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Voice Profile for Internet Mail

Status of this Memo

This memo defines an Experimental Protocol for the Internet community. This memo does not specify an Internet standard of any kind. Discussion and suggestions for improvement are requested. Distribution of this memo is unlimited.

1. Abstract

A class of special-purpose computers has evolved to provide voice messaging services. These machines generally interface to a telephone switch and provide call answering and voice messaging services. Traditionally, messages sent to a non-local machine are transported using analog networking protocols based on DTMF signaling and analog voice playback. As the demand for networking increases, there is a need for a standard high-quality digital protocol to connect these machines. The following document is a profile of the Internet standard MIME and ESMTP protocols for use as a digital voice networking protocol.

This profile is based on an earlier effort in the Audio Message Interchange Specification (AMIS) group to define a voice messaging protocol based on X.400 technology. This protocol is intended to satisfy the user requirements statement from that earlier work with the industry standard ESMTP/MIME mail protocol infrastructures already used within corporate internets. This profile will be called the voice profile in this document.

2. Scope and Design Goals

MIME is the Internet multipurpose, multimedia messaging standard. This document explicitly recognizes its capabilities and provides a mechanism for the exchange of various messaging technologies including voice and facsimile.

This document specifies a profile of the TCP/IP multimedia messaging protocols for use by special-purpose voice processing platforms. These platforms have historically been special-purpose computers and often do not have facilities normally associated with a traditional Internet Email-capable computer. This profile is intended to specify the minimum common set of features and functionally for conformant

systems.

The voice profile does not place limits on the use of additional media types or protocol options. However, systems which are conformant to this profile should not send messages with features beyond this profile unless explicit per-destination configuration of these enhanced features is provided. Such configuration information could be stored in a directory, though the implementation of this is a local matter.

The following are typical limitations of voice messaging platform which were considered in creating this baseline profile.

1) Text messages are not normally received and often cannot be displayed or viewed. They can often be processed only via advanced text-to-speech or text-to-fax features not currently present in these machines.

2) Voice mail machines usually act as an integrated Message Transfer Agent and a User Agent. The voice mail machine is responsible for final delivery, and there is no relaying of messages. RFC 822 header fields may have limited use in the context of the simple messaging features currently deployed.

3) VM message stores are generally not capable of preserving the full semantics of an Internet message. As such, use of a voice mail machine for general message forwarding and gatewaying is not supported. Storage of "Received" lines and "Message-ID" may be limited.

4) Nothing in this document precludes use of a general purpose email gateway from providing these services. However, significant performance degradation may result if the email gateway does not support the ESMTP options recommended by this document.

5) Internet-style mailing lists are not generally supported. Distribution lists are implemented as local alias lists.

6) There is generally no human operator. Error reports must be machine-parsable so that helpful responses can be given to users whose only access mechanism is a telephone.

7) The system user names are often limited to 16 or fewer numeric characters. Alpha characters are not generally used for mailbox identification as they cannot be easily entered from a telephone terminal.

It is a goal of this effort to make as few restrictions and additions to the existing Internet mail protocols as possible while satisfying the user requirements for interoperability with current voice messaging systems. This goal is motivated by the desire to increase the accessibility to digital messaging by enabling the use of proven existing networking software for rapid development.

This specification is intended for use on a TCP/IP network, however, it is possible to use the SMTP protocol suite over other transport protocols. The necessary protocol parameters for such use is outside the scope of this document.

This profile is intended to be robust enough to be used in an environment such as the global Internet with installed base gateways which do not understand MIME. It is expected that a messaging system will be managed by a system administrator who can perform TCP/IP network configuration. When using facsimile or multiple voice encodings, it is expected that the system administrator will maintain a list of the capabilities of the networked mail machines to reduce the sending of undeliverable messages due to lack of feature support. Configuration, implementation and management of this directory listing capabilities is a local matter.

This specification is a profile of the relevant TCP/IP Internet protocols. These technologies, as well as the specifications for the Internet mail protocols, are defined in the Request for Comment (RFC) document series. That series documents the standards as well as the lore of the TCP/IP protocol suite. This document should be read with the following RFC documents: RFC 821, Simple Mail Transfer Protocol; RFC 822, Standard for the format of ARPA Internet Messages; RFC 1521 and RFC 1522, Multipurpose Internet Mail Extensions; RFC 1651, RFC 1652, and RFC 1653, SMTP Service Extensions (ESMTP); and RFC 1034 and RFC 1035, Domain Name System. Where additional functionality is needed, it will be defined in this document or in an appendix.

3. Protocol Restrictions

This protocol does not limit the number of recipients per message. Where possible, implementations should not restrict the number of recipients in a single message. It is recognized that no implementation supports unlimited recipients, and that the number of supported recipients may be quite low. However, ESMTP currently does not provide a mechanism for indicating the number of supported recipients.

This protocol does not limit the maximum message length. Implementors should understand that some machines will be unable to accept excessively long messages. A mechanism is defined in the RFC 1425 ESMTP extensions to declare the maximum message size supported.

The message size indicated in the ESMTP SIZE command is in bytes, not minutes. The number of bytes varies by voice encoding format and must include the MIME wrapper overhead. If the length must be known before sending, an approximate translation into minutes can be performed if the voice encoding is known.

4. Voice Message Interexchange Format

The voice message interchange format is a profile of the Internet Email Protocol Suite. It requires components from the message format standard for Internet messages [RFC822], the Multipurpose Internet Message Extensions [MIME], the X.400 gateway specification [X.400], and the delivery report specifications [DRPT][STATUS].

4.1 Message Addressing Formats

The RFC 822 uses the domain name system. This naming system has two components: the local part, used for username or mailbox identification; and the host part, used for global machine identification.

The local part of the address shall be an ASCII string uniquely identifying a mailbox on a destination system. For voice messaging, the local part is a printable string containing the mailbox ID of the originator or recipient. Administration of this space is expected to conform to national or corporate private telephone numbering plans. While alpha characters and long mailbox identifiers are permitted, most voice mail networks rely on numeric mailbox identifiers to retain compatibility with the limited 10 digit telephone keypad.

For example, a compliant message may contain the address 2145551212@mycompany.com. It should be noted that while the example mailbox address is based on the North American Numbering Plan, any other corporate numbering plan can be used. The use of the domain naming system should be transparent to the user. It is the responsibility of the voice mail machine to lookup the fully-qualified domain name (FQDN) based on the address entered by the user. The mapping of dialed address to final destination system is generally accomplished through implementation-specific means.

Special addresses are provided for compatibility with the conventions of the Internet mail system and to facilitate testing. These addresses do not use numeric local addresses, both to conform to

current Internet practice and to avoid conflict with existing numeric addressing plans. Some special addresses are as follows:

Postmaster@domain

By convention, a special mailbox named "postmaster" MUST exist on all systems. This address is used for diagnostics and should be checked regularly by the system manager. This mailbox is particularly likely to receive text messages, which is not normal on a voice processing platform; the specific handling of these messages is a individual implementation choice.

Loopback@domain

A special mailbox name named "loopback" SHOULD be designated for loopback testing. If supported, all messages sent to this mailbox MUST be returned back to the address listed in the From: address as a new message. The originating address of the returned address MUST be "postmaster" to prevent mail loops.

These two addresses are RESERVED so they do not conflict with any internal addressing plan.

4.2 Message Header Fields

Internet messages contain a header information block. This header block contains information required to identify the sender, the list of recipients, the message send time, and other information intended for user presentation. Except for specialized gateway and mailing list cases, headers do not indicate delivery options for the transport of messages.

The following header lines are permitted for use with voice messages.

From

The originator’s fully-qualified domain address (a mailbox address followed by the fully-qualified domain name). The user listed in this field should be presented in the voice message envelope as the originator of the message.

Systems conformant to this profile SHOULD provide the text personal name of the sender in a quoted phrase if available. To facilitate storage of the text name in a local dial-by-name cache directory, the first and last name MUST be separable. Text names in voice messages MUST be represented in the form "last, first, mi." [822].

Example:

From: "User, Joe S." <2145551212@mycompany.com>

To

The TO header contains the recipient's fully-qualified domain address. There may be one or more To: fields in any message.

Systems conformant to this profile SHOULD provide the text personal name of the recipient, if known, in a quoted phrase. The name MUST be in the form "last, first, mi." [822].

Example:

To: "User, Sam S." <2145551213@mycompany.com>

Cc

The CC header contains additional recipients' fully-qualified domain addresses. Many voice mail systems are not capable of storing or reporting the full list of recipients to the receiver.

Systems conformant to this profile SHOULD provide the text personal name of the recipient, if known, in a quoted phrase. The name MUST be in the form "last, first, mi." [822].

Example:

To: "User, Sam S." <2145551213@mycompany.com>

Systems conformant to this profile may discard the CC list of incoming messages as necessary. Systems conformant to this profile should provide a complete list of recipients when possible.

Date

The Date header contains the date, time, and time zone in which the message was sent by the originator. Conforming implementations SHOULD be able to convert RFC 822 date and time stamps into local time.

Example:

Date: Wed, 28 Jul 93 10:08:49 PST

The sending system MUST report the time the message was sent [822].

Sender

The Sender header contains the actual address of the originator if the message is sent by an agent on behalf of the author indicated in the From: field. Support for this field cannot be assumed when talking to a voice system and SHOULD NOT be generated by a conforming implementation.

While it may not be possible to save this information in some voice mail machines, discarding this information or the ESMTP MAIL FROM address will make it difficult to send an error message to the proper destination [822].

Message-id

The Message-id header contains a unique per-message identifier. A unique message-id MUST be generated for each message sent from a conforming implementation.

The message-id is not required to be stored on the receiving system. This identifier MAY be used for tracking, auditing, and returning read-receipt reports [822].

Example:

Message-id: <12345678@mycompany.com>

Received

The Received header contains trace information added to the beginning of a RFC 822 message by message transport agents (MTA). This is the only header permitted to be added by an MTA. Information in this header is useful for debugging when using an ASCII message reader or a header parsing tool.

A conforming system MUST add Received headers when acting as a gateway and must not remove them. These headers MAY be ignored or deleted when the message is received at the final destination [822].

MIME Version

The MIME-Version header indicates that the message is conformant to the MIME message format specification. Systems conformant to the voice messaging profile MUST include a comment with the words "(Voice 1.0)" [MIME].

Example:

MIME-Version: 1.0 (Voice 1.0)

Content-Type

The content-type header declares the type of content enclosed in the message. One of the allowable contents is multipart, a mechanism for bundling several message components into a single message. The allowable contents are specified in the next section of this document [MIME].

Content-Transfer-Encoding

Because Internet mail was initially specified to carry only 7-bit US-ASCII text, it may be necessary to encode voice and fax data into a representation suitable for that environment. The content-transfer-encoding header describes this transformation if it is needed. Conformant implementations MUST recognize and decode the standard encodings, "Binary", "7bit, "8bit", "Base-64" and "Quoted-Printable". The allowable content-transfer-encodings are specified in the next section of this document [MIME].

Sensitivity

The sensitivity header, if present, indicates the requested privacy level. The case-insensitive values "Personal" and "Private" are specified. If no privacy is requested, this field is omitted.

If a sensitivity header is present in the message, a conformant system MUST prohibit the recipient from forwarding this message to any other user. If the receiving system does not support privacy and the sensitivity is one of "Personal" or "Private", the message MUST be returned to the sender with an appropriate error code indicating that privacy could not be assured and that the message was not delivered [X400].

Importance

Indicates the requested priority to be given by the receiving system. The case-insensitive values "low", "normal" and "high" are specified. If no special importance is requested, this header may be omitted and the value assumed to be "normal".

Conformant implementations MAY use this header to indicate the importance of a message and may order messages in a recipient’s mailbox [X400].

Subject

The subject field is often provided by email systems but is not widely supported on Voice Mail platforms. This field MAY be generated by a conforming implementation and may be discarded if present by a receiving system [822].

4.3 Message Content Types

MIME is a general-purpose message body format that is extensible to carry a wide range of body parts. The basic protocol is described in [MIME]. MIME also provides for encoding binary data so that it can be transported over the 7-bit text-oriented SMTP protocol. This transport encoding is independent of the audio encoding designed to generate a binary object.

MIME defines two transport encoding mechanisms to transform binary data into a 7 bit representation, one designed for text-like data ("Quoted-Printable"), and one for arbitrary binary data ("Base-64"). While Base-64 is dramatically more efficient for audio data, both will work. Where binary transport is available, no transport encoding is needed, and the data can be labeled as "Binary".

An implementation in conformance with this profile SHOULD send audio data in binary form when binary message transport is available. When binary transport is not available, implementations MUST encode the message as Base-64. The detection and decoding of "Quoted-Printable", "7bit", and "8bit" MUST be supported in order to meet MIME requirements and to preserve interoperability with the fullest range of possible devices.

The following content types are identified for use with this profile. Note that each of these contents can be sent individually in a message or wrapped in a multipart message to send multi-segment messages.

Message/RFC822

MIME requires support of the Message/RFC822 message encapsulation body part. This body part is used in the Internet to forward complete messages within a multipart/mixed message. Processing of this body part entails trivial processing to decapsulate/encapsulate the message. Systems conformant to this profile SHOULD NOT send this body part but MUST accept if in conformance with basic MIME. Specific handling depends on the platform, and interpretation of this content-type is left as an implementation decision [MIME].

Text/Plain

MIME requires support of the basic Text/Plain content type. This content type has no applicability within the voice messaging environment. Conformant implementations MUST NOT send the Text/Plain content-type. Conformant implementations MUST accept Text/Plain messages, however, specific handling is left as an implementation decision. One option is to return the message to the sender with a media-unsupported error code [MIME].

Multipart/Mixed

MIME provides the facilities for enclosing several body parts in a single message. Multipart/Mixed MAY be used for sending multi-segment voice messages, that is, to preserve across the network the distinction between an annotation and a forwarded message. Conformant systems MUST accept multipart/mixed body parts. Systems MAY to collapse such a multi-segment message into a single segment if multi-segment messages are not supported on the receiving machine [MIME].

Message/Notification

This MIME body part is used for sending machine-parsable delivery status notifications. Conformant implementations must use the Message/Notification construct when returning messages or sending warnings. Conformant implementations must recognize and decode the Message/Notification content type and present the reason for failure to the user [NOTIFY].

Multipart/Report

The Multipart/Report is used for enclosing a Message/Notification body part and any returned message content. This body type is a companion to Message/Notification. Conformant implementations must use the Multipart/Report construct when returning messages or sending warnings. Conformant implementations must recognize and decode the Multipart/Report content type [REPORT].

Audio/32KADPCM

CCITT Recommendation G.721 [G721] describes the algorithm recommended for conversion of a 64 KB/s A-law or u-law PCM channel to and from a 32 KB/s channel. The conversion is applied to the PCM stream using an Adaptive Differential Pulse Code Modulation (ADPCM) transcoding technique. This algorithm will be registered with the IANA for MIME use under the name Audio/32KADPCM.

An implementation conformant to this profile MUST use Audio/32KADPCM by default.

Proprietary Voice Formats

Proprietary voice encoding formats or other standard formats may be supported under this profile provided a unique identifier is registered with the IANA prior to use. These encodings should be registered as sub-types of Audio.

Use of any other encoding except Audio/32KADPCM reduces interoperability in the absence of explicit manual system configuration. A conformant implementation MAY use any other encoding with explicit per-destination configuration.

Multipart/Voice-Message

This new MIME multipart structure provides a mechanism for packaging the senders spoken name, a spoken subject and, the message. The multipart provides for the packaging of three segments, the first is the spoken name, the second is a spoken subject, and the third is the message itself. Forwarded messages can be created by simply nesting multipart content-types (this is also possible with Multipart/Mixed if spoken name or spoken subject is not present). This type is defined in an appendix to this document.

Conforming implementations MUST send the Multipart/Voice-Message if a spoken name or spoken subject is available. Conforming implementations SHOULD recognize the Multipart/Voice-Message and separate the spoken name or spoken subject.

5. Message Transport Protocol

Messages are transported between voice mail machines using the Internet Extended Simple Mail Transfer Protocol (ESMTP). All information required for proper delivery of the message is included in the ESMTP dialog. This information, including the sender and recipient addresses, is commonly referred to as the message "envelope". This information is equivalent to the message control block in many analog voice networking protocols.

ESMTP is a general-purpose messaging protocol, designed both to send mail and to allow terminal console messaging. Simple Mail Transport Protocol (SMTP) was originally created for the exchange of US-ASCII 7-bit text messages. Binary and 8-bit text messages have traditionally been transported by encoding the messages into a 7-bit text-like form. [ESMTP] was recently published and formalized an extension mechanism for SMTP, and subsequent RFCs have defined 8-bit

text networking, binary networking, and extensions to permit the declaration of message size for the efficient transmission of large messages such as multi-minute voice mail.

A command streaming extension for high performance message transmission has been defined [PIPE]. This extension reduces the number of round-trip packet exchanges and makes it possible to validate all recipient addresses in one operation. This extension is optional but recommended.

The following sections list ESMTP commands, keywords, and parameters that are required and those that are optional.

5.1 ESMTP Commands

HELO

Base SMTP greeting and identification of sender. This command is not to be sent by conforming systems unless the more-capable EHLO command is not accepted. It is included for compatibility with general SMTP implementations. Conforming implementations MUST implement the HELO command for backward compatibility but SHOULD NOT send it unless EHLO is not supported [SMTP].

MAIL FROM (REQUIRED)

Originating mailbox. This address contains the mailbox to which errors should be sent. This address may not be the same as the message sender listed in the message header fields if the message was received from a gateway or sent to an Internet-style mailing list. Conforming implementations MUST implement the extended MAIL FROM command [SMTP, ESMTP].

RCPT TO

Recipient’s mailbox. This field contains only the addresses to which the message should be delivered for this transaction. In the event that multiple transport connections to multiple destination machines are required for the same message, this list may not match the list of recipients in the message header. Conforming implementations MUST implement the extended RCPT TO command [SMTP, ESMTP].

DATA

Initiates the transfer of message data. Support for this command is required in the event the binary mode command BDAT is not supported by the remote system. Conforming implementations MUST implement the SMTP DATA command for backwards compatibility [SMTP].

TURN

Requests a change-of-roles, that is, the client that opened the connection offers to assume the role of server for any mail the remote machine may wish to send. Because SMTP is not an authenticated protocol, the TURN command presents an opportunity to improperly fetch mail queued for another destination. Conforming implementations SHOULD NOT implement the TURN command [SMTP].

QUIT

Requests that the connection be closed. If accepted, the remote machine will reset and close the connection. Conforming implementations MUST implement the QUIT command [SMTP].

RSET

Resets the connection to its initial state. Conforming implementations MUST implement the RSET command [SMTP].

VRFY

Requests verification that this node can reach the listed recipient. While this functionality is also included in the RCPT TO command, VRFY allows the query without beginning a mail transfer transaction. This command is useful for debugging and tracing problems. Conforming implementations MAY implement the VRFY command [SMTP].

(Note that the implementation of VRFY may simplify the guessing of a recipient’s mailbox or automated sweeps for valid mailbox addresses, resulting in a possible reduction in privacy. Various implementation techniques may be used to reduce the threat, such as limiting the number of queries per session [SMTP].)

EHLO

The enhanced mail greeting that enables a server to announce support for extended messaging options. The extended messaging modes are discussed in a later section of this document. Conformant implementations MUST implement the ESMTP command and return the capabilities indicated later in this memo [ESMTP].

BDAT

The BDAT command provides a higher efficiency alternative to the earlier DATA command, especially for voice. The BDAT command provides for native binary transport. Because voice messages are large binary objects otherwise subject to BASE-64 encoding, BDAT will result in a

substantial improvement in transmission efficiency over DATA. Conformant implementations SHOULD support binary transport using the BDAT command [BINARY].

5.2 ESMTP Capabilities

The following ESMTP keywords indicate extended features useful for voice messaging.

PIPELINING

The "PIPELINING" keyword indicates ability of the receiving SMTP to accept pipelined commands. Pipelining commands dramatically improves the protocol performance over wide area networks. Conformant implementations SHOULD support the command pipelining indicated by this parameter [PIPE].

SIZE

The "SIZE" keyword provides a mechanism by which the receiving SMTP can indicate the maximum size message supported. Conformant implementations MUST provide the size capability and SHOULD honor any size limitations when sending [SIZE].

CHUNKING

The "CHUNKING" keyword indicates that the receiver will support the high-performance binary transport mode. Note that CHUNKING can be used with any message format and does not imply support for binary encoded messages. Conformant implementations SHOULD support binary transport indicated by this capability [BINARY].

BINARYMIME

The "BINARYMIME" keyword indicates that the receiver SMTP can accept binary encoded MIME messages. Conformant implementations should support binary transport indicated by this capability [BINARY].

NOTIFY

The "NOTIFY" keyword indicates that the receiver SMTP will accept explicit delivery status notification requests. Conformant implementations MUST support the delivery notification extensions in [DSN].

5.3 ESMTP Parameters - MAIL FROM

BINARYMIME

The current message is a binary encoded MIME messages. Conformant implementations SHOULD support binary transport indicated by this parameter [BINARY].

5.4 ESMTP Parameters - RCPT TO

NOTIFY

The NOTIFY parameter indicates the conditions under which a delivery report SHOULD be sent. Conformant implementations must honor this request [DSN].

RET

The RET parameter indicates whether the content of the message should be returned. Conformant systems SHOULD honor a request for returned content [DSN].

6. Management Protocols

The Internet protocols provide a mechanism for the management of messaging systems, from the management of the physical network through the management of the message queues. SNMP should be supported on a compliant message machine.

6.1 Network Management

The digital interface to the VM and the TCP/IP protocols SHOULD be managed. MIB II SHOULD be implemented to provide basic statistics and reporting of TCP and IP protocol performance [MIB II].

6.2 Directory and Message Management

Conformant systems SHOULD provide for the management of message traffic and queue monitoring based on the Message and Directory MIB [MADMAN].

7. References

[MIME] Borenstein, N., and N. Freed, "Multipurpose Internet Mail Extensions", RFC 1521, Bellcore, Innosoft, September 1993.

[MSG822] Crocker, D., "Standard for the Format of ARPA Internet Text Messages", STD 11, RFC 822, UDEL, August 1982.

[X400] Hardcastle-Kille, S., "Mapping between X.400(1988) / ISO 10021 and RFC 822", RFC 1327, UCL, May 1992.

[PIPE] Freed, N., and A. Cargille, "SMTP Service Extension for Command Pipelining", RFC 1854, October 1995.

[ESMTP] Klensin, J., Freed, N., Rose, M., Stefferud, E., and D. Crocker, "SMTP Service Extensions", RFC 1869, United Nations University, Innosoft International, Inc., Dover Beach Consulting, Inc., Network Management Associates, Inc., The Branch Office, November 1995.

[SIZE] Klensin, J, Freed, N., Moore, K, "SMTP Service Extensions for Message Size Declaration", RFC 1870, United Nations University, Innosoft International, Inc., November 1995.

[8BIT] Klensin, J., Freed, N., Rose, M., Stefferud, E., D. Crocker, "SMTP Service Extension for 8bit-MIMEtransport", RFC 1426, United Nations University, Innosoft International, Inc., Dover Beach Consulting, Inc., Network Management Associates, Inc., The Branch Office, February 1993.

[DNS1] Mockapetris, P., "Domain Names - Implementation and Specification", STD 13, RFC 1035, USC/Information Sciences Institute, November 1987.

[DNS2] Mockapetris, P., "Domain Names - Concepts and Facilities", STD 13, RFC 1034, USC/Information Sciences Institute, November 1987.

[SMTP] Postel, J., "Simple Mail Transfer Protocol", STD 10, RFC 821, USC/Information Sciences Institute, August 1982.

[BINARY] Vaudreuil, G., "SMTP Service Extensions for Transmission of Large and Binary MIME Messages", RFC 1830, Octel Network Services, October 1995.

[NOTIFY] Moore, K., and G. Vaudreuil, "An Extensible Message Format for Delivery Status Notifications", RFC 1894, University of Tennessee, Octel Network Services, January 1996.

[REPORT] Vaudreuil, G., "The Multipart/Report Content Type for the Reporting of Mail System Administrative Messages", RFC 1892, Octel Network Services, January 1996.

[DSN] Moore, K., "SMTP Service Extensions for Delivery Status Notifications", RFC 1891, University of Tennessee, January 1996.

[G721] CCITT Recommendation G.700-G.795 (1988), General Aspects of Digital Transmission Systems, Terminal Equipment. Blue Book.

[MADMAN] Freed, N., and S. Kille, "Mail Monitoring MIB", RFC 1566, January 1994.

[MIB II] Rose, M., "Management Information Base for Network Management of TCP/IP-based internets: MIB-II", RFC 1158, May 1990.

8. Security Consideration

This document is a profile of existing Internet mail protocols. As such, it does not create any security issues not already existing in the profiled Internet mail protocols themselves.

9. Acknowledgments

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11. Appendix - MIME/ESMTP Voice Profile Requirements Summary

FEATURE	SECTION	MUST	SHOULD	MAY	SHOULD NOT	MUST NOT	Footnote
Message Addressing Formats:							
Use DNS host names	4.1	x					
Use only numbers in mailbox IDs	4.1		x				
Use alpha-numeric mailbox IDs	4.1			x			
Support of postmaster@domain	4.1		x				
Support of loopback@domain	4.1		x				
Message Header Fields:							
Encoding outbound messages							
From	4.2	x					
Addition of text personal name	4.2		x				
To	4.2	x					
Addition of text personal name	4.2		x				
CC	4.2			x			
Date	4.2	x					
Sender	4.2				x		
Message-id	4.2		x				
Received	4.2	x					
MIME Version: 1.0 (Voice 1.0)	4.2	x					
Content-Type	4.2	x					
Content-Transfer-Encoding	4.2	x					
Sensitivity	4.2			x			
Importance	4.2			x			
Subject	4.2			x			
Detection & Decoding inbound messages							
From	4.2	x					
Utilize text personal name	4.2		x				
To	4.2	x					
Utilize text personal name	4.2			x			
CC	4.2			x			
Utilize text personal name	4.2			x			
Date	4.2	x					
Conversion of Date to local time	4.2		x				
Sender	4.2				x		

Message ID	4.2	x				
Received	4.2		x			
MIME Version: 1.0 (Voice 1.0)	4.2	x				
Content Type	4.2	x				
Content-Transfer-Encoding	4.2	x				
Sensitivity	4.2	x				1
Importance	4.2			x		
Subject	4.2			x		
Binary Content Encoding:						
Encoding outbound messages						
7BITMIME	4.3				x	
8BITMIME	4.3				x	
Quoted Printable	4.3				x	
Base-64	4.3	x				2
Binary	4.3	x				3
Detection & decoding inbound messages						
7BITMIME	4.3	x				
8BITMIME	4.3	x				
Quoted Printable	4.3	x				
Base-64	4.3	x				
Binary	4.3	x				
Message Content Types:						
Inclusion in outbound messages						
Message/RFC822	4.3				x	
Text/plain	4.3					x
Multipart/Mixed	4.3			x		
Message/Notification	4.3	x				
Multipart/Report	4.3	x				
Audio/32KADPCM	4.3	x				
Audio/* (proprietary encodings)	4.3			x		
Multipart/Voice-Message	4.3	X				
Detection & decoding in inbound messages						
Message/RFC822	4.3	x				
Text/plain	4.3	x				
Multipart/Mixed	4.3	x				
Message/Notification	4.3	x				
Multipart/Report	4.3	x				
Audio/32KADPCM	4.3	x				
Audio/* (proprietary encodings)	4.3			x		
Multipart/Voice-Message	4.3	X				
Message Transport Protocol:						
ESMTP Commands						
HELO	5.1	x				
MAIL FROM	5.1	x				
RCPT TO	5.1	x				

DATA	5.1	x				
TURN	5.1					x
QUIT	5.1	x				
RSET	5.1	x				
VRFY	5.1			x		
EHLO	5.1	x				
BDAT	5.1		x			3
ESMTP Keywords						
PIPELINING	5.2		x			
SIZE	5.2	x				
CHUNKING	5.2		x			
BINARYMIME	5.2		x			
NOTIFY	5.2	x				
Management Protocols:						
Network management	6.1		x			
Monitoring queues	6.2		x			

1. If a sensitive message is received by a system that does not support sensitivity, then it must be returned to the originator with an appropriate error notification.
2. When binary transport is not available
3. When binary transport is available

12. Appendix - Example Voice Message

The following message is a full-featured, all-options-enabled message addressed to two recipients. The message includes the sender's spoken name and a short speech segment. The message is marked as important and private.

```
To: 2145551212@vm1.mycompany.com
To: "Parsons, Glenn, W." 2145551234@VM1.mycompany.com
From: "Vaudreuil, Greg" 2175552345@VM2.mycompany.com
Date: Mon, 26 Aug 93 10:20:20 CST
MIME-Version: 1.0  (Voice 1.0)
Content-type: Multipart/Voice-Message; Boundary = "MessageBoundary"
Content-Transfer-Encoding: 7bit
Message-ID: VM2.mycompany.com-123456789
Sensitivity: Private
Importance: High

--MessageBoundary
Content-type: Audio/32KADPCM
Content-Transfer-Encoding: Base-64
```

```
glslfdslsertiflkTfpgkTportrpkTpfgTpoiTpdadasssdasddasdasd
(This is a sample of the base-64 Spoken Name data) fgdhgd
jrgoij3o45itj09fiuvdkjgWlakgQ93ijkpokfpgokQ90gQ5tkjpokfgW
dlkgpokpeowrit09==

--MessageBoundary
Content-type: Audio/32KADPCM
Content-Transfer-Encoding: Base-64

glslfdslsertiflkTfpgkTportrpkTpfgTpoiTpdadasssdasddasdasd
(This is a sample of the base-64 Spoken Subject data) fgdhgd
jrgoij3o45itj09fiuvdkjgWlakgQ93ijkpokfpgokQ90gQ5tkjpokfgW
dlkgpokpeowrit09==

--MessageBoundary
Content-type: Audio/32KADPCM
Content-Transfer-Encoding: Base-64

glslfdslsertiflkTfpgkTportrpkTpfgTpoiTpdadasssdasddasdasd
(This is a sample of the base-64 message data) fgdhgdfwgd
jrgoij3o45itj09fiuvdkjgWlakgQ93ijkpokfpgokQ90gQ5tkjpokfgW
dlkgpokpeowrit09==

--MessageBoundary--
```

13. Appendix - Audio/32KADPCM Content Type

```
Mime type name: Audio
Mime Sub-Type name: 32KADPCM
Required Parameters: None
Optional Parameters: None
Encoding Considerations: Any encoding necessary for transport may be
used.
```

CCITT Recommendation G.721 [G721] describes the algorithm recommended for conversion of a 64 KB/s A-law or u-law PCM channel to and from a 32 KB/s channel. The conversion is applied to the PCM stream using an Adaptive Differential Pulse Code Modulation (ADPCM) transcoding technique.

No header information shall be included before the audio data. When this subtype is present, a sample rate of 8000 Hz and a single channel is assumed.

14. Appendix - Multipart/Voice-Message

Mime type name: Multipart
Mime Sub-Type name: Voice-Message
Required Parameters: Boundary
Optional Parameters: None
Encoding Considerations: Binary of 7 bit are sufficient. Base-64 and Quoted-Printable are prohibited on multipart content-types.

The syntax of a Multipart/Voice-Message is identical to the Multipart/Mixed content type. The Voice-Message content-type contains three body parts. The first is an audio segment containing the spoken name of the originator, the second is an audio segment containing a spoken subject, and the third is the voice message itself. Forwarded voice messages can be created by simply nesting multipart content types.

The spoken name segment shall contain the name of the message sender in the voice of the sender. The length of the spoken name segment must not exceed 12 seconds. If no spoken name is available, the segment must still be present but may be empty.

The spoken subject segment shall contain the subject of the message sender in the voice of the sender. The length of the spoken subject segment must not exceed 20 seconds. If no spoken subject segment is available, the segment must still be present but may be empty.

The voice message body part may contain any arbitrary content including a multipart/mixed collections of body parts, though will typically be an audio segment.

The default handling of the Multipart/Voice-Message shall be to voice the spoken-name segment and then the spoken-subject prior to displaying or voicing the remainder of the message.