

# Special report for Ferrari electronic

## Unified Messaging Gateway for Exchange 2007

# Gateway to the world of telephony

by Johann Deutinger

*If, in the past few years, you thought Microsoft had become rather a background player in the telecommunications and Unified Messaging sectors, its Exchange Server 2007 and Office Communication Server 2007 solutions have now brought it back to centre stage. In this article, our author describes the technologies used by Exchange and also presents a couple of alternatives..*

There is no doubt that telephony is one of the most important forms of communication. The spread of mobile radio technology throughout the world has further underpinned its leading position. For some years now, the telecommunications market has experienced significant upheavals, characterised by new functionalities such as VoIP and migration. The primary cause can be traced back to the increasing use of global and intra-company data networks to transfer real-time voice data. As the global market leader in creating IP-based networks, Cisco has for many years successfully provided pure IP telephone exchanges as competition to the more established manufacturers of circuit-switched telephone exchanges.

However, as a huge number of „traditional“ telecoms installations are still in use, we can therefore assume that these technologies will have to coexist within companies for some time to come. In this case, it is important to remember that the IP-based telephone exchanges almost exclusively use the public ISDN-telephone network for external telephone connections since until now this has been the only network that can meet the demands for high quality, efficient telephony. It is also quite possible that this public network will take longer to be replaced by the Internet than it will take to change the technology used in companies and organizations.

For some time, Microsoft has been a passive bystander to these developments. Only in the last twelve months has the world's largest software manufacturer launched a range of different products: a clear signal that it has entered a phase of sustainable involvement in telecommunications as well as information technology.

With Exchange 2007, Microsoft has integrated unified Messaging Functions into its widely-used mail platform for the first time. The end of July 2007 saw the launch of Office Communications Server 2007, a comprehensive communications solution,

which, among other things, can act both as an addition to or as a replacement for a telephone exchange. Both systems use only Microsoft-specific versions of „Voice over IP“ (VoIP) protocols to communicate with the outside world. Until now, hardly any other IP telephone exchanges have supported these features.

Signaling is performed over SIP (Session Initiation Protocol). In this instance, instead of UDP, Microsoft decided to use a variant (TCP) which had previously not been used by any other manufacturer, although it was included in the standards for this protocol. A gateway must always be used to connect new systems to circuit-switched telephone exchanges („legacy systems“) via ISDN or analogue ports. OfficeMaster Gate from Ferrari electronic not only fulfills this function – if necessary it can also be used as a controller for Unified Messaging services such as fax, SMS and voice. The technology used by Microsoft Exchange is detailed below.

### UM under Exchange 2007: The process in detail

Unified Messaging in Exchange 2007 primarily means voicemail, i.e. a telephone answering function and general remote access to centrally-stored information by telephone („OutlookVoice Access“). Here, receiving faxes is merely an additional function of the answering machine and is subject to a number of restrictions which are described below. To illustrate the exact process, we shall use a fictitious company which can be contacted under the telephone number 030-12345 plus a three-digit dial code. The sales manager, Joe Bloggs, who has the internal number 947, has set his telephone so that inbound calls are passed on to the Exchange 2007 mailbox if they are not answered within 15 seconds. The same thing happens when an inbound call is received whilst the telephone is engaged, i.e. when Mr. Bloggs is making a telephone call.

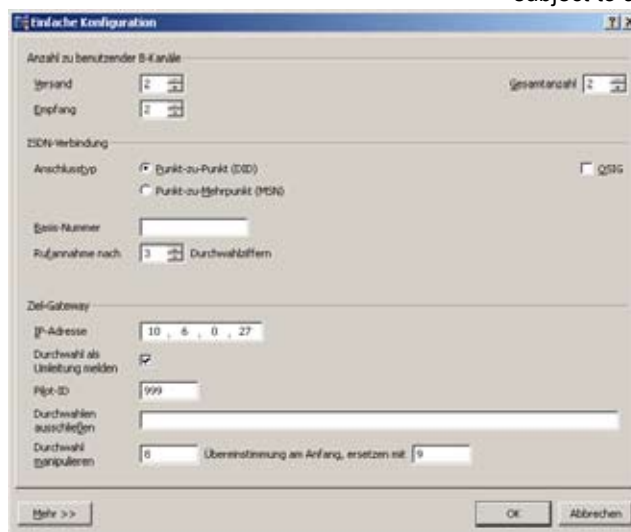


Figure 1. Few details, but all are necessary: Here the administrator sets up the gateway to support Exchange 2007 Unified Messaging (source: Ferrari).

The voicemail system in Exchange is reached by dialling a central number. This is the pilot ID that is set for all diverted calls. Our example uses the internal number 999 as the pilot ID. All calls to this number are transmitted to an ISDN port, to which the gateway is connected, to form the connection between ISDN and Exchange's SIP-based Unified Messaging Server.

A customer with the number 0172-22334455 dials 030-12345-947 to speak to Mr. Bloggs. However, at this moment, Mr. Bloggs is also making a telephone call. For this reason the telephone exchange immediately passes the call on to extension 999 and so on to the gateway. The ISDN-D channel responsible for signaling then receives this information about the call:

*Called Party Number (CPN) = 999*

*Redirecting Number (RGN) = 947*

*Calling Party Number (CGN) = 017222334455*

This information is passed in the SETUP command that triggers the ISDN to establish a connection. The call is therefore sent to the number 999. This applies to any redirected call from any subscriber. A further piece of information is required to identify a particular user's mailbox. Fortunately most telephone exchanges also supply the number of the telephone used to make the original call in the „Redirecting Number“ field.

The gateway can now establish the connection to Exchange. In SIP this is performed by the INVITE request. In our example, it would look like this (section-by-section):

*INVITE sip:999@10.6.0.27:5060 SIP/2.0*

*Content-Type: application/sdp*

*To: „999“ <sip:999@10.6.0.27>*

*Diversion: <sip:947@10.6.0.27>;reason=user-busy;privacy=off;screen=yes*

*Contact: <sip:017222334455@10.0.1.41;transport=tcp>*

*User-Agent: Ferrari electronic SIP agent*

*Allow: INVITE, BYE, ACK, INFO, CANCEL, OPTIONS, NOTIFY*

*From: „017222334455“ <sip:017222334455@10.0.1.41>;tag=16-119 2192600*

From the number 999, Exchange can identify that the pilot ID is being addressed and can take the number of the extension that was originally called from the diversion header. The gateway had transferred the information from the ISDN Redirecting Number to the SIP Diversion Header. However, many of the gateways available today do not support this optional function.

The server uses this number to find the server and then the subscriber in ActiveDirectory and runs the appropriate recorded message. The caller can then leave a message which appears in the recipient's mailbox as a voice file.

Before the voicemail function described here can be used, the following prerequisites must be met for Exchange 2007:

- the Unified Messaging role must be installed on the Exchange server
- a dial plan must be set up for three-digit numbers
- in turn, a mailbox policy must be configured for this Dial plan,
- a UM IP gateway must be established and linked with the dial plan, the IP address of the installed gateway must be specified and
- the voicemail users must be activated for Unified Messaging.

To do this, the dial code (e.g. 947) must be specified as the EUM (Exchange Unified Messaging) address and connected to the appropriate dial plan.



*Figure 2. Small in size, but equipped with a multitude of functions. This gateway provides support for the Exchange Server, which has many UM features (source: Ferrari).*

In addition, an internal ISDN connection must be present in the telephone exchange, to which all calls to extension 999 will be routed. For this purpose, the exchange must transfer the „Redirecting Number“ information element for redirected calls. Finally, the gateway must support SIP signaling over TCP and the function for transferring the diversion header must be implemented.

Microsoft's developers have devised the following method for receiving faxes: The fax sender dials the recipient's normal number. If the recipient does not accept the call, it is diverted to the mailbox and the recorded message is played. At the same time, the calling fax machine usually sends the Calling Tone (CNG, 1100 Hertz which lasts for half a second followed by three seconds of silence and so on). The gateway must now recognise this signal and divert it to be handled as an inbound fax. To do this, it resends INVITE (=reINVITE) to Exchange but this time with

the additional information that the call should be switched from voice to fax via the T.38 protocol.

Exchange confirms this and switches to fax receipt. In the T.38 protocol, the elements of the T.30 fax protocol are demodulated in the gateway and transmitted across the network as UDP packets. Alternatively, they are received via UDP, modulated with the appropriate modem process and forwarded to the fax destination. The gateway must therefore have both the appropriate modem functions and the T.38 protocol.

The following conditions must be met to ensure continuous availability by fax:

- an additional fax dial code for every telephone exchange user as a virtual extension (e.g. 8XX instead of 9XX)
- every one of these numbers must be permanently diverted to Exchange's pilot ID and
- in Exchange a secondary EUM address must be created for every user.

However this is set up by entering the appropriate command lines in the Powershell and not via the graphical administration interface. In this situation it is often a good idea to implement an additional gateway solution to help meet these requirements in a more elegant way. This procedure is described in greater detail in the OfficeMaster Gate solution: here the telephone exchange is configured to forward all fax dial codes (in our example the numbers 8XX) to the gateway. This specifies that this number range always addresses the pilot ID (999) and transfers the original dial code in the diversion header.

Another simple setting can be made to replace the number 8 with the number 9, in the first position. This now gives every user a separate fax number (e.g. 847) that they can use to communicate with the outside world and be constantly available by fax.

For Exchange the gateway simulates a diverted call to the recipient's extension (for example, 947), so there is no need to also maintain a second EUM address. This type of arrangement can be set up in the OfficeMaster Gate configuration program. In addition to being used together with Exchange 2007, the gateway also supports Office Communications Server 2007 telephony functions along with all the Unified Messaging Applications that are provided by other software that can be installed in the network, which can offer other supporting functionality. (fms)