Voice mail, VM

INTERWORKING DESCRIPTION

Mitel®

NOTICE

The information contained in this document is believed to be accurate in all respects but is not warranted by Mitel Networks™ Corporation (MITEL®). Mitel makes no warranty of any kind with regards to this material, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose. The information is subject to change without notice and should not be construed in any way as a commitment by Mitel or any of its affiliates or subsidiaries. Mitel and its affiliates and subsidiaries assume no responsibility for any errors or omissions in this document. Revisions of this document or new editions of it may be issued to incorporate such changes.

TRADEMARKS

1 GENERAL

A Voice mail system (Voice Store and Forward system) is used to store and transmit spoken messages to and from users mailboxes.

The voice mail system consists of a peripheral unit that is connected to the MX-ONE Service Node through an Ethernet interface, or through analog extension lines.

Call connection to the voice mail system takes place on the extension lines and information is transmitted through the signal interface stating which users have messages to listen to and also information about ongoing calls.

Examples of application fields are:

- Information systems, that is, transmission and reception of messages without demanding simultaneous presence in the system of the parties involved, more or less the same function as a text message system.
- Sophisticated telephone answering unit that ascertains, from the MX-ONE Service Node (called MX-ONE Service Node in the figures below), which extension is sought and can thereby automatically store messages to this extension.

The signal interface is used for sending information about calls in progress, as well as information indicating what users have messages waiting for them. In traditional voice mail systems, the signal interface is set up over a separate channel (using V.24 or Ethernet connection) whereas in an IP-based system the information is embedded in the call signaling protocols.

Possible voice mail system configurations are seen in the following pictures.

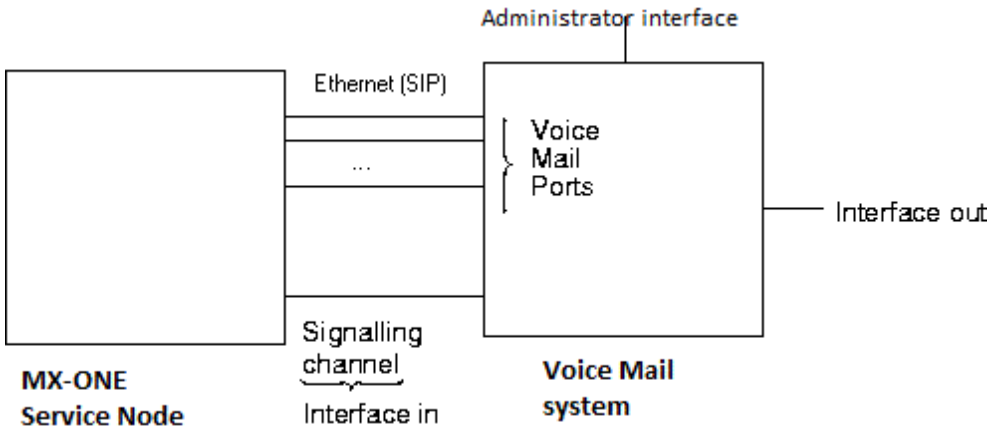


Figure 1: Voice Mail system connected with IP (SIP) media

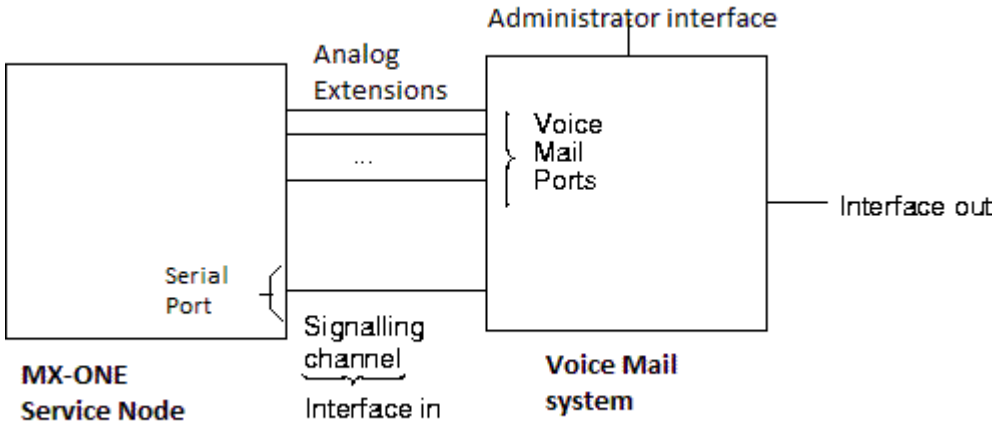


Figure 2: Voice Mail system connected with analog extension lines

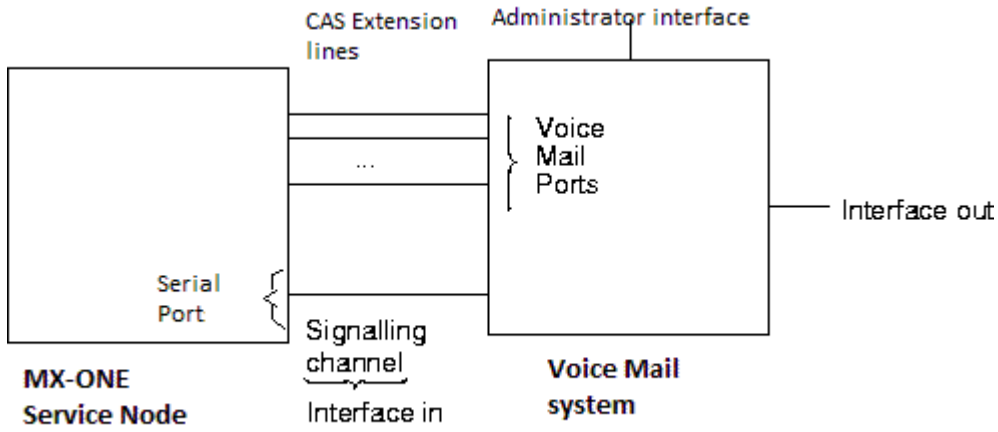


Figure 3: Voice Mail system connected with CAS extension lines

2 INTERFACES IN

2.1 CONNECTION TO SIGNALING CHANNEL

2.1.1 GENERAL

A voice mail system is connected to an individual on either the TCP/IP interface or the V.24 interface.

Up to 16 voice mail systems can be connected to the MX-ONE Service Node.

2.1.2 PROTOCOL

The signals exchanged between the voice mail system and the MX-ONE Service Node consist of the following parts:

- STX

  Start of text character.

- V

  A 2 to 5-digit voice mail port number (voice channel) which defines a voice channel input in a voice mail system.

- T or D

  A 2 to 10-digit directory number in the system.

- SS

  A 2-digit information system number that defines in which information system there is a message waiting for the extension. (00 is reserved for the interception computer system).

- CR

  Carriage Return character.

- LF

  Line Feed character.

- PUB

  A-party number received from the public network (20 digits).

Using a command it is possible to select to use/not to use data flow checks (XON/XOFF-protocol).

Using a command it is possible to select to have different levels of voice mail functionality.

Using a command, it is possible to select signaling sequences for sending call information from the MX-ONE Service Node to the voice mail system.

Using a certain function, specific signals are used from the MX-ONE Service Node to the voice mail system. The voice mail system shall be capable of accepting the following signal:

- **STX 54 CR LF**

  The MX-ONE Service Node requests updating from the voice mail system, that is, indicate message waiting, for relevant extensions.

2.1.2.1 *Signal format over Ethernet*

All signals between MX-ONE Service Node and the information system in the following sections are preceded by character SOH and signal tag K when sent over the Ethernet.

Every signal sent will be responded by the receiving side with an acknowledgment signal. All signals are tagged with a tag number K. The same tag number is returned in the acknowledgment signal.

Example:

Signal	**Non Ethernet format**	**Ethernet format**
Initial update	STX 54 CR LF	SOH K STX 54 CR LF
and the acknowledgment signal from the receiving side is:		
		SOH K STX 93 CR LF

where K = tag number (000 - 255) and 93 is the acknowledgment code.

The signal sending side time-supervises the handshake procedure. If the expected acknowledgment signal is not received within 10 seconds, the signal sent is considered lost and is sent again with the same tag number. At the receiving side, if the new signal that it receives carries the same tag number as the last received signal, it assumes the last acknowledgment signal has been lost. It will acknowledge the current signal, but will not repeat any action taken for the previous signal.

The tag number K is reset to 000 whenever there is a restart condition at the signal sending side. Tag number 000 is reserved for restart condition so that the receiving side will accept the signal with tag number 000 as a new signal.

2.1.2.2 *Signal Format over V.24 Interface*

The GICI protocol message signal format used for the V.24 Interface, differs from the signal format sent over the Ethernet between the MiVoice MX-ONE system and the voice mail system. The messages sent over the V.24 interface will not have SOH and message tag number.

2.1.2.3 *Signals Using Standard Function*

The following signals are sent from the MX-ONE Service Node if the standard function is used:

- **STX 80 T V CR LF**

  Diverted call

  Voice channel V has been seized for an incoming diverted call to an extension with directory number T. ’Diverted call’ includes all the services Diversion, Rerouting, Deflect and Personal Number in this context.

- **STX 81 D V CR LF**

  Direct internal call

  Voice channel V has been seized for an incoming, direct, internal call from an extension or PBX operator with directory number D. In the standard function the voice mail system detects the call origin (internal or external) by the type of ring cadence.

- **STX 98 CR LF**

  Heartbeat check

The heartbeat check is sent periodically to the IP-based voice mail system.

Note: This messages is only sent to IP based VM systems. I.e.voice mail systems connected via V.24 will not get the heartbeat check.

- **STX 99 CR L** F

  Heartbeat response

  The heartbeat response is sent in response to heartbeat check signal from the voice mail system.

Note: This messages is only expected from IP based VM systems. If no response is received, an alarm will be raised.

2.1.2.4 Signals Using Extended or Extended Level 2 Function

The following signals are sent if the extended or extended level 2 function is used:

- **STX 82 D V CR LF**

  Direct internal call from extension or PBX operator

  Voice channel V has been seized for: an incoming direct internal call from an extension possessing directory number D, a direct call from PBX operator with directory number D and no connected party, or a direct call from PBX operator with directory number D and a connected party that was not diverted or rerouted to the PBX operator.

- **STX 83 D T V CR LF**

  Diverted internal call

  Voice channel V has been seized for an incoming diverted internal call to an extension with directory number T from an extension or PBX operator with directory number D.

- **STX 84 V CR LF**

  Direct external call

  Voice channel V has been seized for an incoming direct external call.

- **STX 85 T V CR LF**

  Diverted external call

  Voice channel V has been seized for an incoming diverted external call to an extension with directory number T.

- **STX 86 T V CR LF**

  Direct call from PBX operator with connected party.

  Voice channel V has been seized for an incoming direct call from a PBX operator with connected party. The party connected to the PBX operator has been diverted or rerouted to the PBX operator in conjunction with a call to an extension with directory number T.

- **STX 89 V CR LF**

  Order to clear down the voice channel.

  The party who has had speech connection with the voice mail system on voice channel V has cleared down.

- **STX 98 CR LF**

Heartbeat check

The heartbeat check is sent periodically to the IP-based voice mail system, and expected to be received periodically from the IP-based voice mail system.

Note: This messages is only sent to IP-based VM systems.

- **STX 99 CR L** F

  Heartbeat response

  The heartbeat response is sent in response to heartbeat check signal from the voice mail system.

Note: This messages is only expected from IP-based VM systems. If no response is received, an alarm will be raised.

2.1.2.5 Additional Signals for Extended Level 2 Function

If the extended level 2 function is used, the following signals are sent in addition to the signals sent for the extended function:

- **STX 91 D T V CR LF**

  Diverted internal call no answer

  Voice channel V has been seized for an incoming diverted internal call to an extension with directory number T from an extension or PBX operator with directory number D. The called extension is diverted at no answer.

- **STX 92 D T V CR LF**

  Diverted internal call busy

  Voice channel V has been seized for an incoming diverted internal call to an extension with directory number T from an extension or PBX operator with directory number D. The called extension is diverted at busy.

- **STX 93 CR LF**

  Acknowledgment message (for all types of voice mail systems with Ethernet connection)

  The MX-ONE Service Node informs the voice mail system that it has received the current message and it is ready to receive the next message.

- **STX 94 T V CR LF**

  Diverted external call no answer

  Voice channel V has been seized for an incoming diverted external call to an extension with directory number T. The called extension is diverted at no answer.

- **STX 95 T V CR LF**

  Diverted external call busy

  Voice channel V has been seized for an incoming diverted external call to an extension with directory number T. The called extension is diverted at busy.

- **STX 96 CR LF**

  Disconnection (for all types of voice mail systems with Ethernet connection)

  The MX-ONE Service Node informs the voice mail system that it is terminating the connection.

2.1.2.6 *Additional Signals for Extended Level 3 Function*

If the extended level 3 function is used, the following signals are sent in addition to the signals sent for the extended level 2 function:

- **STX 87 PUB V CR LF**

  Direct external call with calling number:

  Voice channel V has been seized for an incoming direct external call from a user with number PUB.

- **STX 88 PUB T V CR LF**

  Diverted external call with calling number:

  Voice channel V has been seized for an incoming diverted external call to an extension with directory number T, from a user with number PUB.

- **STX 90 PUB T V CR LF**

  Diverted on no answer external call with calling number:

  Voice channel V has been seized for an incoming diverted external call to an extension with directory number T from a user with number PUB. The called extension is diverted on no answer.

- **STX 97 PUB T V CR LF**

  Diverted on busy external call with calling number:

  Voice channel V has been seized for an incoming diverted external call to an extension with directory number T, from a user with number PUB. The called extension is diverted on busy.

2.1.2.7 *Signals for the MX-ONE Service Node*

The MX-ONE Service Node can **receive** the following signals from the voice mail system when standard, extended, extended level 2, or extended level 3 function is used:

- **STX 02 CR LF**

  This is an acknowledgment message - sent in reply to STX 54 CR LF - which means that the voice mail system is ready to update the message waiting information of the MX-ONE Service Node by sending a number of STX 06 for the extensions concerned. STX 02 can also be received spontaneously if the voice mail system requests updating.

- **STX 03 CR LF**

  Updating completed (see STX 02).

- **STX 06 T SS CR LF**

  Indicate that extension T has a message waiting for him/her in message system SS.

- **STX 07 T SS CR LF**

  Erase the message waiting indication for extension T and message system SS.

- **STX 93 CR LF**

  Acknowledgment message (for Ethernet connection only)

The voice mail system informs the MX-ONE Service Node that it has received the current message and it is ready to receive the next message.

The MX-ONE Service Node can receive the following signals from the voice mail system, (and send to the voice mail system) when standard, extended, extended level 2 or 3 function is used:

- **STX 98 CR LF**

  Heartbeat check

  The heartbeat check is sent periodically from the voice mail system.

Note: This message is only expected from IP-based VM systems.

- **STX 99 CR LF**

  Heartbeat response

  The heartbeat response is sent from the MX-ONE Service Node in response to heartbeat check signal.

Note: The Service Node will for IP based voice mail systems periodically **send** the STX 98 and respond with the STX 99 signal when standard, extended, extended level 2, or extended level 3 function is used.

2.2 CONNECTION TO THE VOICE MAIL SYSTEM

2.2.1 GENERAL

The voice mail systems can be connected to analog extension individuals, but this is not recommended, and not described here. The media is transported via SIP.

2.2.2 LOGICAL INTERFACE

See the application system documentation for the MX-ONE Service Node.

2.2.3 ELECTRICAL INTERFACE

See the application system documentation for the MX-ONE Service Node.

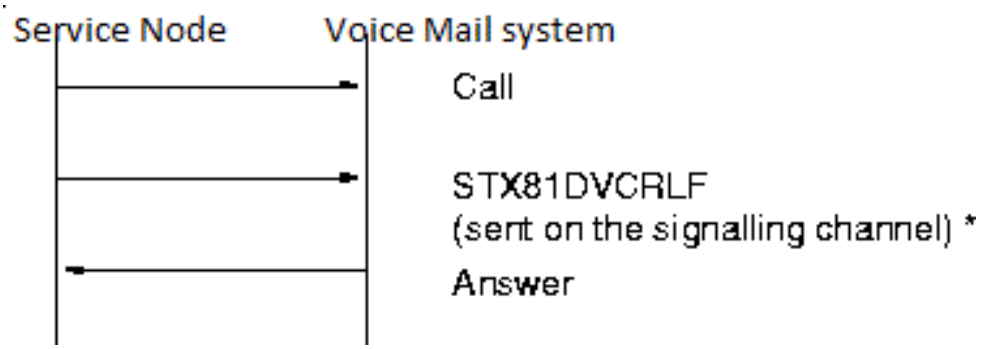
2.2.4 MECHANICAL INTERFACE

See the application system documentation for the MX-ONE Service Node.

2.2.5 PROTOCOL

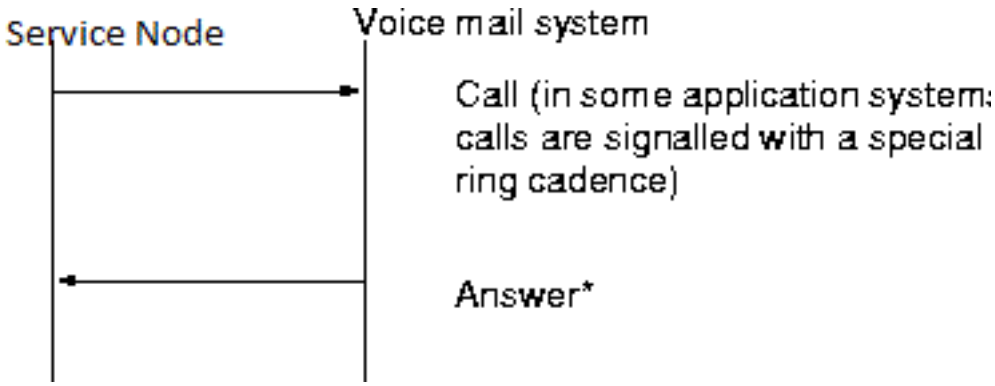
The complete protocol for signaling to/from the voice mail system is not described here. Only a few examples are given.

Example 1 (internal direct call to voice mail port)



* Sent after answer from voice mail system if specified via an application system parameter (PARNUM=145).

Example 2 (external direct call to voice mail port)



* No STX signal is sent.

Example 3 (external diverted/rerouted call to voice mail port)

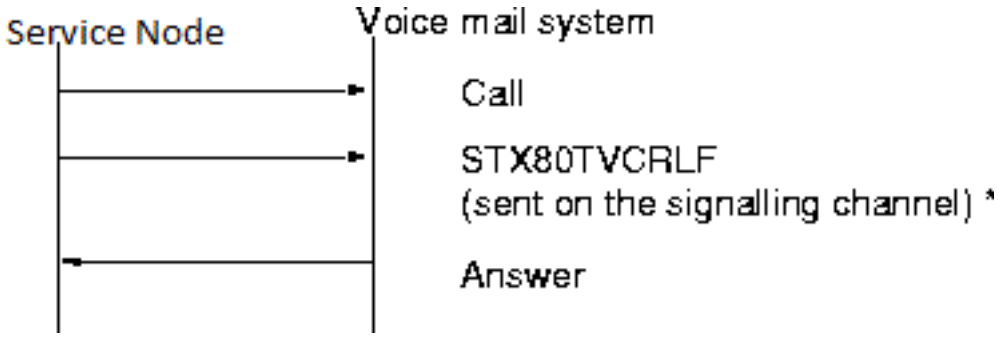


Figure 4:

* Sent after answer from voice mail system if specified via an application system parameter (PARNUM=145).

Consequently, the voice mail system can monitor the ring cadences to decide whether a call is internal or external.

2.2.6 INTERFACE MONITORING

See application system documentation for the MX-ONE Service Node.

3 INTERFACE OUT

The exit (out) interface from the voice mail system is not described in this document because the design of the interface between the voice mail system and any terminals or peripheral units will depend on the type/make of voice mail system chosen.

4 OPERATOR INTERFACE

For the reasons stated in section Interface out, the operator interface is not dealt with in this document.