fixed call-back number should be installed for the service account. This guarantees that only the service computer can be connected to the MRS Server over this connection.
- The possibility also exists to limit the use of the remote access service. This is also an important option that guarantees more security for the customer.

The installation of the remote access service is not always without its problems. The most reoccurring problem is the recognition of the dialtone from the telephone system.

Under Windows NT Version 4.0, the option “Wait for dialtone” or not is available in the modem configuration. This option is unfortunately hidden in a confusion of dialog boxes: **Control Panel→Modems→Properties→Connection→Call Preferences→Wait for Dialtone**.

The computer must be rebooted after changing this option in order for it to take effect.

With Windows NT Version 3.5x the solution to this problem is a bit more complicated since the above mentioned option is not available. In this case the modem driver file must be edited by hand. The file is found under

```
%SystemRoot%\SYSTEM32\RAS
```

and is named `MODEM.INF`.

Here is found the dial string of the modem. The entry `DT` should be replaced with `XDT`. In addition the following steps must be performed:

1. De-install the modem
2. Reboot the computer
3. Re-install the modem
4. Reboot the computer

Both Windows NT 4.0 and 3.5x offer the possibility of compiling log files for data exchange over the modem. This can be very useful for the analysis of connection problems.

At this point it should be reiterated that the transfer rate of the Remote Access connection be as high as possible, and for this reason, a connection over ISDN is preferred. If the ISDN card of the MRS Server does not allow a mixed operation of MRS and Remote Access (see ITK), the use of a terminal adapter (e.g. US Robotics Sportster TA) is suggested.

An important function of the telephone book from Windows NT Remote Access is the connection timeout. Unfortunately, remote access connections are sometimes forgotten by Windows. This can lead to extremely high telephone bills since the connection is not terminated.

The connection timeout is configured under **Accessories→Dialup-Network→User Preferences**. The **Idle seconds before hanging up:** must be larger than 0.

Attention:

All of the following examples operate on the assumption that the MRS Server has the computer name `MRSSERVER`, and that the maintenance account has the user name `MRS_SERVICE`.

A user name and password will be queried prior to the call set-up. This is the maintenance account on the MRS Server. After the successful completion of the call set-up the computers are then linked to one another.

The following command tests the connection and simultaneously opens a session with the remote computer:

```
NET USE \\MRSSERVER /user:MRSSERVER\MRS_SERVICE
```

If everything functions correctly, the password will be queried a second time. Two possible errors could occur: “The computer name could not be found” denotes that the network protocol is not functioning properly. It is sometimes necessary to repeat this command more than once, before a comparison of the names list is made. If the error

continues to occur, the protocol settings in the remote access server as well as in the telephone book of the service computer should be checked.

If the error (e.g. “Unknown user”, Password incorrect”, etc.) occurs, the spelling should be checked or the validity of the account.

Attention:

On a NT server that is a part of a domain, it is not always clear how local users are configured. Configurations for users are made with the “Usermanager for Domains”. The computer name must be entered under the dialog **User→Select Domain**. After completion we find ourselves in the local user list.

Attention:

If the maintenance account is a domain account the domain name of the customer would be used instead of `/user` as in the above example.

Since the maintenance account requires high authority to perform its functions, this solution is not recommended.

Attention:

Now is the time to review the main difference to normal maintenance under QNX. Windows NT remote access is not comparable to QNX or Telnet: one does not see the interface of the remote computer. Only a network connection exists.

The principle differences leads to problems with experienced UNIX (QNX) service technicians since actions are never directly executed on the remote computer, but given explicitly for the individual remote computer.

The following possibilities exist through the network connection:

- Inter task communication with the maintenance tool “MRS Monitor”
- File access to and from the MRS Server
- Access to the registry data base
- Access to the events log of the MRS Server
- Control (start, stop) of MRS services

23.1 The MRS Monitor

The use of the MRS Monitor represents the least challenge. During the connection set-up the name of the MRS Server is entered. Afterwards the work is similar to that of a local application. Attention should be given to the following:

- All paths that are to be entered are relative to the MRS Server and not to the computer of the technician!

- Data transfer per modem is not fast. Debug filters can quickly lead to line overloads.
- The service technician should create a set of useful MRS Monitor layout templates. The difference between a normal layout and a template is that the computer name is not stored, and is requested each time the template is opened.
- It is also possible reroute the connection from a MRS Server to another computer from the context menu of the Module window of the MRS Monitor.
- When using the MRS Monitor, the service technician should always have the Settings **Options→Module→Module-Cache** switched on. If not used, access to the configuration program of the MRS Monitor will be over the slower Remote Access connection.

23.2 File Access

Each NT computer gives the user with administrative authority certain shares, which enables the user to have direct access to all logical drives. The name of the share is comprised of the drive letter followed by a dollar sign. Drive C: of the MRS Server would be addressed as

```
\\MRSSERVER\C$
```

It is recommended not to assign drive letters to the drives on the service computer as this quickly leads to confusion. Working from the command line the service technician can use UNC names with the stipulation that only Commandline programs may be used (e.g. ZIP or UNZIP).

Here is an example of a possible command:

```
dir \\MRSSERVER\C$\MRS\BIN
```

or

```
copy c:\mrs\bin\PrintApl.exe \\MRSSERVER\C$\mrs\bin
```

The Windows NT 4.0 Explorer can be started with the following command

```
start explorer /e,/root,\\MRSSERVER\C$
```

displaying the indicated drive. Should it be necessary, drives can also be assigned a drive letter through the use of the following command:

```
net use * \\MRSSERVER\C$
```

or

```
net use * \\MRSSERVER\C$ /user:MRSSERVER\MRS_SERVICE
```

if one requires the authority of a certain user.

The asterisk signifies that the first available drive letter will be assigned. It is also possible to explicitly define the drive by entering a letter and colon.

To minimize the possibility of access errors or chaos on the service computer, all drive letter assignments should be canceled before terminating the remote access connection. This is accomplished with the command:

```
net use d: /delete
```

whereby d: is to be replaced by the assigned drive letter.

Attention:

The copying of files to the MRS Server can result in errors of failure if the target file is in use. In contrast to QNX, programs running under Windows NT are constantly accessing program files. Before copying executable files for updating purposes, the service that is to be updated must be stopped.

23.3 The Registry Editor

The values in the registration data base of the MRS Server can also be maintained per remote access. This is also accomplished local with the program `REGEDT32.EXE`. After starting the program various branches of the registry are displayed. Under **Registry→Select Computer** it is now possible to enter the name of the MRS Server. In most cases, a dialog box appears indicating that the automatic actualization of the window display is turned off. Since this is not possible over the network, a manual refresh must be made from hand so that the actual data can be seen. The **Refresh** option is found under the menu entry **View**.

From the remote MRS Server the `HKEY_LOCAL_MACHINE` and `HKEY_USERS` windows are displayed and can be administered as needed.

Attention:

Changes made to the settings of MRS services through the `REGEDT32` will (in most cases) only come into effect after a new start-up of the service.

Attention:

After administration has been completed through the `REGEDT32`, the open window to the remote server must be closed. The `REGEDT32` "remembers" this connection, and by a new start will block the system for several minutes even though the connection no longer exists. The windows can be closed in the normal manner e.g. **Registry→Close**, after which the automatic refresh should be re-activated.

23.4 The Event Viewer

The event log of the MRS Server can also be viewed. The command:

```
start eventvwr \\MRSSERVER
```

should be given to start the viewer. Other than connection associated delays, the operation is the same as a local application.

23.5 Starting and Stopping the MRS Services

In many service cases it is necessary to perform numerous shut-downs and re-starts of modules or the complete server. Locally this is done through use of **Control Panel→Services**.

Under Windows NT there is only one program available which allows for the shutting down or re-starting of other computers: The Service Manager. After selecting a computer it is possible under **Computer→Services** to shut down or re-start the various services.

Unfortunately, use of the Service Manager is not recommended for the following two reasons:

- The MRS Server must be in a domain in which the technician has active access.
- The enumeration of the computers listed in the Service manager requires a great deal of time. In a case where a modem is employed for a large domain, times exceeding an hour are not uncommon)

For these reasons the tool `SC` (Service Controller) is recommended.

The Service Controller is a command line utility which allows all operations in regards to services. The shortened name of the various services must be known to use the Service Controller effectively. The shortened names are found in parentheses next to the full name: "MRS SPX Transport Layer (SpxApl)".

The following examples show the three most important operations performed with the `SC`:

Stopping the SPX APL:

```
sc \\MRSSERVER stop SpxApl
```

Starting the SPX APL:

```
sc \\MRSSERVER start SpxApl
```

Query status of the SPX APL:

```
sc \\MRSSERVER query SpxApl
```

Attention:

In most cases when a service fails to start an error message is found in the Event Viewer under the “Applications Log”, if the error originates from a service itself, and if caused by outside interference (missing authorities, etc.) it would be found in the “System Log”.

23.6 The Ultimate Emergency

- Driver configuration
- System software updates
- System re-starting

Re-starting the system is by far the easiest task to perform. For this purpose the program `SHUTGUI.EXE` is available from the Windows NT Resource Kit. This program is completely interactive and requires no further explanation. It is suggested that the system administrator is on hand to observe the process.

For the other two problems it is suggested that any corrective action be taken on site.

Care should be taken when using remote access software (e.g SMS, pcAnywhere). Changes made to the system could result in a total system failure and the solution recognizable only by a person on site.

23.7 The last bit of advice

Every good technician has in their possession a set of disks with the current “Emergency Repair” disk as well as a “Disk Configuration Disk” for the customer. These disks can make the difference between a lengthy full installation (with data loss) or a relatively simple system repair.

Additionally, the latest MRS Software, drivers, Service Packs, and Hotfixes should always accompany the technician.

24 User Database Adaptations

24.1 Configuration of the New User Wizard

The new user Wizard simplifies the creation of a new user by suggesting many "sensible" configuration settings. It then guides the administrator through a step-by-step process of checking and configuring the required data.

The name and login-name of the new user is entered by the administrator. The Wizard searches (from the last assigned extension) for a free extension in the telematic number range. From this data, the Wizard generates all known and configured database entries through expansion of templates.

Known database entries are:

```
FAXG3          FAXG4
VOICE          ISDNTTX
EFT            TXSF
FAXG3-ID       FAXG3-HEADLINE
FAXG4-ID       ISDNTTX-ID
SMTP           EXCH
LN             MS
CC

PASSWORD       PIN

NAME           GROUP
MAILBOX        PREFERRED
```

The Wizard must be configured over the correlation database in order to create these database entries. Each APL creates the necessary database entries pertinent to its own operation.

If correlation database entries known to the Wizard contain no configuration information, they will not be applied and will not appear in the Wizard dialogs. One exception is in the case of `PASSWORD` and `PIN` which are always used and defaulted to an empty string.

The database entry `NAME` is set to the full name of the user, the `GROUP` according to the selection, the `MAILBOX` is set to the login name of the user, and `PREFERRED` is set to the `MAILBOX`.

The correlation database entry structure of the Wizard:

CLASSNAME	CLASS	KEYNAME	KEY
WIZARD	USER	*<DB Entry>*	*<Template>*

Example:

```
WIZARD      USER        FAXG3       4912345678%e
WIZARD      USER        FAXG3-ID    +49 1234 5678 %e
```

Each template is made up of simple strings and place holders. The syntax for the place holders is as follows:

`%[n][m]{v}` (`[n]` and `[m]` are optional, `{v}` is mandatory)

Place holder	Value	Significance
`[n]`	1…63	max. number of characters for this variable argument
`[m]`	a	Only lower case characters and digits
	A	Only upper case characters and digits
	s	Only alphanumeric characters
	c	Lower case, digits and other ASCII characters
	C	Upper case, digits and other ASCII characters
`{v}`	e	Current extension
	f	First name
	l	Last name
	n	First and last name
	u	Login-name

Percent signs within a template must be entered as: `%%`. Number ranges must also be specified with an entry

```
CLASSNAME   CLASS       KEYNAME     KEY
WIZARD      USER        EXTRANGE    [len];[first];[last]
```

e.g.

```
WIZARD      USER        EXTRANGE    2;11;99
```

for a range of two digit extension numbers between 11 and 99. If the number generated is less than `[len]` digits, it is padded on the left with zeros. The Wizard can only be started if this entry exists within the correlation database.

The Wizard must also know which entries are to be given in the selection box for the group of the new user. This is accomplished by creating the following correlation database entries:

```
CLASSNAME   CLASS       KEYNAME     KEY
USER        <Group Name>  ISGROUP     YES
```

e.g.

```
CLASSNAME    CLASS        KEYNAME      KEY
USER         USER         ISGROUP      YES
USER         SERVICE      ISGROUP      YES
USER         SUPERVISOR   ISGROUP      YES
```

24.2 Bitmaps in Fax Logos

Through the use of a database reference, bitmap images can be fastened to fax logos. With this technique, photos or signatures can be incorporated into fax logos.

Several entries must be made in the correlation database in order to make these images known to the server. Subsequently these image fields can be used exactly as other fields and embedded into fax logos.

The user database must be expanded with several data fields which later will contain the file names of the various images to be incorporated. Therefore the user database mask is exported using the command:

```
Infotool Maskexport File=user.mdl
```

to the file `user.mdl`. The utility Infotool is a part of the SDK Utilities. The mask format is described on page 64ff. By using a text editor the mask can be expanded with three new fields for images e.g private logo (`BMP-LOGO`), signature (`BMP-NAME`), and a photo (`BMP-PIC`). The only attribute to these fields is `CHAR`.

With the command

```
Infotool Maskimport File=user.mdl
```

is the expanded user database mask again imported into the database. These data fields must be inserted into the list of available data fields for cover sheets and logos. For this purpose a small text file (fc.txt) is created with four database entries per line and separated by exactly one tab.

```
CLASSNAME CLASS          KEYNAME   KEY
FAXCOVER  DBO(BMP-LOGO)  0         Originator Private Logo
FAXCOVER  DBO(BMP-NAME)  0         Originator signature
FAXCOVER  DBO(BMP-PIC)   0         Originator Photo
FAXCOVER  DBR(BMP-PIC)   0         Recipient Photo
```

For fax logos the field in `DBO()` is taken from the originators database entries, and `DBR()` from the database record of the recipient. Through use of the command

```
Infotool ClassImport Class=FAXCOVER file=fc.txt
```

this file is imported into the correlation database. Non-standard characters that are used in the description of a field which will later appear in insertable data fields must correspond and be coded in accordance with the codepage 437.

This process must be repeated for the classes `FC_ENGLISH` and `FC_GERMAN`. Therefore the file fc.txt has to be altered by replacing `FAXCOVER` with e.g. `FC_ENGLISH`. The field description in this case would be in English. When importing, the class must be changed from `FAXCOVER` to `FC_ENGLISH`. If an English client is logged-in the field description from `FC_ENGLISH` is displayed. Other available languages clients are dealt with in a like manner.

Entries for a bitmap file always begin with "`BMP-`". Only Windows Bitmap files in black and white may be used (**no greyscale!**).

The physical path and file name is contained in the user entry for the personal images on the server. Photos can be defined in the user database that will appear in the fax logo.

25 MRS Service Provider

The MRS Service Provider is used as a global sub-structure for all client applications e.g. Lotus Notes LSX, TrayPhone, Outlook CTI Extensions or the MRS Client.While several client applications can run on a computer simultaneously only one instance of the MRS Service Provider is available.

The following services are provided:

- Local database (cache)

  It is not necessary for a client application to keep an individual database up to date. If required the MRS Service Provider synchronizes its local database with the database of the MRS Server. Thereby the contents of the local database is made available to all client applications so that fast access is enabled anytime.

- Store & forward interface

  Client applications can send documents to or receive them from a MRS Server.

- Transaction interface

  Client applications can communicate with APLs of the MRS Server which support transactions.

The MRS Service Provider is available in two versions: as normal program executable on all Windows 32 Bit platforms and as Windows NT service. To install the latter one administrative privileges and as operating system Windows NT or Windows 2000 is required. The following table shows the executability on various operating systems:

Operating System	`MSP.EXE` **(Program) supported**	`MSPSVC.EXE` **(Service) supported**
Windows 3.x	No	No
Windows 95	Yes	No
Windows 98	Yes	No
Windows Millenium	Yes	No
Windows NT 4.0	Yes	Yes
Windows NT 4.0 mit Terminalserver	Yes[a]	Yes
Windows 2000	Yes	Yes

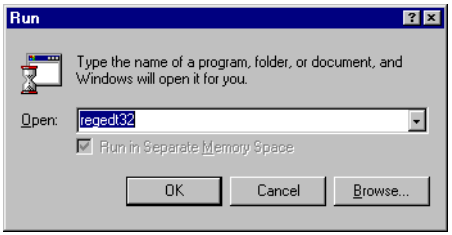
Operating System	`MSP.EXE` **(Program) supported**	`MSPSVC.EXE` **(Service) supported**
Windows 2000 with terminal server	Yes[a]	Yes

a. `MSP.EXE` should only be installed on the terminal server if you do not intend to have the MRS Service Provider be used by more than one user at a time. In case of doubt the MRS Service Provider should always be installed as service on the terminal server.

25.1 MRS Service Provider and TCP/IP APL on one Computer

If the MRS Service Provider is to run on the same computer as the MRS Server and the client application be connected via TCP/IP the TCP/IP APL must be assigned a different I/O port manually. Otherwise the MRS Service Provider would use the same port as the TCP/IP APL which is not possible.

This is what you do to change the port:



1. Open the Registry Editor through **Start → Run** and enter `regedt32` in the Open field.
2. Click on **OK.**
3. Open the key `Software\PP-COM\MRS\TcpApl\NwPlugTcp\` in the `HKEY_LOCAL_MACHINE` window.
4. Modify the value **`IoPort`** from 1107 (decimal) to 8944 (decimal).

Subsequently the TCP/IP APL of the server must be stopped and started again, meaning that you enter `tcpapl stop` and `tcpapl start` in the directory *<MRS Root>*`\bin` successively.

25.2 Registry Entries

25.2.1 Database

The following *Values* are found in the *Key*

`HKEY_LOCAL_MACHINE\SOFTWARE\Cycos AG\MSP\Database`

Directory REG_SZ

Directory in which the cTree database files are stored. Default: Sub-directory database from Module.

Example: `D:\msp\bin\database`

Enabled REG_DWORD *0 or 1*

Enables use of the database. If for example only an Applet is to be used, the database can be disabled by setting the value to 0.

Default: `1`

25.2.2 Server

The *Values* found in the *Key*

`HKEY_LOCAL_MACHINE\SOFTWARE\Cycos AG\MSP\Server`

are used for internal administration purposes by the MRS Service Provider. The keys and values available should never be modified. They are not documented here since they vary from system to system and beyond that alterations may occur without prior notice anytime.

25.2.3 Service Provider

The following *Values* are found in the *Key*

`HKEY_LOCAL_MACHINE\SOFTWARE\Cycos AG\MSP\ServiceProvider`

`ConfigDLL REG_SZ`

Path and file name of the Service Provider configuration DLL. This path is not only used by the MSP itself but also by the applets requiring this value to start the GUI based log-in and the MSP configuration.

Example: `D:\WINNT\System32\MSPCFG.CPL`

Inbound REG_SZ

Path under which the MRS Service Provider stores temporary and document files, normally the subdirectory `Inbound` of the MSP installation directory.

Example: `D:\Program\MSP\Inbound`

LogFile REG_SZ

Directory and file name for the Log file. Default: The same path as by Module with the attachment with `MSP.LOG`.

Example: `D:\msp\bin\Msp.log`

Logging REG_DWORD *0 or 1*

Writing a log file (1).

Default: 0

Module REG_SZ

Path to the Service Provider Program. This path is not installed by the MSP. When not already running, the first Applet started by the MSP will install the path. Default: The complete path to the MSP.

Example: `D:\msp\bin\Msp.exe`

Service REG_DWORD *0 or 1*

This value informs an applet of whether the MRS Service Provider is installed as program or service. The value is only generated by `MSPSVC.EXE` and should never be modified.

Default: 0 or not existing with `MSP.EXE`; 1 with `MSPSVC.EXE`.

25.2.4 Transport

The following *Values* are found in the *Key*

`HKEY_LOCAL_MACHINE\SOFTWARE\Cycos AG\MSP\Transport`

ServerCache REG_MULTI_SZ

Contains a list of all MRS Servers found during the installation. Format per entry:<*Server Name*>`@NVS:`<*Protocol*>`/`<*Network Address*>

Example: `INHOUSE@NVS:TCPIP/mrs.sample.com:1107`

25.2.5 SPX Transport

The following *Values* are found in the *Key*

`HKLM\SOFTWARE\Cycos AG\MSP\Transport\NVS:SPX`

AplBrowsePort REG_DWORD

The port number over which the SPX Transport APL can be contacted for purposes of localization. This value should never be modified.

Default: `0xA985`

AplBrowseTimeout REG_DWORD

Time in seconds after which the browsing process is terminated when no further servers are found in the network within the allotted time period. This value should not be less than 4 seconds.

Default: `4`

Enabled REG_DWORD *0 or 1*

Enables or disables the SPX Transport. Default: Dependent upon the local configuration and that of the network stack.

MspListenPort REG_DWORD

SPX port number over which the SPX APL is to contact the MSP (e.g. for active delivery).

Default: `0xA968`

RipBrowseTimeout REG_DWORD

Time in seconds after which a browsing process is terminated when no further routers are found in the local subnet within the allotted time period. This value should not be less than 2 seconds.

Default: `2`

RipMaxHops REG_DWORD

Defines the distance over which an IPX broadcast may be made when searching for another SPX APL in remote RipMaxHops network.

Default: `0xFFFF`

25.2.6 TCP/IP Transport

The following *Values* are found in the *Key*

`HKLM\SOFTWARE\Cycos AG\MSP\Transport\NVS:TCPIP`

AplBrowsePort REG_DWORD

The port number over which the TCP/IP Transport APL can be contacted for purposes of localization. This value should never be modified.

Default: `1107` (decimal)

AplBrowseTimeout REG_DWORD

Time in seconds after which the browsing process is terminated when no further servers are found in the network within the allotted time period. This value should not be less than 4 seconds.

Default: `4`

BindAddress REG_SZ

Interface IP Address on which the TCP/IP Transport is to be bound for communications with the TCP/IP APL. Legal values are: All available IP Addresses on the local (multihomed) system.

Default: `0.0.0.0`

Enabled REG_DWORD *0 or 1*

Enables or disables the TCP/IP Transport. Default: Dependent upon the local configuration and that of the network stack.

MspListenPort REG_DWORD

TCP/IP port number over which the TCP/IP is to contact the MSP (e.g. for active delivery).

Default: `8968`

UseNameServer REG_DWORD

Determines whether a qualified Domain Name or an IP Address is to be used as a server name. Default: Dependent upon the local configuration and that of the network stack.

25.2.7 User- Dependent Entries

The following *Values* are found in the *Key*

`HKCU\SOFTWARE\Cycos AG\MSP`

These entries are not generated by the MRS Service Provider but by applets or the MRS Service Provider configuration module `MSPCFG.DLL`. These entries should never be manually modified per Registry Editor!

DefaultProfile REG_SZ

Name of the default user profile.

HiddenServers REG_MULTI_SZ

List of servers that have been faded out of the list of displayed MRS Servers in the MRS Service Provider configuration module by means of the **Hide** button.

UserProfiles REG_MULTI_SZ

List of user profiles. Each entry has the format:

< *profile name*>,MRSUSER,MRSSERVER,<*encrypted password*>

26 Document Formats

26.1 Supported Document Formats

MRS supports various document formats. In most cases they are given in the form of an acronym when necessary. We differentiate between formats that can include other formats, so that an upper class is formed from text, graphic and audio formats. In addition there are also printer formats which appear only in connection with exported lines from the Print APL of the NVS Server.

Master Formats

Acronym	Format Description
BIN	All file formats not recognized by MRS. These could be Word files, Excel Sheets, … A conversion through the applications converter of the MRS Server is only possible to fax format.
EML	Internet MIME standard electronic mail format.
PMF	Cycos Multi Document Format. See section 26.2.

Text Formats

Acronym	Format Description
AS7	7-Bit ASCII
ASC	Text ASCII Character set (Codepage 437, Standard DOS Character set with IBM Symbols)
MIT	7-Bit ASCII coded 8-Bit Mime text. Display is as TXT.
TLX	Telex ITA2 Character set
TTX	Teletex T.61 Character set
TXT	Text ANSI Character set (Codepage 850, Standard Windows Character set)

Graphic Formats

Acronym	Format Description
BMP	Windows Bitmap. Result of fax conversion.

Acronym	Format Description
DCX	Multi-page PCX format (standard-Fax-Format from Microsoft)
FG3	Cycos Fax G3 Format
FG4	Cycos Fax G4 Format
BMP_COL	Fax data converted to Windows BMP standard. A trilinear gray scale interpolation is performed.
JPG	JPEG format.
PS	Adobe Postscript Format
TG3	Compressed multi-page TIFF Fax G3 Format
TG4	Compressed multi-page TIFF Fax G4 Format
TIF	Compressed single page TIFF fax format.
TIF_BMP	Bitmap fax data converted to a TIFF standard (non-compressed, multi-page).
TIF_MUL	Compressed multi-page TIFF fax format (obsolete and should not be used).

Audio Formats

Acronym	Format Description
AIFF	Audio-Format
AU	Audio-Format, found mostly in UNIX environments.
PCM	Cycos ISDN Voice PCM coding.
WAV	Windows wave RIFF audio format (not compressed)
`WAV_A`	Windows Wave RIFF Audio-Format (Compressed, A-Law encoded, 8 KHz Mono)
`WAV_MU`	Windows Wave RIFF Audio-Format (Compressed, µ-Law encoded, 8 KHz Mono)
`WAV_C`	Windows Wave RIFF Audio-Format (Compressed, non-`WAV_A` or `WAV_MU`)

NVS Printer Formats

The formats are only used by the Print APL of the NVS Server under QNX. In other words, only when a remote system link to a NVS Server exists.

Acronym	Format Description
PCL	HP-PCL 4 Printer language with additional Cycos information for the Print APL of the NVS Server.
PPS	Adobe Postscript Format with additional Cycos information for the Print APL of the NVS Server.

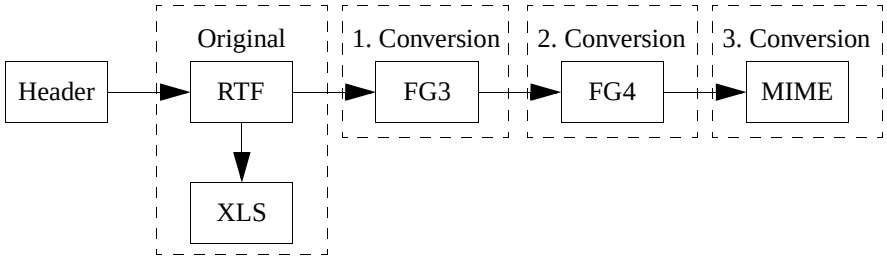
26.2 Multi Document Format (PMF)

The PMF format was developed for the implementation of emails with attachments within MRS. Formats from foreign mail systems can also be stored within the PMF format.

A PMF file always consists of a header and one or more representations of a document. The first representation is always the original format, which can also consist of numerous files. The following representations are made through conversions as required for display on the client or for transmission.

Example:

Schematic structure of a document created in MS Exchange (RTF with an Excel table) which is to be sent through a distribution list. Since the various database recipients have different preferences, the document is converted into a fax G3, G4, and a MIME document formats. Since this is an email format which allows the appending of attachments, one sees that all the original Exchange documents are contained within with the MIME document.



26.2.1 PMF File Structure

The Header has the following Structure:

```
typedef struct
{
   char    szObjIdent[16];
   DWORD   dwObjVersion;
   DWORD   pObjNext;
   DWORD   pThis;
   DWORD   reserved[5];
} OBJ, FAR *LPOBJ;
```

`szObjIdent` contains the string `"PmfFile_______"`, `szObjVersion` the version number of the PMF format, currently `0x01` and `pObjNext` an offset to the first representation that is comprised of the following structure `OBJ_FILE`, which contains the original document.

`pThis` is the offset from the beginning of the PMF file to its own structure. In the case of the header it is always `0`.

The body consists of one or more copies of the following structure:

```
typedef struct
{
   OBJ     Obj;
   char    szFilename[256];
   char    szOrgFilename[256];
   DWORD   frm;
   DWORD   flags;
   DWORD   frmWanted;
   DWORD   offsetData;
   DWORD   lengthData;
   T_TIME  t_modified;
   DWORD   dwError;
   DWORD   pObjMore;
   DWORD   dwInfo;
   DWORD   dwIdentity;
   SHORT   sSystemType;
   SHORT   dummy;
   DWORD   usedData;
   DWORD   reserved[2];
} OBJ_FILE, FAR *LPOBJ_FILE;
```

In the structure `OBJ` is `szObjIdent` again a string with the contents `"OriginalFiles__"`, `"ConvertedFiles_"`, or `PropertyFile` depending if it is an original or a converted file. The first structure always contains the original file and in the following zero or more objects with converted files. "`PropertyFile__`" occurs only as an object (`OriginalFile`) within the first representation, which is referenced as `pObjMore`. This concerns a system object with `sSystemType 'PT'`.

`szObjVersion` is the version number for a structure with original files resp. converted files. Currently this is in both cases the structure `OBJ_FILE` and value is `0x01`.

`pObjNext` points correspondingly to the next representation and is an offset from the beginning of the PMF file. The next representation is either a further structure `OBJ_FILE` that contains a conversion or the value `NEG:=0xFFFFFFFF` (no further conversions).

`pThis` is again an offset from the beginning of the PMF file to its own structure.

`szFilename` is the physical file name, `szOrgFilename` a descriptive file name e.g. `MRSDOCU.DOC`.

`frm` contains exactly one file format from:

Value	Description
`0x00000001`	Telex (ITA2)
`0x00000002`	Text (ASCII)
`0x00000004`	Text (ANSI)
`0x00000008`	Teletex (T.61)
`0x00000010`	Fax (G3)
`0x00000020`	Fax (G4)
`0x00000040`	Audio (WAV)
`0x00000080`	Audio (PCM)
`0x00000100`	Binary code
`0x00000200`	ASCII 7-Bit
`0x00000400`	Fax (DCX)
`0x00000800`	HP PCL-4
`0x00001000`	Postscript
`0x00002000`	PP-Postscript
`0x00004000`	Bitmap
`0x00008000`	TIFF-Fax
`0x00010000`	TIFF-Bitmap
`0x00020000`	MIME E-Mail
`0x00040000`	Multiple Objects
`0x00080000`	MIME Text
`0x00100000`	Greyscale Bitmap

Value	Description
0x00200000	Greyscale JPEG
0x00400000	Audio (AIFF)
0x00800000	Audio (AU)
0x01000000	TIFF Multipage (TIF_MUL)
0x02000000	Audio (WAV_A)
0x04000000	TIFF Multipage Fax G3 (TG3)
0x08000000	TIFF Multipage Fax G4 (TG4)
0x10000000	Audio (WAV_MU)

The various `flags` are listed here.

Value	Significance
0x00000001	`PMF_FLAG_BODY` – Used by the ExchangeApl. MS Exchange document always consists of a RTF (Default) or ASCII file, the body and eventually attachments.
0x00000002	`PMF_FLAG_ATTACH` – An attached object to an MS Exchange document, e.g. an image file.
0x00000004	`PMF_FLAG_SYSTEM` – Special information files. Their types are specified by the parameter `sSystemType`.
0x00000008	`PMF_FLAG_OLE` – An object integrated in an MS Exchange document. These could be e.g. Excel tables directly imbedded and displayed and processed in MS Exchange. Not supported for Application Conversion.
0x00000010	`PMF_FLAG_NEXTISALTERNATIVE` – The next referenced area through `pObjMore` is an alternative display of this file as within this representation. Example: A text is as TXT, RTF, and as MS Word document in one representation. First is the (`dwInfo=0`) file with the greatest amount of information loss (TXT) inserted and this flag set. Next is the RTF file (`dwInfo=1`) with the flag set and finally the MS Word document (`dwInfo=2`), without this flag, since no better representation follows. `dwInfo` is used to enumerate documents within the representation.

`frmWanted` are those formats requested as possible conversions for the client and correspond to those described in `frm`. If for example fax G3 or fax G4 was requested, these would be here and in `frm` the actual conversion format.

`offsetData` is the offset to the structure in the described file within the PMF file.

`lengthData` is the file length.

`t_modified` is the time of the last modification in UNITIME format.

`dwError` is set when a conversion error occurs and an empty file is contained within the object.

Error	Significance
0	Regular and error free completion
1	File is not aMS Windows *.wav file
2	Error while allocating memory
3	File is not an ISDN PCM file
4	No data in MS Windows *.wav file
5	MS Windows WAVE file specifies irregular number of channels
6	Division by 0 is not possible
7	Under-sampling of data in MS Windows *.wav file
8	Irregular block alignment in MS Windows *.wav file
9	Error opening the file
10	Error creating the file
11	Error reading the file
12	Header information in file is corrupt
13	Error writing the file
14	Conversion not possible yet
15	Syntax-error in file name
16	Irregular bit-group-size (needs to be 8)
17	Source- and target-file cannot have the same name
18	Source- and target-file are of the same data type
19	End of file reached
20	Error reading phoneme File (*.inf)
21	Error opening phoneme File (*.inf)
22	Error in section [PHONEMES]
23	Keyword [PHONEMES] expected, found other

Error	Significance
24	Error in section [SETS]
25	Keyword [PRONOUNCE] expected, found other
26	Error in section [PRONOUNCE]
27	Too many phoneme elements in phoneme file
28	Phoneme definition too long
29	Format information in header of MS Windows *.wav files are different
30	Character '@' is missing in phoneme section
31	Error opening sound file
32	Too many set elements in phoneme file
33	Too many pronunciation rules in phoneme file
34	Not enough memory for MS Windows *.wav file
35	MS Windows *.wav file is corrupted
36	Character '@' is missing in pronounce section
37	Keyword [SETS] expected
38	Wrong format for source file
39	Wrong format for target file
40	Error during speech conversion
41	Error freeing allocated memory
42	ISDN File has no header information
43	Not enough memory for ISDN file
44	Error reading ISDN file
45	ISDN File is corrupted
46	Data conversion in buffer memory not yet possible
47	phoneme File too big (>32000 Bytes)
48	Error opening file for writing
49	Error opening file for reading
50	Kerning parameter set to 0
51	Error opening phoneme File (*.dat)
52	The sound filename in the phoneme directory of *.dat is missing
53	File does not exist
54	Fax(G3) synchronization word is missing

Error	Significance
55	Character '@' is missing in set section
56	No fax(G3) data
57	Target buffer too small
58	Source buffer too small
59	WAVE speech conversion not initialized
60	ISDN speech conversion not initialized
61	Irregular specification of ISDN/WAVE-speechfile
62	Speech conversion only possible for words < 41 characters
63	Data of file is not in fax(G4) format
64	Invalid downsizing factor for bitmap (valid: 1..8)
65	Unknown size of fax page
66	Invalid teletex header
67	Fax (G3) data error
68	Fax length 0
69	Fax header error
70	*.dcx header error
71	Base64 MIME header error
72	Base64 file end error
73	Base64 data error
74	Font (*.fnt) header error
75	Logo/Cover version mismatch
76	Fax page is too long (exceeds 10 meters)
77	Function StartTextToFaxOptions probably not called
78	Ghostscript spawn failure
79	Syntax error in fax-split description string
80	Too many pages for fax adding
81	For fax adding are only files of the same format possible
82	Security Descriptor creation error
83	CreatePipe() error
84	ShellExecute() error
85	PipeRead or PipeWrite error
86	Error during fax printing

Error	Significance
87	A PMF file is expected
88	Zero files were converted
89	A file is missing for conversion
90	The printed fax document could not be renamed
91	The scanned bitmap has to be black and white and not compressed
92	The scanned bitmap has to have a width of at least 1200 pixels
93	The scanned bitmap has not enough data
94	Error reading a *.pmf file
95	Internal SoX program conversion error, incompatible document
96	OCR software: initialization error
97	Property size too small to fill value
98	Property is not there
99	Properties not saved because of memory allocation error
100	One or more files are not convertible to fax
101	Error during initalization of text to speech library
102	OCR Software: converting to document error
103	OCR Software: error during recognition process
104	Fax printing timed out
105	Fax printer selection failed
106	Fax printer event could not be created
107	Speech library ttsmgr32.dll could not be loaded, with proper functions
108	Error during conversion of text to speech
109	Error unloading text to speech
110	Error during conversion of text to speech during Windows-Wave to M-Law conversion
111	TTS: Error in parameter count
112	TTS software, SelectEngine procedure returned an error
113	TTS software, SelectVoice procedure returned an error
114	TTS software, SetSpeechMode procedure returned an error
115	File concatenation error, (disk full?)

`pObjMore` is an offset in the PMF file to a further object of the type `OBJ_FILE`, which belongs to the current representation of the document. If the value is NEG, no further files exist within this representation.

`dwInfo` contains the number of file within the representation. The first file always has the number 0, and any further files would be sequentially numbered.

`dwIdentity` is the message ID. These are used for example when numerous fax documents are created through the conversion of a text document. This occurs frequently with distribution lists when fax logos or cover sheets of intended recipients are inserted in the various fax documents.

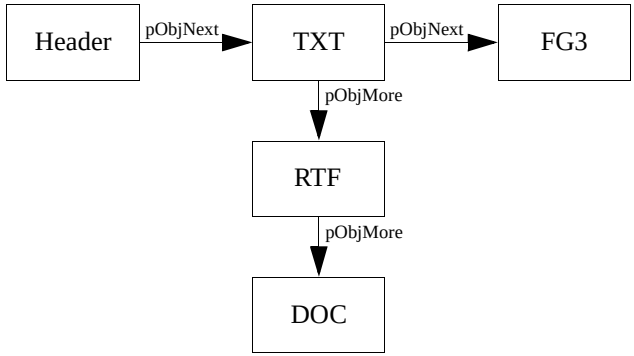
`sSystemType` when given with `PMF_FLAG_SYSTEM` is type of the information that follows.

Value	Significance
`0`	`PMF_FLAG_SYSTEM` is not set so that`sSystemType` is also not set
`'PT'`	Concerning property data that e.g. are used with the AutoLearn Mode. This type of data is always a part of the first representation (original).

`usedData` is actual length of a system object (`PMF_FLAG_SYSTEM`) contained within the data. For reasons of efficiency, system objects are always written with a length of 4KB so that if a `lengthData` of less than 4KB is returned `usedData` would be used.

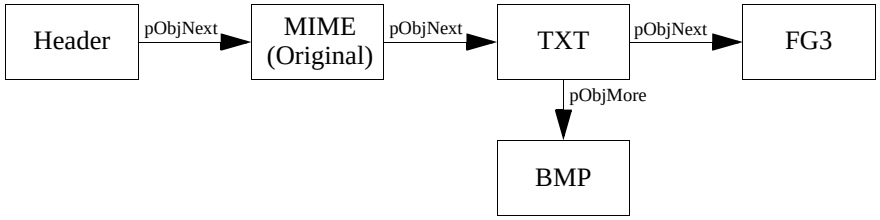
Various functions for the processing of PMF files are found in `pmf.h`.

Example: Text document with alternative representations



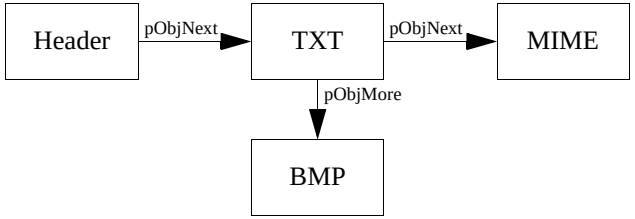
The original contains numerous representations of a document. This is indicated through the flag `PMF_FLAG_NEXTISALTERNATIVE`. A fax G3 is the first conversion created from the original. Such a representation could be e.g. from the Exchange APL created. The email format MIME can also contain such alternate representations so that all possible client variations are considered. In the case where a MIME document of this type is received, the first object is the MIME document contained as original, the first conversion would contain the corresponding alternative representations.

Example: MIME message with text and attached image



First comes the originally received MIME document. The first conversion is then made with the extracted text along with the image (BMP). The second conversion then follows as a G3 fax. In order to prevent an overload to the router, the SMTP APL (by default) converts the first representation with extracted files for MIME documents with numerous files. Other APL's files are processed in a similar manner.

Example: Text and attached image, converted to MIME



The original consists of two files that are converted to a MIME document.

26.2.2 The Utility CheckPMF

With the Utility CheckPMF one can view the contents of a PMF document and extract singular files.

```
CheckPMF -[s][l][h][f][n][x9.9][v][w] filename
Options:
   s       Shows small file type description.
```

```
l       Shows long file type description.
h       Shows usage info.
f       Shows original filename.
n       Shows extraction file number.
x       Extracts file to format pmf*.*
v       Shows flags
w       Shows wanted format(s)
```

Example:

```
[D:\MRS\Folders\folder59\]checkpmf -lf 2701f2e382.pmf
Original file 0:
  Mime mail, binary code
  Filename        : D:\Folders\folder59\2701f2e382
  FilenameOriginal: D:\Folders\folder59\2701f2e382
  Converted file 1:
    Binary code
    Filename        : D:\Folders\folder59\2401f2e3841.htm
    FilenameOriginal:
    Binary code
    Filename        : D:\Folders\folder59\2401f2e3840.cdr
    FilenameOriginal: 6effects.cdr
    Binary code
    Filename        : D:\Folders\folder59\2401f2e3840.doc
    FilenameOriginal: g.doc
    Binary code
    Filename        : D:\Folders\folder59\2401f2e3841.rtf
    FilenameOriginal: isdn.rtf
  Converted file 2:
    Fax (G4)
    Filename        : D:\Folders\folder59\6901f2e38c3.FG4
    FilenameOriginal: 6effects.FG4
    Fax (G4)
    Filename        : Error
    FilenameOriginal:
    ERROR: Conversion not possible yet
```

This example shows a PMF file which contains a MIME message with binary data. The first conversions are those files contained within the MIME message: HTML file, Corel Draw file, RTF text, and a MS Word document. The second conversion creates a fax G4 document. The file name is formed from the first portion of the first convertable format. Since HTML to fax G4 conversions are not yet possible, an object with the corresponding error message would be appended to the fax.

With the call

```
CheckPMF -x0 2701f2e382.00c0.pmf
```

the original MIME file can be extracted. With the parameter -x1 all files from the first conversion and so on. All extracted file names begin with `PMF`.

27 Privileges

The following table contains a list of the most important standard privileges. Dependent upon the configuration, further privileges can be defined. New privileges are defined through a `CORREL` data record.

To edit privileges use a client application such as Communications or the Web Administrator that offer the privilege name for selection. Hex computations are an alternative.

Privilege	Bit	Significance
`SYS_SUPERVISOR`	`0x01`	SUPERVISOR Privilege Database fields can be so created that this privilege is required to make alterations. Furthermore it authorizes the use of the user data editor and the MRS Monitor via which the MRS Server is configured. **Attention:** With this privilege all rights are implicitly assigned even if some of the following privileges have not been assigned to the corresponding user.
`SYS_SERVICE`	`0x02`	SERVICE Privilege Database fields can be so created that this privilege is required to make alterations. Furthermore it authorizes the use of the user data editor and the MRS Monitor via which the MRS Server is configured.
`SYS_USER`	`0x03`	USER Privilege Database fields can be so created that this privilege is required to make alterations. It is principally required to log in at the server.
`SYS_REMACC`	`0x04`	ISDN Service Remote Access This privilege has no significance for MRS and is only included for compatibility reasons with a NVS server on a QNX basis to manage the remote access to the NVS server via the ISDN APL.

Privilege	Bit	Significance
SYS_EDITLOGO	0x05	Fax Logo- and Coverpage-Editor Fax logos and cover sheets can be created or modified with the client's editor.
SYS_BETATESTER	0x06	Client Beta-Tester A beta test version of the client in the server file system is offered as update.
SYS_ADVUSER	0x07	Advanced USER This privilege is for client applications connecting it with specific functions. With the **ACD Agent** client these are e.g. the configuration options.
SYS_ACDMONITOR	0x08	ACD Monitor Privilege The user may view current call center data via the **ACD Supervisor** client, but no configuration alterations can be executed.
SYS_ACDSUPER	0x09	ACD Supervisor Privilege The user may view current call center data via the **ACD Supervisor** client and is allowed to alter the configuration.
SYS_VMS_ADMIN	0x0A	VMS Administrator Privilege Administrator privilege for the TUI VMS by Siemens.
SYS_SPECIAL_DEL	0x0C	Special Delivery Options Privilege Privilege for the TUI VMS and PhoneMail by Siemens.
SYS_TTS	0x0D	TTS Capabilities Privilege The user is permitted to have messages read out via a TUI per Text-to-Speech.
SYS_INTERNAL	0x0F	Internal Call Privilege With the TUI PhoneMail by Siemens recoupling is permitted for this user.
SYS_REDIT	0x10	Global Distribution List Editor Global distribution lists can be created or modified with the client's editor.

Privilege	Bit	Significance
SYS_RSEND	0x11	Global Distribution List Send Privilege Messages can be sent to a global distribution list.
SYS_SEDIT	0x12	Global Alias Editor The alias (short) data can be created or modified with the client's editor. Local resp. private contacts are always permitted.
SYS_RECH	0x13	Server Query Research operation in the server's global journal may be executed.
SYS_TREE	0x14	Document Chain Query Document routing and reply reference may be viewed.
SYS_AMT	0x15	Local Call Privilege Telematic services can be used within the area code. If required, this privilege is checked with Notification APL jobs as well.
SYS_NATIONAL	0x16	National Call Privilege Telematic services can be used within the country. If required, this privilege is checked with Notification APL jobs as well.
SYS_INTERNAT	0x17	International Call Privilege Telematic services can be used worldwide. If required, this privilege is checked with Notification APL jobs as well.
SYS_SERVERFILE	0x18	Server File Access Access to the MRS Server virtual file system through the server file manager on the client.
SYS_LOCALFILE	0x19	Local File Access Access to the local file system through an appropriate file manager on the client. Revoking this privilege is only meaningful when the client PC is to be used as a terminal and booted over the network. In this case local files are non-existent.

Privilege	Bit	Significance
SYS_VIEWRECHDOC	0x1A	Query Result Document View Documents generated by a research of routing or reply traces on the server may be viewed. Without this privilege only the header information can be read.
SYS_ACTASDOMAIN	0x1B	Trusted Domain Privilege This privilege can be used for services and gateways. Through the configuration of a pseudo user FAXG3 or MS, privileges assigned to the pseudo user are also assigned to all incoming FAXG3 documents or incoming documents over the MS-Mail gateway. This is used for example when further costs are accumulated by a routing where the originator does not have the necessary authority. This privilege is required for the validation of Remote System Links.
SYS_PRIVRECH	0x1C	Private Query This privilege allows users to research their individual documents. If the user does not posses this privilege or the SYS_RECH privilege, then a research of either private or other documents is not allowed.
SYS_ARCHIVRECH	0x1D	External Archive Query Allows researching of external archives. Currently not implemented under MRS.
SND_TLX	0x20	Telex Privilege Telex messages may be sent. Telex services are not within the performance spectrum of the server and require a remote system link to a NVS server on a QNX basis.
SND_FAXG3	0x23	FAX G3 Privilege Fax G3 may be transmitted.

Privilege	Bit	Significance
SND_FAXG4	0x24	FAX G4 Privilege Fax G4 may be transmitted.
SND_EMAIL	0x25	e-Mail Privilege E-mail may be transmitted.
SND_SMTP	0x26	Internet Mail Privilege Internet mail may be transmitted.
SND_VOICE	0x27	Voice Privilege Voicemail may be transmitted.
SND_SMS	0x28	Short Message Privilege Short messages may be transmitted.
SND_FAXG3REV	0x29	FAX G3 Poll Privilege Documents may be polled from a fax on demand server.
SND_AMIS	0x2A	AMIS Privilege External voice mail servers may be addressed per AMIS protocol.
SND_DICTATE	0x2B	Send dictates privilege With the TUI VMS by Siemens this user is permitted to record dictates. These may become relatively long and require the corresponding space.
SND_BROADCAST	0x2C	Send broadcast privilege This user is permitted to use the broadcast service. If send jobs were created where the user lacks the privilege, they would be executed just the same. This feature is used e.g. by the Siemens TUI VMS.
SND_EFT	0x2D	Euro-Filetransfer Client Privilege User files may be sent/received from a EFT server through the MRS Client.
SND_PAGER	0x2E	Paging Privilege The pager service may be used.

Privilege	Bit	Significance
EFT_LOAD	0x30	Euro-Filetransfer Receive EFT server privilege. The MRS Server may act as an EFT server. If an EFT client queries a MRS Server, files may also be downloaded from the EFT server.
EFT_SAVE	0x31	Euro-Filetransfer Send Same as “load” with the exception that files may be uploaded to the EFT server.
EFT_RENAME	0x32	Euro-Filetransfer Rename Same as “load” with the exception that files may be renamed on the EFT server.
EFT_DELETE	0x33	Euro-Filetransfer Remove Same as “load” with the exception that files may be deleted on the EFT server.
EFT_OVERWRITE	0x34	Euro-Filetransfer Overwrite Same as “load” with the exception that files may be overwritten on the EFT server.
FAX_INTRNL	0x3B	Internal Fax Privilege In the Siemens TUI PhoneMail internal fax message forwarding is permitted.
FAX_LOCAL	0x3C	Local Fax Privilege In the Siemens TUI PhoneMail local fax message forwarding is permitted.
FAX_NATL	0x3D	National Fax Privilege In the Siemens TUI PhoneMail fax message forwarding is permitted within the individual country.
FAX_INTRNT	0x3E	International Fax Privilege In the Siemens TUI PhoneMail world-wide fax message forwarding is permitted.

Privilege	Bit	Significance
DLG_TLX	0x40	Telex dialog Authorization to use telex dialog services. Telex services are not within the performance spectrum of the server and require a remote system link to a NVS server on a QNX basis.
DLG_EMAIL	0x45	e-Mail dialog Authorization to use email dialog services (chat). This is only possible from one MRS Client 2.5 to another. A remote system link is required for clients on dissimilar servers.
DLG_VOICE	0x47	Voice dialog Authorization to use voice dialog services.
SYS_PWD_LOGIN	0x4A	Login via Phone possible with PIN from all devices Without this privilege the TUI VMS and PhoneMail by Siemens do not allow accessing the individual mailbox from any other telephone but the individual one.
SFT_OWNER	0x50	Individual files may be stored or modified in the MRS Server virtual file system. Enables file allocation to users. Direct assignment to a user is not considered useful.
SFT_GROUP	0x51	Individual files may be stored or modified in the MRS Server virtual file system within the user group. Enables file allocation to groups. Direct assignment to a user is not considered useful.
MENU_MSG_SAVE	0x55	Message Save Privilege The user receives this menu in the Siemens TUI PhoneMail.
MENU_REC	0x56	Recording Menu Privilege The user receives this menu in the Siemens TUI PhoneMail.

Privilege	Bit	Significance
MENU_MBX_OPTS	0x57	Mailbox Options Menu Privilege The user receives this menu in the Siemens TUI PhoneMail.
MENU_REF_EXT	0x58	Change Referral Extension Menu Privilege The user receives this menu in the Siemens TUI PhoneMail.
MENU_ANSW_OPTS	0x59	Answering Options Menu Privilege The user receives this menu in the Siemens TUI PhoneMail.
DICTATE_RECEIVE	0x5D	Receive Dictates Privilege The user is permitted to receive dictates in the Siemens TUI VMS.
CIT_FAXG3	0x63	Only when set are message waiting signals over CIT sent for incoming fax G3 messages. This privilege is not used with Notification APL usage.
CIT_FAXG4	0x64	Only when set are message waiting signals over CIT sent for incoming fax G4 messages. This privilege is not used with Notification APL usage
CIT_EMAIL	0x65	Only when set are message waiting signals over CIT sent for incoming email messages. This privilege is not used with Notification APL usage
CIT_VOICE	0x67	Only when set are message waiting signals over CIT sent for incoming voicemail messages. This privilege is not used with Notification APL usage
CIT_EFT	0x68	Only when set are message waiting signals over CIT sent for incoming Euro file transfers.This privilege is not used with Notification APL usage
NO_OBLIG_PWD	0x6C	No obligation to change password after first login The user need not perform a mandatory change of his/her PIN in the Siemens TUI VMS and PhoneMail after the initial login.

Privilege	Bit	Significance
NO_OBLIG_NAME	0x6D	No obligation to record name after first login The user need not perform a mandatory recording of his/her name in the Siemens TUI VMS and PhoneMail.
PMP_COMP_ANN	0x70	Company announcement file enabled Special privilege for Siemens TUI VMS. For this user the special company announcement is played.
PMP_VMS	0x71	VoiceMailSystem is prompted Special privilege for Siemens TUI VMS. For this user the greeting “This is the voice mail system“ is played.
PMP_CIU	0x72	ConnectToInfoboxOfUser is prompted Special privilege for Siemens TUI VMS. For this user the greeting “You are connected with the infobox of …“ is played.
PMP_LONG	0x73	Long prompts available Special privilege for Siemens TUI PhoneMail. The user can choose between long and short voice prompts.
REC_INFO	0x76	Additional Recording Info Privilege Special privilege for Siemens TUI VMS. With recordings additional information is given in the greeting.
REC_SHORT	0x77	Short Recording Start Info Privilege Special privilege for Siemens TUI VMS. The caller only hears “Please speak after the tone“ without indication of the maximum recording duration.

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