



mrs 5.1
message.routing.system

MRS and Microsoft Exchange 2000



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1 Introduction

To use the extended MRS Server message functions (fax, SMS, CTI etc.) under Windows 2000 (Win2k) in Exchange 2000 Server environments, various additional components, depending on the desired messaging application, are required. Thus both systems are coupled via a gateway (E2k APL, Exchange 2000 Access Protocol Layer), specially adjusted to the above system scenario. It provides the functions required for “Store and Forward” operation. User data replication occurs via the LDAP APL, mandatory for the cooperation with Exchange 2000 (because of the central user administration via Active Directory). True Unified Messaging requires an additional connector, the ExUM APL, which, as transaction interface, enables direct access to the Exchange server’s data store. In this way, e-mails sent in Exchange can be directly retrieved via a telephone interface (TUI) without replication to the MRS Server

Function, installation and configuration of these components (E2K APL, LDAP APL and ExUM APL) is the subject of this manual.

Please note: The introduction of MRS 5.0 changes the installation and access concept for the Exchange APLs with new installations. From now on, Exchange APLs will always be installed on the computer where the MRS Server runs and, similar to Lotus Notes, access the Exchange Server as mail client. The thus improved connection of the MRS Server to the Exchange APLs increases stability as disruptions in the network remain without influence. Furthermore, installation and maintenance access are simplified.

From the MRS Kernel’s point of view, APLs ((Access Protocol Layer) provide protocols for sending documents to Exchange users and transmitting address information. Thus all additional MRS Server services are available to Exchange users (for example: fax, SMS, CTI etc.).

1.1 Exchange 2000 Access Protocol Layer (E2k APL)

The new E2k APL has been specially conceived for Exchange 2000 Server and is radically different from the one required for Exchange Server 5.5 (because of the user administration via the Windows 2000 Active Directory service introduced with Exchange 2000). Here the Exch APL is nothing but a software connector via which data can be interchanged. The installation place is always freely selectable. This means that you can either install the gateway on the MRS Server computer (recommended with new installations) or on the computer where Exchange 2000 Server is operated (only intended for update installations).

1.2 Exchange True Unified Messaging APL (ExUm APL)

True Unified Messaging enables direct access to the MS Exchange Server message store. Thereby the required message can be directly forwarded to the telephone interface from the Exchange data store via the MRS Server without replication to the MRS Server so that messages need not be kept twice. The necessary query is realized by transactions. Prerequisite is of course that the corresponding script is able to initiate this TUM query, which applies to e.g. the ERGO and PhoneMail script by Siemens.

True Unified Messaging is realized via the ExUm APL connector. It is an add-on component that must be installed additionally to the standard E2k APL if True Unified Messaging is to be used.

Via the ExUM APL the notification service (NOT APL) is connected as well. For this purpose, system environments, in which the ExUM APL is exclusively used, require the E2K APL installation, too. This is necessary for logging in the notification service at an Exchange account.

1.3 LDAP APL

The LDAP APL is additionally required for address administration. It makes sure that address data relevant to MRS and centrally maintained via the Windows 2000 Active Directory can be replicated in both directions.

When the E2k APL is selected in Setup, the LDAP APL is automatically selected as well and thus immediately integrated in the Setup process.

The LDAP APL is also installed on the MRS Server because of the then minimized network data traffic.

A possibly required LDAP APL reinstallation for other directory services is also performed via the user defined MRS Server Setup by solely selecting this component for installation.

1.4 Advanced Unified Messaging

First we want to give a short description of what Advanced Unified Messaging actually is and in which evolutionary steps the MRS Server provides different functions here so that you basically understand the various configuration options.

Unified Messaging means that you can access all messages via a uniform journal, no matter which service delivers them. Thus for example viewing resp. playing fax, voice messages or e-mails from within Microsoft Outlook. Of course Unified Messaging is possible with the "Communications" MRS client, via telephone by means of modern

interactive voice response applications such as ERGO, via Microsoft Exchange, Lotus Notes or SAP R/3 connections on the respective foreign systems.

The supplementation of Unified Messaging by the CTI functions that on the one hand generate journal information on everything happening with the individual telephone (for example missed calls due to the absence of the callee or failed calling attempts etc.), on the other hand enable operating the individual telephone via the client is called Advanced Unified Messaging.

The next step is deduced via the following example:

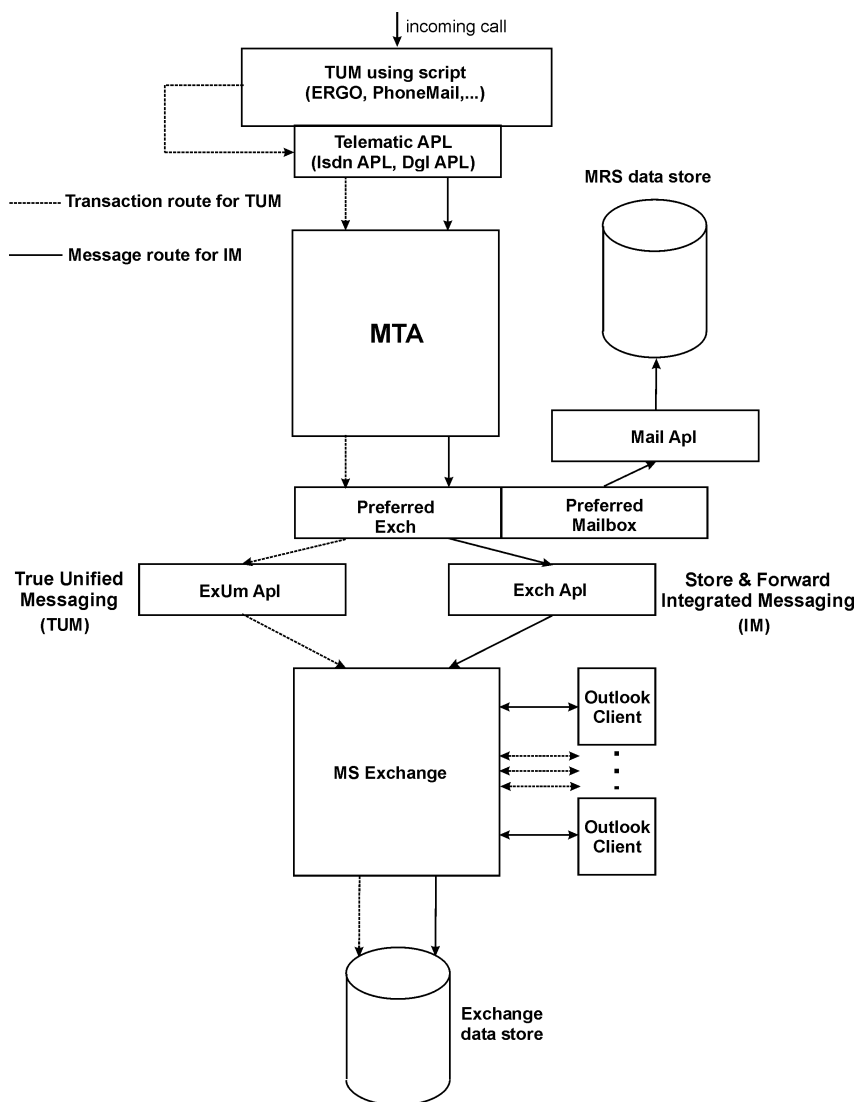
A field worker retrieves his messages from the MRS Server via telephone. However, without any further provisions only messages directly received via the MRS Server are put out, thus no e-mails e.g. written by colleagues under Microsoft Exchange. In order to make these also accessible via telephone, two methods are possible:

- **Integrated Messaging:** This first enables a replication of all messages of this employee to the MRS Server so that twice the data amount is certainly generated for this field worker but all e-mails can then immediately be queried per telephone as well. Integrated Messaging is available for Lotus Notes and Microsoft Exchange.
- **True Unified Messaging:** As an alternative you can also directly access the foreign system's data store and only request a message from there when it is retrieved via telephone. Here we depend on the foreign system transmitting the message almost in real time so that no waiting periods occur at the telephone. On grounds of constant development this is possible with modern servers in most cases. This type of access without permanent message replication is called True Unified Messaging. It is also available for Lotus Notes and Microsoft Exchange. To use TUM, the corresponding UM APL needs to be installed in each case as well (for Exchange 2000 the ExUM APL)

Integrated Messaging and True Unified Messaging can also be operated parallel. For example Integrated Messaging (characteristic: data replication to the MRS Server) can then be employed with slow servers for users that permanently need to access messages by means of the MRS Server. For all other users that only occasionally retrieve messages and who are willing to wait a few seconds, True Unified Messaging (characteristic: direct access to the foreign system's data store) can be used.

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Advanced Unified Messaging



1.5 MRS-Exchange Gateway Structure

- Setup Module

This module controls the installation, deinstallation and configuration of the MRS Server portion of the MRS-Exchange Gateway. It is called by the MRS Server Setup as well as by the MRS Monitor.

- Address Generation (Proxy)

Here MRS Server addressing deviating from Exchange 2000 Server is transformed to addresses known to the Exchange 2000 Server and vice versa.

- Administration Extension

Extension of Microsoft Exchange administration settings. All required configurations of the Exchange portion of the server can thus be performed from within Exchange.

- Exchange Gateway Object

From the perspective of the Exchange 2000 Server, this is the actual gateway object. It consists of a Microsoft information store which has as principal component two folders (MTS-IN and MTS-OUT) at its disposal. Message Transfer Envelopes, containing messages in a format recognized by the Exchange 2000 Server, are interchanged via these interfaces. The MTS-IN folder contains all messages to the Exchange 2000 Server and MTS-OUT those destined for the MRS system.

- MRS Send/Receive Interface

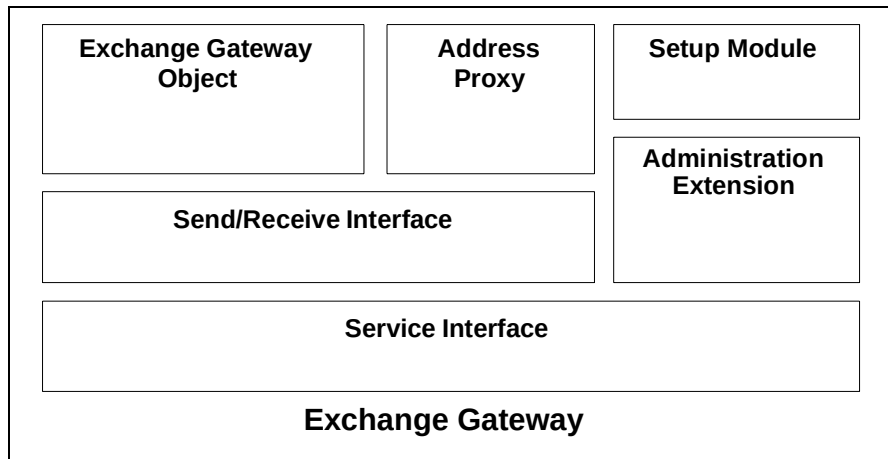
The actual interface to the MRS Server.

- MRS Service Interface

Basic functionality for the gateway to run as Windows 2000 service. This has the following advantages:

- The gateway service can be automatically started by the service control manager.
- The service is checked by the operating system.
- A separate *Security Context* can be assigned to the service.

The following illustration displays the modular structure of the MRS-Exchange Gateway:



1.6 Addressing

1.6.1 Addressing from MRS to Exchange

Microsoft Exchange 2000 Server administers internally all address data via a *Distinguished Name* according to X.500. Each installed connector provides one Proxy-DLL for address mapping within the environment (MRS Server, SMTP, X.400, ...) connected by the connector. For user "Mayer", with the Distinguished Name

`/o=Sample Ltd /ou=Town /cn=recipients/cn=Mayer`

the MRS Gateway would thus result in the address

`NVS:EXCH/MAYER@TOWN.SAMPLELTD.MRS`

on the MRS portion of the server.

With incoming messages the assignment of a message to the user can already occur on the MRS side of the server when the required information is contained in the database. If for the Exchange user "Mayer" the Exchange gateway has been default set by means of the "EXCH" entry in the "PREFERRED" field of the MRS user database, MRS routes the message to the above address. The Exchange gateway then internally generates the address

`MRS:MAYER@TOWN.SAMPLELTD.COM`

and reroutes the message further to the addressed user that has the entry "MAYER" in the Exchange alias field, provided that on the MRS side of the server an extension number for etc. is allocated for user "Mayer", so that the MRS Server can assign in-

coming documents to this user. This normally occurs through address book data replication so that fax number assignment is performed under Exchange.

Otherwise, with the corresponding *routing rule*, the fax is sent with the recipient address

NVS:EXCH/FAXG3:01234567890

to the Exchange gateway so that the connector must try to assign user “Mayer” as recipient by means of the fax number entered in the Exchange database.

1.6.2 Addressing from Exchange to MRS

From within Exchange each MRS address can be specified in the format:

[MRS:<Node>/<User>]

It is easier, however, to enter such an address in the address book with subsequent addressing via a “Display Name”. During the installation various services are so configured that they can be selected when a new address is entered and only the corresponding number needs to be specified.

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Addressing

2 Microsoft Exchange 2000 Gateway (Exch APL) Installation

2.1 Introduction

The installation of the Exchange 2000 APL (E2k APL), the gateway from the MRS Server to Microsoft Exchange 2000 Server, is normally performed with the MRS Server installation. It can be added at a later date as well (for example with a migration from Exchange 5.5 to Exchange 2000). For this purpose simply call the user defined MRS Setup and select the corresponding component(s) there.

The MRS Server and Exchange 2000 Server installation should always occur on separate computers with the Exchange 2000 APL (the MRS-Exchange gateway) then always being installed on the computer where the MRS Server is just being installed or already runs. Whether the two servers (MRS and Exchange) are in the same or in two different domains is irrelevant in this process. In the latter case the corresponding administrative privileges are required in both domains.

It is also possible to install Exchange 2000 Server and MRS on the same computer. This means that the MRS Server with the Exchange 2000 APL is added to an existing Exchange 2000 Server. However, we strongly advise against this installation variant. At any rate we recommend to install the MRS Server and Exchange 2000 Server on two computers since resources are utilized by a Microsoft Exchange 2000 Server to such a high extent that simultaneous operation of the MRS Server on the same computer system is not advisable. And there is the advantage that in case of a hardware breakdown in one system the other one is not impaired in its function.

To use True Unified Messaging (TUM) the Exchange True Unified Messaging APL (ExUM APL) must additionally be selected for installation in Setup so that this feature is available.

The installation description refers to the case that the MRS Server and Microsoft Exchange 2000 Server are on two separate computers but in the same domain.

The version of both programs running on one PC is already included in this description as trivial solution.

The following installation instructions also apply to operating an environment where both servers are in different domains. Merely make sure that for these domains the corresponding privileges exist.

Note: Before you start with the installation please read the current release notes (in the root directory of the MRS installation CD). Here you find the latest program and process alterations as well as information on hard and software compatibility that could

not be considered in the manual. In addition you can obtain further information from the corresponding readme files of the single components. These are found in the components' directories.

2.2 Installation Requirements

The gateway installation requires privileges as

- Full Exchange Admin and as
- Domain Administrator.

In the following find a detailed description of the MRS-Exchange gateway installation requirements:

- Microsoft Exchange 2000 Server must be installed in the network **and** active at the time of the MRS-Exchange gateway installation.
- Make sure that with the installation of the Windows 2000 Server operating system (on the computer where the Exchange 2000 server runs) the "Network News Transfer Protocol (NNTP)" and the "Simple Mail Transfer Protocol (SMTP)" have been installed. You can check on this by viewing the installed components (via **Start → Settings → Control Panel** doubleclick the **Add/Remove Programs** icon and subsequently enable the **Add/Remove Windows Components** button).

Otherwise reinstall the two protocols from the "Internet Information Services 5.0 (IIS)" directory.

- On the computer where the E2k APL is to be installed, the Exchange System Manager must be **previously** installed. Only then can the Connector SnapIn be registered there as well and the connector administered on this machine at a later date.
- So that the E2k Apl, the ExUM APL and the MRS-MMC SnapIns (required for performing the MRS user settings in the Active Directory) can be installed, Outlook must have been previously installed with an arbitrary user profile and started once. The start is to ensure that a valid user profile has been defined in Outlook. The following Outlook versions are permitted:
 - Outlook 2000 with SP2
 - Outlook XP with SP1. **Attention:** Owing to an unspecified modification by Microsoft in the security context of Outlook XP Service Pack 2, no proper coordination with the CDO is given here. Therefore Service Pack 2 must not be installed for XP!

Installation of Outlook is also required to locate the Exchange Server in the network via MAPI. Make sure that the "Collaboration Data Object (CDO)" was considered with the Outlook 2000 installation. (**Remark:** the CDO is not

automatically installed along with the “typical mode” installation of MS Office). If necessary, perform the CDO installation afterwards from the MS Office-CD.

- The installing user must be a member of the local administrator group of the Exchange Server **and** the computer where the MRS Server runs so that the respective service database can be accessed without restriction. This is important with respect to installing and configuring the service.
- The user account under which the Exchange 2000 APL service runs on the kernel computer must have “Full Administrative Privileges” on Exchange 2000 Server. These privileges are required for starting and stopping the services.
- The installing person must have administrative privileges in the corresponding domains as well as on the Exchange 2000 Server computer.
- Privileges on the Exchange 2000 Server
 1. The user must have privileges on the “Full Exchange Admin” Exchange organization so that unrestricted access to the Exchange specific part of the Active Directory is possible to install and deinstall various objects (for example: connector, address type, templates (provided these are still to be defined) etc.).
 2. Beyond that, the “Send As” and “Receive As” privileges are required for all mailbox stores that contain mailboxes relevant to inbox replication or that are used for the E2k APL installation. Only then the connector is able open the mailboxes of these mailbox stores and its own waiting loops (MTS-IN resp. MTS-OUT). This access privilege is automatically set with the installation. If privileges are to be set for several mailbox stores, this can also occur on a higher directory level since these privileges are then bequeathed “downward”. Compare Q264733 (Q264733 Microsoft Knowledgebase with specification of the item number).

Important: Bequeathed privileges are displayed in grey, explicitly set ones appear in white. Explicitly set privileges overwrite the bequeathed ones and a “Deny” overwrites an “Allow” (provided both are explicit or bequeathed). Consequently an explicitly set “Allow” overwrites a bequeathed “Deny”.
- Privileges for the user **specified** with the installation:

The specified user must have the following privileges on the E2k APL computer (these privileges are set during the E2k APL):

 1. “Logon as a service“, so that the E2kAPL can start as service with the specified user at all.
 2. “Act as part of the operating system“, so that the service can also work with comparable privileges such as “LocalSystem“.
 3. “Back up files and directories“. This privilege is required if the E2k APL writes notifications in directories (see also Q188321).

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Generals on the E2k APL and ExUM APL Installation

4. “Restore files and directories”.
5. “Logon as batch job”: Required if with the “LogonUser” the *LOGON32_LOGON_BATCH* flag is used to inform the system that the process must/ is to do without user interaction.
6. For the specified user (under who the E2k APL is to run at a later date) we generally recommend to grant the first four mentioned privileges. Compare also Q185154, Q184205 as well as Q147701. The privileges required for MTA and IS are listed there.

Note: Perform privilege assignment via the Security Policies. With Local Security Policies the locally set and “effective” policies are displayed.

Important: Separate policies can be entered for domains and domain controllers. These policies overwrite, as the case may be, the locally defaulted ones. After policy modification on domain level a restart of the corresponding computers (domain controllers and E2k APL computers) may be required.

- Further notes on Exchange 2000 Server

1. If the connector delivery restrictions are used, please heed the Q277872 KB article.
2. The Exchange 2000 connector depends on the LDAP APL since this APL creates the cn=Settings object in the MRS container. The LDAP APL must therefore be installed as well.

2.3 Generals on the E2k APL and ExUM APL Installation

Prerequisite for the installation is, as already mentioned above, an installed and executable MS Exchange 2000 Server. If a new MRS Server is set up for connecting Exchange 2000, make sure that with the MS Exchange 2000 connector (E2k APL) installation the LDAP directory synchronization (LDAP APL) is considered.

If True Unified Messaging is to be used as well, additionally select the MS Exchange True Unified Messaging connector (ExUM APL) for installation. Select this component (with the MRS Server installation) or with a reinstallation from the component selection tree in the MRS Server Setup.

Attention: Before you install the ExUM APL, Outlook 2000 (SR1) must have been previously installed with user profile and started once. This start is to make sure that a valid user profile has been installed in Outlook.

Make sure that the “Collaboration Data Object (CDO)” was considered with the Outlook installation. Otherwise it must be reinstalled from the MS Office CD.

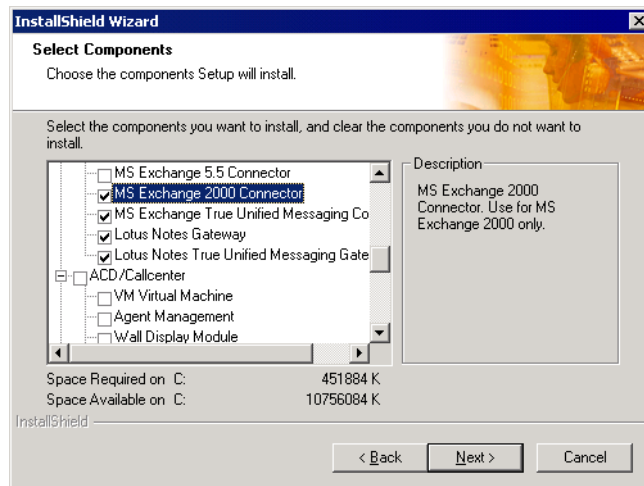
To reinstall the Exchange 2000 APL with the LADP APL or the ExUM APL simply start the normal MRS Server Setup from the “Installation” MRS-CD (label name: “Main”) on the computer where the MRS Server is already installed.

The installation of the Exchange connector can be roughly divided into two steps:

- First all necessary parameters are queried required for successfully connecting the MRS Server to the previously installed Exchange 2000 Server program, and the essential program files are copied.
- In the second step the system configuration takes place.

2.4 Software Installation of the LDAP APL and the Exchange Connectors

The following description refers to the installation of the MS Exchange 2000 Connector (in Setup it is named Exchange gateway to differentiate it from the MS Exchange True Unified Messaging Connector) with the LDAP APL and the Exchange True Unified Messaging Connector (ExUM APL) in the running, complete MRS Setup. With a reinstallation, i.e. the MRS Server has already been previously installed and merely the Exchange 2000 Gateway components (E2k APL, LDAP APL and probably the ExUM APL) are now additionally implemented, the installation process is analog. Start the MRS Server Setup and select the single components, probably after entry of additional license keys, in the component selection window (see the following illustration). The system requirements are identical for both cases.



2.4.1 Installation Start

The installation of the Exchange components in the running MRS Setup starts with dialogs called for the preparative installation of the LDAP APL (the dialogs normally appear after the Setup settings for the ISDN protocols). The steps lying between the Setup start and this stage serve to install other MRS Server components. The respective settings are comprehensively described in the “First Steps” manual and can be referred to there if necessary.

2.4.1.1 General Setup Operating Functions

Apart from the different entries that need to be made in the individual Setup windows depending on the type of parameter, three recurring buttons are available to maneuver within Setup. So that their significance need not be explained each time they appear, a short function definition is given in the following:

- **Back**

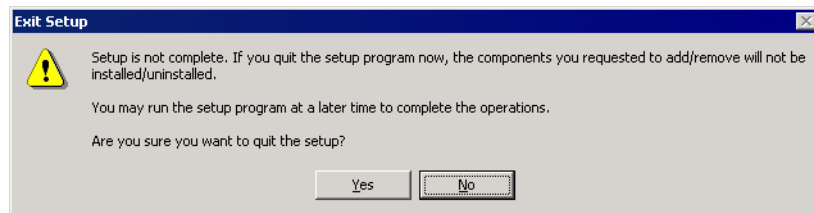
Via this button you are always taken back to the previously edited (or displayed) Setup window.

- **Next or Finish**

Takes you to the next configuration tab or to the final program procedure after which Setup is terminated.

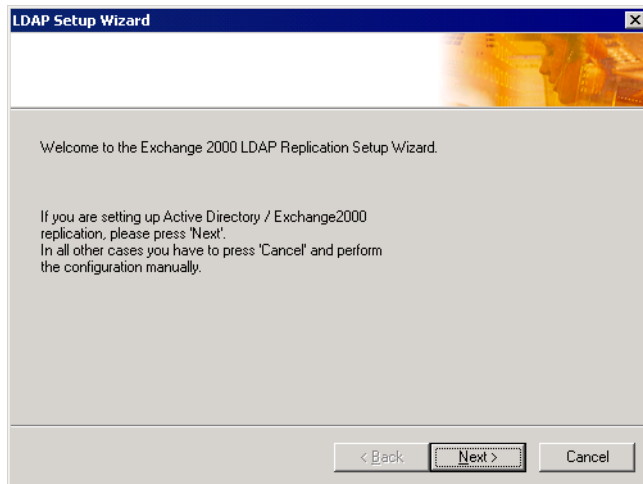
- **Cancel**

Pressing this button leads to the information that Setup has not been properly finished yet. You are also prompted as to whether you want to terminate Setup just the same. If you opt for **Yes**, Setup continues (it would skip to the next component to be installed), the current component, however, is not installed. **No** takes you back to the currently running Setup.

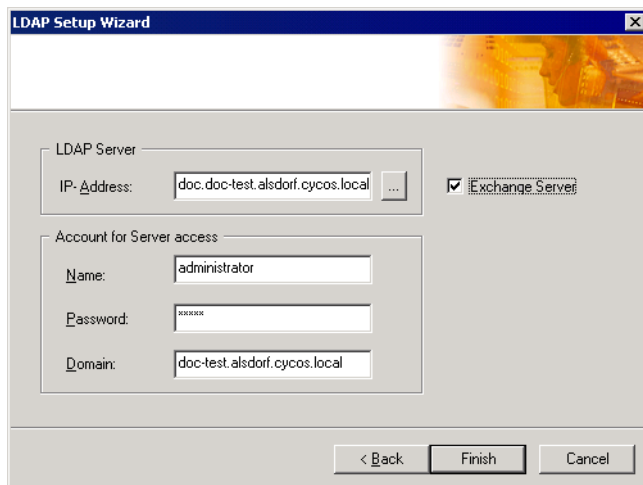


2.4.2 LADP APL Installation

At the stage where in the MRS Server Setup the installation of the LDAP directory synchronization (LDAP APL) starts, the LDAP Setup wizard first appears in its welcome window.



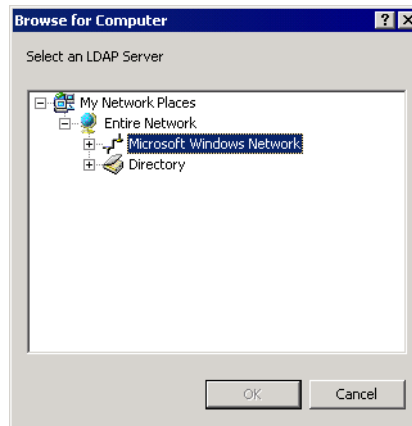
After you have clicked on **Next**, the configuration dialog opens where you find the **IP-Address** field (in the **LDAP Server** portion). In there you need to specify the name of the computer the LDAP APL is to access for data replication (this is normally the computer that keeps the Active Directory “global catalog”).



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Software Installation of the LDAP APL and the Exchange Connectors

This can either be done by directly entering the server name in this entry line or via the “Browse for Computer” dialog which opens when you enable the (...) selection button next to the entry field.

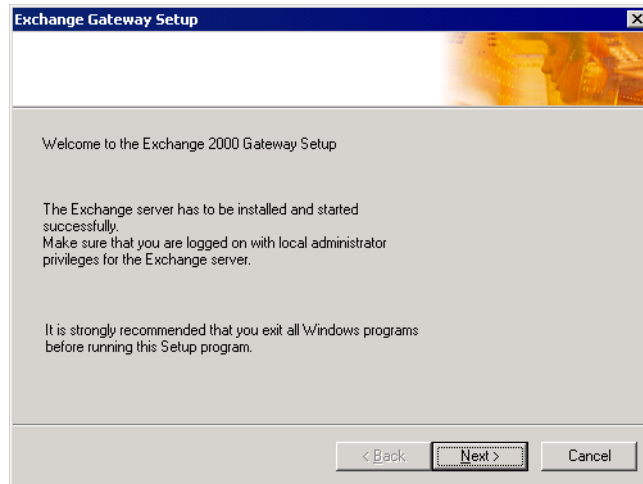


Place a check mark in the **Exchange Server** box to integrate the configuration file (ex2000.lcf) required for Exchange 2000 Server. To access other directory services via LDAP, leave the checkbox inactive. The AdRepl.lcf configuration file is then selected per default. It enables LDAP access to the Active Directory when Exchange Server has not been installed.

Now define the user account, consisting of user name, user password and the domain name, for server access. Click **Finish** to accomplish these entries and the LDAP Setup. **Back** opens the welcome window again and **Cancel** terminates the installation.

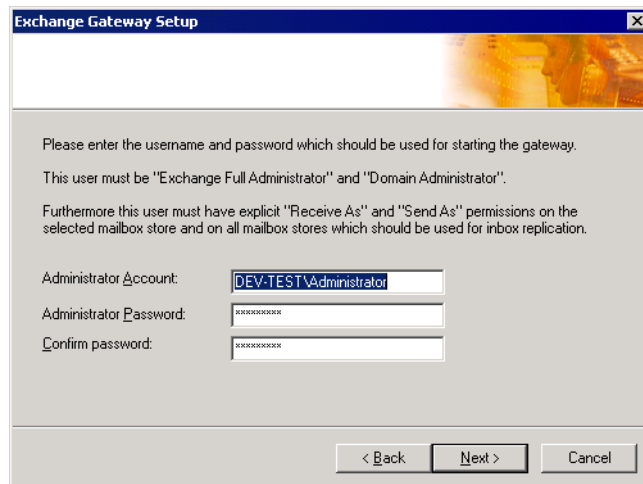
Subsequently follows the actual Exchange gateway installation.

2.4.3 Exchange 2000 Gateway Installation



The E2kAPL installation welcome window once again points to the requirements that must be fulfilled for a successful installation.

Click **Next** to reach the dialog for entering the user account and the password of the installing person. This person must have administrator privileges under Microsoft Exchange 2000 Server.



Since the Exchange gateway cannot link up with the Exchange 2000 Server when a wrong password has been specified, the entry must occur twice to exclude at least typ-

MRS and Exchange 2000

Software Installation of the LDAP APL and the Exchange Connectors

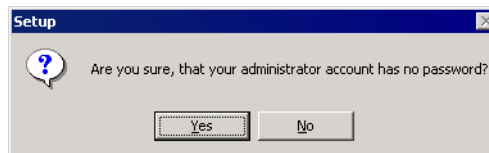
ing errors as source of error. With a correct entry an information dialog opens as confirmation and to display a list of the user privileges assigned to the user account.



Entry of two different passwords generates an error message. Confirm this message with **OK** to be taken back to the password entry form where you can make the corresponding correction.

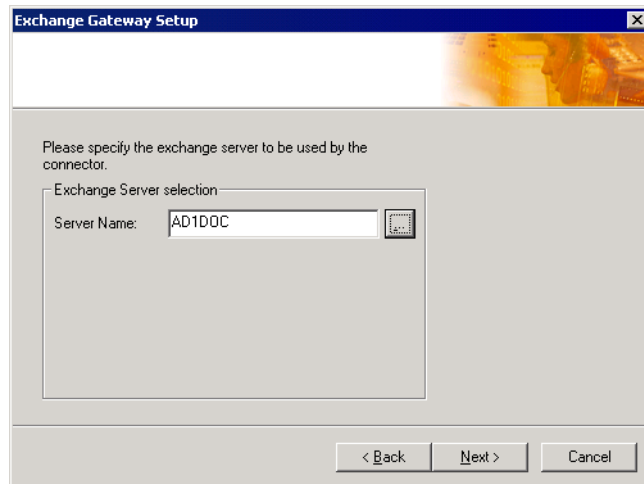


If you do not enter a password you are prompted as to whether you are sure that the administrator account does not have one.

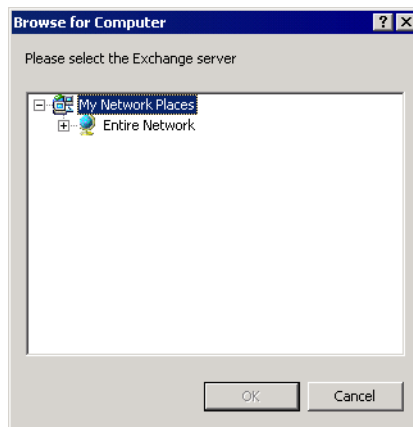


Yes leads to the above error message if an administrator password well exists; **No** takes you immediately back to the password entry form.

If you click **OK** in the user privileges information dialog, Setup is continued with entering the name of the computer on which the Exchange 2000 Server is running. The connector (E2k APL) in to connect this server to the MRS Server.



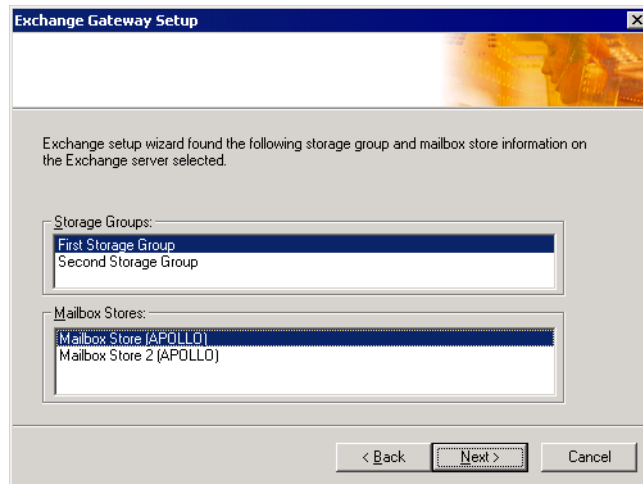
Here you can either directly enter the server name or enable the (...) selection button to look for the respective server in the network.



After you have specified the Exchange 2000 Server in the network click **Next** to look up on this server which storage groups and mailbox stores are available to include the Connector mailbox. The installation of this mailbox usually occurs in the "First Storage Group" in the "Mailbox Store" directory. It is also possible to define further storage groups (up to four storage groups with four mailbox stores each) on the Exchange 2000 Server that contain additional mailbox stores. In this case, if desired or required for security reasons, you can install the Connector mailbox in one of these directories. The below dialog first lists all storage groups with their mailbox stores. Here you can define in which mailbox store the Connector mailbox is to be incorporated.

MRS and Exchange 2000

Software Installation of the LDAP APL and the Exchange Connectors



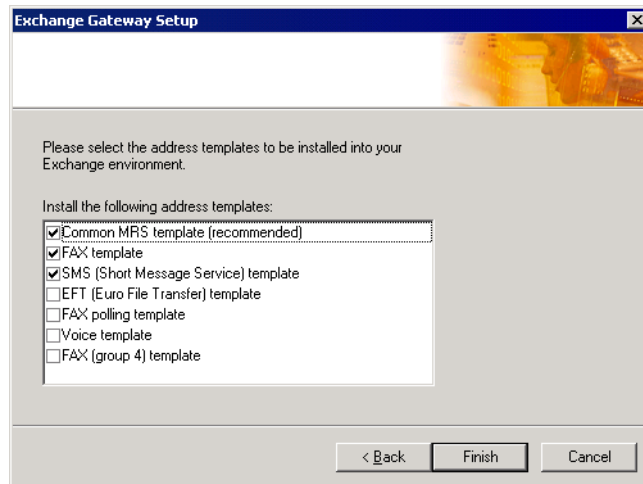
The **Storage Groups** portion of the dialog displays all available storage groups. If you can make a selection here, pick the name of the group that contains the desired mailbox store. In the above example, "First Storage Group" has been chosen.

The **Mailbox Stores** section lists all mailbox stores defined in the selected storage group. If several mailbox stores are available, a selection needs to be made here as well (e.g. Mailbox Store (Apollo) as shown above). The name in brackets is the name of the server on which Exchange 2000 Server is installed.

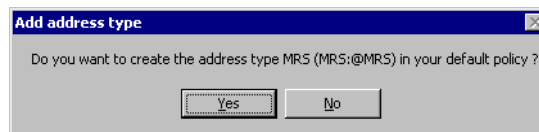
Only after making your selection you can click **Next** to continue the installation with defining the address templates.

Now you can have *address templates* installed in your Exchange environment for various services offered by the MRS Server.

In this way you can later generate e.g. a **New address for address book** in the client so that you only need to enter the corresponding number and select the desired service in there instead of working with the somewhat cryptic default Exchange addressing.



Subsequently you can determine whether or not the (MRS@MRS) MRS address type is to be created in the default policy directory.



Yes immediately creates this address type and leads to the installation of the ExUM APL, required for True Unified Messaging (TUM) usage. If you select **No**, Setup immediately continues the installation process with the ExUM APL. The MRS address type definition must then, if necessary, be performed manually at a later date (see 2.4.6, "Adding an Active Directory Address Type Object", on page 34).

Attention: When you create the MRS address type with **Yes**, an MRS address is automatically assigned to all of the already existing users. This effect is probably not desired with very large system environments.

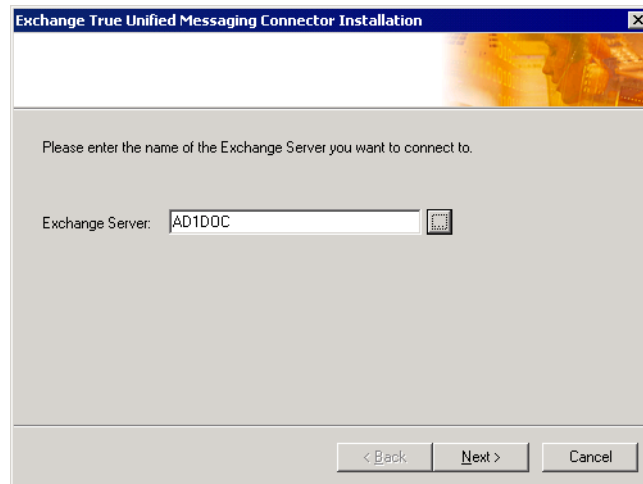
Caution: This subsequent definition intervenes in the Active Directory. Therefore be extremely careful here as **a wrong entry can have serious consequences**.

2.4.4 Installation of the MS Exchange True Unified Messaging Connector (ExUM APL)

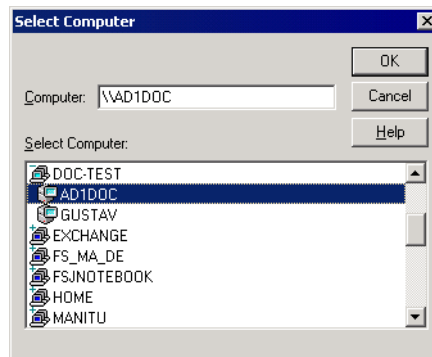
After completion of the E2k APL installation follows automatically the ExUM APL for True Unified Messaging Setup, provided this connector has been previously selected as component.

MRS and Exchange 2000

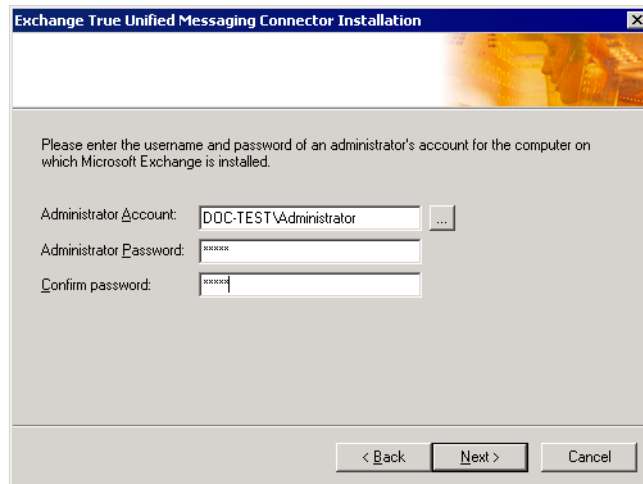
Software Installation of the LDAP APL and the Exchange Connectors



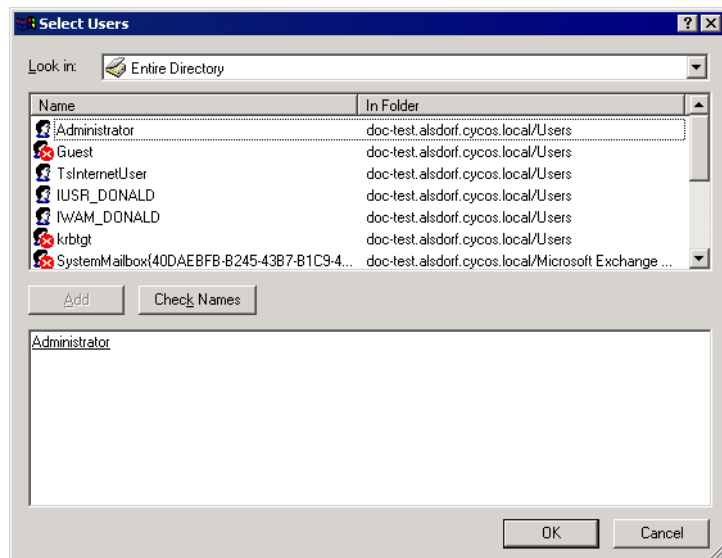
In the first dialog define the Exchange Server the ExUM APL is to establish a connection to. You can either directly enter the server name or enable the (...) button to look for the corresponding server in the network. In the latter case a window opens for selecting the Exchange Server.



After accomplishing this process press the **Next** button to access the entry window for specifying Exchange Server user account.



Here as well you can directly enter the name (do not forget the domain description) or pick the corresponding account via a user selection window.



How to copy the user account to the ExUM APL configuration tab via the use selection dialog:

1. By means of a doubleclick on the selected name.
2. Via direct entry of the name in the lower portion of the dialog. Then verify the

MRS and Exchange 2000

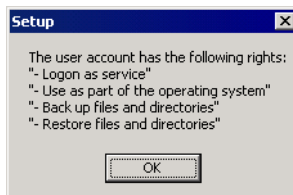
Software Installation of the LDAP APL and the Exchange Connectors

name by pressing the **Check Names** button.

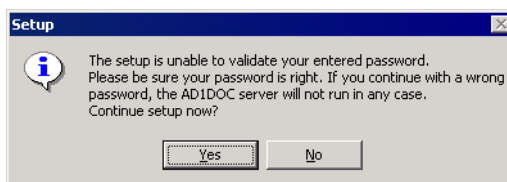
3. Through selection of the name in the list. Then click the **Add** button.

Conclude the process with a click on **OK**.

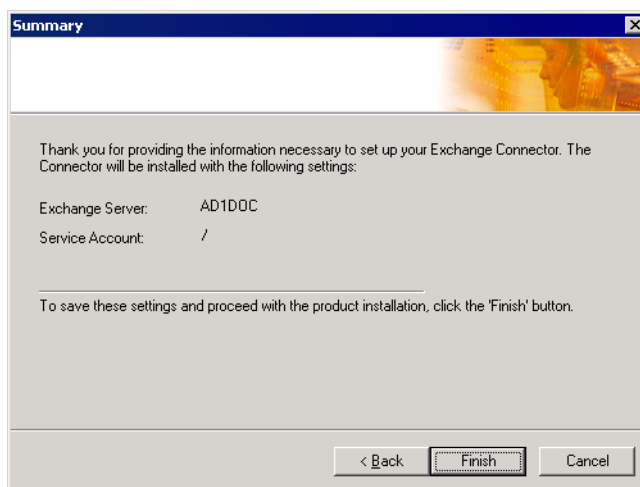
Enter a password to legitimize the account. If the specified user account is valid, the assigned user privileges are displayed in a message.



Confirm this message with **OK**. You are then informed that the entered password cannot be checked for validity. If you are not sure at this point, enable **No** to return to the password entry for making an alteration if necessary.



When you continue the ExUM APL Setup with **Yes**, the "Summary" window displays the entered parameters once again.



Click **Finish** to save your entries and to accomplish the ExUM APL Setup.

2.4.5 Error Analysis During the Installation

In the event that an error has occurred during the installation, the cause of a termination can be detected in the log file that is automatically created with the installation. It is stored in the Temp directory of the installing user. The path to this directory generally is: X:\documents and settings\<installing user>\local settings\Temp. In this log file (MrSEXCH.log) all installation steps are individually listed and classified with a status description.

Example:

```
.
.
.
ExchangeUpdate HrInstallAddressTemplates successful
EnterpriseGDI successfully read
Successfully remove Exchange 2000 Gateway object.
Successfully got MRS-Container-Object (LDAP://AD1DOC/
CN=MRS,CN=Microsoft Exchange,CN=Services,CN=Configuration,
DC=doc-test,DC=alsdorf,DC=cycos,DC=local)
Settings Object (C) successfully removed.
MrsExchSetup HrInstallService successful
Active Directory Object successfully installed.
Successfully got MRS-Container-Object (LDAP://AD1DOC/
CN=MRS,CN=Microsoft Exchange,CN=Services,
CN=Configuration,Settings Object (GUSTAV)
<CN=GUSTAV:AD1DOC> successfully installed
ExchangeUpdate HrInstallGateway successful
Registering Extensions
Successfully registered Admin Extension
Successfully registered User Extension
ExchangeUpdate completed and successful
MaintProxy finished
```

If an error has occurred, the corresponding installation step is followed by **failed** instead of **successful**.

Example:

```
MrsExchSetup HrInstallService failed
```

Useful is also the Windows event viewer which can be employed for diagnosis (**Start** → **Programs** → **Administrative Tools (Common)** → **Event Viewer**). In there all running processes are logged. When you select the desired protocol or service, the events that happened therein are displayed.

2.4.6 Adding an Active Directory Address Type Object

You can add a new Active Directory address type object from any computer. The only prerequisite is that the “Windows 2000 support tools “ are installed on the respective computer. The manual address type definition procedure is divided into two steps:

1. Generation of an Active Directory address type object by means of “ADSI Edit”.
2. Creation of the MRS address type in the “Exchange System Manager” under “Default Policy”.

So that Active Directory objects can be edited at all, the “ADSI Edit” Windows support tool must be installed. If this has not been done yet, open the X:\ SUPPORT\TOOLS directory on the Windows 2000 Server installation CD and start the Setup program there.

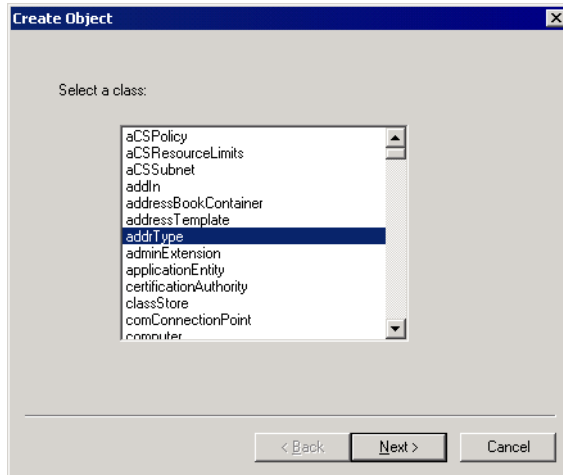
After the installation the Active Directory editor can be immediately called via **Start → Programs → Windows 2000 Support Tools → ADSI Edit**.

Under the “ADSI Edit” root directory open the “Configuration Container” and select the “CN=Address-Types” folder in the directory tree. The entire path to this folder runs:

```
\ADSI Edit
  \Configuration Container,...
    \CN=Configuration,...
      \CN=Services
        \CN=Microsoft Exchange
          \CN=<Organization name of the Exchange domain>
            \CN=Addressing
              \CN=Address-Types
```

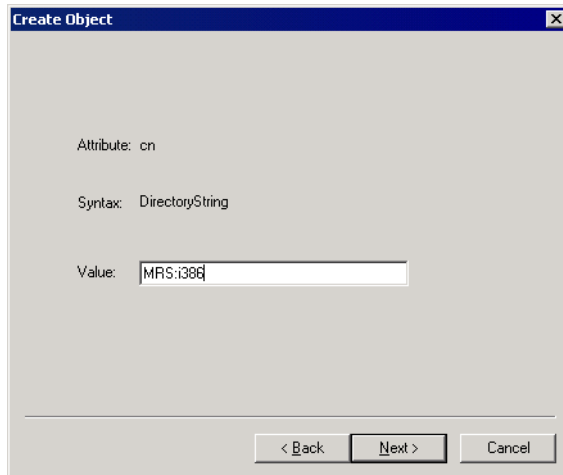
The open folder displays a list of the already available address types. Click this list window with the right mousebutton (attention: do not select a list entry) to access a context menu. In there select the **New → Object...** function to create the new address type object.

In the first configuration window of the Create Object wizard define the object “class”.



Here “addrType” must be selected (see illustration).

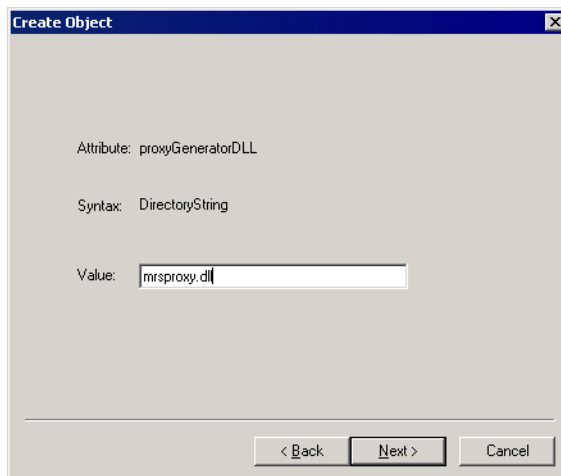
Next takes you to an entry form where the directory name, the name under which the new entry is to appear in the address types list, is determined.



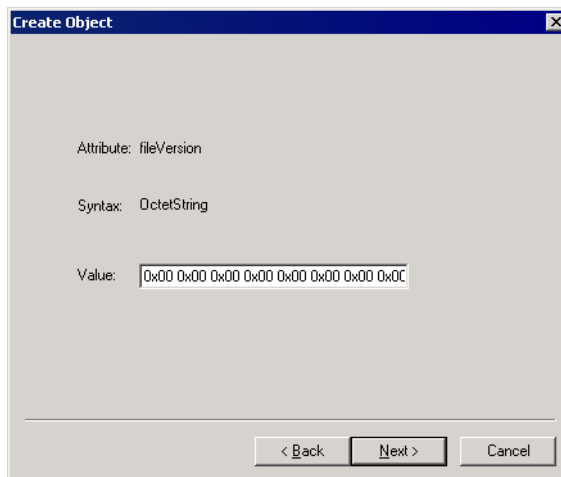
When this step has been accomplished, enable **Next** to open the dialog for specifying the “ProxyGeneratorDLL”. It is called “mrsproxy.dll” in this case.

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Software Installation of the LDAP APL and the Exchange Connectors



Via **Next** define the file version in the following window. For this purpose enter the 0 value eight times hexadecimally (0x00), separated by a blank, in the corresponding entry line.



Click **Next** anew and **Finish** in the ensuing dialog to conclude address type object definition.

2.4.7 Adding the MRS Address Type

You can add the MRS address type via any computer in the network on which the Exchange System Manager is installed. This is already the case on the computer where

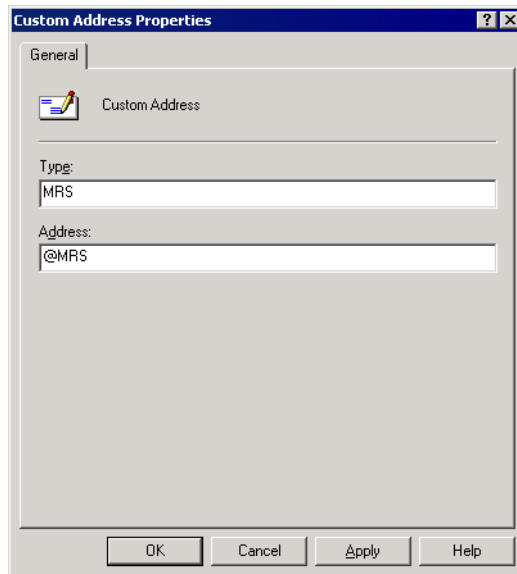
the Exchange 2000 resp. MRS Server runs since the Exchange System Manager is there already installed.

To create the MRS address type in the Exchange System Manager proceed as follows:

1. Start the Exchange System Manager via **Start → Programs → Microsoft Exchange**.
2. Under Organization open the “Recipients” directory and
3. in there select the “Recipient Policies” folder.
4. Next doubleclick the “Default Policy” entry.
5. Subsequently the “Default Policy Properties” registry window opens;
6. where you then click the “E-Mail Addresses” tab.
7. Enable the **New** button to switch to the “New E-mail Address” definition dialog.
8. Select “Custom Address Properties” and press **OK**. Make the following entries in the form now available:

Under **Type**: MRS

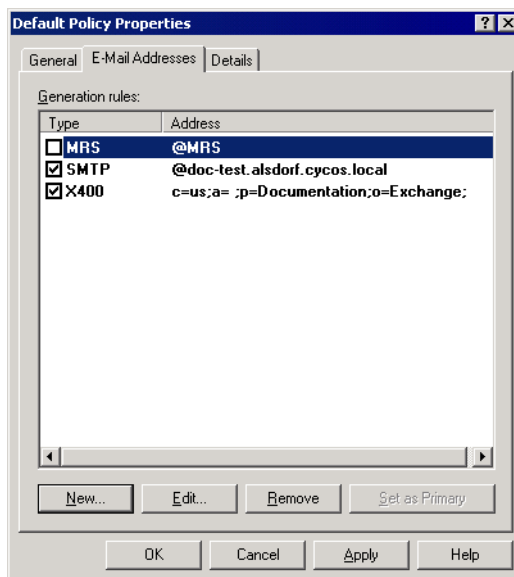
Under **Address**: @ MRS (see also the following illustration)



When you click **Apply** and **OK**, the settings are integrated in the e-mail addresses list. **Cancel** takes you back to the below dialog without a new address definition.

MRS and Exchange 2000

The MMC Snap-In Extension

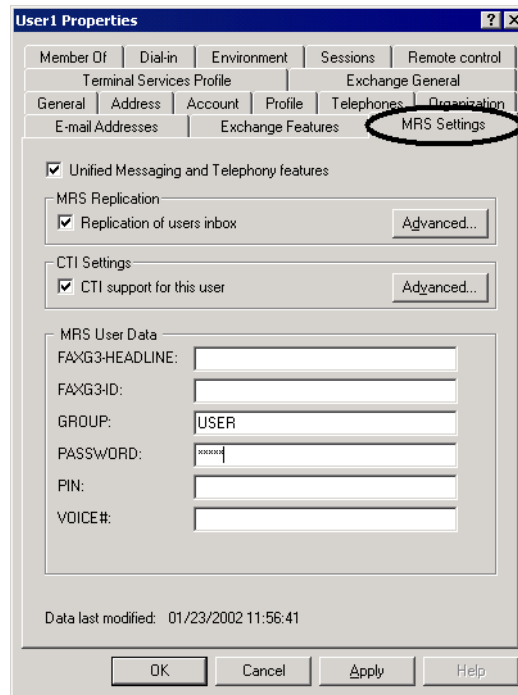


When the checkbox next to the e-mail address type is activated, the e-mail address associating this e-mail address type is generated for members of a recipient policy. Another click on **OK** terminates this process with saving the MRS address type now defined.

2.5 The MMC Snap-In Extension

The MRS MMC Snap-In for Exchange 2000 (MMC = Microsoft Management Console) is required to display and configure MRS users as well as the connector.

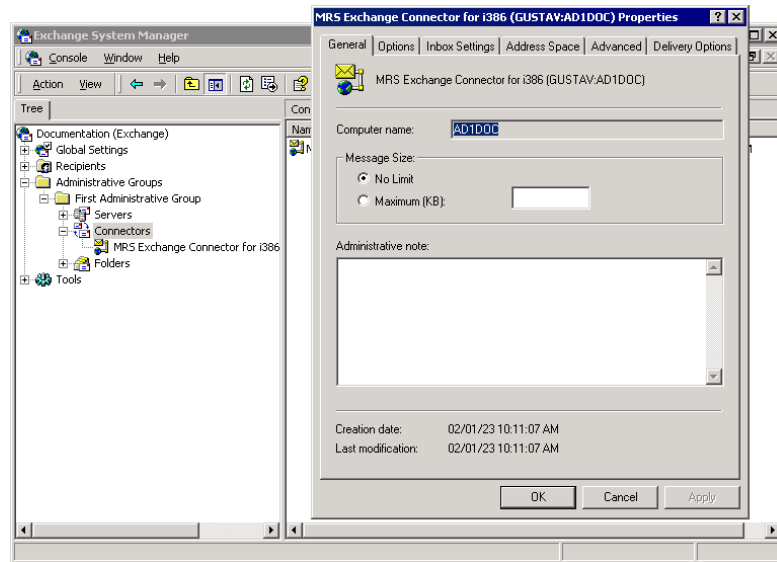
- For user configurations the “MRS Settings” tab is faded in via the administration program “Active Directory Users and Computers” if an MRS relevant user entry is marked there and **Properties** selected via the context menu (right mousebutton). Which MRS user data can be edited is found in chapter 5.2, “Exchange User Settings”, on page 109.



- The connector settings are performed from within the Exchange System Manager. To reach the corresponding configuration dialog, start the system manager, open the **Connectors** directory and in there select **MRS Exchange Connector for i 386** (<MRS Server computer name>:<Exchange Server computer name>). From within the context menu call the configuration dialog via **Properties** (for more information on the settings refer to chapter 5.3, “Exchange Connector Settings”, on page 115).

MRS and Exchange 2000

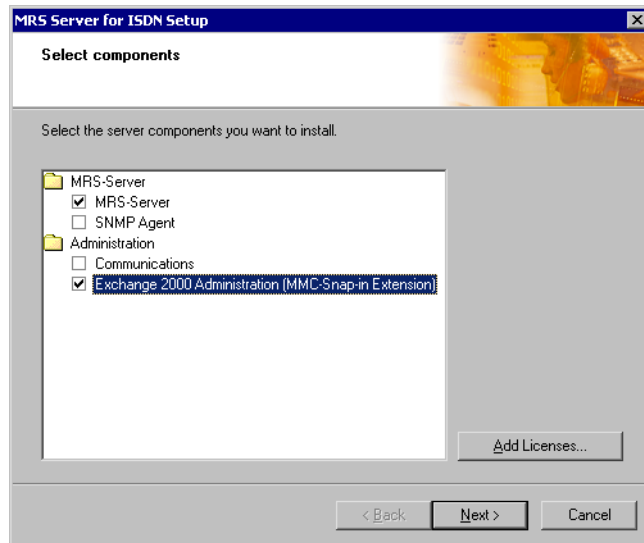
The MMC Snap-In Extension



2.5.1 MRS MMC Snap-In Installation for Exchange

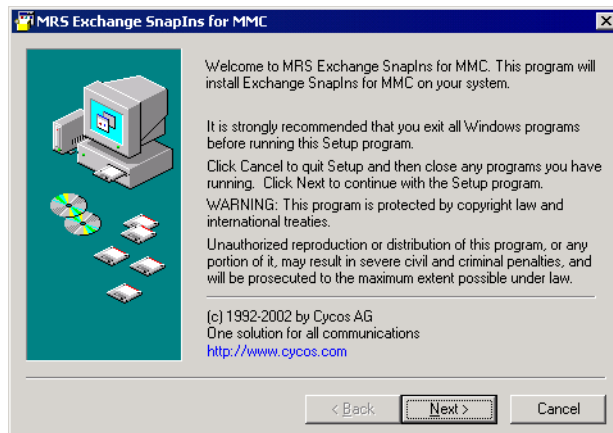
Before you can install the MRS MMC Snap-In, Outlook 2000 (SR1) must have been implemented with a user profile and started once. The start is to make sure that a user profile has been defined in Outlook.

The MMC Snap-In can be installed along with a new installation of the MRS Server. In the first installation dialog, after calling the server setup, select the component “Exchange 2000 Administration (MMC-Snap-in Extension)”.



The installation can also be manually performed from the MRS-CD. The Setup file is found there in the directory: X:\Client\Exchange\MMCSnapIns (X corresponds to the current drive letter of your CD drive).

After starting the Setup program you are taken to the welcome window.



It points out that all running applications should be terminated before Setup is started. So if any applications are still open, close them after selection of **Cancel**. Setup is left then and active programs can be shut down. Subsequently it must be started again. If you press the **Cancel** button in this window, the installation process terminates after the security prompt as to whether you really want to leave Setup.

MRS and Exchange 2000

The MMC Snap-In Extension

Enabling **Next** takes you to the dialog for defining the target directory.

During the installation the files

ExtInst.MMCExchSnapIns.ini

MrsAdUserExt.dll

Mrs ExchAdminExt.dll

setup.MMCExchSnapIns.ini

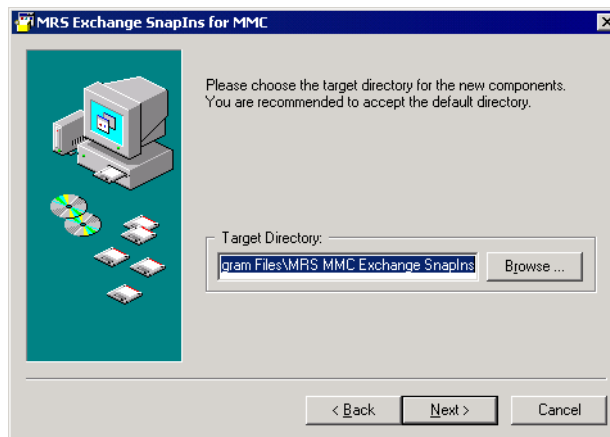
Uninstall.MMCExchSnapins.exe and its alias to the application file

Uninstall.MMCExchSnapins.exe

are copied to the directory

X:\Programs\MRS MMC Exchange SnapIns

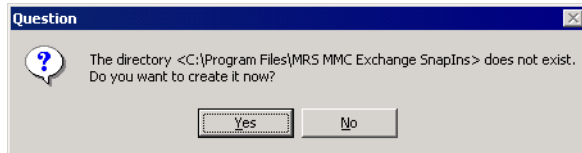
(X corresponds to the current drive letter of your local data carrier in which the “Programs” folder is found).



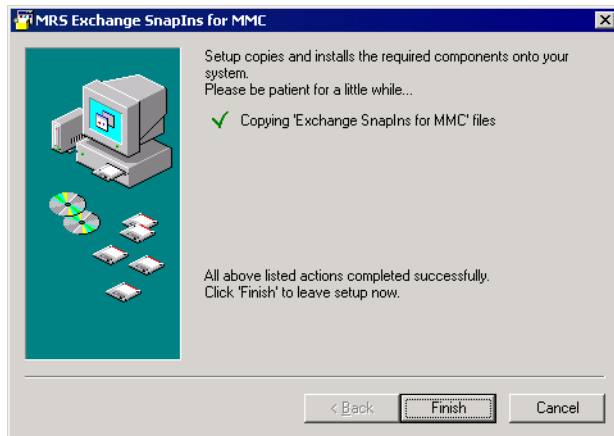
Alternatively you can press **Browse...** to specify or newly define a directory to which the program files are then copied. After enabling this button a file selection window opens for this purpose. However, we recommend to copy the preset directory since the program components are then easier to find when the necessity arises.

Via **Back** you can access the welcome window again and a click on **Cancel** terminates Setup after a security prompt.

When you have selected the target directory, the program files are copied to the specified folder. If this directory does not exist yet you are prompted as to whether you want to have it defined. Confirm with **Yes**.



You can follow the progress of the copying and installation process in the below window. While the activities continue, a black cross precedes the “Copying ‘Exchange SnapIns for MMC’ files:” line. After completion of the data transmission a green tick replaces the black cross.



To accomplish the MMC Exchange Snap-In installation, click the **Finish** button.

MRS and Exchange 2000

The MMC Snap-In Extension

3 Outlook/Exchange Extensions

3.1 Outlook Extensions Functions

The Outlook/Exchange extensions offer Outlook users some practical, additional features:

- Display of special message icons in the inbound journal for the various message types (icon forms).
- A simplified addressing method when fax messages are sent or polled.
- Convenient SMS message transmission.
- Incoming messages, regardless the service (fax, e-mail or voice message) can be furnished with a text and/or voice annotation and forwarded (to one or several addresses). It is also possible to send a message back as reply to the originator or all original recipients (if it has arrived as carbon copy (cc)). The voice annotation can either be recorded via telephone or a microphone connected to the sound card.
- Transmission of new voice messages.
- Incoming fax and voice messages can be read or listened to in the preview window (editing fax and voice messages via the preview window is not possible with Outlook XP). When you open such messages with a doubleclick, a convenient fax editing function is available so that you can add text or graphic elements to incoming fax messages before they are forwarded. Voice messages can be played back either via soundcard or the individual telephone and extended with a voice annotation before they are forwarded.
- Furthermore advantage can be taken of the full range of the new MRS Server CTI functions from within Outlook. Precondition is of course that the corresponding CTI functionality is installed on the MRS Server.

In this way the individual in and outbound calls can be displayed in Outlook and return calls triggered per mouseclick. Contacts resp. persons present in local Outlook or Exchange 2000 Server address books can be called or conference circuits initiated just as easily.

3.2 MRS Icon and Message Forms

Icon and message forms are implemented in one installation step. Call the corresponding Setup.exe from the ...\\Client\\Exchange\\Forms\\ServerBasedForms directory (MRS-CD 2 "Add-on").

3.2.1 Icon Forms

All messages transmitted from MRS to Exchange are additionally indicated with a default icon (envelope) in the Outlook inbound journal (unless you have faded out the icon column by editing the journal window caption bar). In order to graphically improve the recognizability of messages coming in via the Exchange connector for Outlook users it is possible to introduce new, additional icons which immediately represent the message type and status. These new icons are not only available for standard messages (fax, data transfer and voice) but also for CTI status display and for an administrator report. Please refer to the following table for the additional icons and the message classes and states they indicate:

CTI Message Classes:

Icon	Description	Name Entry in the Form Manager
	Inbound call has not reached the user (red arrow).	MRS.CTI.Inbound.Failed
	Inbound call has not reached the user, therefore set on reschedule (red arrow).	MRS.CTI.Inbound.Failed.Rescheduled
	Inbound call has reached the user (green arrow).	MRS.CTI.Inbound.Success
	Inbound call has reached the user, yet set on reschedule (green arrow).	MRS.CTI.Inbound.Success.Rescheduled
	Outbound call has not reached the subscriber (red arrow).	MRS.CTI.Outbound.Failed
	Outbound call has not reached the subscriber, therefore set on reschedule (red arrow).	MRS.CTI.Outbound.Failed.Rescheduled

	Outbound call has reached the subscriber (green arrow).	MRS.CTI.Outbound.Success
	Outbound call has reached the subscriber, yet set on reschedule (green arrow).	MRS.CTI.Outbound.Success.Rescheduled

Data Message Classes:

Icon	Description	Name Entry in the Form Manager
	Standard fax message (icon with black characters)	MRS.Fax
	Fax message, in OK (icon with green characters)	MRS.Fax.DR
	Fax message, in failed (icon with red characters)	MRS.Fax.NDR
	Standard Eurofile transfer	MRS.Eft
	Standard voice message	MRS.Voice

Administration Message Classes:

Icon	Description	Name Entry in the Form Manager
	Administration report; e.g. to display errors during the address- book replication	MRS.AdminReport

3.2.2 Message Forms

Message forms provide two basic types of usage:

1. View forms: Incoming fax and voice messages can be edited via the preview window except in Windows XP where this is currently not possible for technical reasons. In order to edit an incoming fax as well as voice message there, open the documents with a doubleclick. Fax or voice messages are accessible then (fax messages in .TIF format, voice messages in .WAV format). Both can then be read resp. listened to with an appropriate view or playback program.
2. Send forms: As preparative measure message forms are stored on the server to make them available to all desired subscribers with an extended functional range. The only requirement for this purpose is the additional start of the “Unattended Setup” with each client that is to use the functions. The “Unattended Setup” can simply be distributed to the corresponding users per e-mail as file attachment. These users only need to start the program then. During this setup no entries are necessary. The extended functional range includes:
 - Simplified addressing with fax transmission and polling, combined with a convenient editing function to furnish incoming messages with additional text or graphic elements before they are forwarded.
 - Convenient SMS message sending.
 - Voice message playback either via soundcard or the individual telephone and attachment of a voice annotation before the message is forwarded.
 - Voice message generation
 - Service independent (fax, e-mail or voice message) attachment of a text and/or a voice annotation to arbitrary messages that can then be forwarded to one or several addresses or sent back as reply to the originator resp. all original recipients (if the message arrived as Carbon Copy (CC)). The voice annotation can be recorded via telephone or via a microphone connected to the sound card.

3.2.3 Requirements for the Installation of Message and Icon Forms

So that the message icon representation can be activated (in other words, the new icons are displayed in the clients’ journals with messages coming in via the Exchange 2000 Server), some preconditions are to be met and preparative operations required (via the Exchange System Manager) before Setup is started:

- Installation can occur from any Outlook client of the Exchange organization except the one that is installed on the computer where the Exchange Server runs. The installing user must have a mailbox on the Exchange 2000 Server and requires the owner privilege for the Exchange form library (privilege assignment: mark the

organization directory and call the context menu, select **Properties** and switch to the “Permissions” tab. Via the **Client Permissions...** button the corresponding privileges can be granted or a new user with the required privileges added).

- The Collaboration Data Object (CDO.DLL) must be available on the computer from which the installation is to be performed. It is not automatically installed along with an MS Office standard installation (typical mode). In this case it must be subsequently installed from the Office-CD.
- When you have defined several user profiles in Outlook: make sure that in Outlook, under **Tools** → **Options...**, “Prompt for a profile to be used” is selected in the **Mail Services** tab. Otherwise the error message might appear that the required user privilege for the organization folder does not exist.
- Before Setup starts (from the MRS-CD 2 “Add-on”, directory ...\\Client\\Exchange\\Forms\\ServerBasedForms\\...), at least one default folder must be generated for the organization forms, if the folder does not exist yet (see “Generating the Organization Forms Folder” on page 49).
- If several folders haven been created for the organization forms and the icon forms are to be stored in a system folder different from the one mentioned above, the `Formregister.exe` program must be used. It is also manually started with the `x` parameter (see “Subsequent Message and Icon Forms Registration” on page 56). You find the `Formregister.exe` program in the ...\\ServerBasedForms\\Uncomp\\... directory on the MRS-CD 2 “Add-on”. Prerequisite for this intallation version is that the Collaboration Data Object (CDO.DLL) is available on the computer from which the installation is to occur. Without the CDO.DLL the icon forms are copied to the organization folder default used by Outlook.
- Make sure that the registry key “CreateDefaultMessageClasses” is present in HKLM\\Software\\PP-COM\\MRS\\ExchApl and set to value 1. Depending on the program version the value is yet to be set manually (see also page 145).

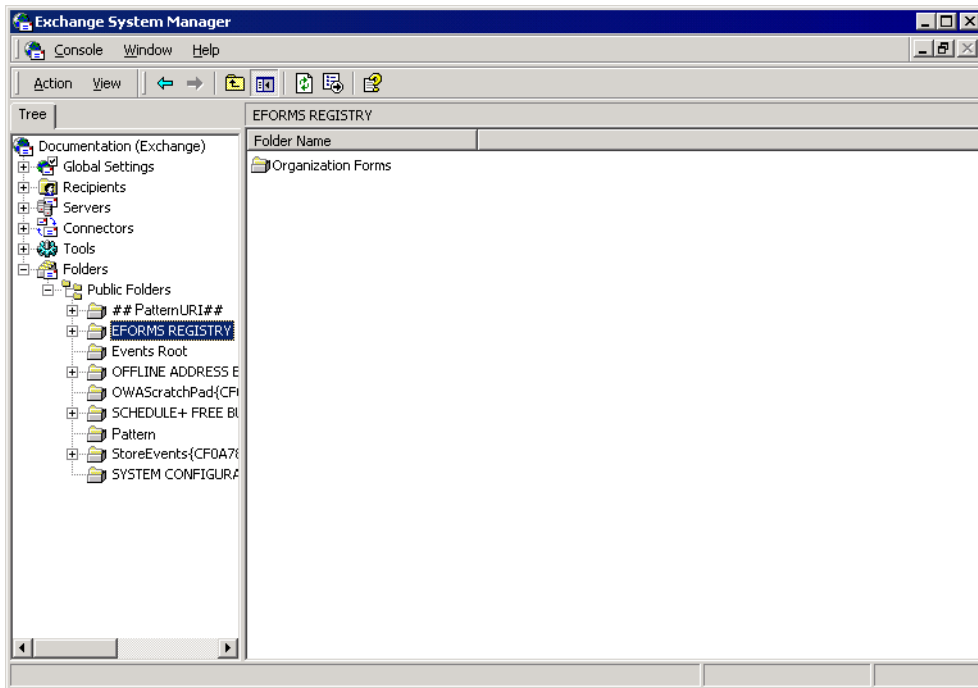
3.2.3.1 Generating the Organization Forms Folder

All message classes forms must be installed in a global library so that they can later be made available to all connected Outlook clients.

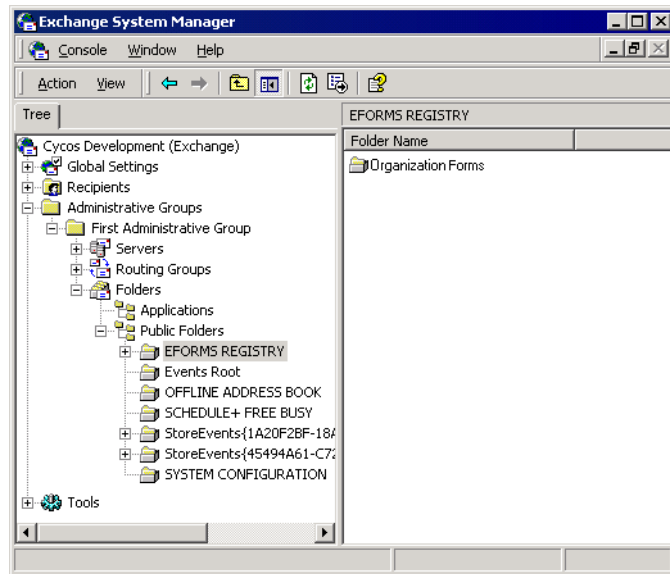
First you need to create a new directory (with arbitrary name) via the Exchange System Manager in the “EFORMS REGISTRY” system directory (under ...\\Folders\\Public Folders).

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MRS Icon and Message Forms



Depending on the view mode presetting in the Exchange Manager (standard display or representation with the administrative groups) the “folder” directory is accessible directly in the main path under “<Organization>” (see above illustration) or in the branch <Organization>\Administrative Groups\First Administrative Group (see following illustration). When you open this folder, you find the “public folders” subfolder in there. This subfolder includes the “EFORMS REGISTRY” directory.



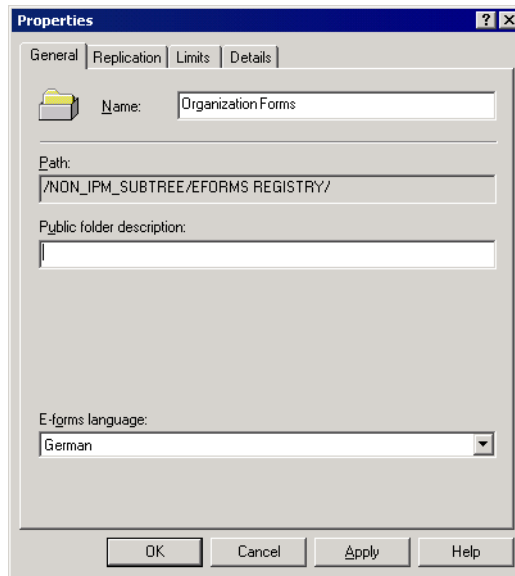
If the EFORMS REGISTRY folder (and the other system directories) is not displayed, the following might be the cause:

1. You are in a view mode in which the system folders are not shown. In order to switch to a view mode that displays the system folders, select the “Public Folders” element first. Then select the **Show System Folders** function either via **Properties** in the context menu or via the **Action** main menu option of the Exchange Manager. Subsequently a tree structure similar to those shown in the above illustrations is displayed.
2. You access from the computer where the MRS Server is installed and though the settings have been performed as described under point 1., the directories are not displayed. In this case the required privileges are missing. To assign these subsequently, select the “Public Folders” directory and choose **Properties** from the context menu (or the **Action** main menu of the Exchange Manager). Switch to the **Security** tab and assign the correct privileges.

Generating the new directory (in our example “Organization Forms” occurs in the same way for both view modes. After a click with the right mousebutton on the “EFORMS REGISTRY” entry, call **New → Organization Forms...** in the context menu now open.

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In the “Properties” form shown above enter the directory **Name** in the field provided (in our example “Organization Forms”) for definition. For an environment with English Outlook installation set e.g. English as “E-Forms language”. Confirm with **OK** and the directory is installed under “EFORMS REGISTRY”. This dialog closes and no further definitions are required at this point. Thus we have defined the folder that Outlook accesses per default.

Repeat the previously described steps to add further organization folders under “EFORMS REGISTRY”.

Remarks: If different Outlook language versions are used in the system and only one organization folder is available, this folder is utilized by all users per default then.

Selection of another “E-forms language” is mandatory for each additional folder to be defined (for all English speaking Outlook users “English” is default set).

3.2.3.2 Starting the Installation Routine

After these preparations the actual message icon installation comes next. Start the setup.exe installation program found in the

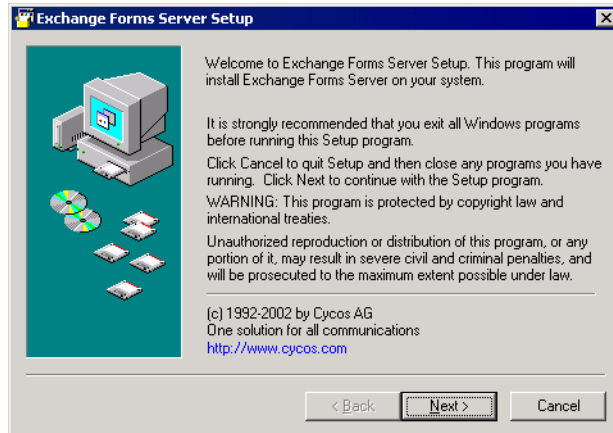
X:\Client\Exchange\ServerBasedForms\

directory on the MRS-CD “Add-on” (X: represents the current letter of your CD-ROM drive).

The installation consists of two integrated processes:

1. Copying of all required files to the directory to be defined during Setup.
2. Automatic start of the `Formregister.exe` program that writes the required forms in the organization folder.

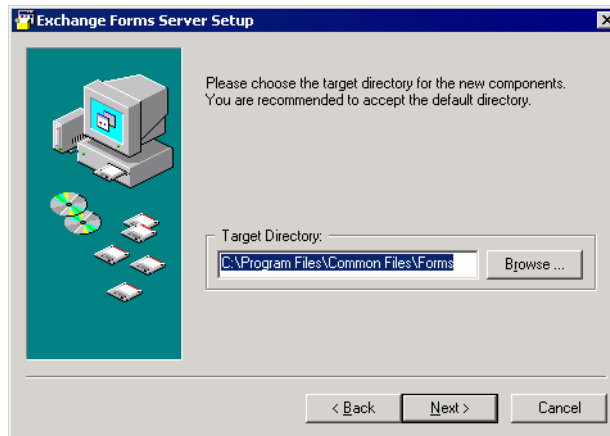
After starting the Setup program a welcome window appears, prompting you to close all running applications prior to the installation as precaution measure. If necessary, this can here be retrieved via **Cancel**. The running Setup is terminated then and needs to be restarted later to continue the installation process.



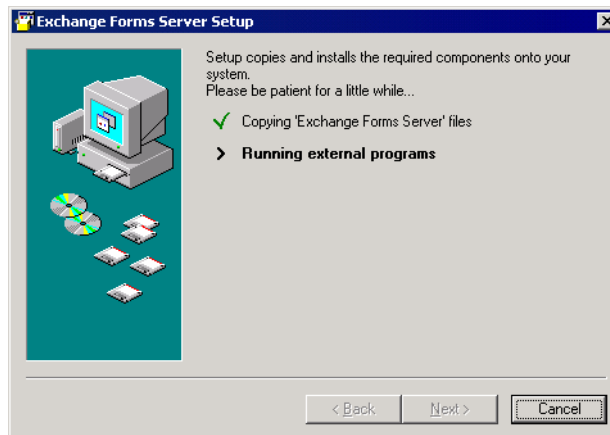
Enable **Next** to access the directory selection dialog in which you can determine (or newly define) the target directory in which the program components are to be stored. We recommend to accept the suggested directory (`C:\Program Files\Common Files\Forms`) so that in case of errors the corresponding files are easily found. If you want to fall back on a directory already installed, you can make the corresponding selection via the **Browse...** button (a file directory window opens) just like in the Windows Explorer. As with the gateway installation, Cancel terminates the running Setup (after a confirmation prompt).

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MRS Icon and Message Forms

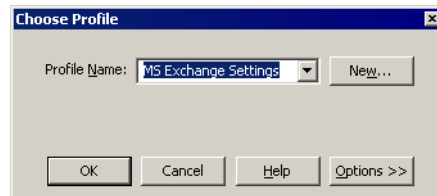


Click **Next** to start the actual copy and installation process the progress of which you can roughly monitor in another window. **Back** opens the welcome window again and **Cancel** delivers the prompt as to whether you really want to stop Setup at this point.

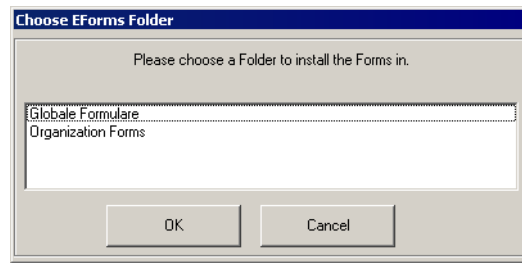


In the monitoring window you find processes just being performed indicated by an intimated arrow (>) that precedes the descriptive text entry. The text is bold set. A successfully accomplished installation step appears preceded with a green tick (✓).

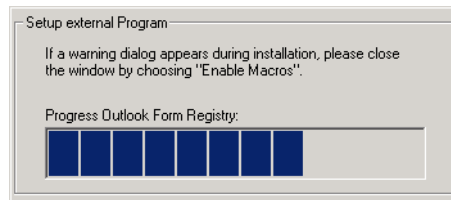
Copying the program files is followed by the icon forms registration under the “Running external programs” installation step.



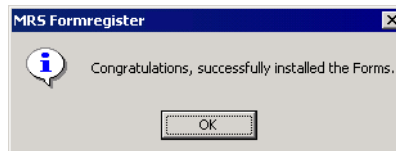
In the above dialog you first need to select a profile with the necessary owner privilege, then define the organization folder in which the forms are to be registered. Usually only one folder (the default folder) will be available here for selection. If, however, several have been defined, you can choose one from this pool.



After you have selected the corresponding name, a progress indicator displays the ongoing action.



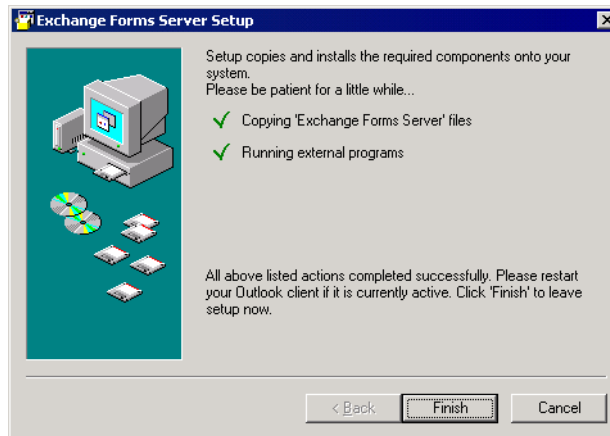
Finally the message appears that the entire process has been successfully accomplished.



Confirm with **OK**. Now that all required files have been copied and external programs closed, click **Finish** to conclude Setup.

MRS and Exchange 2000

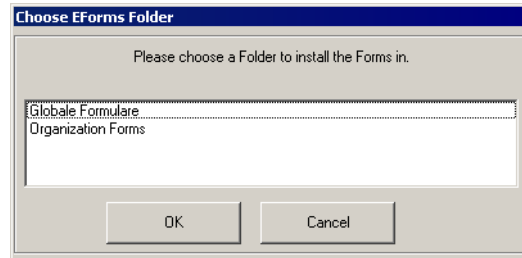
MRS Icon and Message Forms



If the default folder was specified for installation, you can now check Outlook as to whether the installation has been successful and the message icons are now known. Start Outlook and select **Tools** in the main menu. In there click on **Options...** to open the corresponding window. Then switch to the “Other” tab and enable the **Advanced Options** button in the dialog’s “General” section. In the “Advanced Options” window you find the **Custom Forms...** button in the lower portion via which another option window is opened. Then select **Manage Forms...** to display the forms manager the left half of which should now list all message icons under “Organization Forms”.

3.2.3.3 Subsequent Message and Icon Forms Registration

In the course of Setup, the icon forms are all registered in the organization folder that you have selected in Setup. After the installation you are now able to install the forms in another organization folder. From the computer on which the corresponding files have been stored, call the `FormRegister.exe` program with the `x` parameter (MRS-CD “Add-On“ `...\Client\Exchange\Forms\ServerBasedForms\Uncomp...`). The executing user requires a valid Outlook profile on the computer from which the operation is started and the user privilege for the Exchange form library for this purpose. After starting this EXE file you are prompted as to which organization folder is to be supplemented with the forms. When you have made your selection click on **OK** so that registration in the new directory is performed.



Removing forms from the organization folder is done analog to the previously described procedure, using the `DeInstallBtn.exe` program that is also called with the `x` parameter from the “Uncomp” directory.

3.2.3.4 Deinstalling Message Icons

Removing message icons (admin forms) should be done as customary in Windows. Start the control panel via **Start → Settings → Control Panel**. Call the **Add/Remove Programs** function to view a list of the application programs already installed. In this list look for the **Exchange Forms Server** entry and select it. Next enable the **Remove** button to start the deinstallation program. Then follow the instructions given in the corresponding windows to delete the forms.

If you want to perform the deinstalltion manually (what we do not recommend), you find the corresponding deinstallation program

`Uninstall.ExchForms Server.exe`

together with the other forms program components in the directory

`X:\Program Files\Common Files\Forms`

and is automatically copied to the harddisk when the admin forms are installed.

3.3 Installation of Client Components

These components enable the activation of message forms at any Outlook client after they have been centrally stored via the *Server Based Forms* installation. Via this type of installation users can be selectively given permission to use the forms by sending them Setup (for example per e-mail with the `Setup.exe` as attachment). Unrestricted use can be made of the message forms on systems with Outlook 2000 whereas with Outlook XP (fax and voice messages cannot be displayed in the preview window) usage is limited. Under Outlook 98, for technical reasons, only view forms for received fax and voice messages are available.

The client extension installation also activates the ActiveX component for the user to edit fax and voice messages. So that the ActiveX components can be used, the security

settings must be configured accordingly. In the Internet Explorer, via **Tools → Internet Options...**, access the **Security** tab. Then click the **Custom Level...** button. Finally select the entry “ActiveX controls and plug-ins” and set it to **Enable** or at least to **Prompt**.

3.3.1 Requirements and Remarks

- Message and icon forms for Outlook clients can only be installed if the server components (message and icon forms) have been previously installed on the Exchange Server (see “MRS Icon and Message Forms” on page 45).
- To start Setup you need administrative privileges on the client computer (for activating the ActiveX component and registering the library).
- When you call a form, a macro warning may appear that, however, can be ignored (click the **Enable Macros** button) since the forms do not use any macros. To avoid this warning, the security can be set either to “High” or “Low” under **Tools → Macro → Security** (we recommend “High”).
- When you open a fax or voice message in Outlook and the Internet Explorer comes up with an error message saying: “An ActiveX control on this page is not safe. Your current security settings prohibit running unsafe controls on this page. As a result, this page may not display as intended”, adapt the corresponding ActiveX security settings (set “Enable”) under **Tools → Options... → Security → Zone Settings... → Custom Level...**

3.3.2 Starting the Client Attended Setup

Once Setup has been started, it runs without any interaction with the installing person.

It must be started on every computer the user of which is to employ the message forms. The `Setup.exe` (from the `...\\Client\\Exchange\\Forms\\ServerBased-FormsClientComponents` directory) needs to be previously transmitted to the respective clients either per e-mail or by another distribution software and the program started there. If the presettings have been modified by editing the `ExtInst.ini`, the entire “Uncomp” folder with the edited `ExtInst.ini` is to be sent to the respective clients and the `Setup.exe` contained therein started. (see also: “User Defined Setup” on page 59).

The Setup defaults that can be altered user defined at a later date are:

- Modification Point 1: All numeric values entered in the address field are automatically interpreted as fax address. This behaviour may lead to addressing errors if your address entries in the local or personal address book are not updated according to names but to code numbers.

- Modification Point 2 to 7: All available forms are installed at the client per default. You can, however, exclude each single form from the installation user defined.
- Modification Point 8: Per default the forms are so installed that they are available to each user logged in at the respective computer (admin installation). By means of `ExtInst.ini` manipulation, Setup can be executed in a way that only the user currently logged in and performing Setup can use the forms.
- Modification Point 9: This setting is similar to the one described under Modification Point 1 but only more consistent in its effects. The default value “0” suppresses the overall acceptance of a number entry in the address field for addressing a standard e-mail. Fax transmission then mandatorily requires the use of the “fax send” form. The entry “1” resets this default to the normal behaviour. A number entry in the standard e-mail address field is then interpreted as fax G3 address again (depending on the setting in Modification Point 1).
- Modification Point 10: A log file can be generated for a possibly required debugging. This function is deactivated per default. If you want to generate a log file, set the variable “DEBUG=” to “1” (DEBUG=1) in the first line.
In the second line specify the path in which the log file is to be stored: `Debug-Path=”c:\FormsLog.txt”`
- Modification Point 11: Is used to cancel the privilege of modifying the individual telephone number at the respective Outlook client. Parameter “1” is default set and allows telephone number modification. To cancel the privilege enter “0”.
- Modification Point 12: Changing the default value 1 to 0 default sets after the installation that no “sent” or “read” notification is transmitted.
- Modification Point 13: Changing the default value 1 to 0 default sets after the installation that no “sent” or “read” notification is transmitted for sent SMS messages.

3.3.2.1 User Defined Setup

To adapt the installation to the conditions of the system environment, the possible functions can be assigned to users by editing the `ExtInst.ini` file (on the MRS-CD 2 “Add-On“ in the directory `... \Client\Exchange\Forms\ServerBasedForm-sClientComponents\Uncomp`) associated to this Setup. The options provided by the user defined Setup have already been described with the Setup presets.

In order to adjust the installation for these cases you need to open and edit the `ExtInst.ini` file with a suitable editor program (WordPad, MS Editor etc.). So

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Installation of Client Components

that the adjustments from this file take effect, send the entire “Uncom” subdirectory to the clients where the adapted Setup is to be executed. The installation is then started by means of the `Setup.exe` from the “Uncomp” directory.

Important: In the `ExtInst.ini` you may alter only program lines titled “;**Modification Point x**”.

If the “0” value is replaced with a “1” at the corresponding positions or a semicolon (;) is placed before the listing lines (which turns them into an annotation text, not being considered with processing), the described functions are adapted and not installed.

Remark: Be extremely careful when you indicate listing lines with a leading semicolon. A semicolon set in the wrong place leads to a Setup crash!

The following extract from the `.INI` file shows the listing portion where the adaptations are made:

```
[RegHKLocalMachine]
;Modification Point 1: if NoNumberOnlyResolution is set to 1, the dll wont resolve num-
bers to faxg3/number.
Software\Cycos AG\ExchForms Client\NoNumberOnlyResolution="0"

;Modification Point 2: if you don't want to install the fax button and form, please
change the following "0" to "1".
Software\Cycos AG\ExchForms Client\NoFaxBtn="0"
;Modification Point 3: if you don't want to install the SMS button and form, please
change the following "0" to "1".
Software\Cycos AG\ExchForms Client\NoSMSBtn="0"
;Modification Point 4: if you don't want to install the fax on demand button and form,
please change the following "0" to "1".
Software\Cycos AG\ExchForms Client\NoFODBtn="0"
;Modification Point 5: if you don't want to install the voicemail annotation buttons and
Form, please change the following "0" to "1".
Software\Cycos AG\ExchForms Client\NoVMBtn="0"
;Modification Point 6: if you don't want to install the voiceview form, please change
the following "0" to "1".
Software\Cycos AG\ExchForms Client\NoVoiceViewForm="0"
;Modification Point 7: if you don't want to install the faxview form, please change the
following "0" to "1".
Software\Cycos AG\ExchForms Client\NoFaxViewForm="0"

;Modification Point 8: comment the following 5 lines, by writting the ";" at the be-
ginning of each line, to make the com add-In ONLY available for the user who installed on
that machine.
Software\Microsoft\Office\Outlook\Addins
Software\Microsoft\Office\Outlook\Addins\Fax_SMS.UMSConnect\FriendlyName="MRS  Extensi-
ons"
Software\Microsoft\Office\Outlook\Addins\Fax_SMS.UMSConnect\Description="MRS  Extensi-
ons for fax and SMS"
Software\Microsoft\Office\Outlook\Addins\Fax_SMS.UMSConnect\LoadBehavior=3
Software\Microsoft\Office\Outlook\Addins\Fax_SMS.UMSConnect\CommandLineSafe=0

;Modifcation Point 9: Change "0" to "1", if you dont want fax address resolution (234-
>faxg3/234) working in your standard mail form.
Software\Cycos AG\ExchForms Client\WatchIPMNote="1"

;Modification Point 10: If you want to create a log please change "0" to "1".
Software\Cycos AG\ExchForms Client\Debug="0"
Software\Cycos AG\ExchForms Client\DebugPath="c:\FormsLog.txt"

;Modification Point 11: If set to 0 client is not allowed to do any changes with his
phone number.
Software\Cycos AG\ExchForms Client\ChangePhoneNo="1"
```

```
;Modification Point 12: If you change "1" to "0" the form fax send will have the option  
read/delivery receipt disabled by default.
```

```
Software\Cycos AG\ExchForms Client\FAX\DeliveryReceipt="1"
```

```
Software\Cycos AG\ExchForms Client\FAX\ReadReceipt="1"
```

```
;Modification Point 13: If you change "1" to "0" the form SMS send send will have the  
option read/delivery receipt disabled by default.
```

```
Software\Cycos AG\ExchForms Client\SMS\DeliveryReceipt="1"
```

```
Software\Cycos AG\ExchForms Client\SMS\ReadReceipt="0"
```

3.3.3 Deinstalling the Client Components

If you want to remove message icons or message forms, do so in the manner common under Windows. Via **Start → Settings → Control Panel** the control panel is started. Here you can call the **Add/Remove Programs** function to view a list of already installed application programs. In this list look for the entry **Exchange Forms Server** and select it. Now you only need to enable the **Change/Remove** button to trigger the deinstallation program. Then follow the instructions given in the displayed dialogs to remove the forms from the system.

The corresponding deinstallation program

Uninstall.ExchForms Client Components.exe

is found with the program components of the other forms in the directory

X:\Programs\Common Files\Forms

and is automatically copied to the harddisk with the forms installation.

3.4 Fax Extension

Fax extension has become obsolete with the development of forms (see “MRS Icon and Message Forms” on page 45). It is only described here with respect to maintaining existing systems.

Fax extension components enable the Outlook user to:

1. View incoming fax messages.
2. Send fax messages.
3. Address text messages as SMS.

3.4.1 General Remarks on the Fax Extension Installation

The installation requires administrative privileges on the local computer where the extensions are to be used.

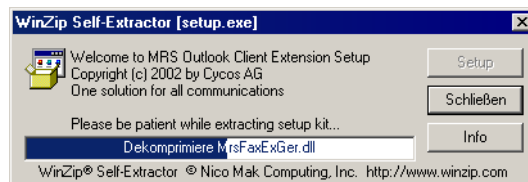
Two installation versions are available. Decide which one is the most convenient according to your situation:

- Installation from the MRS-CD which is described in the following.
- Installation via network which in principle is performed like installing from the CD but Setup of files from a shared folder (normally in:
Mrs_Cln\update\...) is started from the MRS Server.

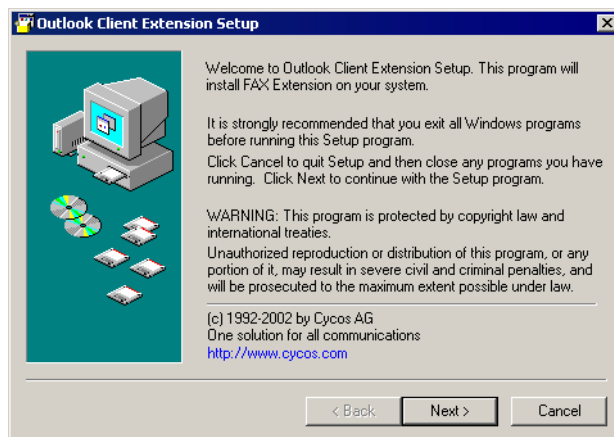
When the fax extension installation has been accomplished, no further configurations are required.

3.4.2 Fax Extension Installation

To install the fax extension start the corresponding Setup program `setup.exe` (self-extracting zip file) from the directory...\\Client\\Exch\\Fax\\ (MRS-CD 2 “Add-on”) on the Outlook computer. First the self-extractor dialog appears. The extractor decompresses data required for the installation process.



Then the welcome window is faded in, prompting you to exit all running applications before starting Setup as precaution measure.

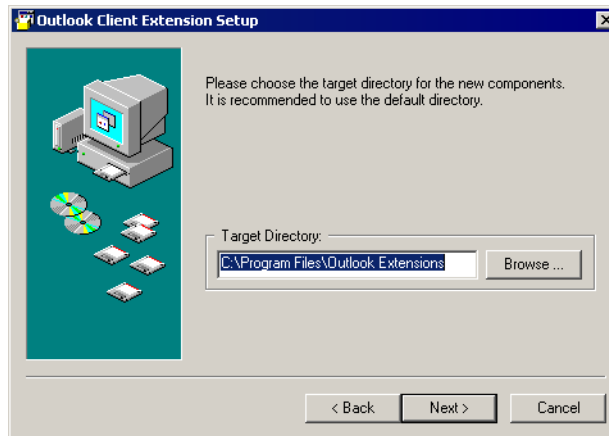


Click on **Next** to access the directory selection dialog. Just as with CTI extension, the target directory where the program components are to be stored can be selected (or

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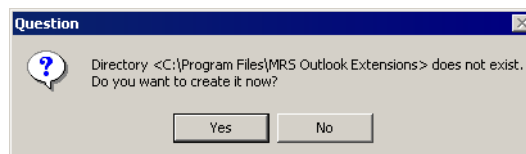
Fax Extension

newly defined) here. We recommend to copy the suggested directory (\Program Files\MRS Outlook Extensions\) so that all extension files can be stored in the same directory and quickly be found in case of an error. If, however, you want to revert to an already configured directory for the installation, click on **Browse...** (opens the **Select Folder** file directory) to select the corresponding folder as common in the Windows Explorer. Via **Cancel** you can, as with the gateway installation, exit the running Setup (after a confirmation prompt).



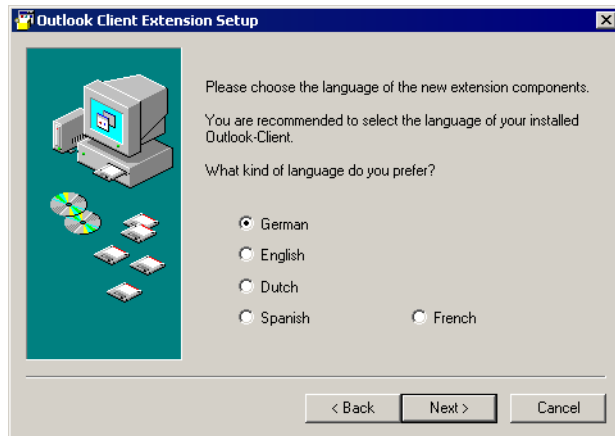
If you want to define a new directory for the Outlook extensions or the suggested target folder does not exist yet, you are, after enabling **Next**, first informed by a prompt that such a directory is not available yet. **Back** takes you from the directory selection to the welcome window. **Cancel** initiates the Setup termination.

Confirm whether this file folder is to be created.

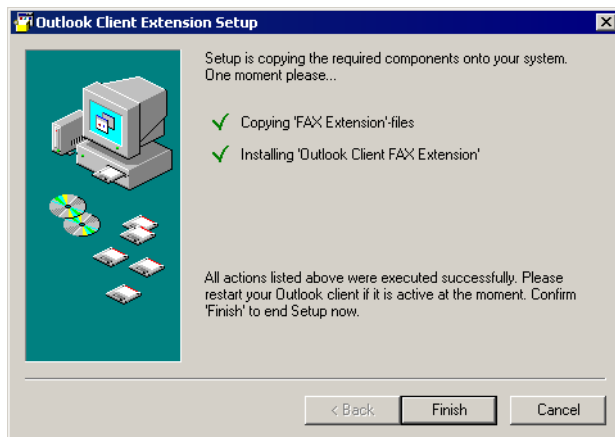


When you opt for **Yes**, the corresponding files are created. **No** leads you back to the target directory dialog.

If the directory exists already, **Next** immediately takes you to the dialog for language selection.



After making the desired selection in the above dialog press **Next**.



You can monitor the installation as it proceeds: actions not performed yet are indicated by a black cross preceding the descriptive text entry. Processes being carried out can be recognized by bold lettering of the corresponding text entry and a successfully accomplished installation step is indicated by a green tick.

3.5 CTI Extension

CTI extension components enable the Outlook user to:

1. Trigger various telephony actions via the dialer function (e.g.: calling, consulting, alternating between, establishing a conference circuit, installing a call diversion, etc., only to mention the most important).

2. Initiate a direct return call on grounds of a selected journal entry (provided a corresponding contact entry including the associating telephone number exists for this message).
3. Play back voice messages, depending on the configuration via PC sound card or the local telephone.

CTI extensions are based on the MRS Service Provider (MSP) which is installed on the client computer (Outlook computer). Installation of CTI extensions also copies the required MRS Service Provider Modules to the correct directories.

3.5.1 General Remarks on the CTI Extension Installation

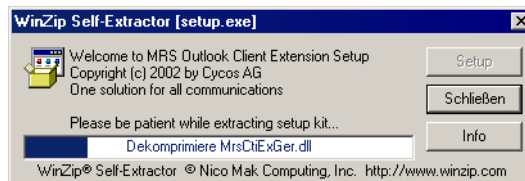
The installation requires administrative privileges on the local computer where the extensions are to be used.

Two installation versions are available. Decide which one is the most convenient according to your situation:

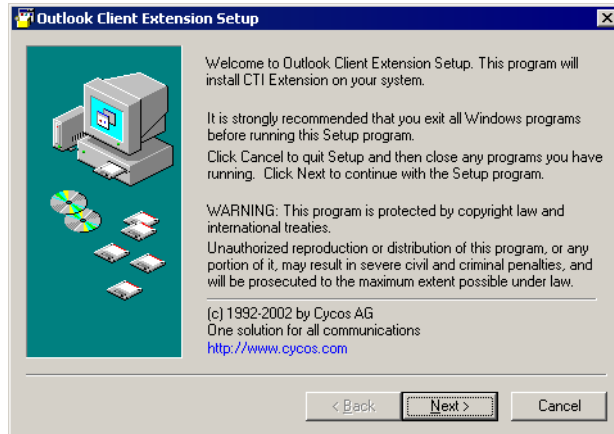
- Installation from the MRS-CD which is described in the following.
- Installation via network which in principle is performed like installing from the CD but Setup of files from a shared folder is started from the MRS Server (normally in: `Mrs_Cln\update\CTIExch`).

3.5.2 Installing the CTI Extension

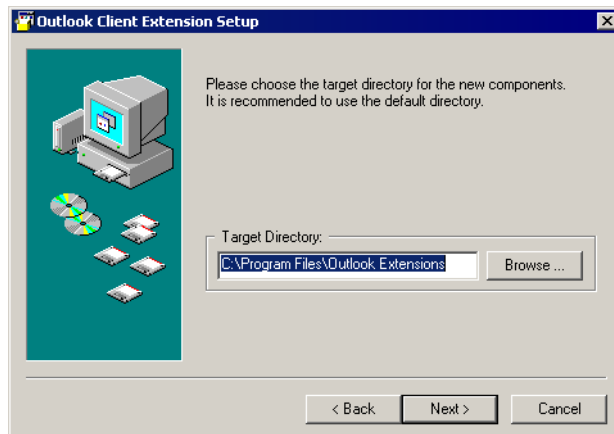
Start the installation program `setup.exe` (self-extracting zip file) from the directory `...\Client\Exch\Cti\` (MRS-CD 2 “Add-on”) on the Outlook computer. First the self-extractor dialog shown below appears. The extractor decompresses data required for the installation process.



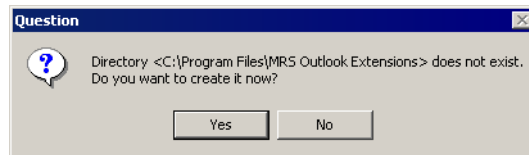
Then the welcome window is faded in, prompting you to exit all running applications as precaution measure before starting Setup.



Click on **Next** to access the directory selection window. The target directory where the program components are to be stored can be selected (or newly defined) here. We recommend to copy the suggested directory (\Program Files\MRS Outlook Extensions\) so that these files can be quickly found in case of an error. If, however, you want to revert to an already configured directory for the installation, click on **Browse...** (opens the **Select Folder** file directory) to select the corresponding folder as customary in the Windows Explorer. Via **Cancel** you can, as with the gateway installation, exit the running Setup (after a confirmation prompt).



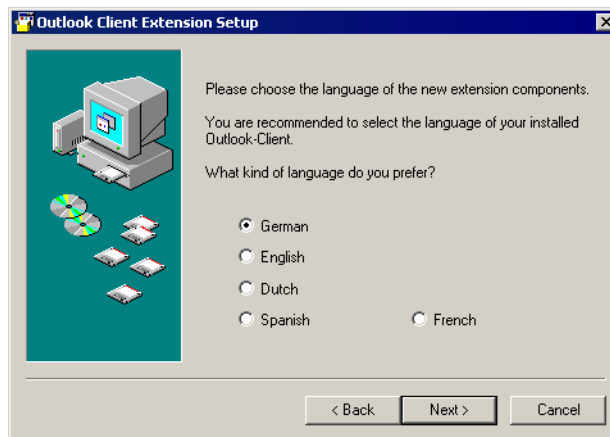
If you have defined a new directory for the Outlook extensions here or the suggested target folder does not exist yet, you are, after enabling **Next**, first informed by a prompt that such a directory is not available yet and asked whether this file folder is to be created.



After accomplishing this step with **Yes** you are taken to the dialog for language selection.

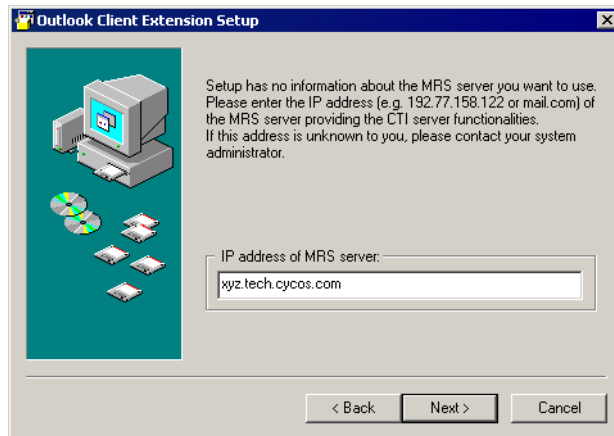
If the directory exists already, this dialog is immediately accessed via **Next**. **Back** opens the welcome window again and a click on **Cancel** initiates the Setup termination.

Using the language selection dialog you can determine in which language the program texts are to appear in the client. Presently you can choose from: German, English, Dutch, Spanish and French. Additional languages are currently under preparation. The best bet is to select the language in which Outlook has been installed at the respective workstation.

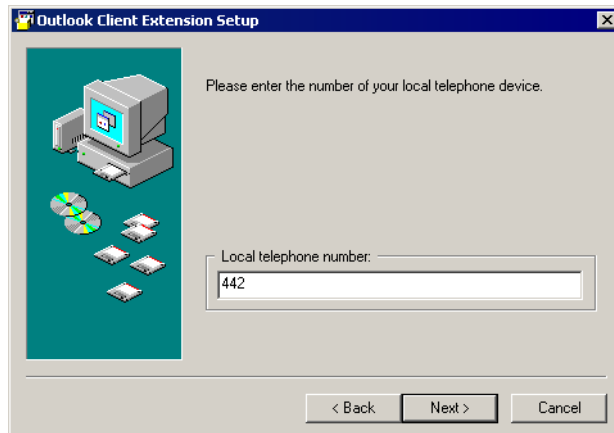


After making the desired selection in the above dialog, **Next** is pressed to access a window for entering the MRS Server IP address. **Back** opens the target directory dialog again and if you want to exit Setup at this stage, click on **Cancel**.

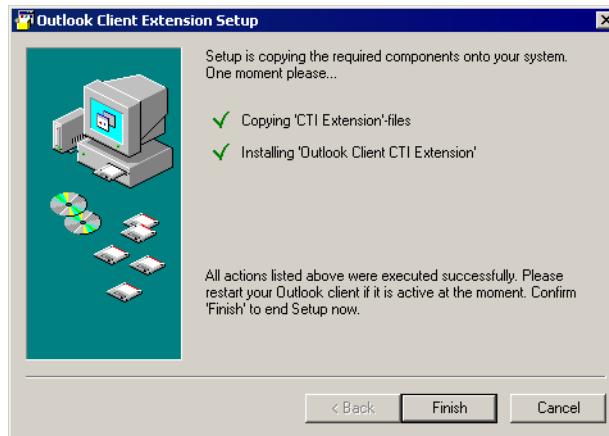
The IP address is required for directly connecting the MRS Server so that real time information, e.g. incoming calls, can be signalled at once. This address can either be entered as pure IP address (e.g.: 192.77.158.122) or as qualified hostname (e.g. xyz.tech.cycos.com as shown below).



After entry of the IP address click on **Next** to define the local telephone number. **Remark:** This dialog is missed out when the telephone number is already present in Exchange (for example after an update). **Back** opens the language selection window again; via **Cancel** you are prompted if Setup is to be terminated at this stage.



Defining the local telephone number is followed by the actual copy and installation processes which is started when you enable **Next**. **Back** opens the IP address entry dialog again; via **Cancel** you are prompted if Setup is to be terminated at this stage.



You can monitor the installation as it proceeds: actions not performed yet are indicated by a black cross preceding the descriptive text entry. Processes just carried out can be recognized by the corresponding text entry displayed in bold letters and a successfully accomplished installation step is indicated with a green tick.

Now that all required files have been copied and the CTI extension and the Service Provider (detailed information on the Service Provider is found in the appendix under 6.1, page 107) have been installed, Setup is left via **Finish**.

Please note: With Exchange 2000 Server the CTI functionality must be released in the user configurations for each user. This configuration is performed in the “Active Directory Users and Computers” configuration tab (**Start → Programs → Microsoft Exchange → Active Directory Users and Computers**) where you select the corresponding user entry with the right mousebutton. Then click on **Properties** in the thus opened context menu. An alternative is to select the user entry with the left mousebutton. Subsequently enable the **Properties** function in the configuration tab’s main menu option **Action**.

3.6 CTI Extension Configuration

3.6.1 Voice/CTI

In the Outlook Client under the menu item **Tools** → **Options** the new configuration tab **Voice/CTI** has been added. The following options are available in this tab:

The option **Delete message after submit** automatically deletes the message (mail with attached file) sent to the MRS Server for the execution of a playback or return call job from the **Outbox**. Since such a message is only generated if the connection occurs via the Exchange Gateway (thus in environments working without an MSP installed at the Client), this configuration only refers to this case which is only

used in few Exchange environments. The MRS Server is assigned the corresponding job via this message. Connections over the MRS Service Provider are a direct Client/Server connection. Thereby also telephone calls are initiated or a voice message is put out on a telephone via this direct connection that does not require such a mail.

Generate delivery report enables the generation of an acknowledgement of receipt by the MRS Server to document the result of the playback or return call job.

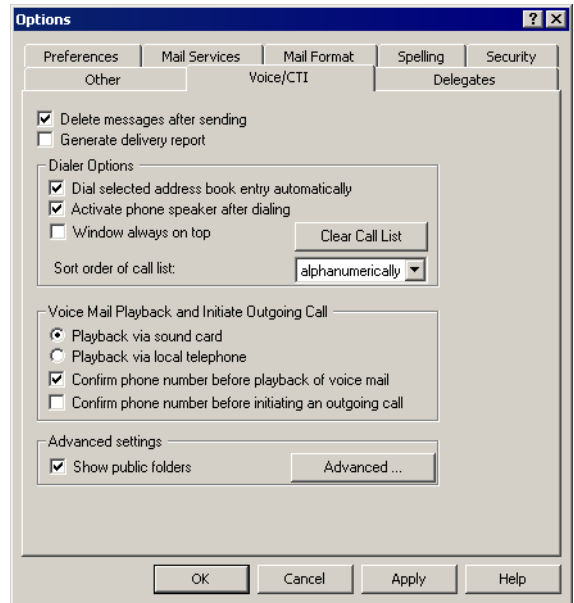
Dialer Options

The **Dialer** is an individual window over which calls can be initiated, alternated between or conference circuits set up. Speed dialing keys are also available for storing frequently dialed or important numbers to enable call initiation per mouseclick.

When the option **Dial selected address book entry automatically** is checkmarked, a doubleclick on an address book entry immediately initiates the dialing sequence.

The option **Activate phone speaker after dialing** activates the phone speaker so that users hear when the called party picks up the telephone.

Via **Window always on top** the Dialer always remains in the foreground and is thus always immediately accessible.



When selected, the **Clear Call List** button deletes all entries in the call history list. This list can quickly be accessed through a pull-down menu in the Dialer.

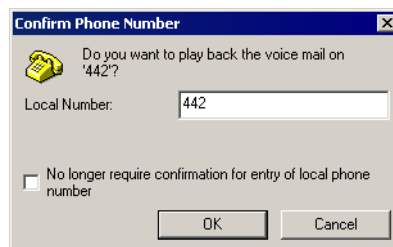
By means of the **Sort order of call list** function the call history list can either be sorted **chronologically** or **alphanumerically**. Alphanumeric sorting displays the name of known contacts resp. addresses and not the telephone number.

Voice Message Playback and Call Initiation

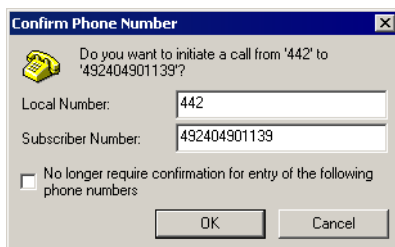
Output device options for playback of voicemail messages are either **Playback via sound card** or **Playback via local telephone**. The option **Confirm phone number before playback of voicemail** or **before initiating an outgoing call** provides the opportunity to alter the individual phone number with a return call. This is reasonable in case you wish to play back your messages at another workstation.

Confirm phone number before playback of voice mail

When this option is set, the opposite dialog appears before voice message output. You can then modify the telephone number for voice message playback (initiating playback in Outlook: select a voice message in the journal and subsequently the main menu option **Telephony**. Then click **Playback Voice Mail**. You can also press the loudspeaker icon after selecting the message).



Confirm phone number before initiating an outgoing call



Activating this option opens the "Confirm Phone Number dialog" with initiating an outgoing call to a message's originator. Here you can alter the telephone numbers both for the caller and the subscriber that is called (making a return call in Outlook: select a message in the journal and subsequently the main menu option **Telephony**. Then click **Initiate Call**. You can also press the telephone

icon after selecting the message).

In the **Advanced Settings** portion you can set the **Show public folders** checkbox to determine whether in the **Search** tab (available after a click on the **Advanced...** button) under **Search phone number in contact folders** also public folders are to be displayed, thus used for caller identification.

Remark: A large number of public folders in your system environment may decrease the performance since searching probably becomes more elaborate then.

3.6.2 Advanced Settings for CTI Configuration

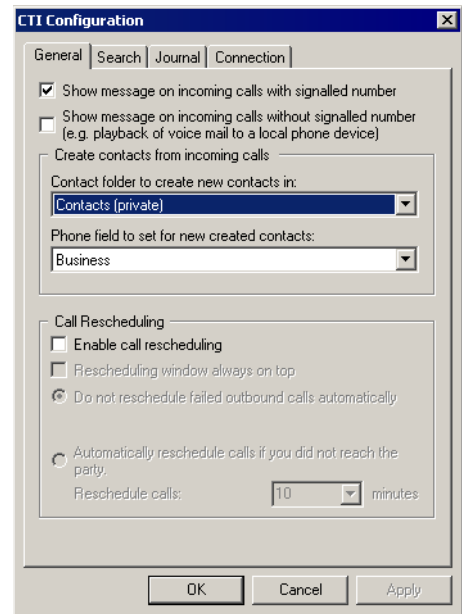
The following CTI options can be configured through selection of the **Advanced...** button.

3.6.2.1 General

With incoming calls a **message on call with signalled number** and **without signalled number** can be shown. Selecting the first option also enables simultaneous display of the corresponding contact information so that you already receive the available information on the caller before you pick up the phone. Via the second option it is at least possible to answer a call at the individual telephone per mouseclick. This is particularly useful to people wearing a headset (headphone-microphone combination), common in Hotline or Call Center jobs.

In the entry line **Contact folder to create new contacts in** a contact folder and in **Phone field to set for new created contact** a field can be specified to create a new contact when a call with unknown calling number comes in.

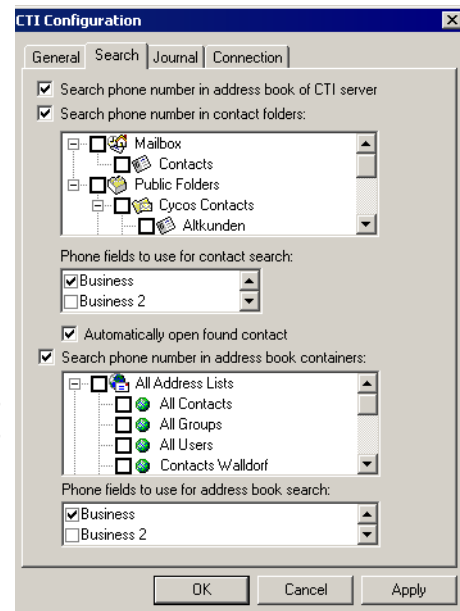
The **Call Rescheduling** functions serve to automatically reschedule unsuccessful individual calls, return calls or successful calls that require an additional call after a certain period. For this purpose you can **Enable call rescheduling** here. The option **Keep rescheduling window always on top** keeps the rescheduling window constantly visible on the desktop. With activated rescheduling, usage of this function can additionally be specified via **Do not reschedule failed outbound calls automatically** resp. **Automatically reschedule calls if you did not reach the party**. In this way rescheduling can be initiated manually or failed individual calls can automatically be rescheduled after a set period.



3.6.2.2 Search

In the **Search** tab you specify the folders and criteria to be used for caller identification, provided the caller's telephone number has been transmitted. You can search for the stored data, associating the transmitted calling number, in the **address book** of the **CTI server**, in **contact folders** as well as in **address book containers**. An arbitrary combination of the three options is also possible. To exclude directories from the search for speeding up the process, place a check mark in the corresponding boxes of the directory tree displayed. The type of number field to be used for searching can be separately defined via **Search phone number in contact folders:** and **Search phone number in address book containers:** by selecting the corresponding number field.

When the option **Automatically open found contact** is activated, caller data of the corresponding contact entry are displayed on the screen with incoming calls before you pick up the phone.



3.6.2.3 Journal

The option **Use global settings for generation of journal entries** uses those settings configured for all users on the Exchange Server. If these settings are not desired, the following options can be used to track in and outbound phone calls.

Activating the options under **Generate journal entry if the calling party...** creates an entry in the appropriate journal depending on whether you checkmarked **successfully reached you**, **failed to reach you** or both.

Tracking of your outgoing calls can correspondingly be activated in the following field.

So that clarity in the journal is maintained you can activate the **Store only latest journal entry for each phone number** checkbox to prevent the generation of an entry for each call (this function is in preparation).

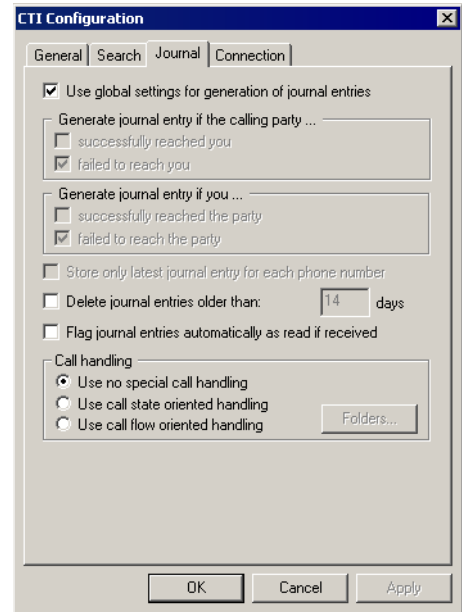
Via **Delete journal entries older than... days** the journal can be purged after a fixed time by deleting the old journal entries.

In addition you can in advance indicate all journal entries referring to telephony as read via **Flag journal entries automatically as read if received** so that they are not interpreted as new message (and reported as such).

Call handling can be performed according to **Use no special call handling**, **Use call state oriented handling**, thus moving calls to a separate folder, or **Use call flow oriented handling**, which moves calls success-dependently to separate folders. Especially the last two options provide a good overview on calls to be initiated and rescheduling makes sure that no calls are forgotten.

The bottom section in this tab concerns the three options of call handling. The individual settings exclude each other so that only one can be selected at a time.

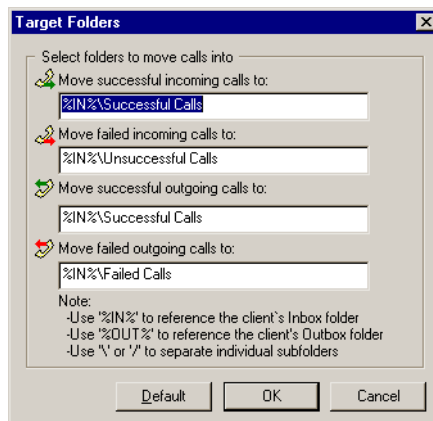
- **Use no special call handling** is default set with no special handling of calls intended. They are collectively displayed in the inbox.



MRS and Exchange 2000

CTI Extension Configuration

- **Use call state oriented handling** sorts calls according to their current status (successful or failed) in special directories. Via the **Folders...** button the corresponding directories are generated in a new window (Target Folders). They are freely defineable in the inbox resp. outbox. You can also click on **Default** to employ default folders which can generally be used as they are.



The 'Target Folders' dialog box is titled 'Target Folders' with a close button (X) in the top right corner. It contains a section 'Select folders to move calls into' with four entries, each preceded by a folder icon:

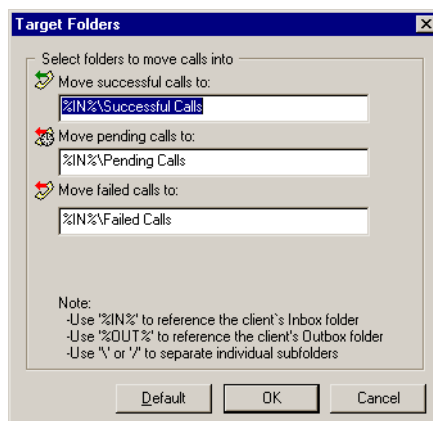
- Move successful incoming calls to: %IN%\Successful Calls
- Move failed incoming calls to: %IN%\Unsuccessful Calls
- Move successful outgoing calls to: %IN%\Successful Calls
- Move failed outgoing calls to: %IN%\Failed Calls

Below these entries is a 'Note:' section with the following text:

- Use '%IN%' to reference the client's Inbox folder
- Use '%OUT%' to reference the client's Outbox folder
- Use '\' or '/' to separate individual subfolders

At the bottom of the dialog are three buttons: 'Default', 'OK', and 'Cancel'.

- **Use call flow oriented handling** saves inbound calls according to their status (successful, pending and failed). Here as well you can freely define where calls are to be filed. Default folders may be used, too.



The 'Target Folders' dialog box is titled 'Target Folders' with a close button (X) in the top right corner. It contains a section 'Select folders to move calls into' with three entries, each preceded by a folder icon:

- Move successful calls to: %IN%\Successful Calls
- Move pending calls to: %IN%\Pending Calls
- Move failed calls to: %IN%\Failed Calls

Below these entries is a 'Note:' section with the following text:

- Use '%IN%' to reference the client's Inbox folder
- Use '%OUT%' to reference the client's Outbox folder
- Use '\' or '/' to separate individual subfolders

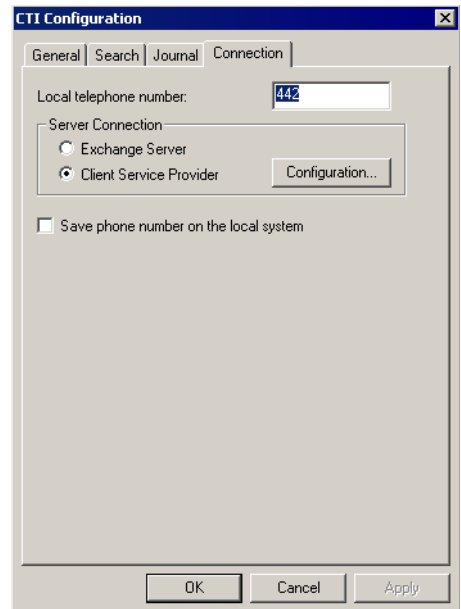
At the bottom of the dialog are three buttons: 'Default', 'OK', and 'Cancel'.

3.6.2.4 Connection

Here the **local telephone number** is entered. The corresponding telephone device will always be used for a connection attempt.

Server Connection can either occur via the **Exchange Server** with Exchange Gateway to the MRS Server or via the **MRS Service Provider (MSP)**. The first option is only suitable for establishing a connection resp. for voicemail playback. All further CTI functions are not possible via this server connection. Pressing the **Configuration...** button takes you to the MRS Service Provider (MSP) configuration tabs. A detailed description of the MSP is found in the appendix under page 107.

The **Save phone number on the local system** checkbox enables you to “take your telephone number with you” when you are temporarily at another workstation. After you have logged in to Exchange 5.5 there with your user profile via Outlook, switch to this tab and enter the calling number belonging to your standard workstation in the **Local telephone number:** field. Then place a tick in the checkbox. To accomplish the procedure, click **Apply** and then **OK**. The entered calling number is now locally stored in the registry. In this way it is possible to redirect all calls arriving at your normal workstation to this local client.



3.7 Deinstalling Outlook Extensions

If you want to remove one or both Outlook extensions from the system, do so as common under Windows. Via **Start → Settings → Control Panel → Add/Remove Programs** you can select the corresponding component from the displayed list (for example FAX extension) and subsequently deinstall it by means of the Add/Remove. Then follow the instructions given in the windows displayed.

4 LDAP APL

4.1 Generals

With Windows 2000, Microsoft have introduced the Active Directory Concept which allows a much more flexible administration of any kind of user data. Browsing the Active Directory requires a protocol, specially developed for this purpose. This protocol is called Lightweight Directory Access Protocol, LDAP for short. It is a further development of the access protocol Directory Access Protocol (DAP), based on the X.500 Directory Service since the DAP could not meet the demands in terms of speed and overhead any more.

4.1.1 Active Directory

The Active Directory Service¹ (DS) is understood as a scalable directory service structured similar to a folder directory in a file system except for a file hierarchy (e.g. nested directories as with the complete path: `c:\Company\Site\Department\Group...`). Instead, the hierarchy consists of objects which in this context are units described by unique, named sentences of attributes. With folder directories, the Explorer would principally be the counterpart to the LADP protocol, used for Active Directory display and editing.

During log-in to the network and the search for released resources, Active Directory clients must be able to communicate with computers on which Active Directory is executed. This means that extraneous access to the domain control and global catalogs has to be performed using LDAP (Lightweight Directory Access Protocol).

4.1.2 LDAP (Lightweight Directory Access Protocol)

LDAP² is a communication protocol developed for TCP/IP networks. The LDAP protocol defines in which way directory clients access directory servers, carry out directory actions and make use of shared directory data. LDAP standards are established by IETF (Internet Engineering Task Force) working parties. The LDAP specifications for attributes and the IETF standards for LDAP versions 2 and 3 are implemented in Active Directory.

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1. See also the five volume reference by Microsoft:
Active Directory Developer's Reference Library, David Iseminger,
Microsoft Press 2000, ISBN 0-7356-0993-6
 2. Further literature to deepen the LDAP subject:
Implementing LDAP, Mark Wilcox, Wrox Press Ltd. 1999, ISBN 1-861002-21-1

As the name already suggests, LDAP is an efficient method to access directory services without the complexity of other directory protocols. Since the LDAP protocol defines which processes are permitted in querying and modifying directory information and how to perform safe access, you can list directory objects, execute queries or administer Active Directory with LDAP.

4.1.2.1 LDAP and Interoperability

LDAP is an open Internet standard. The use of LDAP enables cooperation of Active Directory with the directory services of other suppliers. As component of Active Directory Interfaces (DSI), the Active Directory support of LDAP comprises an LDAP supplier object. The Active Directory Interfaces support the LDAP application programming interfaces for C, defined in the RFC 1823 Internet standard. Other directory service applications can be adapted to access Active Directory information via DSI and LDAP.

4.1.3 Active Directory and Exchange 2000 Server

In the course of standardization and a stronger integration of Exchange in the operating system Windows 2000, Exchange Server (from version Exchange 2000 Server) has been completely adapted to cooperation with the directory service Active Directory introduced in Windows 2000. This means that now all Exchange directory information is stored in Active Directory, too. Thus the individual Exchange directory used in previous versions to centrally store objects of an organization (e.g. addresses, mail boxes, distribution lists and public folders...) has been replaced. Among other things it was necessary to install a special directory service to administer data replication between individual Exchange Servers. Connecting Exchange to the Active Directory Service of Windows 2000 has the following advantages:

- Enabling a centralized object administration.

In other words, the directory objects of the operating systems Windows 2000 Server and Exchange 2000 Server can be administered from one place with only one management tool.

- Security management simplification.

Since Exchange 2000 uses the same security functions as Windows 2000, all security regulation modifications (user or group accounts) apply to data stored in Exchange and Windows as well.

- Efficient creation of distribution lists.

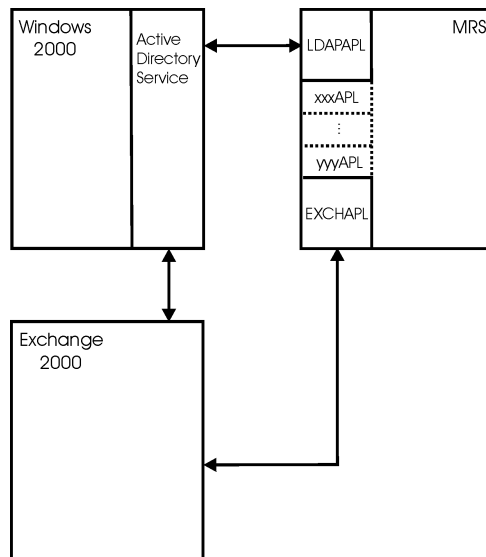
The security groups defined in Windows 2000 are automatically used as distribution lists by Exchange 2000.

- Simplified access to directory information.

The creation of an LDAP interface that allows displaying and editing Active Directory data via the system specific LDAP protocol easily enables access to directory information (in versions previous to Exchange 2000, search processes in the directory were always performed via the Named Service Provider interface).

4.1.4 Active Directory and MRS

To meet future demands and to ensure the interaction with Exchange 2000 Server, usage of the directory service Active Directory (DS) has been integrated in the MRS system by means of the LDAP APL.



For this purpose a separate connection to the Active Directory via the LDAP APL is required. This APL enables a mapping between the Active Directory attributes and MRS relevant data, thus establishing the correct assignment. Since manual adaption of the database fields is relatively laborious, the effort is minimized by performing the basic configuration via the import of a standard configuration file (xxx.lcf).

Annotations:

- Default the LDAP APL uses port 389.
- The LDAP APL only serves to replicate user data - the DS pattern is not extended or modified.
- The LDAP APL is so conceived that it can additionally access other systems supporting the LDAP protocol.

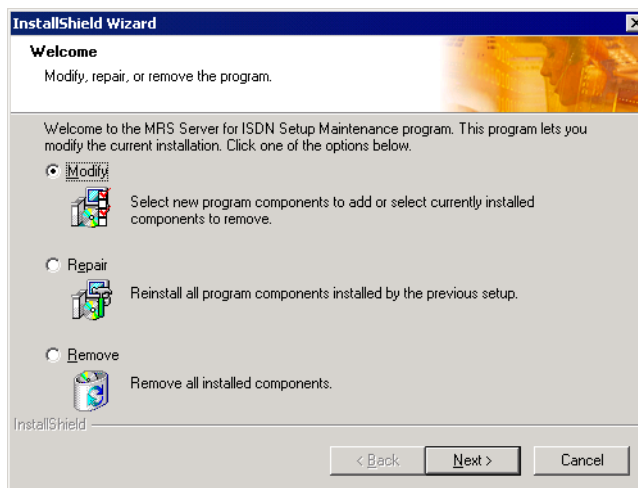
4.2 LDAP APL Installation

4.2.1 Installation via MRS Setup

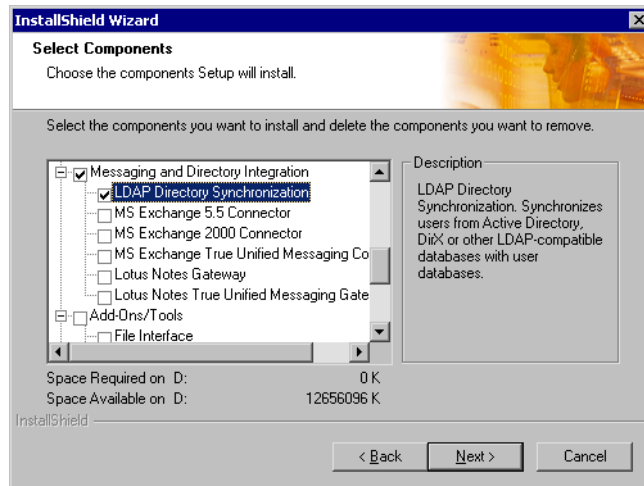
Installation of the LDAP APL is embedded in the MRS Server Setup. If a new MRS Server is to be set up for Exchange 2000 Server, the LDAP APL must be integrated in the installation for selecting the E2k APL. The LDAP APL installation procedure in the MRS Setup is described under LDAP APL Installation, page 23.

4.2.2 Manual Installation

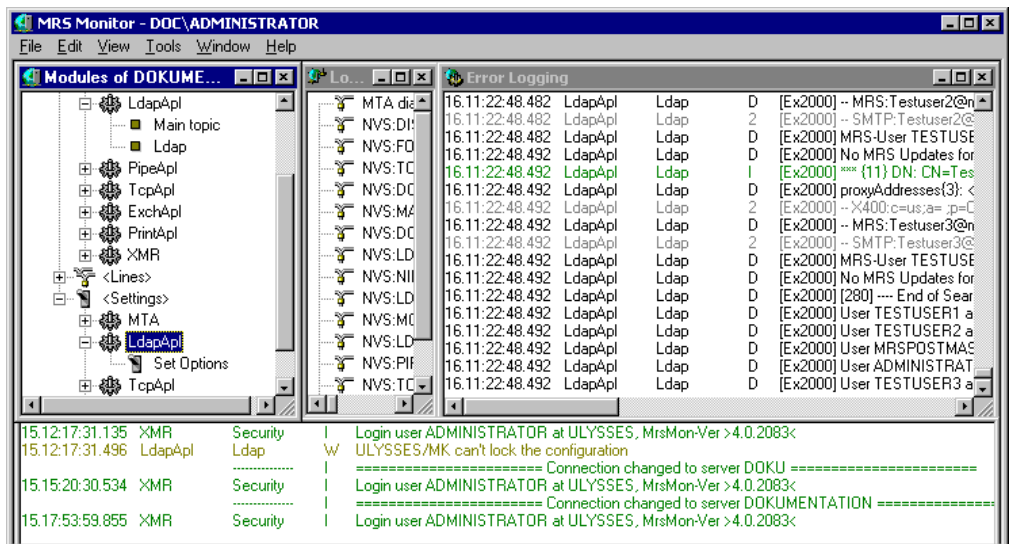
If the LDAP APL is required to access other directory services, it can still be reinstalled separately. This user defined installation is started by calling the MRS Server Setup again.



Via the **Modify** Setup setting and **Next** you are taken to the selection tree in which components to be installed resp. removed are selected. Place a tick in the checkbox preceding the LDAP component and subsequently enable **Next** to initiate the installation.



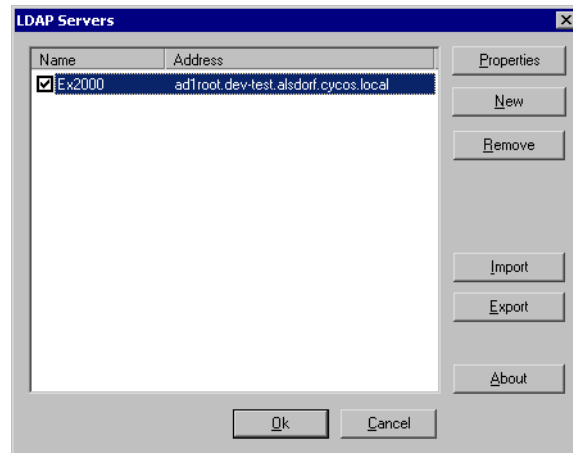
4.3 LDAP Settings



All LDAP settings are performed from within the MRS Monitor. In the “Modules of <MRS Server name>” window first select the branching icon [+] preceding <Settings> (switch icon), then the branching icon preceding the gear wheel icon LdapApl named “LdapApl” to open the subbranches. Subsequently, by way of doubleclicking “Set Options”, branch to the LDAP APL setting dialogs.

MRS and Exchange 2000

LDAP Settings



This first dialog serves general administration purposes. The names and IP addresses of already existing LDAP servers are listed here (in our example it is the server already defined via Setup). From here you can define further LDAP servers and modify the settings of already existing ones. In use is the server that features a check mark before the name entry.

The buttons in this dialog have the following significance:

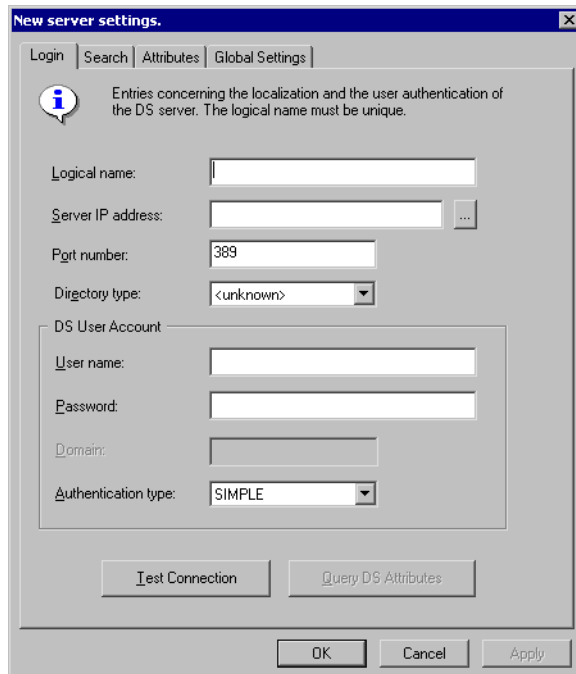
- **Properties**

When you select an arbitrary server entry with the mouse, this button takes you to the register window “Edit server settings”. In there you find four tabs used for LDAP configuration.

- **New**

Further LDAP servers can be added using this button. When you enable it you are taken to an empty **Login** tab in the “New server settings” window where a name is assigned to the new entry. Here the desired DS server (DS = Directory Service) is selected and the DS user privilege queried.

The significance of the individual entry lines can be gathered from the **Properties** button description further below.

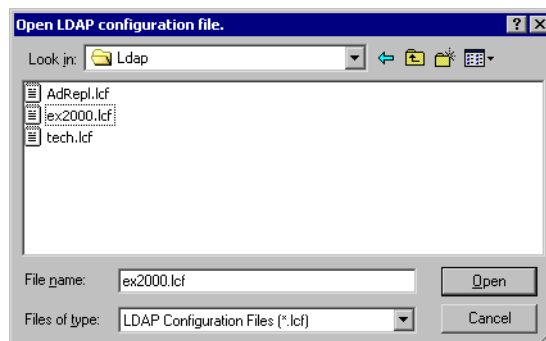


- **Remove**

Deletes the selected server entry

- **Import**

Branches to the file selection window "Open an LDAP Configuration File". Here a (default) configuration file (format: xxx.lcf) can be entered. In this way it is possible to implement configuration files for other directory services (Novell, Netscape etc.). Accomplishing this step takes you to the **Login** tab in the "Edit server settings" window.

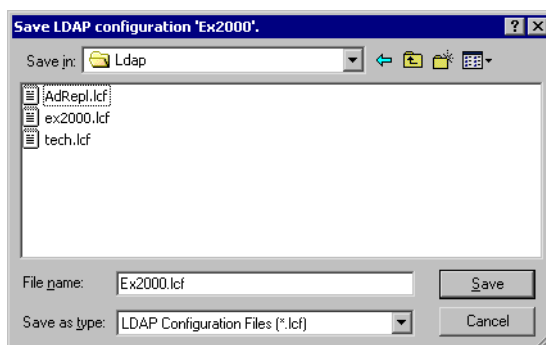


MRS and Exchange 2000

LDAP Settings

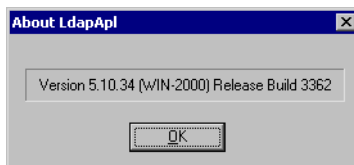
- **Export**

If stored as xxx.lcf file, a configuration file can be created which includes all current settings of the selected server.



- **About**

Displays the currently active LDAP APL version. Click **OK** to leave this dialog.



- **OK**

Copies the settings performed in the tabs of the "Edit server settings" window and closes the LDAP APL configuration dialog.

- **Cancel**

Terminates the LDAP configuration without copying modifications previously made.

4.3.1 The "Login" Tab

Here all information on this DS server is displayed. In the top portion you find the assigned LDAP server name, its IP address, the port number and the addressed directory type. Thereunder, entry lines for user identification data are available. With the exception of the assigned logical name you can now edit settings for DS server localization and the access privileges.

Remark: a name can only be changed with redefining the server settings.

The screenshot shows a Windows-style dialog box titled "Edit server settings." with a close button (X) in the top right corner. It has four tabs: "Login", "Search", "Attributes", and "Global Settings", with "Login" currently selected. Below the tabs is an information icon (i) and a text box stating: "Entries concerning the localization and the user authentication of the DS server. The logical name must be unique." The form contains several fields: "Logical name:" with the value "Ex2000"; "Server IP address:" with the value "ad1root.dev-test.alsdorf.cycos.local" and a selection button "..."; "Port number:" with the value "389"; "Directory type:" with a dropdown menu showing "Active Directory"; a section titled "DS User Account" containing "User name:" (Administrator), "Password:" (masked with asterisks), "Domain:" (dev-test), and "Authentication type:" (NTLM dropdown). At the bottom are buttons for "Test Connection", "Query DS Attributes", "OK", "Cancel", and "Apply".

The entry fields in the **Login** tab have the following function:

Field

Entry

Logical name:

A DS server selected upon a new localization is assigned an arbitrary name here. This name must be unique since it is used for registry entry replication. In case of an already existing DS server the previously assigned name is displayed. It can however not be changed in this form (a name modification is nevertheless possible when you delete the server entry, followed by a new definition).

Server IP address:

In this entry line you can specify the valid DS server IP address (either the qualified host name or the numeric address), resp. the IP address of the selected entry is displayed. To simplify the process click the selection button (...), to the right of the entry line) to search the entire network for the desired DS server.

MRS and Exchange 2000

LDAP Settings

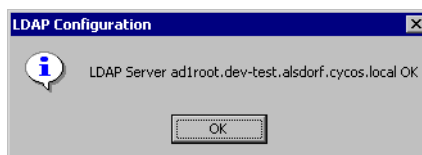
Field	Entry
Port number:	Entry field for displaying the currently set port or to modify the port number.
Directory type:	This menu allows selection of either Active Directory, <unknown> or DirX. For our purposes set Active Directory here. The other options refer to LDAP connections to other systems.

In the “DS User Account” portion:

User name:	The name of the user account provided with the corresponding privileges is entered or displayed here.
Password:	This entry field is for definition of the password associated with the above user account.
Domain:	Field for entry (or display) of the domain name associated to the above user account.
Authentication type:	The definition of the authentication type must be set to NTLM (NT Lan Manager) for connecting the Active Directory Service. The alternatives “SIMPLE” and “negotiate” are intended for other directory systems. Remark: When you log in with the authentication type “SIMPLE”, the user name must be entered in the LDAP format, i.e. as “Distinguished Name” (DN). Example: <i>uid=admin, ou= administrators, ou=TopologyManagement, o=NetscapeRoot</i>

Thus all data relevant for DS server selection are entered and can be verified via **Test Connection**.

You are informed about the status of the connection to the DS server by a message shown in the below illustration.



In case of an error (the connection cannot be established), the same dialog appears with a special message which, if possible, contains details on the problem occurred.



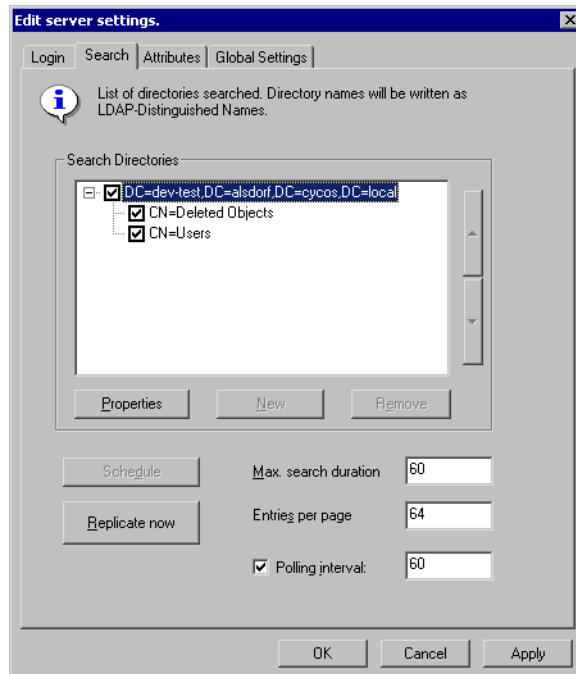
With a click on **Query DS Attributes**, transmission of the DS attributes can be manually initiated. Otherwise the selected DS server reads out DS attributes specified by the configuration file by way of a periodically occurring query. The attributes are then listed in the **Attributes** tab. This process can be observed in the MRS Monitor as well (see Monitoring the LDAP APL Activities, page 103).

4.3.2 The “Search” Tab

The **Search** tab is used to define directories or user entries that are to be integrated in the replication process. Here you must explicitly select the containers that include users to who replication is to apply. An implemented logic prevents a redundant replication. An error message is issued when in addition to a subordinate container further subdirectories have been selected. Default set directories are cn=Users and cn=Deleted Objects. Subsequently a replication with the corresponding MRS attributes can be executed.

MRS and Exchange 2000

LDAP Settings

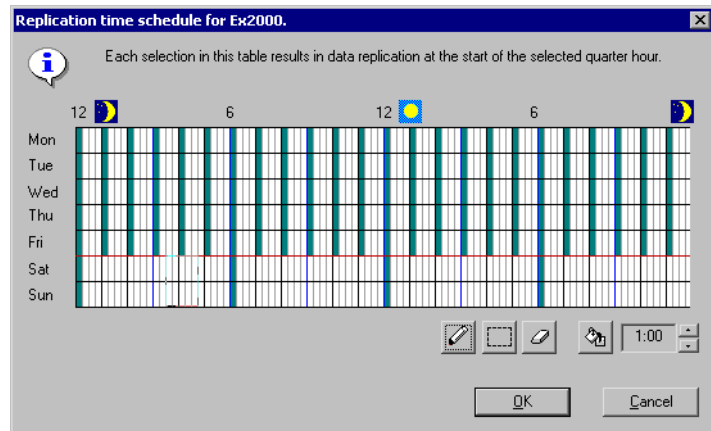


Entries in the **Polling interval:** (default 300 seconds) and **Max. search duration** (default 60 seconds) fields determine the time flow of the replication. If 0 is entered for the polling interval, no regular replication is performed. Any other numeric value x starts the replication after x seconds (for example: with an entry of 12 the next search starts after 12 seconds).

The value in **Max. search duration** determines the maximum duration of a replication. Any numeric value x ($x > 0$) entered there terminates the replication when this value has been reached after x seconds.

Since timeout problems may occur when extremely large amounts of data have to be replicated, you can determine the number of data records to be transferred per transmission unit via the **Entries per page** field. 0 means that all data records are to be transmitted in one go; any other value restricts the number of data records. When e.g. 128 is set, this number of data records is sent per transmission unit.

With a click on the **Schedule** button you can create a replication week profile. Replication can be set in 15-minute steps for each weekday.



After opening the schedule you can edit the replication times. The following tools are available:

Icon

Function



Serves to arbitrarily enter replication times in the schedule.



Selection tool for marking sections in the week profile.



With the eraser function you can remove single replication times from the week profile. When you have previously selected an entire section with the selection tool, only replication marks outside of this section are removed.



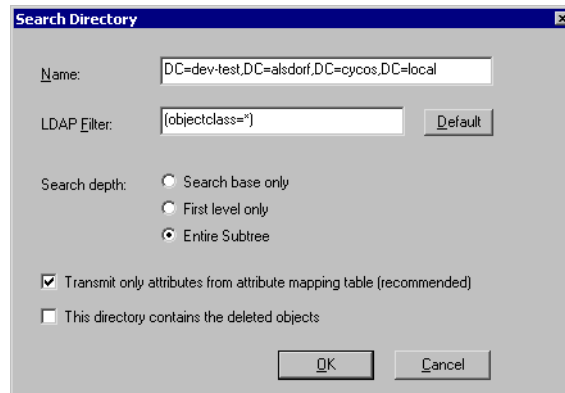
Is used to define a replication time for a whole week if replication is to occur each day at the same time in the same interval. The intervals can be specified in the entry field next to this icon.

With a click on **Replicate now** you can start this process manually.

In the **Search Directories:** portion of the dialog you find the directories of the entire DS tree. When you expand the tree (to open the subbranches click the [+] -icons) you can branch to the single user entries for display. Selection of the desired directories occurs through checkmarking the boxes next to the tree's branching nodes.

The two buttons with the small triangles (on the right margin of this window) serve to change the directory sequence in the list. For this purpose simply select the list entry to be moved up or down with a click and enable the corresponding button. In this way it is possible to assign a priority to the search as with several selected directories it is performed sequentially (the directories in the list are searched from top to bottom).

After clicking on **Properties** you can view and modify the search directory settings.



Via **New** more nodes (for example additional domains) are integrated in the search folder list. The node to be added is integrated as subfolder under the previously selected folder. For this purpose the above dialog is opened as well to enable the name definition and the performance of the corresponding settings.

Under **Name**: the DS branch node is displayed resp. entered if it is to be newly defined.

The **LDAP Filter**: entry field is used to restrict the search to certain attributes. The default filter *objectclass=** however replicates all entries. Any complex logical filter¹ is conceivable. After changing the filter you can click on the **Default** button to switch to the *objectclass=** filter again.

Furthermore the search depth can be roughly set for three levels.

- **Search base only** limits the search to the top level of the folder tree (start level).
- **First level only** extends the search so that in addition to the start level the next branch is included in the search.
- **Entire Subtree** integrates all branches following the indicated level in the search. This is the default setting.

By means of the checkbox **Transmit only attributes from attribute mapping table (recommended)** you can define that only the entries listed in the **Attributes** tab are transmitted.

1. For more information see:
Implementing LDAP, Mark Wilcox, Wrox Press Ltd. 1999, ISBN 1-861002-21-1

This setting is recommended since it optimizes IP transmission (only attributes needed most are transmitted).

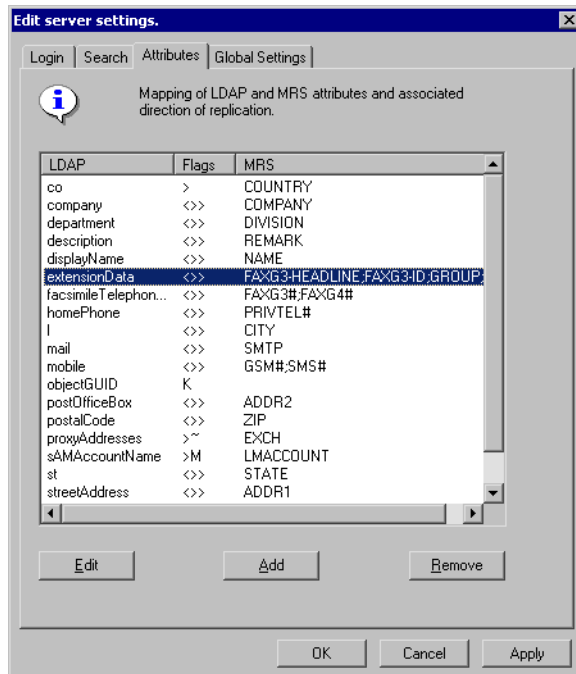
When the checkbox **This directory contains the deleted objects** is active, the elements of the folder entered in the **Name** field are interpreted as “deleted” (in DS “Deleted Objects”). The expression “deleted” is somewhat inaccurate here since objects thus defined are not removed but only “hidden”.

The settings become valid with **OK**, **Cancel** terminates the previously described process without performing any modifications. Simultaneously you are taken back to the **Search** tab.

Via **Remove** entire folders or single entries in these folders are deleted.

4.3.3 The “Attributes” Tab

In the center of the **Attributes** tab you find a list of DS attributes and their assigned MRS data fields as well as the set flags. They are already defaulted by way of basic configuration resp. the configuration file import.

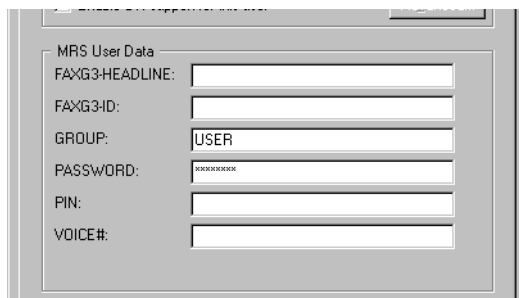


The “extensionData” attribute is of special significance. The MRS data fields assigned to this DS attribute are exactly those found in the MRS configuration tab. Via editing

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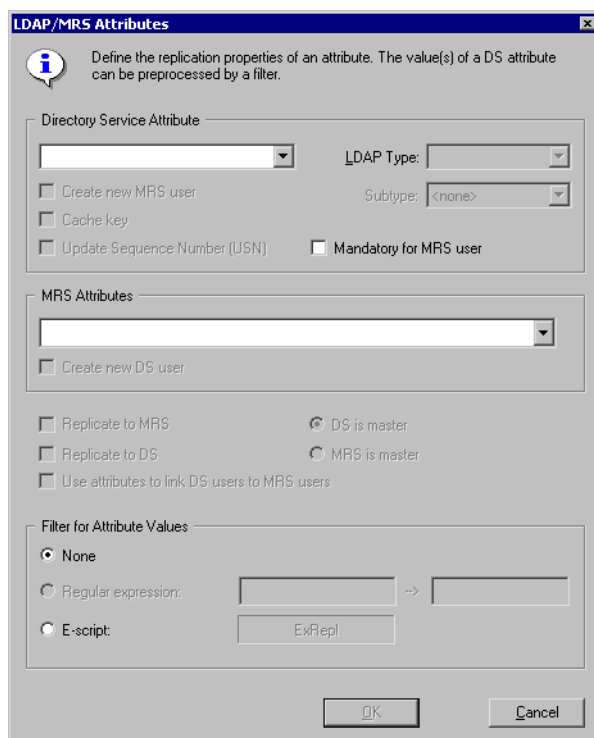
this attribute (see page 99) additional fields can be inserted in this MRS configuration tab.



A screenshot of a configuration window titled 'MRS User Data'. It contains several input fields: 'FAXG3-HEADLINE:', 'FAXG3-ID:', 'GROUP:' (with 'USER' entered), 'PASSWORD:', 'PIN:', and 'VOICE#:'.

When you click on the **Edit** button, settings for selected attributes can be changed and via **Add** further attributes are selected, assigned and various attribute parameters set.

The following illustration shows the empty form to select a new attribute and the required mapping as well as settings of the individual parameters (usage of attributes, replications etc.).



A screenshot of the 'LDAP/MRS Attributes' configuration window. It has a title bar and a close button. Below the title bar is an information icon and a text box: 'Define the replication properties of an attribute. The value(s) of a DS attribute can be preprocessed by a filter.' The window is divided into several sections: 'Directory Service Attribute' with a dropdown menu, 'LDAP Type:' dropdown, and checkboxes for 'Create new MRS user', 'Cache key', 'Update Sequence Number (USN)', and 'Mandatory for MRS user'; 'MRS Attributes' with a dropdown menu and a checkbox for 'Create new DS user'; a section for replication with checkboxes for 'Replicate to MRS', 'Replicate to DS', and 'Use attributes to link DS users to MRS users', along with radio buttons for 'DS is master' and 'MRS is master'; and 'Filter for Attribute Values' with radio buttons for 'None', 'Regular expression:', and 'E-script:', and corresponding input fields. At the bottom are 'OK' and 'Cancel' buttons.

In the “Directory Service Attribute” portion of the dialog a field is provided where you can select and display the attribute to which the following settings refer. Next to this name field you find the data type in the gray **LDAP Type:** field. Thus you are informed whether the type is a string variable (**str**), an integer variable (**int**) etc. Thereunder another field is placed to display the **Subtype:** if there is another differentiation in subtypes as e.g. with an Octets type.

The checkboxes included in this portion have the following functions:

Checkbox	Function
Create new MRS user Flag: M	Checkmark this box if a new MRS user is to be defined.
Cache key Flag: K	Integrates an attribute in the cache (for faster access).
Update Sequence Number (USN) Flag: #	The USN is an update ID incremented from MRS attributes to DS attributes with every search query. When this checkbox is active, only records having a larger USN-ID than the one generated with the last search run are replicated.
Mandatory for MRS user	Defines that the attribute is mandatory for an MRS user.

Thereunder you find the **MRS Attributes** selection field to assign the above selected DS attribute to the corresponding MRS database field. All MRS database fields are listed here so that each DS attribute can be mapped on each MRS field (and vice versa of course).

The associating checkbox allows using this attribute when a new **DS user** is to be created (Flag: **D**). This option is presently not available but will be implemented for future applications.

The checkboxes coming next determine the replication direction. You can alternatively replicate to the MRS Server (**Replicate to MRS**, flag: **>**), to the domain server (**Replicate to DS**, flag: **<**) or to both simultaneously (both characters are then displayed as flag: **< >**). If a reciprocative replication is desired, you need to define one of the two servers as the superordinate one. This is done via activation of the **DS is master** or **MRS is master** switches.

Through activating the checkbox **Use attributes to link DS users to MRS users** (flag **~**) you can directly relate a DS user to an MRS user via attributes. Since the search then need

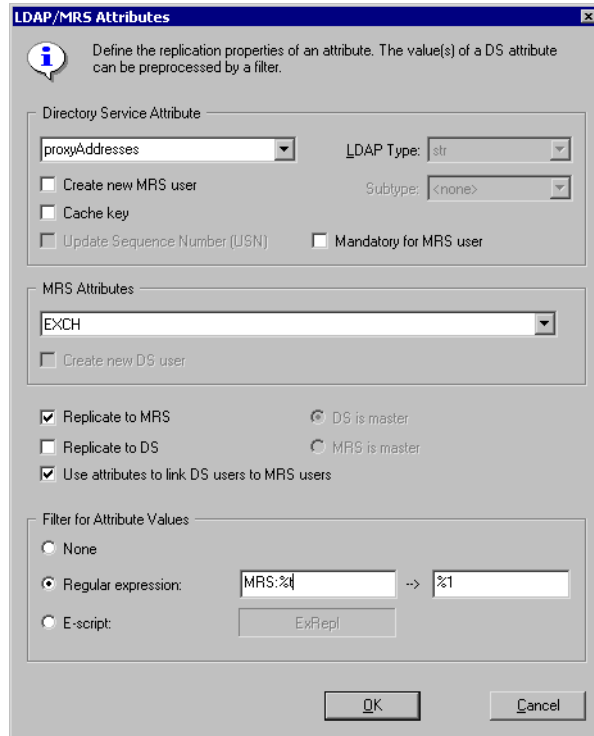
not be executed via the relatively complex assignment of datafields, the process is accomplished decidedly faster.

The switches in the **Filter for Attribute Values** portion can be set to manipulate attributes in various manners (for example to quickly determine a user etc.). Depending on the complexity of the manipulation, this can either be done per filter or by an e-Script. E-Scripts are programs for establishing e.g. complex filters.

The following settings are available:

Switch	Function
none	The filter function is deactivated.
Regular expression:	Entry fields for regular expressions.
E-Script:	Entry field for the name of the e-Script to be applied to the DS attribute.

Definition example of an attribute's replication properties with usage of the **Regular expression** filter function.



The dialog box is titled "LDAP/MRS Attributes". It contains a help icon and a description: "Define the replication properties of an attribute. The value(s) of a DS attribute can be preprocessed by a filter." The "Directory Service Attribute" section has a dropdown menu set to "proxyAddresses", an "LDAP Type" dropdown set to "str", and a "Subtype" dropdown set to "<none>". There are four checkboxes: "Create new MRS user" (unchecked), "Cache key" (unchecked), "Update Sequence Number (USN)" (unchecked), and "Mandatory for MRS user" (unchecked). The "MRS Attributes" section has a dropdown menu set to "ExCH" and a "Create new DS user" checkbox (unchecked). Below this are three checkboxes: "Replicate to MRS" (checked), "Replicate to DS" (unchecked), and "Use attributes to link DS users to MRS users" (checked). To the right of these are two radio buttons: "DS is master" (selected) and "MRS is master" (unselected). The "Filter for Attribute Values" section has three radio buttons: "None" (unselected), "Regular expression:" (selected), and "E-script:" (unselected). The "Regular expression:" section has two text boxes: the left one contains "MRS:%t" and the right one contains "%1", with a "-->" arrow between them. There is an "ExRepl" button below the text boxes. At the bottom are "OK" and "Cancel" buttons.

The entries in the above dialog have the following significance:

All entries of the Directory Service attribute *proxyAddresses* are filtered. When an entry matches the regular expression *MRS:%t* it is replaced with the expression on the right and copied; all other are rejected. *%t* serves as wild card for an arbitrary, not empty chain of characters without blanks entered in the right field for %1. Several subpatterns can generally be entered in the regular expression field on the left-hand side; on the right-hand side the nth subpattern can then be indicated with %n. More information on regular expressions is found in the “E Programming Language” manual.

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

Element	Description
.	corresponds to each character except for line break.
*	corresponds to 0 or more copies of the previous expression.

Element	Description
[]	a category of characters corresponding to each character within the brackets. If the first character is '^', the specification corresponds to all characters except for those within the brackets. Ranges can be defined by means of '-' (example: [a-z])
+	corresponds to one or several copies of the previous expression.
?	corresponds to 0 or one copy of the previous expression.
	corresponds either to the previous or next expression.
()	groups a number of regular expressions to a new regular expression.
[:<ctype> :]	is another option to represent a category of characters. This representation can also be used in the above described category of characters. <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 value 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. The character '\' is entered so that a special character can be used as a normal one again. This means that '\' has to be written twice in order to have a real backslash.

Examples

Expression	applies for
. *	any chain of characters
* *	exactly two asterisks

Expression	applies for
www\.\cycos\.\com	www.cycos.com

The settings performed become valid with a click on **OK** and you are simultaneously taken back to the **Attributes** tab. Newly selected and edited attributes are added at the bottom of the list.

Extending MRS Attributes

An additional example explains how to add new fields to user data (in “Active Directory Users and Computers”) in the “MRS Settings” configuration tab. For this purpose select the **Set Options** function in the MRS Monitor under LDAP APL. Next mark the desired server in the list of possible LDAP servers and enable the **Properties** button. Subsequently the “Edit server properties” dialog opens. In there select the **Attributes** tab and then the entry “*extensionData*” in the attributes list. After a click on **Edit**, all entries of the Directory Service attribute *extensionData* are displayed (in the “LDAP/MRS Attributes” window). You can then select a data field from the “MRS Attributes” pull-down list via the associating checkbox. Finally enable **OK** so that this field is additionally integrated in the user configurations in “Active Directory Users and Computers”.

Attention: If additional MRS attributes are defined here for the DS server, data replication to the MRS Server may lead to the deletion of MRS relevant data fields. When you replicate an empty MRS data field, it probably deletes (overwrites) a data field filled in.

Therefore MRS data fields must not be left empty with defining a user.

Cancel terminates the process and modifications already performed are disregarded. A click on either button simultaneously takes you back to the **Attributes** tab.

If the attributes are defined by the configuration file, they are listed in the **Attributes** tab with the already existing assignment to the MRS system. This means that with the represented attribute the corresponding MRS data field on which this attribute has been mapped is displayed. Between the attribute name and the MRS data fields you find various flag symbols that already give information on how specific attribute resp. rep-

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LDAP Settings

lication parameters have been set. In detail the following flags or a combination of flags can be set:

Flag Symbol	Significance for the selected attribute
M	The attribute is used when a new MRS user is to be defined.
D	The attribute is used when a new DS user is to be defined (this option is presently not available).
K	Integrating the attribute in the cache (for faster access).
#	This flag indicates that the search run is only performed from the last replicated records.
<	Replicates this attribute to the DS server (MRS as master). (This setting can be used if e.g. a new Exchange 2000 Server is to be coupled to an existing MRS Server to replicate all MRS data to the AD).
>	Replicates this attribute to the MRS Server (AD is master).
<>	Replication in both directions.
<>>	Replication in both directions with AD as master.
<<>	Replication in both directions with MRS as master.
~	This flag indicates that the Directory Service user is directly related to an MRS user via the attribute.

The **Edit** button enables the modification of the attribute parameters of a selected entry at a later date. When you click it the **LDAP/MRS Attributes** dialog opens with the entries made for the selected attribute. You can adapt entries and save them as described above.

4.3.4 The “Global Settings” Tab

In the **Global Settings** tab additional, more detailed settings can be performed.

This tab is divided into three portions.

- Settings referring to the Directory Service,
- such that concern MRS and
- a selection window to call an e-Script.

The screenshot shows a window titled "Edit server settings." with a tabbed interface. The "Global Settings" tab is selected. At the top, there is a message icon and text: "Global settings to be applied to all attributes, e.g. you can set one side to read-only, or use a previous USN, to repeat replication." Below this, the window is divided into three main sections. The "Directory Service" section has two checked checkboxes: "Write changes to DS" and "Save USN". Below these is a text field labeled "USN:" containing the value "728223". The "MRS" section has three checked checkboxes: "Write changes to MRS", "Save Update-ID", and "Delete users from MRS". Below these is a text field labeled "Update-ID:" containing the value "7057". The "E-Script" section has a label "Name:" followed by a dropdown menu showing "ExRepl". At the bottom of the window are three buttons: "OK", "Cancel", and "Apply".

Settings in the “Directory Service“ and “MRS“ portion are performed analog for the Active Directory and MRS side. They are in detail:

Checkbox

Write changes to DS,
or

Write changes to MRS

Significance

Changes can alternatively be saved to the Active Directory, to the MRS system or to both.

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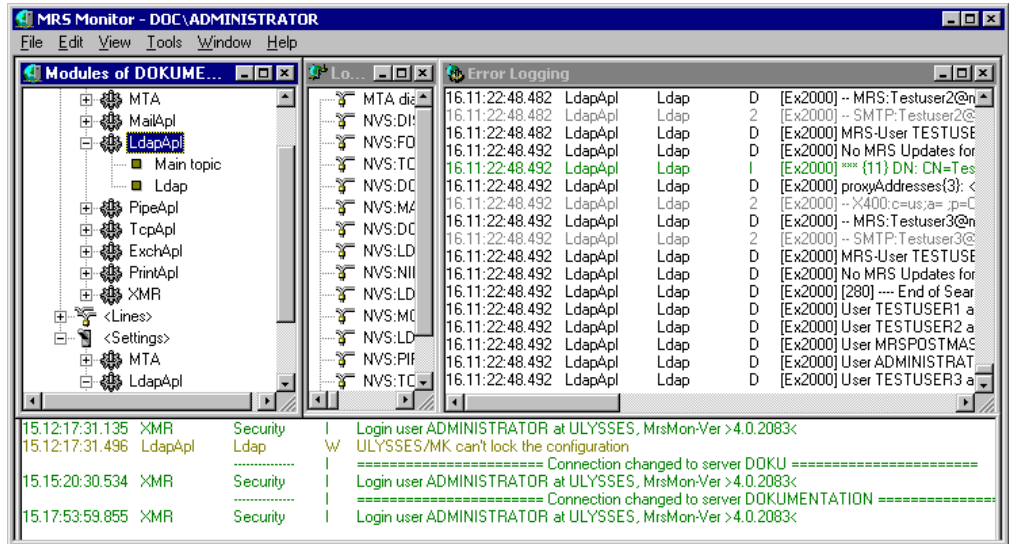
LDAP Settings

Checkbox	Significance
Save USN or Save Update-ID	With the modifications copied upon LDAP APL shut-down, the USN (Update Sequence Number) and/or the UID (Update ID) is incremented. Here you can determine whether this is desired for one of the two or for both. The corresponding values are stored in the registry. Both IDs make sure that replication processes performed at a later date can start from a certain flag rather than all over again.
Create new MRS users	Depending on the preset replication directions, creation of a user entry can be suppressed for testing purposes by deactivating the checkbox .
Delete users from MRS	Via this checkbox (deactivation) you can alternatively suppress deletion of user entries for testing purposes.
Entry fields: USN: and Update-ID:	By means of these entry fields replication can be started from a certain USN or Update ID. In doing so it should always be clear what has been replicated with the entered UID resp. Update ID (in this context we recommend to keep some kind of log on the replication processes).

You can select an e-script in the corresponding portion used for automatic attribute editing. The defaulted e-script “ExRepl” sets the predefined values for the standard replication.

An e-script can act as complex filter allowing e.g. telephone number normalization or special actions with creating a new MRS user. Selection of e-scripts is performed via the pull-down list. E-scripts that already exist are generally found in the . . . \MRS\res\Ldap directory.

4.4 Monitoring the LDAP APL Activities



Via the MRS Monitor you can precisely observe which actions are currently carried out by the LDAP APL. The following short instruction shows you the path to this display:

1. In the MRS Monitor access the “Modules of <MRS Server name>” – drag the gear wheel icon  LdapApl named “LdapApl” from the <Topics>  branch to the “Error Logging” window per Drag&Drop.
2. In the now open “Logging Monitor Properties” dialog adapt the parameters with reference to the data to be displayed.
3. Verify the settings via the **Copy** button.
4. Confirm with **OK**.
5. The selected LDAP APL activities are now logged in the “LdapApl-All Topics” window.

Which additional setting options are available here can be found in chapter 5 of the “MRS Server Administration” manual under “MRS Monitor”.

4.5 LDAP APL Deinstallation

Analog to the installation, individual components can be deinstalled from the command line by means of

`LdapApl remove.`

The running component of the *Service Control Manager* should be previously terminated through selection of the component and a subsequent mouseclick on **Stop** or from the command line via

`LdapApl stop.`

5 Exchange Gateway Configuration

5.1 General

To ensure a trouble-free configuration you should ascertain beforehand that the Exchange account to be specified has administrator privileges for the Exchange Server. If this user has already installed Exchange Server, no problems should occur.

The Setup entries referring to the account are stored in the registry under the key
HKEY_LOCAL_MACHINE\SOFTWARE\PP-COM\MRS\ExchApL.

In most cases it is thus not necessary to edit the registry entries since these values, except for a few, are performed via the configuration menus described in the following.

Attention: These registry keys should not be modified by means of REGEDT32; they are only listed for internal purposes. You find a complete directory of all registry keys in the appendix under “Complete Directory of Registry Entries” on page 143.

After a successful entry in the Setup Wizard the following *values* should be present in the registry:

Access:REG_SZ:<Password>

The encrypted password of the installing Exchange account.

Account:REG_SZ:<Name>

Name of the Exchange account who has installed the Exchange Gateway.

ADsDomainPath:REG_SZ:<Path Specification>

LDAP path for the domain.

Example: *DC=docutest, DC=alsdorf, DC=cycos, DC=com*

Attrib:REG_MULTI_SZ:<SF, IN, OUT or RCIT>

A list of this protocol's attributes. With the APL installation they are reasonably preset so that in most cases no modifications have to be and should not be performed. Depending on the line some attributes cannot be used and, if added, even prevent regular resp. intended operating via this line.

SF: This logical line allows Store-and-Forward of documents.

IN: This logical line allows incoming traffic with reference to the server.

OUT: This logical line allows outgoing traffic with reference to the server.

RCIT: If a read report is received on this line, the corresponding CIT signal is deactivated.

Default: *SF, IN, OUT, RCIT*

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General

DELIVERY_REPORT:REG_DWORD:<0 or 1>

When set to *1* a delivery report is always sent. *0* suppresses the delivery report. The value entered here is copied from the **General** tab in the “ExchAPL - Exchange APL Configuration” window accessed via the MRS Monitor (in the modules window under **Settings** → **ExchAPL** → **Set Options**). You can also open this tab via the Connector settings in the Exchange System Manager in the “MRS Exchange Connector for i386 <Computer Name> Properties” dialog (in there access the **Options** tab and click on **Advanced**).

Default: *0*

Domain:REG_SZ:<Name>

Windows NT domain of the Exchange account who has installed the Exchange Gateway.

Format:REG_MULTI_SZ:<Format Entries>

Presettings for the formats into which documents and file attachments are converted for Exchange. For internal use only!

Default: *PMF, ASC, TXT, WAV, AS7, BMP, BMP-COL, BIN, TG3, TG4*

GUID:REG_SZ:<Value>

Automatically assigned Connector CLSID.

InstallAddressTemplates:REG_DWORD:<Name>

References to the selected address templates specified with the Exchange Gateway installation are stored here (Now you can have address templates installed in your Exchange environment for various services offered by the MRS Server., page 28).

InstallPath:REG_SZ:<Path Specification>

Path to the MRS Connector.

Example: *D:\Cycos\MRS\Bin\ExchAp1.exe*

NOVOICEMAILATTACHMENTS:REG_DWORD:<0 or 1>

When set to *1* only a notification mail is sent to the Exchange user. *0* sends the notification with voice attachment. The value entered here is copied from the **General** tab in the “ExchAPL - Exchange APL Configuration” window accessed via the MRS Monitor (in the modules window under **Settings** → **ExchAPL** → **Set Options**). You can also open this tab via the Connector settings in the Exchange System Manager in the “MRS Exchange Connector for i386 <Computer Name> Properties” dialog (in there access the **Options** tab and click on **Advanced**).

Default: *0*

PostmasterDisplay:REG_SZ:<Entry>

Entry of the postmaster name as specified in Setup.

Example: MRS Postmaster

PostmasterDS:REG_SZ:<Directory tree>

Entry of the unique postmaster name (Distinguished Name).

Example: /o=Cycos AG/ou=First administrative group/
cn=Recipients/cn=mrspostmaster

READ_REPORT:REG_DWORD:<0 or 1>

When set to *1* a read confirmation is always sent. *0* suppresses confirmation transmission. The value entered here is copied from the **General** tab in the “ExchAPL - Exchange APL Configuration” window accessed via the MRS Monitor (in the modules window under **Settings** → **ExchAPL** → **Set Options**). You can also open this tab via the Connector settings in the Exchange System Manager in the “MRS Exchange Connector for i386 <Computer Name> Properties” dialog (in there access the **Options** tab and click on **Advanced**).

Default: *1*

ROUTINGGROUP:REG_SZ:<Routing group>

Name entry of the current routing group.

Example: First Routing Group

SendRTFBODY:REG_DWORD:<0 or 1>

When set to *1* the message is always also sent as RTF attachment (Rich Text Format) in addition to the actual text message. *0* suppresses the RTF attachment. The value entered here is copied from the **General** tab in the “ExchAPL - Exchange APL Configuration” window accessed via the MRS Monitor (in the modules window under **Settings** → **ExchAPL** → **Set Options**). You can also open this tab via the Connector settings in the Exchange System Manager in the “MRS Exchange Connector for i386 <Computer Name> Properties” dialog (in there access the **Options** tab and click on **Advanced**).

Default: *1*

Server:REG_SZ:<Server Name>

Windows NT name of the server on which the Connector has been installed.

Example: AURELIO

Site:REG_SZ:<Site Name>

Name of the site under which the Connector has been installed.

Example: /o=Sample Ltd /ou=AURELIO

MRS and Exchange 2000

General

SUPPRESS_MID_REPORTS:REG_DWORD:<0 or 1>

When set to 1 the MID information otherwise displayed in square brackets in the subject line is suppressed. 0 is the default value for this entry meaning that the MID information is usually sent. The value entered here is copied from the **General** tab in the “ExchAPL - Exchange APL Configuration” window accessed via the MRS Monitor (in the modules window under **Settings** → **ExchAPL** → **Set Options**). You can also open this tab via the Connector settings in the Exchange System Manager in the “MRS Exchange Connector for i386 <Computer Name> Properties” dialog (in there access the **Options** tab and click on **Advanced**).

Default: 0

SUPPRESS_REPORTS:REG_DWORD:<0 or 1>

When set to 1 special report forms are used instead of default reports. With 0 only default reports are used. The value entered here is copied from the **General** tab in the “ExchAPL - Exchange APL Configuration” window accessed via the MRS Monitor (in the modules window under **Settings** → **ExchAPL** → **Set Options**). You can also open this tab via the Connector settings in the Exchange System Manager in the “MRS Exchange Connector for i386 <Computer Name> Properties” dialog (in there access the **Options** tab and click on **Advanced**).

Default: 0

After the successful service installation the Connector has been integrated in the service list of the Windows 2000 computer (see **Start** → **Programs** → **Administrative Tools** → **Services**). Now another key exists in the registry:

```
HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\
ExchAp1
```

that includes the below listed entries. **Attention:** These registry values are Windows specific for the Exchange Connector service and must not be modified.

DependOnGroup:REG_MULTI_SZ:

No Entry

DependOnService:REG_MULTI_SZ:

Example: msexchangesa msexchangeds msexchangeis
msexchangeta NameLoc

DisplayName:REG_SZ:

Displayed MRS Connector name

Example: MRS Exchange Connector for i386 (AURELIO)

ErrorControl:REG_SZ:

Setting: 1

ImagePath:REG_EXPAND_SZ:

Example: C:\Cycos\MRS\bin\EchApl.exe

ObjectName:REG_SZ:

Displays the account under which the Exchange Connector runs.

Example: <Domain>\<User>

Start:REG_DWORD:<2, 3, 4>

Start-up mode configuration. This setting could be modified under Windows NT. For this purpose open the configuration tab of the **MRS Exchange Connector for i386** service with a doubleclick (**Start → Settings → Control Panel → Services → MRS Exchange Connector for i386**). The start-up behaviour can be changed through activation of one of the available checkboxes. The following start-up mode options are found here: automatic (generates 2 as registry value), manual (generates 3 as registry value) and deactivated (generates 4 as registry value).

Default: 3

Type:REG_DWORD:

Setting: 16

The actual configuration is performed from within the Exchange Administrator. To enable this, the configuration options in Microsoft Exchange Server are extended with the installation of the MRS-Exchange Gateway.

5.2 Exchange User Settings

Installation of the MRS-E2kApl expands the user properties in “Active Directory Users and Computers” with the “MRS Settings” tab. To access this tab start the administration program “Active Directory Users and Computers” via **Start → Programs → Microsoft Exchange** and click with the right mousebutton on the corresponding user entry to open the context menu. In this menu, under Properties, you can branch to a window that provides the single configuration tabs in form of an index. Here you also find the “MRS Settings” tab in which individual, MRS relevant settings are performed for each user.

5.2.1 MRS Settings Tab

The screenshot shows the 'Exchange ET: Testuser1 Properties' dialog box with the 'MRS Settings' tab selected. The dialog has a tabbed interface with the following tabs: Member Of, Dial-in, Environment, Sessions, Remote control, Terminal Services Profile, Exchange General, General, Address, Account, Profile, Telephones, Organization, E-mail Addresses, Exchange Features, and MRS Settings. The 'MRS Settings' tab is active and contains the following options:

- ☒ Unified Messaging and Telephony features
- ☐ MRS Replication
 - ☐ Activate inbox replication (with an 'Advanced...' button)
- ☐ CTI Settings
 - ☐ Activate CTI support for this user (with an 'Advanced...' button)
- MRS User Data
 - FAXG3-HEADLINE: [text box]
 - FAXG3-ID: [text box]
 - GROUP: [text box containing 'USER']
 - PASSWORD: [text box with masked characters]
 - PIN: [text box]
 - VOICE#: [text box]

At the bottom, it says 'Data last modified: 11/21/2002 14:48:25' and has buttons for OK, Cancel, Apply, and Help.

Via the “Unified Messaging and Telephony features” checkbox (topmost checkbox in the MRS Settings tab) you can exclude a user from functions provided by the MRS system. Removing the tick deletes the user from the MRS database.

MRS Replication

Replication is just another term for synchronization of data between database supported applications. It provides an automatic update so that databases need not be maintained in two applications.

By means of **Replication of users inbox** which can be set for the selected subscriber in the above dialog under “MRS Replication”, the messages of this subscriber and the message states are replicated, in other words, are integrated in the synchronization process.

Advanced Replication Settings

When you click on the **Advanced** button, options are available to you to define in which way the message text and file attachments are to be synchronized with the MRS Server for each user.

On the one hand you can copy the global settings performed in the Exchange Connector (checkbox: **Use global settings**), on the other hand the behaviour can be individually determined for the respective user (checkbox: **Use following local settings**). The following configurations can now be made:

The **Message Text** can be replicated with or without additional RTF representation.

For **Attachments** three options are available:

- **Replicate all attachments**

Default setting. All file attachments are replicated.

- **Replicate only attachments smaller than:**

Enables specification of the size limit from which attachments are no longer synchronized. When the **Add placeholder attachments** option is active, each attachment is replaced with a short notification so that you are at least informed about omitted attachments when a message is queried e.g. via a voicemail system.

- **Replicate no attachments**

Always omits attachments completely and replaces them with a small notification when the **Add placeholder attachments** option is set.

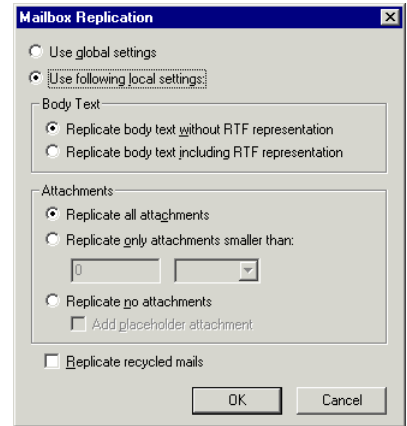
Via **Replicate recycled mails** messages restored by the Exchange user are made available again on the MRS Server as well.

CTI Settings

Via the checkbox **Enable CTI support for this user**, telephony functions can be released for the respective user provided they are implemented and configured.

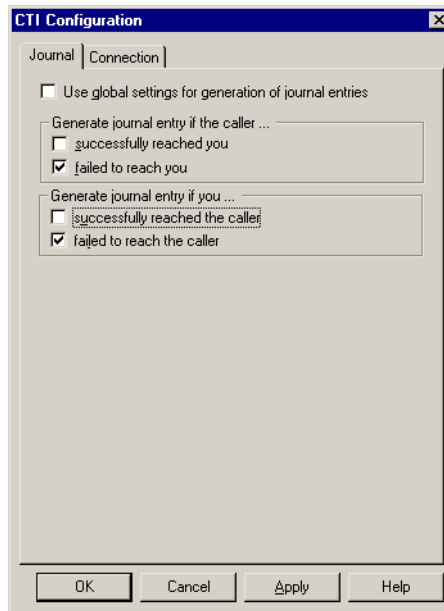
Advanced CTI Settings

Via **Advanced...** you are taken to the “CTI Configuration“ dialog that allows customizing CTI functions so that they differ from the global settings. (Global settings are performed with the connector settings in the **Options** tab after clicking the **CTI Defaults...** button; see also the “CTI Defaults...” on page 117).



MRS and Exchange 2000

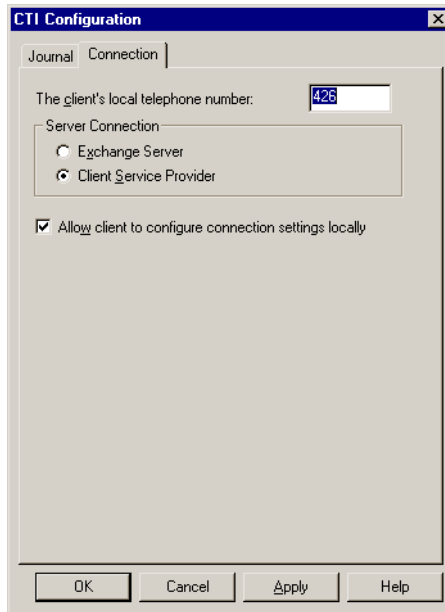
Exchange User Settings



In the **Journal** tab you can activate **Use global settings for generation of journal entries** to determine that the basic settings are to apply for the respective subscribers. An individual setting is possible through use of the checkboxes placed in the two fields thereunder. Separated according to in or outbound telephone calls you can decide whether journal entries are to be generated for successful calls (which have reached you), as well as for those that you could not answer or for calls where the callee was available/not available.

The journal settings performed here refer to the basic CTI Journal configuration valid for the client. In Outlook it can be adapted to the individual requirements of the respective workstation at a later date.

Another configuration tab in the “CTI Configuration” window is **Connection**.



The **client's local telephone number** is entered here. When a connection is established (for example to listen to a voicemail) this telephone connection is always used.

Server Connection can either occur via the **Exchange Server** with Exchange Gateway to the MRS Server or via the **Client Service Provider** (MSP). The first option is only suitable for establishing a connection or for voicemail playback. All other CTI functions are not possible via this server connection. You can deactivate the checkbox **Allow client to configure connection settings locally** to prevent local users from accessing the configuration tabs.

MRS User Data

These are the database fields of the MRS user database selected in the LDAP APL under "extensionData".

A description of these fields is found in the Server Administration manual in chapter "User Data Administration", section "Field Significance".

5.2.2 Inbound Routing

Two methods are available to realize inbound routing:

- Inbound routing via the MRS Server

Inbound routing by the MRS Server should be preferred. As usual the extension numbers for the used telematic services are entered in the user database for this purpose. In

MRS and Exchange 2000

Exchange User Settings

the PREFERRED field, the EXCH field, in which the MRS Proxy is finally entered, is additionally referenced. In this case the MRS e-mail Proxy Address must be present in the Exchange administrator in the user's configuration tab **E-mail Addresses**. With an administration from Exchange these configurations do not apply for the MRS Server because they are automatically performed by means of LDAP replication.

Exchange ET. Testuser1 Properties

Member Of | Dial-in | Environment | Sessions | Remote control |

Terminal Services Profile | Exchange General

General | Address | Account | Profile | Telephones | Organization

E-mail Addresses | Exchange Features | MRS Settings

Each e-mail address type has one default reply address. To change the default, select an entry in the list, and then click Set As Primary.

E-mail addresses:

Type	Address
CCMAIL	Testuser1, Exchange at Rom
MRS	Testuser1-Hans@mrs
MS	CYCOSDEVEL/ROM/TESTUSER1H
SMTP	Testuser1-Hans-@rom.dev.com
X400	c=US;a= ;p=Cycos Developmen;o=Ro...

New... Edit... Remove Set As Primary

☒ Automatically update e-mail addresses based on recipient policy

OK Cancel Apply Help

- Inbound routing via Microsoft Exchange

Alternatively routing of inbound fax documents can also be left to Exchange. For this purpose each user must be assigned a unique extension number in international notation (for example 491234567890) by the Exchange administrator. On this the **Fax** field in the **Telephones** tab of the user configuration dialog can be used. To generate proxy addresses the recipient containers need to be specified. Address book replication is not required.

The screenshot shows a Windows-style dialog box titled "Exchange ET. Testuser1 Properties". It has a tabbed interface with the following tabs: Member Of, Dial-in, Environment, Sessions, Remote control, Terminal Services Profile, Exchange General, E-mail Addresses, Exchange Features, MRS Settings (selected), General, Address, Account, Profile, Telephones, and Organization. The "MRS Settings" tab is active and contains a section titled "Telephone numbers" with five rows: Home, Pager, Mobile, Fax, and IP phone. Each row has a text input field and a button labeled "Other...". Below this section is a "Notes:" label followed by a large text area. At the bottom of the dialog are four buttons: OK, Cancel, Apply, and Help.

Inbound fax and voice documents will be subsequently routed to the inbox of the corresponding user on the base of this number.

The numbers, as with all other telematic numbers, must be contained in the Exchange database in an international format. Thus all leading zeros of the international and area codes are omitted and the extension number affixed.

Example: 491234567890

(49: Germany, 1234: area code, 567890: extension number).

5.3 Exchange Connector Settings

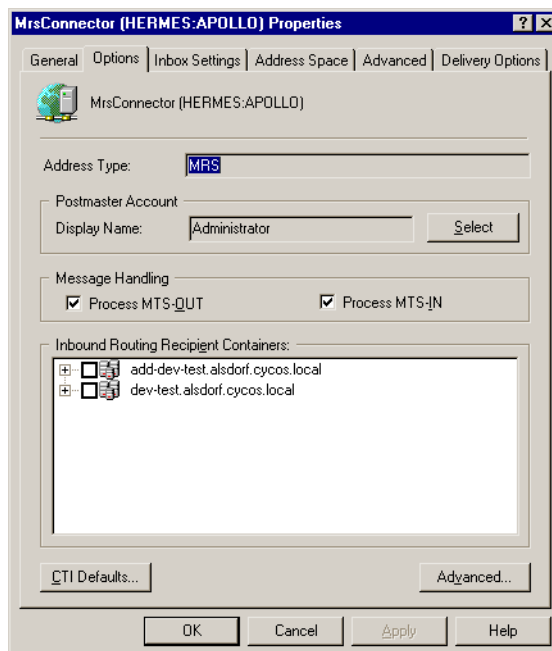
In addition to existing configuration tabs for every Exchange Connector (which are described in the Exchange 2000 System Manager manual), the MRS specific configuration tabs **Options** and **Inbox Settings** are available for the MRS-Exchange Connector. These are automatically added to the Exchange 2000 System Manager upon installation of the MRS-Exchange gateway. The Connector settings can be edited there. To access the editing windows open the Connector branch in the Exchange 2000 System Manager, select the MRS-Exchange Connector for i386 and call the Properties suboption via the context menu. Some of the settings can also be performed from the MRS Monitor. All settings performed here are global, in other words, they are binding for

MRS and Exchange 2000

Exchange Connector Settings

each subscriber. They can only be created individually via the detailed settings of the user configuration. **Remark:** Settings in Exchange 2000-specific tabs are ignored by Exchange since the SDK connector does not support data transfer to Exchange.

5.3.1 “Options” Tab Settings



Address Type:

Display of the address type created by the MRS-Exchange Connector. The type specified here is MRS and cannot be modified.

Postmaster Account

Documents that cannot be delivered to their intended recipients due to address errors are routed to the “Postmaster Account”.

Via **Select** you can choose one of the available recipient mailboxes for this purpose.

Display Name:

This field displays the recipient appointed postmaster.

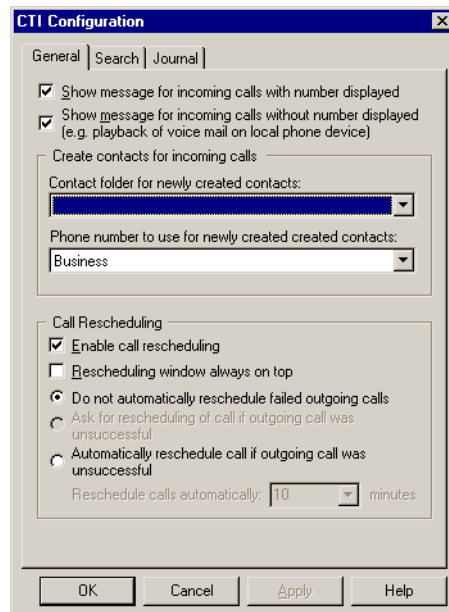
Message Handling

Via the MTS-IN and MTS-OUT interfaces, Message Transfer Envelopes are exchanged which contain messages in a format known to the Exchange Server. MTS-IN contains all messages to Exchange Server and MTS-OUT those destined for the MRS system. The two interfaces for outbound (**Process MTS-OUT**) and inbound (**Process MTS-IN**) message handling can be separately activated in Exchange. However, both these processes should always be active!

Inbound Routing Recipient Containers:

Via the checkboxes selectable in this dialog, inbound routing is adapted to the system configuration, in other words, according to the selected routing rules. Choose all containers (place a tick in the corresponding checkbox) that include user entries to be involved in inbound routing.

CTI Defaults...

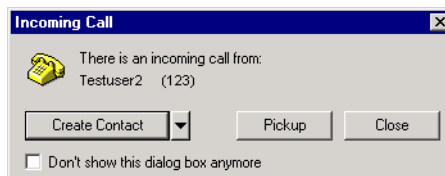


.Enabling the **CTI Defaults...** button takes you to another configuration window also structured like a card-index box. The first tab, **General**, is selected for basic client configurations.

By means of the two checkboxes **Show message for incoming calls...** you can determine how the user is to be notified about inbound telephone calls in Outlook. The options can be selected/deactivated individually or in combination. If the checkbox **Show message for incoming calls with number displayed** is active, a pop-up window appears with incoming calls that displays the telephone number and the name of the caller (see below illustration). Furthermore, buttons are available in this notification window allowing the user to answer the call, to terminate it and to generate a contact entry

MRS and Exchange 2000

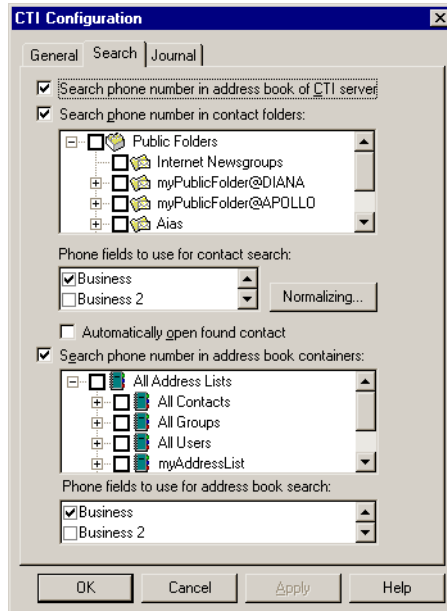
Exchange Connector Settings



Selecting the checkbox **Show message for incoming calls without number displayed** opens the above pop-up window as well but since the calling number has not been transmitted, the dialog carries the information that the caller is unknown. This option is useful when calls arriving without transmitted telephone number are to be signalled (e.g. a voicemail to be listened to through the individual telephone).

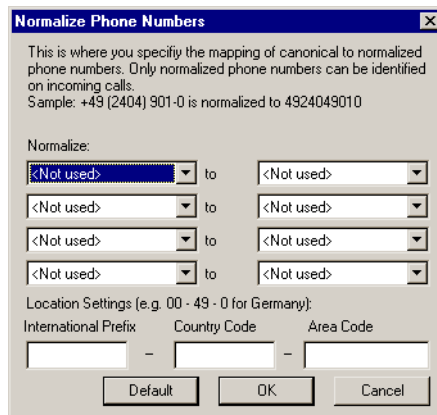
Via **Contact folder for newly created contacts**: you can select a private or public folder created under Outlook to enter newly generated contact information. The field thereunder allows assigning the contact's calling number to a certain data field type. Each of these data fields has a unique designation which is later used as search function criterion.

The **Call Rescheduling** portion offers a number of options for determining how to proceed in case a subscriber could not be reached. In the top checkbox you can either activate or deactivate the call rescheduling function. Only when a checkmark has been placed in this box, further settings are available. The checkbox **Rescheduling window always on top** determines that this window is always displayed in the foreground. Furthermore you can set whether rescheduling is to be performed automatically or not. If you opt for automatic rescheduling, use the small selection window to define a period after which another attempt is made to reach the subscriber. The available intervals are 5, 10, 20, 30, 45, 60, 90 and 120 minutes. Via **Apply** and **OK** the settings come into effect and this window is closed. **Cancel** closes the window with maintaining the originally valid values.



By means of the **Search** tab directories and criteria are defined which can be applied to identify a caller if the telephone number has been transmitted with the call. The saved data matching the transmitted **phone number** can be searched for either in the **CTI Server address book**, in **contact folders**, in **address book containers** or in an arbitrary combination of these three directories. With activation of the corresponding checkboxes in the displayed directory trees, directories can be selectively excluded from the search to accelerate the process. Which type of number field is used here can be determined according to **Search phone number in contact folders:** and **Search phone number in address book containers:** via selection of the corresponding number field.

With a contact entry you can also activate **Automatically open found contact** so that with an incoming call all information concerning the caller is displayed on the screen before you answer the phone.



Click on the **Normalizing...** button to convert via mapping the canonical calling number (e.g. +49(2404)901-123456) into the normalized form (e.g. 492404901123456) as only normalized calling numbers can be identified with incoming calls. When this process has been concluded, the CTI extension is able to find a contact that arrived in unnormalized form. Conversion requires an additional contact field where the normalized number is stored. This field is freely selectable from the list of available fields but it should be one rarely used.

Attention: Be cautious with using already existing fields. Older entries will be overwritten when a redefinition is performed. In case of a wrong assignment, all entries may have to be manually recovered.

MRS and Exchange 2000

Exchange Connector Settings

Normalization does not mean that some digits are simply omitted but that connection data are transported into a certain format. This also requires configuring the location. Via **Default** reasonable default values are specified for e.g. Germany. They can be generally used as defined and only need to be copied with **OK**.

The **Journal** tab is similar to the configuration tab in Outlook with the default settings offered there (**Tools** → **Options...** → **Voice/CTI** → **Advanced...** → **Journal**).

Activating the options under **Generate journal entry if the caller...** creates an entry in the appropriate journal depending on whether you checkmarked **successfully reached you** or **failed to reach you**.

Using the options under **Generate journal entry if you...** you can also track outbound calls in the same way as incoming ones. The user defined adaption should be performed at the respective workstation.

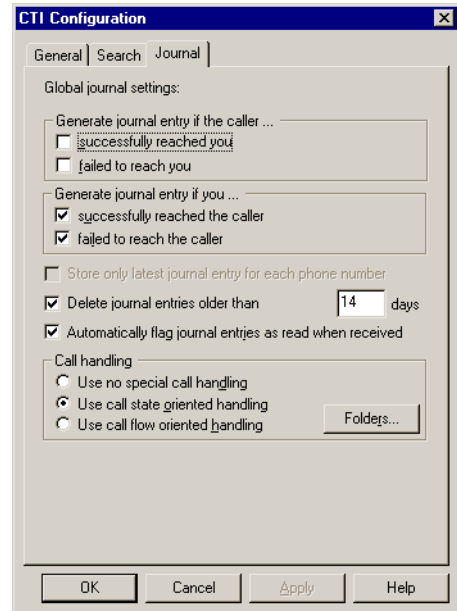
So that no unwanted entries appear in the journal you can activate the **Store only latest journal entry for each phone number** option to prevent an entry being generated for each call (function in preparation).

Via **Delete journal entries older than... days** the journal can be purged after a fixed time by deleting the old journal entries.

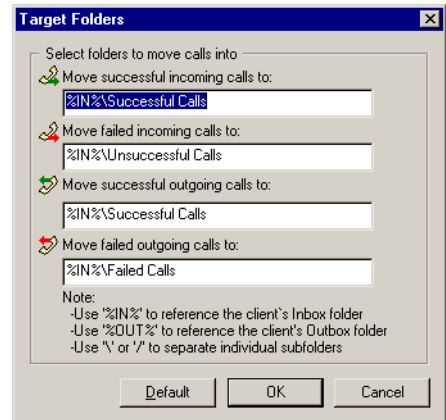
In addition you can in advance indicate all journal entries referring to telephony as read via **Automatically flag journal entries as read when received** so that they are not interpreted as new message (and reported as such).

Call handling can be performed according to **Use no special call handling**, **Use call state oriented handling**, thus moving calls to a separate folder, or **Use call flow oriented handling**, which moves calls success-dependently to separate folders. Especially the last two options provide a good overview of unsuccessful calls.

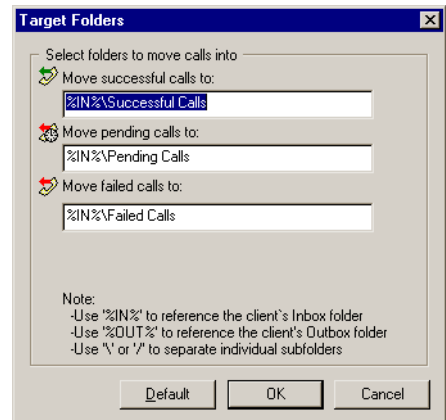
Separated according to in or outbound telephone calls you can decide whether journal entries are to be generated for successful calls (which have reached you), as well as for those that you could not answer or for calls where the callee was available/not available.



- **Use no special call handling** is default set with no special handling of calls intended. They are collectively displayed in the inbox.
- **Use call state oriented handling** sorts calls according to their current status (successful or failed) in separate directories. Via the **Folders...** button the corresponding directories are generated in a new window (Target Folders). They are freely defineable in the Inbox resp. Outbox. You can also click on **Default** to employ default folders (in the telephone journal for example: “Failed Incoming Calls” and “Failed Outgoing Calls”).



- **Use call flow oriented handling** saves inbound calls according to their status (successful, pending and failed). Here as well you can freely define where to file the calls. Default folders may be used, too.

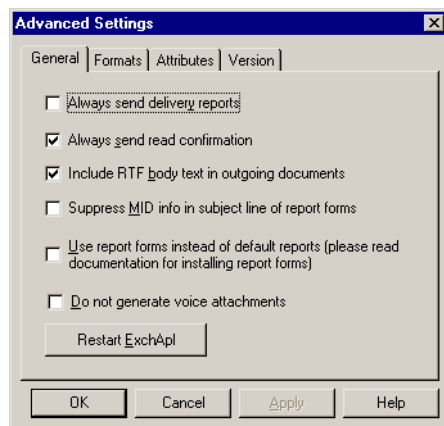


Advanced...

Via the **Advanced...** button (in the **Options** tab of the “Mrs Connector Properties dialog”) you reach the same configuration tabs as can be called from the MRS Monitor (in the components window select **ExchApl** → **Set Options**) for Exchange configuration.

MRS and Exchange 2000

Exchange Connector Settings



First perform some basic configurations (**General** tab). The **Always send delivery reports** option generates a delivery report for messages that originate from Exchange, even when not explicitly asked for. The **Always send read confirmation** option returns a read report to the MRS originator as soon as messages are read on the Exchange Server.

It is also possible to **Include RTF body text in outgoing documents**. The RTF (Rich Text Format) body is then attached to the normal representation of the message. RTF is the official data exchange format used by

Microsoft for text files. Text files exchanged in this format retain their formatting e.g. font weight, etc. when being transferred between users.

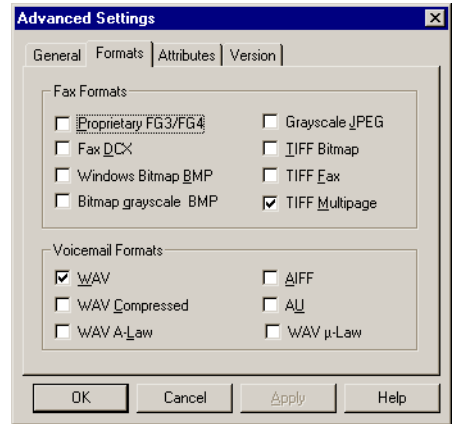
When the **Suppress MID info in subject line of report forms** option is activated, the message IDs in square brackets are omitted from the subject line. These IDs are normally used to assign a report to a message, particularly in large Exchange environments where numerous connectors are present. With default reports it is not possible to suppress the message ID display.

Via **Use report forms instead of default reports** MRS report forms are used instead of normal Exchange reports. For a more detailed description of the function and installation of MRS reports refer to the *MRS System Architecture* manual from the section “Automatic Report Transmission per Mail”.

Through use of **Do not generate voice attachments**, only a notification of a received voicemail is sent to the Exchange recipient. Normally the user can then listen to this mail through his telephone (Standard Voice/Fax Mailbox) or via the Outlook extensions.

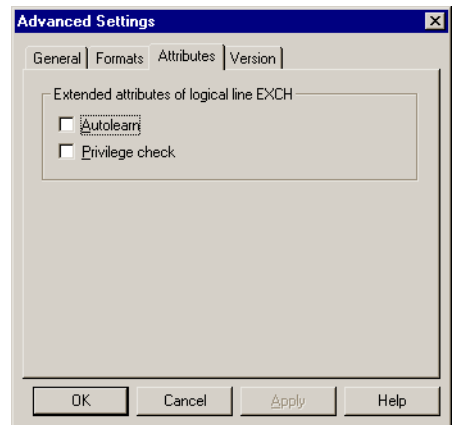
The Exchange Gateway can be shut down and subsequently restarted by selecting the **Restart ExchApl** button. The ExchAPL cannot be started from here if it has not been started as service with booting the computer for some reason. When the ExchAPL is not running, the **Advanced...** button in the **Options** tab is inactive.

The **Formats** configuration tab enables the configuration of file formats recognized by the Exchange APL. The Exchange client should be able to display these formats of course. Documents received by the MRS Server, that are not in one of the formats selected in this dialog, would be converted into one of these formats prior to being sent to the Exchange APL.



The Exchange APL reports a line to the Message Transfer Agent (MTA). Various **Attributes** can be assigned to this line.

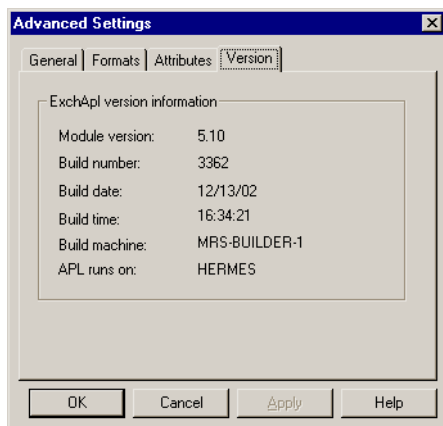
The first option that should be mentioned is **Autolearn**. When enabled, it allows certain database fields to be transferred automatically from Exchange to the MRS Server. This mode is intended for the case that no address book replication has been enabled. Otherwise, due to its greater flexibility, the more modern method described further below should be used for address book replication.



Furthermore you should enable the **Privilege check** option so that for all transmission jobs requiring a privilege the user initiating the job must be assigned this privilege by the user data editor in the MRS client. In most cases this privilege is already granted to users through the group assignment. The MRS client should only be used when special privileges are required

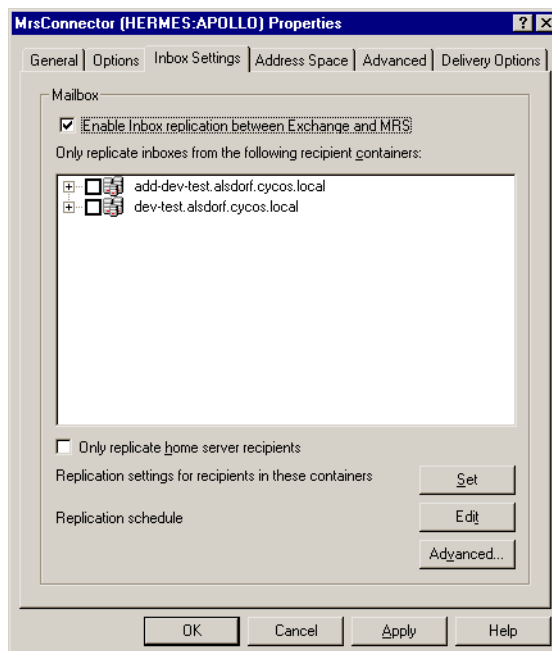
MRS and Exchange 2000

Exchange Connector Settings



In the **Version** configuration tab the version of the installed Exchange APL is displayed. The version should always be indicated in error reports.

5.3.2 Configurations in the “Inbox Settings” Tab

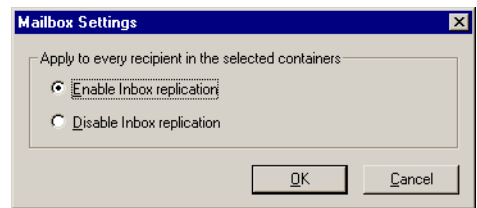


Enable Mailbox Replication between Exchange and MRS

Every user has an individual inbox and all inbound messages for that user are stored in the inbox. If users also wish to access their messages under programs other than Ex-

change, e.g. via an MRS Server voice menu, then inbound messages must be accessible under both, Exchange and MRS. At the same time, the message status must be synchronized on both systems, so that read messages on one system do not appear as new messages on the other. So if the inbox replication has been activated here, the options **Only replicate inboxes from the following recipient containers:** and **Only replicate home server recipients** can be used to restrict the replication. It is then limited to certain recipient containers and additionally to users from these containers whose Home Server computer is the one on which the Exchange Server runs and where the MRS Exchange Connector is installed.

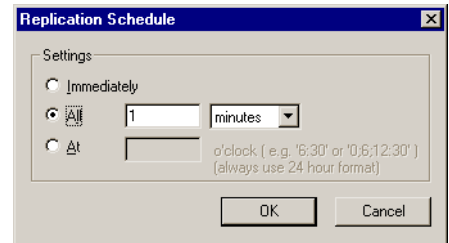
Inbox replication for all users within the selected containers can be immediately activated or deactivated with the option **Replication settings for recipients in these containers** after a click on **Set**.



Attention: Use this option cautiously since replication affects all mailboxes of the selected container.

These settings can be individually adapted for users in the User Configuration dialog (see below).

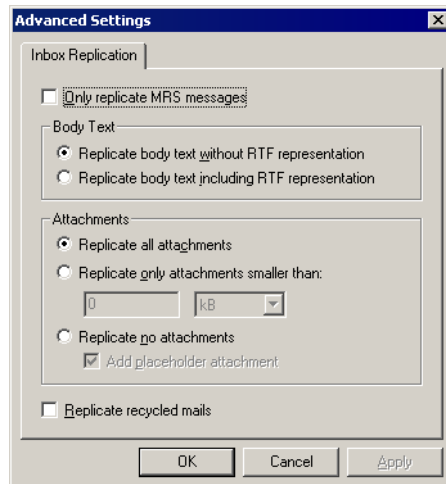
Through use of **Replication schedule** and the **Edit** button the interval is given at which the inbox replication is to occur. Interval options are: **Immediately**, **All *n* minutes/hours/days**, and **At**. The last option means that replication is triggered at fixed times. The entry format for this purpose is **hours:minutes**. A sequence of several fixed times can be entered separated by a semicolon. This entry format allows omitting minutes when replication is to occur at the full hour.



Setting **Immediately** restricts the number of users with integrated messaging to 200. This is a restriction of the Exchange server that, in a MAPI session, transmits modifications in the mailboxes of the affected users. For a MAPI session a maximum of 200 mailboxes is permitted. As soon as you define more than 200 users for inbox replication, the replication time automatically switches to **Every *n* minutes/hours/days**.

MRS and Exchange 2000

Exchange Connector Settings



In the **Inbox Replication** configuration tab to be reached via the **Advanced...** button, you can determine in which way body text and file attachments are to be globally replicated with the MRS Server. Except for the “Only replicate MRS messages” checkbox you can individually adapt these settings for each user in the “Active Directory Users and Computers” window at a later date (see also 5.2 Exchange User Settings, page 109).

The checkbox **Only replicate MRS messages** is set if messages are exclusively to be replicated from the MRS Server to the Exchange Server. This is reasonable e.g. to restrict the system load. The disadvantage

of this is that owing to the missing replication from Exchange to the MRS Server no e-mails can be put out via telephone per Text-to-Speech converter.

The **Body Text** can be replicated either with or without additional RTF representations.

Three replication options are available to the user for **Attachments**:

- **Replicate all attachments**

Default setting. All file attachments are replicated.

- **Replicate only attachments smaller than...**

This option allows the user to decide whether an attachment is replicated or not depending on its size. The option **Add placeholder attachment** replaces the attachment with a small notification so that e.g. with message querying over a voicemail system, the user is informed of the omitted files.

- **Replicate no attachments**

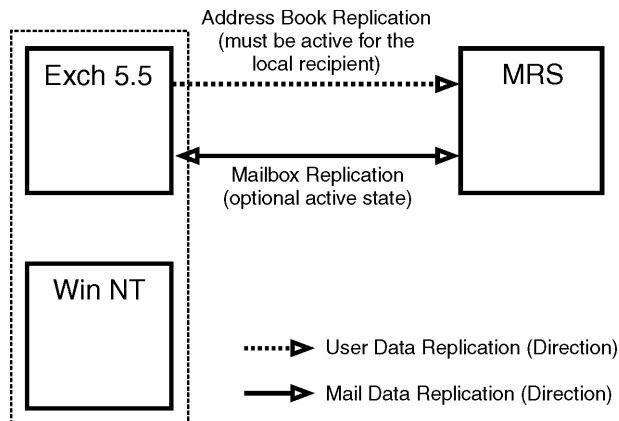
When activated, no attachments will be replicated. If the option **Add placeholder attachment** is enabled, the attachment is replaced with a small text notification.

Via **Replicate recycled mails** the Exchange user can make restored messages available again also on the MRS Server.

5.4 Migration from Exchange 5.5 to Exchange 2000

Starting from a system based on Windows NT and Exchange Server 5.5 with an MRS Server the following explains how to perform the conversion to Windows 2000 and Exchange 2000 Server. The method described step by step has been tested and should not cause any problems when the process is executed as shown.

Starting point for the migration is a Windows NT and Exchange Server 5.5 environment with MRS Server as displayed in the following illustration. The address book replication from Exchange 5.5 to MRS for local recipients must be active. Mailbox replication can be enabled as well but is not required.

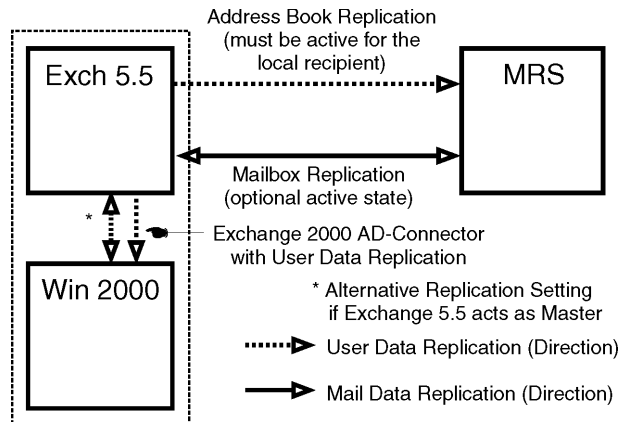


1. The first step is migration of the NT4-PDC to a Windows 2000 Active Directory Controller.
2. Subsequently the Active Directory Connector (from the Exchange 2000 Server-CD) is to be installed between Exchange Server 5.5 and Windows 2000 and configured for user replication. In doing so the replication direction from Exchange Server 5.5 to Active Directory is to be preferred, however, replication may also occur in both directions according to dual setting. In this case the Exchange Server 5.5 needs to be defined as master.

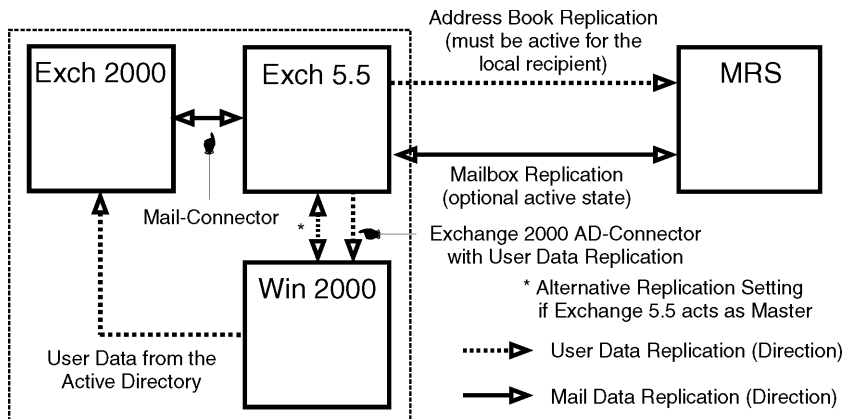
Then user data replication is initiated so that the Exchange 5.5 address book data can be copied to the Active Directory of Windows 2000.

MRS and Exchange 2000

Migration from Exchange 5.5 to Exchange 2000

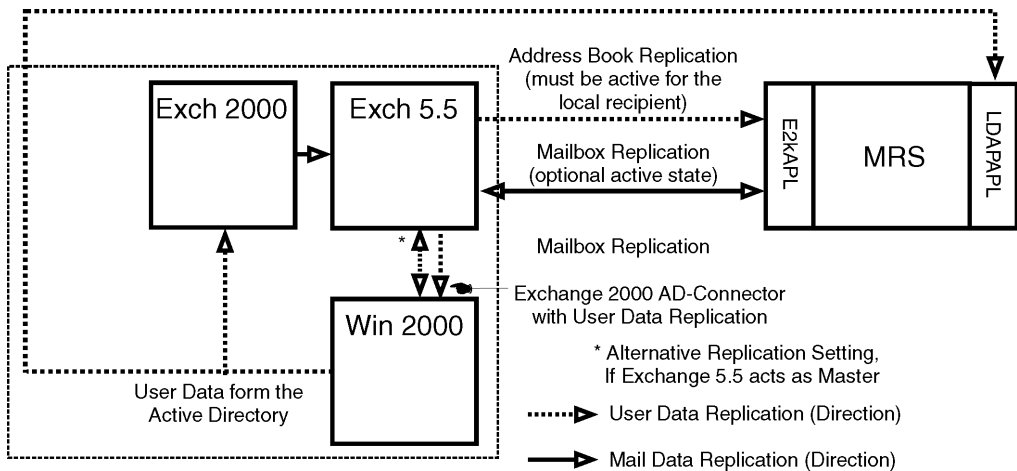


3. Install the Exchange 2000 Server so that it is member in the existing Exchange 5.5 organization.



4. Install the following components on the MRS Server in the sequence:
 - Outlook 2000 SR 1 (with user profile and started once)
 - Exchange 2000 System Manager

- LDAP APL (the setting for the poll interval must be 0 for the time being)
 - E2k APL installation
 - MRS-MMC Snap-In installation.
5. Start the MRS Server.



6. Start the Exchange 5.5 Administrator. Open the MRS Connector configuration dialog. Deactivate the checkbox for global address book replication between Exchange and MRS. This is required to avoid replication processes during the export and import of user data. **Attention:** Do not change the setting for recipient container selection.
7. Export the user data from Exchange 5.5 with the Exchange Maintenance Utility (ExchMaint.exe).
8. In Exchange 5.5 add all database fields that are to be synchronized via the LDAP APL at a later date (**GROUP** and **PASSWORD** are mandatory as well).
9. Reimport the exported user data with the Exchange Maintenance Utility (Exch-Maint.exe) to Exchange 5.5.
10. After this step reactivate the checkbox for global address book replication.

11. Wait a few minutes until address book replication of the MRS user data to Exchange 5.5 is accomplished. The newly installed database fields (**GROUP** and **PASSWORD**) are filled in during this process. **Annotation:** You can observe the replication via the MRS Monitor.
12. To check whether the new database fields have been filled in, start the Exchange 5.5 Administrator. In the user configuration tabs you can then see that the new database fields (**GROUP** and **PASSWORD**) feature the corresponding values.
13. Open the Active Directory Connector and enable the “Replicate now” button so that the MRS database fields, linked with the “extension data” DS attribute are replicated. Attention: in large multi-domain, multi-site and multi-domain controller environments make sure that the Active Directory data are synchronized on all systems. This may take a while.
14. Open an MRS user entry in “Active Directory User and Computers” and select the MRS Settings tab. Check whether the **GROUP** and **PASSWORD** data fields have been filled in.
15. Open the LDAP configuration settings via the MRS Monitor and set the poll interval to ≥ 10 .
16. Finally the Exchange 5.5 mailboxes need to be transmitted to Exchange 2000.

5.5 Foreign Fax-Systems Support

The MRS ExUM APL supports fax message systems of the companies:

- Fax Sr, by Omtool, Ltd
- LightningFAX, by Interstar Technologies

Their “Message Classes”, coming in via Exchange, are recognized as fax messages. Therefore it is possible to announce and edit these fax messages (for example forwarding to a fax terminal device) in the TUI (Telephone User Interface). Outlook displays these fax messages as file attachment in the TIFF format after they have been opened. The following “Message Classes” can be recognized:

- IPM.NOTE.ReceivedFaxWithViewer
- IPM.NOTE.PreviewFaxWithViewer
- IPM.NOTE.RIGHTFAX
- IPM.FAX
- IPM.NOTE.Incoming LightningFAX Message
- IPM.NOTE.FAX

5.6 Exchange Maintenance Utility

Through use of the Exchange Maintenance Tool `Exch2kMaint.EXE`, adaptations to an Exchange Connector environment can be made. The program is found after the MRS installation in the `... \mrs\bin\` directory. Before the program can be used, the required modules must be copied to a separate directory. The modules are::

Module	Description	Mode/ MS Utility
Exch2kMaint.exe	Utility	All Modes
MrsMaint2k.dll	Utility DLL for Exch2kMaint	All Modes
MrsMxAdm.dll	Exchange Mailbox-Extension. This DLL enables the display of the MRS extninst (MS) Settings configuration tab on mailboxes.	installmbx, extninst (MS)
MrsAdmin.dll	Exchange Connector-Extension. This DLL enables the display of the Con- nector configuration menu.	install, extninst (MS)
MrsProxy.dll	Exchange Proxy-Extension. This DLL enables the generation of MRS Proxy Addresses by Exchange.	install, addrinst (MS)
MrsAdminEng.hlp	Exchange Connector Extension. English help files.	install, tmplinst (MS)
MrsAdminGer.hlp	Exchange Connector Extension. German help files.	install, tmplinst (MS)
MrsAdt.blk MrsAdt.hlp MrsAdt.oel MrsAdtg.blk MrsAdtg.hlp	General MRS address template files.	install, tmplinst (MS)
MrsAdtEFT.blk MrsAdtEFT.oel MrsAdtEFTg.blk	EFT (Eurofile-Transfer) address files.	install, tmplinst (MS)
MrsAdtFaxg3.blk MrsAdtFaxg3.oel MrsAdtFaxg3g.blk	Fax G3 address template files.	install, tmplinst (MS)

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Module	Description	Mode/ MS Utility
MrsAdtFaxg3Rev.bl MrsAdtFaxg3Rev.oel MrsAdtFaxg3Rev.g.bl	Fax polling address template files.	install, tmplinst (MS)
MrsAdtFaxg4.bl MrsAdtFaxg4.oel MrsAdtFaxg4.g.bl	Fax G4 address template files.	install, tmplinst (MS)
MrsAdtSMS.bl MrsAdtSMS.oel MrsAdtSMS.g.bl	SMS (Short Message Service) address template files.	install, tmplinst (MS)
MrsAdtVoice.bl MrsAdtVoice.oel MrsAdtVoice.g.bl	Voicemail address template files.	install, tmplinst (MS)
MrsPmt.bl MrsPmt.g.bl	Message address template files.	install, tmplinst (MS)
MrsPrt.bl MrsPrt.g.bl	Recipient address template files	install, tmplinst (MS)

Through use of the address templates, new address types are available when entering addresses in the Exchange address book.

Exch2kMaint is started from the command line prompt. Various maintenance modes can be executed via the command line parameter */MODE=<Mode>*. Each parameter requires further parameters. A detailed description of these parameters can be

seen by entering the additional parameter name `/?`. Contrary to the Exchange 5.5 Connector, the Exchange 2000 Connector only provides the two following modes.

Mode	Description
INSTALL	Installs the MRS Exchange 2000 Connector, the Connector Extension (<code>MrsAdmin.dll</code>) and the Proxy Extension (<code>MrsProxy.dll</code>). This mode can only be executed when the local <code>ExchApl</code> registry is present. Parameters: BINPATH= (Type: <code>abc\xyz.xyz</code>) Definition of the path at which the components are to be installed. ATTIBUTES= <code><1, 2, 4, 8, 16 or 32></code> Default of the address templates to be installed. <code>1</code> → General MRS address template <code>2</code> → Fax <code>4</code> → Fax polling <code>8</code> → FaxG4 <code>16</code> → Eurofile-Transfer <code>32</code> → SMS Annotation: The address templates are more conveniently selected during the connector setup.
REMOVE	Removes the MRS Exchange 2000 Connector and all associated components (no further parameters available).
EXPORTBLOBS	Export of user data to a text file (separator is a tab). This function can be used for example to edit user data by means of other programs (MS Excel). This is required for example with migrating user data from other servers. Besides the LDAP address the fields are exported that were replicated to the Active Directory via “extensionData“. In addition, the CTI settings that were also stored in the mailbox can be exported. Annotation: By means of the Exchange 5.5 tool <code>ExchMaint.exe</code>, user data can be exported from Exchange 5.5 to Exchange 2000 and imported again from Exchange 2000 via the <code>Exch2kMaint</code> tool.

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Mode	Description
	Parameters: EXCHANGESERVER= Computer name (Exchange Server name). CONTAINER= Active Directory Distinguished Name (DN) of the folder or of the organization unit. Attention: When a blank occurs in the DN address, the complete string must be set in inverted commas! FILENAME= Path and file name of the text file to be exported for the user data. CTIFILENAME= Path and file name of the text file to be exported for the CTI data. Further optional parameters: DETAILED=1 Export of user data plus the extended inbox configuration data. SUBFOLDERS=1 Export of all user data from the subdirectories under /CONTAINER. ATTRIBUTES=ALL Export of user data and users that do not have MRS settings. INTERACTIVE=1 Opens before export the dialog for MAPI profile selection. The profile to be selected must have the corresponding privileges on the Exchange Server.
IMPORTBLOBS	Import of edited user data. Parameters: EXCHANGESERVER= Computer name of the Exchange Server. FILENAME= Path and file name of the text file to be imported with the user data. CTIFILENAME= Path and file name of the text file to be imported for the CTI data.

Calling the function for user data export and import:

```
exch2kmaint /mode=Exportblobs /ExchangeServer=<server name>  
/Filename=<file name> /Container="cn=users,dc=<domain>,  
dc=<com,de,local>" /CTIFilename=<file name>
```

Remark 1: With an export from an organization unit specify the container

```
"ou=<organization unit>,dc=<Domain>,dc=<com,de,local>"
```

Remark 2: With an export from a subdomain:

```
"dc=<sub_domain>, dc=<domain>, dc=<com,de,local>"
```

```
exch2kmaint /mode=Importblobs /ExchangeServer=<server name>  
/Filename=<file name> /CTIFilename=<file name>
```

Example:

```
exch2kmaint /mode=exportblobs  
/exchangeserver=Exchange_Server  
/container="ou=TestUser,dc=Test,dc=local"  
/filename=file.txt /detailed=1 /attributes=ALL  
/ctifilename=cti.txt /interactive=1
```

```
exch2kmaint /mode=importblobs  
/exchangeserver=Exchange_Server /filename=file3.txt  
/ctifilename=cti.txt
```

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Example of an exported user data file from the Active Directory:

Remark: The data records of the single columns are separated by a tab.

OBJDISTNAME (LDAP user address)	ADDRREPL	IBXREPL	...
LDAP://AD1R00T/CN=USER001,OU=TESTUSER,DC=TEST,DC=LOCAL	OFF	OFF	...
LDAP://AD1R00T/CN=USER002,OU=TESTUSER,DC=TEST,DC=LOCAL	OFF	OFF	...
LDAP://AD1R00T/CN=USER003,OU=TESTUSER,DC=TEST,DC=LOCAL	OFF	OFF	...
LDAP://AD1R00T/CN=USER004,OU=TESTUSER,DC=TEST,DC=LOCAL	OFF	OFF	...
LDAP://AD1R00T/CN=USER005,OU=TESTUSER,DC=TEST,DC=LOCAL	OFF	OFF	...
LDAP://AD1R00T/CN=USER006,OU=TESTUSER,DC=TEST,DC=LOCAL	OFF	OFF	...
LDAP://AD1R00T/CN=USER007,OU=TESTUSER,DC=TEST,DC=LOCAL	OFF	OFF	...

Continuation

...	IBXREPL_ONLYMRS	EXT_GLOBAL	EXT_RTFBODYREPL	EXT_ATTACHREPL	...
...	OFF	ON	OFF	ALL	...
...	OFF	OFF	OFF	ALL	...
...	OFF	OFF	OFF	ALL	...
...	OFF	OFF	OFF	ALL	...
...	OFF	OFF	OFF	ALL	...
...	OFF	OFF	OFF	ALL	...
...	OFF	OFF	OFF	ALL	...

Continuation

...	EXT_ATTACHMAXSIZEREPL	EXT_ATTACHPLACEHOLDER	EXT_RECYCLEDREPL	...
...	0BYTES	OFF	OFF	...
...	0BYTES	OFF	OFF	...
...	0BYTES	OFF	OFF	...
...	0BYTES	OFF	OFF	...
...	0BYTES	OFF	OFF	...
...	0BYTES	OFF	OFF	...
...	0BYTES	OFF	OFF	...

Continuation

...	FAXG3-HEADLINE	FAXG3-ID	GROUP	PASSWORD	PIN	VOICE#
...	USER001 HeadLine	+492001234001	USER	-592113043	111111	+492001234001
...	USER002 HeadLine	+492001234002	USER	-592113043	111112	+492001234002
...	USER003 HeadLine	+492001234003	USER	-592113043	111113	+492001234003
...	USER004 HeadLine	+492001234004	USER	-592113043	111114	+492001234004
...	USER005 HeadLine	+492001234004	USER	-592113043	111115	+492001234005
...	USER006 HeadLine	+492001234006	USER	-592113043	111116	+492001234006
...	USER007 HeadLine	+492001234007	USER	-592113043	111117	+492001234007

Example of an exported text file with CTI data:

OBJDISTNAME	LOCALNUMBER	FLAGS
LDAP://AD1R00T/CN=USER001,OU=TESTUSER,DC=TEST,DC=LOCAL	001	0x230003D
LDAP://AD1R00T/CN=USER002,OU=TESTUSER,DC=TEST,DC=LOCAL	002	0x230002B
LDAP://AD1R00T/CN=USER003,OU=TESTUSER,DC=TEST,DC=LOCAL	003	0x230002B
LDAP://AD1R00T/CN=USER004,OU=TESTUSER,DC=TEST,DC=LOCAL	004	0x230002B
LDAP://AD1R00T/CN=USER005,OU=TESTUSER,DC=TEST,DC=LOCAL	005	0x230002B
LDAP://AD1R00T/CN=USER006,OU=TESTUSER,DC=TEST,DC=LOCAL	006	0x230002B
LDAP://AD1R00T/CN=USER007,OU=TESTUSER,DC=TEST,DC=LOCAL	007	0x2300031

5.6.1 External Editing of the Exchange 2000 User Data

The “Exch2kMaint” tool can be used in the EXPORTBLOBS and IMPORTBLOBS mode for the following purposes:

1. Administration of BLOB data by means of other programs (for example Microsoft Excel). This might be required when the organization telephone number has changed. Adapting user entries manually is considered too laborious at larger companies.
2. Copying old user data from another server or from an Exchange 5.5 Server. The export file may have to be adapted manually for this purpose. For user data transfer from Exchange 5.5 to Exchange 2000 the ExchMaint tool of the Exchange 5.5 connection (ExchMaint.exe) is required, too. See also “Migration from Exchange 5.5 to Exchange 2000” on page 127.

With an export or import of user data the fields, referenced in the “extensionData” attribute, are exported or imported.

With specifying a name for CTI data (under CTIFILENAME=) the CTI settings stored with mailbox data are additionally exported or imported.

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6 Appendix

6.1 MRS Service Provider (MSP)

The MRS Service Provider is used as a global sub-structure for all client applications using MRS Server services, e.g. Message Routing System, Lotus Notes LSX, Outlook CTI Extensions or MRS Communications. 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 every 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 any time.
- **Store & forward interface**
Client applications can send documents to or receive them from an MRS Server. This refers to classic communication per fax, e-mail etc. The CTI journal of the Message Routing System operates via this interface as well.
- **Transaction interface**
Through this service client applications can communicate with components of the MRS Server that support transactions. This enables in particular the CTI functionality for client applications such as Message Routing System or the Outlook CTI Extensions.

According to requirements the MSP is automatically implemented upon the installation of an MRS client component. When the installation is completed you find the file `MSP.INSTALL.LOG` in the Temp Directory of the installing user, helping to detect errors if problems should occur.

The MRS Service Provider is automatically started by the first client application requiring it. The MRS Service Provider configuration module in the control panel is such an application.

More information on the Service Provider and on profile definition is found in the "Server Administration" manual.

6.2 Tips on Automatic Client Software Distribution

6.2.1 Client Log-in via Windows User Account

To simplify client software distribution, the Windows user account can be assigned to an MRS user account instead of a user profile with MRS user ID and password. Therefore, in a scenario with Exchange connection, the administrator need not maintain individual MRS user profiles on the respective client computer, but the already defined Windows user account is used for logging in (for example the Outlook forms or the Outlook CTI extension).

Before this feature can be used, the Windows domain and user account of each user must be present in the `Lmaccount` database field. Example: for user `TESTUSER` in the `TEST` domain the entry would be: `TEST\TESTUSER`. Thus logging in under Windows NT/2000/XP occurs automatically via a corresponding validation at the domain server. In case of an error (for example, when the `Lmaccount` field among the user data has not been filled in), a user profile must still be created via the Service Provider before the first log-in.

Under Windows 9x/ME each client application logging in must be validated at the domain server via entry of the respective password. This restriction is part of the security requirements of the Windows operating system 9x/ME.

A prerequisite for this log-in version is that no MRS user has a backslash [`\`] in their `USER` database field.

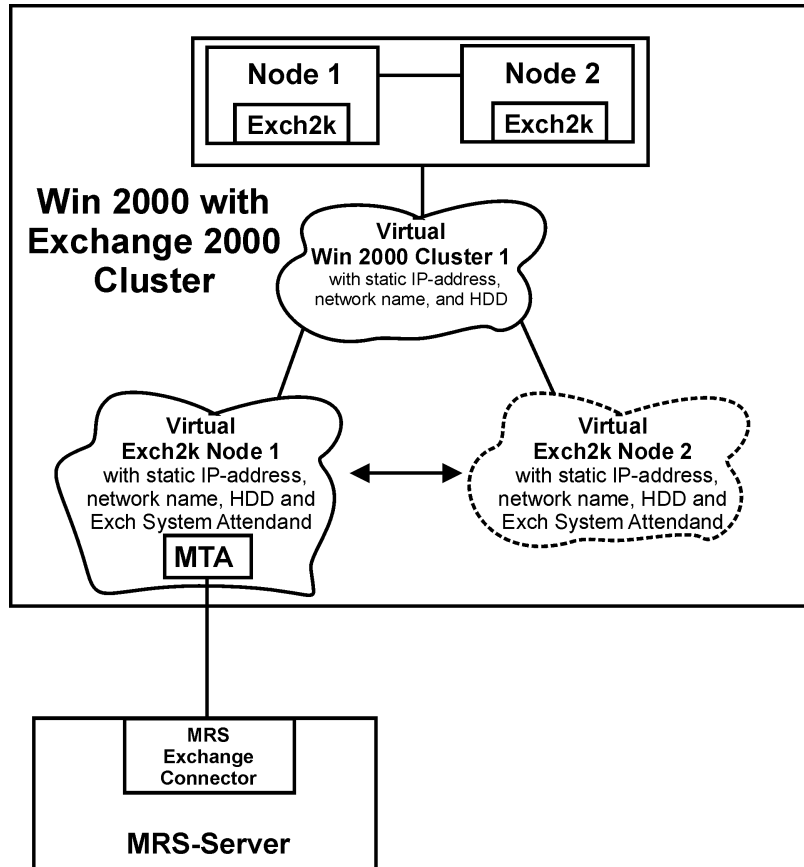
The `Lmaccount` user database field is available per default. You find it as part of the user data in the **Advanced** tab. Here you can also check whether a correct entry has been made for a user via LDAP replication.

Another LDAP APL configuration is not required since the corresponding settings are performed via the LDAP configuration file (`ex2000.lcf`). So that the `Lmaccount` user database field is automatically filled in with the domain and the user name, the “`LMACCOUNT`” MRS attribute is assigned to the “`sAMAccountName`” Active Directory attribute. This assignment can be checked in the **Attributes** tab of the LDAP configuration dialog. In the attributes list the “`LMACCOUNT`” MRS attribute is entered next to the “`sAMAccount`” Active Directory attribute.

6.3 MRS Connection to a Microsoft Exchange 2000 Cluster Environment

You can integrate an MRS Server in an existing MS Exchange 2000 cluster environment. The scenario described in the following for a two-node cluster (Windows 2000 Advanced Server with Exchange 2000 Enterprise Server) applies correspondingly to

four-node clusters as well (Windows 2000 Datacenter Server with Exchange 2000 Enterprise Server).



When connecting the MRS Server to a complete MS Exchange 2000 cluster environment via the MRS-Exchange 2000 gateway (the E2kAPL), heed the following explanations.

6.3.1 Generals

1. The E2kApl must not be installed on the MS Exchange 2000 cluster itself.
2. Installation of the E2kAPL on a clustered MRS Server is not supported.
3. The gateway connection occurs as illustrated in the above block diagram. With the MRS-Exchange 2000 gateway installation it is important to establish a connection

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to the virtual Exchange node that performs the Exchange Message Transfer Agent instance (MTA). This is done via entry of the corresponding virtual Exchange server name in the setup for the MRS-Exchange Connector.

Depending on the cluster configuration, the following differentiations are possible:

6.3.1.1 Active-Passive Cluster Configuration

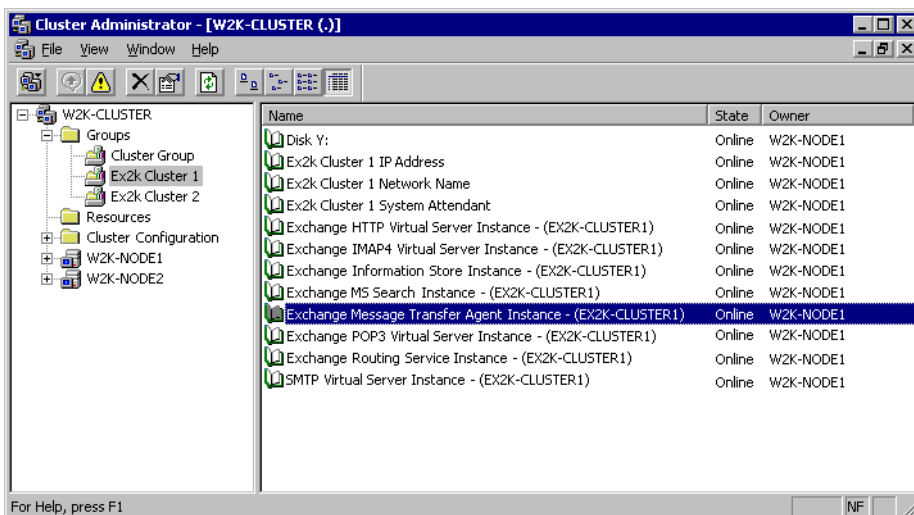
This version features only one virtual Exchange 2000 node, on which the MTA instance is performed as well. Consequently in this cluster installation recommended by Microsoft the connector can only be connected with the active virtual Exchange 2000 Server. With a failover the passive node automatically takes over the entire virtual Exchange 2000 Server function.

6.3.1.2 Active-Active Cluster Configuration

With an active-active configuration several virtual Exchange 2000 nodes are available. The MRS-Exchange 2000 connector must be connected to the virtual Exchange 2000 node, on which the Exchange Message Transfer Agent instance (MTA) is performed.

Via the cluster administration you can see which virtual Exchange 2000 node is used for this purpose. Call the properties dialog of the Exchange Message Transfer Agent instance (doubleclick on the corresponding entry) and switch to the **Parameter** tab.

Remark: The cluster administration does not only display on which virtual Exchange node the MTA is located but you can also determine the network name or the IP address of the selected virtual Exchange node (open the properties dialog for E2k Cluster x Name or E2k Cluster x IP).



6.3.1.3 Active-Active-Active-Passive Configuration of a Four-Node Cluster

The proceeding is the same as described with the two-node active-active cluster. Here as well connecting occurs to the virtual Exchange 2000 node on which the MTA runs.

6.4 Complete Directory of Registry Entries

All system relevant values are normally configured via Setup and subsequently via the Exchange Admin. These settings are partly stored in the Registry. In most cases the Registry need not be edited.

We strongly recommend only to perform modifications here when you are absolutely sure about the ensuing consequences. Wrong entries may lead to the complete system stopping its service in an extreme case with all consequential damages!

Registry entries have the format: **Value Name:Data Type:Value**. The **Value** entries depend on the data type. The following data types are used here:

- String: **REG_SZ**,
- Data: **REG_DWORD**, with either binary -, decimal- or hexadecimal based entries,
- Multipart Strings: **REG_MULTI_SZ**.

6.4.1 HKEY_LOCAL_MACHINE\SOFTWARE\PP-COM\...

For the E2kApl the following *values* are found in the *key*

HKEY_LOCAL_MACHINE\SOFTWARE\PP-COM\MRS\ExchApl

Access:REG_SZ:<Password>

Password of the installing Exchange account. The password is displayed encrypted.

Account:REG_SZ:<Name>

Name of the installing Exchange account. The account must have administrator authority under Microsoft Exchange.

Addr_Lookup_Mode:REG_DWORD:<0 or 1>

A fax look-up table is created in which all mailboxes with fax numbers are integrated (1). This is the default setting. Since this table can be very large, it is possible to prevent its use with this parameter (0), so that required dialling numbers can be sequentially queried. Except in the case of extremely limited harddisk storage space, generation of the table should not be terminated since otherwise the performance is dramatically reduced .

Default: 1

Address_Book_View_Support:REG_DWORD:<0 or 1>

Address book views are supported (1) or not (0).

Default: 0

Default: 1

Address_Mode:REG_DWORD:<0 or 1>

Determines if a dialling number is to be searched for in the Global Address List (0) or in the Site Container (1).

Default: 0

Address_Restrict_Mode:REG_DWORD:<0 or 1>

Decides whether a MAPI restrict with fax numbers is to be executed on containers (0), or if the Connector goes through all entries individually and integrates only those mailboxes in the look-up table that have a fax number (1).

A restrict error occurs with containers that include more than 16,000 users. In this case Restrict should not be applied and the value should be set to "1".

Default: 1

Admingroup_RDN: REG_SZ:<Name entry>

Display name of the routing group (under "Administrative Groups") in which the Connector is installed.

ADsDomainPath:REG_SZ:<Path>

Domain LDAP path (root path to the Active Directory).

Example: DC=docutest, DC=alsdorf, DC=cycos, DC=com

APL_SLOWDOWN:REG_DWORD:<0 and 1>

Setting for particularly critical system environments (for example Timeout adaptation for strongly used network connections). For internal use only!

Default: 0

Attrib:REG_MULTI_SZ:<SF, IN, OUT or RCIT>

A list of this attribute's protocols. These are already reasonably preset with the APL installation, so that usually no modifications need to be and are to be performed. In particular, some attributes are, depending on the type of line, unsuitable and even prevent the regular resp. intended operation via this line if they are added.

SF: This logical line allows store-and-forward of documents.

IN: This logical line allows inbound traffic with reference to the server.

OUT: This logical line allows outbound traffic with reference to the server.

RCIT: If a read report is received on this line, the corresponding CIT signal is deactivated.

Default: *SF, IN, OUT, RCIT*

CheckForDeletedUser:REG_DWORD:<Value in Milliseconds>

Time interval in which the Address Book Replication searches for deleted users.

Default: *900000*_{Dec}, *DBBA0*_{Hex} or *1101 1011 1011 1010 0000*_{Bin} (corresponds to 15 minutes)

Contacts:REG_MULTI_SZ:<Entry>

List of data fields from the public contact folders used for calling number normalization. These have the format:

Folder-Path;OrgFeld;DestFeld;OrgFeld1;DestFeld1;...

Example: *ExternalContacts;Business;Business2;Home;Home2*

CreateDefaultMessageClasses:REG_DWORD:<0 or 1>

When this registry value is set to 0 and no message classes are defined, no special Forms are used to represent MRS documents. Thus the value 0 leads to the registry being read (as before) to use the message classes defined there. Changing the default value from 0 to 1 results in the use of default message classes for voice and fax messages. In this way compatibility to existing installations and maximum flexibility is ensured.

Default: 0

CTI_Lookup_Counter:REG_DWORD:

Number of CTI messages in the MTS-Out queue of the Connector. These messages are searched for and subsequently processed before processing other email jobs. Used to accelerate the processing of email generated CTI jobs. For internal use only!

Default: 32

CTI_Monitor:REG_DWORD:<0 or 1>

Determines whether the Connector Journal function is to be used (1) or not (0) with an available CTI License.

Default: 1

DeleteOutOfOfficeReplay:REG_DWORD:<0 or 1>

To rule out the rare case of a message loop occurring under unfavorable circumstances, this registry value can be set to 1. This is e.g. possible in the following scenario: subscriber A sends a message to subscriber B. Subscriber B has activated his or her absence assistant. Therefore, after a certain period, a message is sent to A ("I am not in"). In the meantime, A has activated his or her absence assistant as well,

now replying to the received message. In other words, an exchange of absence messages would here be generated, only to be ended with one of the two subscribers logging on to Outlook again.

Default: 0

DeleteOutOfOfficeReplayTemplate:REG_DWORD:<0 or 1>

Same as above but the described behaviour is avoided using templates.

Default: 0

Delivery_Report:REG_DWORD:<0 or 1>

Delivery reports are sent to the Exchange Client (even when disabled in the Client) when set to 1.

Default: 0

Distrib_Count:REG_DWORD:

Maximum number of processed users in an Exchange Distribution List in one run. No restrictions when set to 0.

Default: 0

DlgSession:REG_SZ.

Intended for future expansion of dialog services.

Default: 16

Domain:REG_SZ:<Name>

Windows NT domain of the installing Exchange account.

ExchangeServer:REG_SZ:<Name>

Name of the computer of which the Exchange Server runs.

Extension_Poll:REG_DWORD:<Value in Seconds>

Time in seconds after which the Connector automatically checks for a modification to its settings. If a change is detected, the Connector will be restarted.

Default: 60_{Dec}, 3C_{Hex} or 11 1100_{Bin}

ExtensionBuildNumbers:REG_DWORD:<Build Number>

Here the Build Number is automatically entered with the installation. For internal user only!

Format:REG_MULTI_SZ:<Format Entries>

Presetting for formats into which documents and file attachments are converted for Exchange. For internal use only!

Default: PMF, ASC, TXT, WAV, AS7, BMP, BMP-COL, BIN, TG3, TG4

GUID:REG_SZ:<Value>

Automatically assigned Connector CLSID.

IBX_ReplMode:REG_DWORD:<0, 1, 2 or 3>

Setting for the Inbox Replication mode. For internal use only!

InboxRecovery:REG_DWORD:<0 or 1>

The utmost caution is advised: When set to 1, the domain-wide correlation entries of all users are deleted! This option is only intended for the case that the correlation database is to be re-established after an error and no backup is available.

Default: 0

InstallAddressTemplates:REG_DWORD:<Value>

The value which appears here is entered with the installation and should not be modified. For internal use only!

InstallPath:REG_SZ:<Path Entry>

MRS Connector path.

Example: *D:\Cycos\MRS\Bin\ExchApl.exe*

MailboxStore:REG_SZ:<Mailbox directory>

Entry of the mailbox store in which the connector mailbox lies.

MaxStoreAccessTries:REG_DWORD:<0 to 10>

Maximum number of attempts to open a user's Exchange mailbox before an error message is issued.

Default: 5

Multiline_Support:REG_DWORD:<0 or 1>

Activates (1) the Multiline mode of the Exchange APL. This is required when from a single MRS Server Exchange Connectors to several Exchange Servers are to be installed.

Default: 0

NeverReplicateDocumentsOlderThanDays:REG_DWORD:< $n=0$, n : 1 to 1000>

If the default value is set here, the system behaves as if the registry key did not exist. Each value deviating from 0 (setting $n=1$ to maximum $n=1000$) is interpreted as replication parameter. This parameter determines that only documents from MRS to Exchange generated n days ago are replicated.

Default: 0

NeverSynchronizeDocumentsOlderThanDays:REG_DWORD:< $n=0$, n : 1 to 1000>

When set to 0, the system behaves as if this registry key was not available. Each value deviating from 0 (setting $n=1$ to a maximum of $n=1000$) is interpreted as

synchronization parameter. This parameter defines that only the document states (read, unread etc.) are synchronized from MRS to Exchange the creation date of which dates back *n* days.

Default: 0

NolbxFriendlyName:REG_DWORD:<0 or 1>

If the Exchange Server is used as SMTP server via which SMTP messages are received and the MRS Client serves for mail administration, answering incoming external mails causes problems when the inbox replication is active. Since in this case the Exchange Server does not transmit the complete address to the MRS Server but attempts addressing via the “Friendly Name” data field, sending a reply fails (with “Non Delivery Notification”). So that with the above constellation the complete address is forwarded to the MRS Server and the problem is solved, either this registry entry must be inserted with value 1 or, if already existing, the value changed from 0 to 1.

Default: 0

NoVoicemailAttachments:REG_DWORD:<0 or 1>

Determines whether WAV-Attachments may be appended (1) to an email message or not (0).

Default: 1

Organization_RDN:REG_SZ:<Name entry>

Display name of the organization.

PollPastPeriod:REG_DWORD:<Value in Seconds>

Time interval in which new messages are searched for in Inbox. The process notices the time when the last mail was edited. The difference then determines the next search process.

Default: 5

PostmasterDisplay:REG_SZ:<Name>

Name of the set postmaster address (in this example *Postmaster*). This is where undeliverable messages are automatically routed to.

Example: *Postmaster*

PostmasterDN:REG_SZ:<Entry>

Entry of the Postmaster Account's Distinguished Name (DN)

Example: *\o=<Organization>\ou=<Site>\cn=<Recipient Container>\cn=<Recipient>*

Private_Folder_Support:REG_DWORD:<0 or 1>

Determines whether the Exchange Connector will recognize (1) the moving of email messages to private folders during active Inbox replication or not (0). The default setting is 0 (no recognition). If this option is activated, a greater amount of processing will be required for the Inbox replication.

Read_Report:REG_DWORD:<0 or 1>

When set to 1 a Read-Report will be requested by newly delivered email messages from Exchange. In large organizations this can be suppressed with the value 0.

Default: 1

Reset_Out:REG_DWORD:<0 or 1>

All outgoing messages are to be deleted (1).

Default: 0 (no activity)

RouteTableMinRebuildTime:REG_DWORD:<Value in Seconds>

Time in seconds after which the Fax Look-up table is to be reinstalled. This is required for new or modified dialling numbers.

Default: 3600_{Dec}, E10_{Hex} oder 1110 0001 0000_{Bin}

Routinggroup:REG_SZ:<Routing group name>

Display of the name of the first routing group found.

SendRTFBody:REG_DWORD:<0 or 1>

E-mail messages will be transmitted with RTF-Body parts to the MRS Server (1). The RTF representation can be excluded with a value of 0.

Default: 1

Server:REG_SZ:<Server Name>

Windows name of the server on which the connector has been installed.

Example: *MRS Server*

Site:REG_SZ:<Site Name>

Description of the site under which the Connector is installed. This is done here in X.500 notation as used with the Distinguished Names of Microsoft Exchange Server.

Example: /o=*Sample Ltd* /ou=*AURELIO*

Standard_Cti_Settings:REG_SZ:<uvwxx> (u, v, w, x = 0 or 1, 0 deactivates, 1 activates)

Via this registry key you can set the default behaviour for call logging. Per definition you can define which journal entries are generated for all users that can employ CTI functions. Each of the four parameters (u, v, w, x) represents a notification option:

u : Successful ingoing call (IN)

v: Failed ingoing call (IN)

w: Successful outgoing call (OUT)

x: Failed outgoing call (OUT)

Example: If for the parameters *u*, *v*, *w*, *x* the values 0, 1, 0, 1 are set, only journal entries for failed calls are generated. Successful calls are not logged.

SupportContactScan:REG_DWORD:<0 or 1>

Calling numbers are normalized in the public contact folders (1). If this is to be stopped, set this value to 0 (see also **Contacts** page 145).

Default: 1

Suppress_MID_Reports:REG_DWORD:<0 or 1>

The MID character string taken from the subject line is removed in reports (0). If the MID is required, a value of 1 should be used.

Default: 1

Suppress_Reports:REG_DWORD:<0 or 1>

Exchange Report-Mechanism is used for transmission and error reports (0). When set to (1), this must be realized by means of the MRS Report Forms.

Default: 0

SuppressMIDinSubject:REG_DWORD:<0 or 1>

If you do not want the MID (Message ID) to be displayed in a message's subject line, enter 1 here to avoid it. If 0 is set, the MID is indicated in the subject line as well.

Default: 0

WorkAroundAreaCodeProblem:REG_DWORD:<0 or 1>

Addressing from within Outlook can cause problems when telephone or fax numbers in the format "+xxx(yyy)zzzz" are stored in the contact information. Upon calling and handing over one of these addresses, the expression in brackets is replaced by its ASCII character and consequently the message cannot be sent. In the event that problems arise here, change the default value from (0) to 1 to avoid wrong addressing.

Default: 0

6.4.2 HKEY_LOCAL_MACHINE\... or HKEY_CURRENT_USER\SOFTWARE\...

Depending on the configuration with the installation of the Outlook Com Add-in the following additional values are stored in the key

HKEY_LOCAL_MACHINE\SOFTWARE as well as under HKEY_CURRENT_USER
under

\Microsoft\Office\Outlook\Addins\Fax_SMS.UMSConnect.

This is to define whether the Add-in can only be used by the person that has installed it on the respective computer or by all users that are allowed to log in at this computer:

FriendlyName:REG_SZ:*MRS Extensions*

Description:REG_SZ:*MRS Extensions for FAX and SMS*

LoadBehavior:REG_DWORD:3

CommandLineSafe:REG_DWORD:0

These keys are entered and furnished with the above values if with the installation (by editing the ExtInst.ini from the ...\\Client\\Exchange\\Forms\\ServerBasedFormsClientComponents directory of the MRS-CD “Add-on”) the initially described behaviour is to be generated.

6.4.3 HKEY_LOCAL_MACHINE\SOFTWARE\Cycos AG Outlook CTI Extensions

For the CTI extension the following values are additionally stored in the key

HKEY_LOCAL_MACHINE\SOFTWARE

but under

\Cycos AG\Outlook CTI Extensions:

AllowNoUpdate:REG_DWORD:<0 or 1>

Setting this value to 1 disables the user to start an update themselves.

Default: 0

CTIForAll:REG_DWORD:<0 or 1>

When set to 1, all users that can log in at a computer are provided with CTI functionality. You can edit this value also via the user defined installation by means of the ExtInst.ini. In this way entries exclusively stored under **HKey_Current_User** become globally usable.

Default: 0

CTIServerAddr:REG_SZ:<Entry>

Entry of the MRS Server address.

CTIServerName:REG_SZ:<Server name>

Entry of the MRS Server name.

ForceCTIEnable:REG_DWORD:<0 or 1>

Enforces CTI activation when 1 has been entered.

Default: 0

IgnoreOffline:REG_SZ:<0 or 1>

To suppress the corresponding error report with laptops currently not operated at the data network, the CTI function can be deactivated here.

Default: 0

InstallPath:REG_SZ:<Path>

Path to the Outlook extension installation files.

Language:REG_DWORD:<Value>

Outlook extension language setting. The current entry depends on the language selected in Setup (for example 3 for German or 4 for English).

NeverShowPublicFolder:REG_DWORD:<0 or 1>

The default setting 0 deactivates the “Show public folders” function (in the “Advanced Settings“ portion under **Tools** → **Options...** in the Voice/CTI tab). Setting this value to 1 activates the function again. **Attention:** in large system environments it can take relatively long until all public folders are scanned so that further system calls are ignored at first, in other words, the system does not respond.

Default: 0

NoActivePopUp:REG_DWORD:<0 or 1>

With Outlook 97 or 98, newly incoming messages are always reported per pop-up dialog, even if Outlook has not been started. Setting this value to 1 prevents the dialog from appearing in the foreground. In this way running applications are not disrupted by the active pop-up dialog. This configuration can only be selected by editing this registry key.

Default: 0

NoCallDivChoice:REG_DWORD:<0 or 1>

With some PBXs it is not possible to diversify the call forwarding behaviour (for example: call forwarding any time, call forwarding with busy line or call forwarding when the call is not answered). These allow a procedure for call forwarding. So that no malfunction occurs when a special type of call forwarding is nonethe-

less configured, this value can be set to *1* to enforce default forwarding. This configuration can only be selected by editing this registry key.

Default: *0*

NoClientButtons:REG_DWORD:<0 or 1>

Changing this value from (default) *0* to *1* hides the CTI function tool icons (playing a voice message, establishing a phone connection, rescheduling and dialer). These functions are then not available any more.

Default: *0*

NoDialerButtons:REG_DWORD:<0 or 1>

Changing this value from (default) *0* to *1* hides the dialer icon in the toolbar. This function is then not available any more.

Default: *0*

NoFaxButtons:REG_DWORD:<0 or 1>

Changing this value from (default) *0* to *1* hides the fax icon in the toolbar. This function is then not available any more.

Default: *0*

NoHangUpBtn:REG_DWORD:<0 or 1>

Since with some PBXs it is not possible to terminate a connection per icon (thus per software), a corresponding adaption can be performed here. Changing this value from (default) *0* to *1* deactivates the hang-up function in the dialer. This is recognizable by the call icon not turning into a hang-up icon with establishing a connection.

Default: *0*

NoMonitoring:REG_DWORD:<0 or 1>

With some PBXs, monitoring the individual telephone leads to malfunctions since these systems do not support this function. Changing this value from (default) *0* to *1* deactivates monitoring the individual telephone.

Default: *0*

NoPopUp:REG_DWORD:<0 or 1>

Suppresses opening the pop-up dialog with incoming calls when the default value has been set from *0* to *1*.

Default: *0*

NoUserConfiguration:REG_DWORD:<0 or 1>

Changing the default value from 0 to 1 hides the “Advanced” button (in the “Advanced Settings” portion under Tools -> Options... -> Voice/CTI). Thus a user cannot access the configurations available there any more.

Default: 0

PhonNumber:REG_SZ:<Number>

Here you can enter the individual telephone number.

SetupComplete:REG_DWORD:<0 or 1>

Enter 1 after a completed setup.

UpdateFolder:REG_SZ:<Path>

Path that names the directory in which update files are searched for.

TermServer:REG_DWORD:<0 or 1>

With terminal server applications you can prevent (1) the local telephone number from getting read out or written which otherwise might lead to a malfunction with several active terminals. This configuration can only be selected by editing this registry key.

Default: 0

6.4.4 HKEY_CURRENT_USER\Software\Cycos AG

To supplement the previous registry entries **AllowNoUpdate**, **Language**, **NoActivePopUp** and **NoCallDivChoice**, the following additional values are found in the registry directory **HKey_Curret_User\Software\Cycos AG\Outlook CTI Extensions**:

CtiOnChecked:REG_DWORD:<Value>

1 indicates that the CTI function has been activated for this user.

CtiServerAddr:REG_SZ:<Network Path>

Display of the network path to the MRS Server.

NoActivePopUp:REG_DWORD:<0 or 1>

With Outlook 97 or 98, newly incoming messages are always reported per pop-up dialog, even if Outlook has not been started. Setting this value to 1 prevents the dialog from appearing in the foreground. In this way running applications are not disrupted by the active pop-up dialog. This configuration can only be selected by editing this registry key.

Default: 0

NoCallDivChoice:REG_DWORD:<0 or 1>

With some PBXs it is not possible to diversify the call forwarding behaviour (for example: call forwarding any time, call forwarding with busy line or call forwarding when the call is not answered). These allow a procedure for call forwarding. So that no malfunction occurs when a special type of call forwarding is nonetheless configured, this value can be set to 1 to enforce default forwarding. This configuration can only be selected by editing this registry key.

Default: 0

PhonNumber:REG_SZ:<Telephone Number>

Display of the local telephone number.

The following values are added for the Outlook forms in HKey_Local_Machine and HKey_Current_User under Software\Cycos AG:

- In the **ExchForms Server** directory:

InstallPath:REG_SZ:<Path specification>

Path to the installation files for the Outlook extensions.

SetupComplete:REG_DWORD:<0 or 1>

After an accomplished Setup, 1 is entered here.

In addition, the values that can be adapted by editing the ExtInst.ini are entered in the ExchForms Client directory.

- In the **ExchForms Client** directory

ChangePhoneNo:REG_SZ:<0 or 1>

If the default value 1 is set to 0, the corresponding client cannot change its telephone number in the Outlook configuration dialog.

Default: 1

Debug:REG_SZ:<0 or 1>

Switches the debug mode on (1) or off (0).

Default: 0

DebugPath:REG_SZ:<Drive letter\path\filename>

Here you can define the drive, path and filename that is to store the log file created in debug mode.

Default: c:\FormsLog.txt

NoFaxBtn:REG_SZ:<0 or 1>

Fades in/out the fax icon and the fax form in the Outlook menu.

NoFaxViewForm:REG_SZ:<0 or 1>

Fades in/out the fax view function in the Outlook preview window.

NoFODBtn:REG_SZ:*<0 or 1>*

Fades in/out the fax-on-demand (FOD) form in the Outlook menu.

NoNumberOnlyResolution:REG_SZ:*<0 or 1>*

When set to *1*, number entries in the address field are, contrary to the default behaviour, no longer automatically considered a fax G3 address.

NoSMSBtn:REG_SZ:*<0 or 1>*

Fades in/out the SMS icon and the SMS form in the Outlook menu.

NoVMBtn:REG_SZ:*<0 or 1>*

Fades in/out the “voice message” button and the forms in the Outlook menu that that serve to generate a voice annotation for messages.

NoVoiceViewForm:REG_SZ:*<0 or 1>*

Fades in/out the voice message playback function in the Outlook preview window.

Default for both: *0*

Here *1* is set in each case when during the installation (by editing the `ExtInst.ini` from the directory `...\\Client\\Exchange\\Forms\\Server-BasedFormsClientComponents` of the MRS-CD “Add-On”) the fax view form and/or the voice view form has been excluded from implementation. The fax view resp. voice playback is deactivated in the Outlook preview window then.

SMTP_Server:REG_SZ:*<Server name>*

Entry of the SMTP server name (only for Outlook connection to SMTP servers).

WatchedFolder:REG_SZ:*<Entry ID>*

Here the default mail account is entered for the operation version “Local Forms SMTP”, if the default account is not to be used on the MRS Server.

WatchIPMNote:REG_SZ:*<0 or 1>*

If you nevertheless want to directly use the number resolution for fax addressing in standard mail operation (for example: 234 -> faxg3/234), enter *1*.

Default: *0*

Here *1* is set in each case when during the installation (by editing the `ExtInst.ini` from the directory `...\\Client\\Exchange\\Forms\\Server-BasedFormsClientComponents` of the MRS-CD “Add-On”) the corresponding functionality has been selected.

In the subdirectories under `...\\ExchForms Client (\\Fax, \\FaxView, \\FOD, \\Shared, \\SMS, \\VoiceMail and \\VoiceView)` you merely find the text strings for different language versions. In the addition the following registry keys are found in the directories `\\Fax` and `\\SMS` each:

DeliveryReceipt:REG_SZ:*<0 or 1>*

If the default value *1* is set to *0*, the fax (SMS) form does not transmit a “sent notification”. This notification is considered useful for clients that rout such documents exclusively to a printer or a fax device.

Default: *1*

ReadReceipt:REG_SZ:*<0 oder 1>*

If the default value *1* is set to *0*, the fax (SMS) form does not transmit a “read notification”. This notification is considered useful for clients that rout such documents exclusively to a printer or a fax device.

Default: *1*

6.4.5 HKEY_LOCAL_MACHINE\SOFTWARE\Cycos AG Outlook Fax Extensions

For the fax extension the following additional entries are generated in the key Software\Cycos AG\OutlookExtensions:

NoClientButtons:REG_DWORD:*<0 or 1>*

Changing this value from (default) *0* to *1* hides the fax icon in the toolbar. The fax function is then not available any more.

Default: *0*

FillBodyWithName:REG_DWORD:*<0 or 1>*

With sending a fax message (via the fax extension button and subsequent address selection from the address book) the first line of the message body always contains the addressee’s name. If this behaviour is not desired, set *0* instead of the defaulted *1* to suppress it.

Default: *1*

PureNumberOnly:REG_DWORD:*<0 or 1>*

Setting this registry key to *1* enforces entering a number string for addressing a fax message. Thus addressing cannot occur via a name entry. This is considered useful when user names are used in the format: Jones3, Brown16 or Peter1234. Otherwise wrong addressing might be the result.

Default: *0*

6.4.6 HKEY_LOCAL_MACHINE\SOFTWARE\MICROSOFT\EXCHANGE\CLIENT\MRSCtiExt

This key contains the entry:

DialerAlwaysCompleteVisible:REG_DWORD:<Value: 0 or 1>

The value entered defines the representation behaviour of the dialer window. The parameter value *1* determines that this window is always visibly positioned on the “workstation”. With *0* this representation mode is not explicitly enforced.

Default: *1*

6.4.7 HKEY_LOCAL_MACHINE\SYSTEM\...

After the successful Exchange Service installation, the connector has been integrated in the list of the Windows computer services. Thus the service *key*

HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\ExchAp1

is also available. It contains the entries listed in the following. **Attention:** These registry values are Windows specific entries for the Exchange Connector service and must not be modified.

DependOnGroup:REG_MULTI_SZ:

No entry

DependOnService:REG_MULTI_SZ:

Example: msexchangesa msexchangeds msexchangeis
msexchangeta NameLoc

DisplayName:REG_SZ:<Entry>

Displayed MRS Connector name.

Example: MRS Exchange Connector for i386 (AURELIO)

ErrorControl:REG_SZ:

Setting: *1*

ImagePath:REG_EXPAND_SZ:

Example: C:\Cycos\MRS\bin\EchAp1.exe

ObjectName:REG_SZ:

Displays the account under which the Exchange Connector runs.

Example: <Domain>\<User>

Start:REG_DWORD:<Value: 2, 3, 4>

Start-up type setting. This setting can be modified under Windows 2000. Open the configuration tab for the service **MRS Exchange Connector for i386** with a double-

click (**Start → Settings → Control Panel → MRS Exchange Connector for i386**). Through activation of one of the available checkboxes the starting behaviour can be altered there. The following options are available to determine the start-up type: automatic (generates 2 as registry value), manual (generates 3 as registry value) and deactivated (generates 4 as registry value)

Default: 3

Type:REG_DWORD:

Setting: 16

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