

[MS-OXOMSG]: E-mail Object Protocol Specification

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Revision Summary			
Author	Date	Version	Comments
Microsoft Corporation	April 4, 2008	0.1	Initial Availability.
Microsoft Corporation	April 25, 2008	0.2	Revised and updated property names and other technical content.
Microsoft Corporation	June 27, 2008	1.0	Initial Release.

Table of Contents

1	Introduction.....	8
1.1	Glossary.....	8
1.2	References.....	10
1.2.1	Normative References.....	10
1.2.2	Informative References.....	11
1.3	Protocol Overview.....	11
1.3.1	E-mail Objects.....	12
1.3.1.1	Creating, Opening, and Saving E-mail Objects.....	12
1.3.1.2	Sending Messages.....	12
1.3.1.3	Replying and Forwarding Messages.....	12
1.3.2	Report Messages.....	12
1.3.2.1	Read Receipt.....	12
1.3.2.2	Nonread Receipt.....	12
1.3.2.3	Delivery Receipt.....	13
1.3.2.4	Non-Delivery Receipt.....	13
1.3.2.5	Voting and Tracking.....	13
1.3.3	Controlling sending and delivery of mail.....	13
1.4	Relationship to Other Protocols.....	13
1.5	Prerequisites/Preconditions.....	13
1.6	Applicability Statement.....	13
1.7	Versioning and Capability Negotiation.....	13
1.8	Vendor-Extensible Fields.....	14
1.9	Standards Assignments.....	14
2	Messages.....	14
2.1	Transport.....	14
2.2	Message Syntax.....	14
2.2.1	E-mail Object Properties.....	14
2.2.1.1	PidTagBlockStatus.....	14
2.2.1.2	PidTagConversationIndex.....	15
2.2.1.3	PidTagConversationTopic.....	17
2.2.1.4	PidTagDeferredDeliveryTime.....	17
2.2.1.5	PidTagDisplayBcc.....	18
2.2.1.6	PidTagDisplayCc.....	18
2.2.1.7	PidTagDisplayTo.....	18
2.2.1.8	PidTagIconIndex.....	18
2.2.1.9	PidTagInternetMailOverrideFormat.....	19
2.2.1.10	PidTagInternetMessageId.....	20
2.2.1.11	PidTagInReplyToId.....	21
2.2.1.12	PidTagMessageClass.....	21
2.2.1.13	PidTagMessageToMe.....	21
2.2.1.14	PidTagMessageCcMe.....	21

2.2.1.15	PidTagMessageRecipientMe	21
2.2.1.16	PidTagOriginatorDeliveryReportRequested.....	22
2.2.1.17	PidTagOriginatorNonDeliveryReportRequested.....	22
2.2.1.18	PidTagOriginalSensitivity	22
2.2.1.19	PidTagReceivedRepresentingAddressType.....	22
2.2.1.20	PidTagReceivedRepresentingEmailAddress	22
2.2.1.21	PidTagReceivedRepresentingEntryId.....	23
2.2.1.22	PidTagReceivedRepresentingName	23
2.2.1.23	PidTagReceivedRepresentingSearchKey	23
2.2.1.24	PidTagReadReceiptRequested.....	23
2.2.1.25	PidTagReceivedByAddressType	23
2.2.1.26	PidTagReceivedByEmailAddress.....	24
2.2.1.27	PidTagReceivedByEntryId	24
2.2.1.28	PidTagReceivedByName.....	24
2.2.1.29	PidTagReceivedBySearchKey.....	24
2.2.1.30	PidTagRecipientReassignmentProhibited	24
2.2.1.31	PidTagReplyRecipientEntries.....	25
2.2.1.32	PidTagReplyRecipientNames.....	25
2.2.1.33	PidTagReplyRequested.....	25
2.2.1.34	PidTagResponseRequested.....	25
2.2.1.35	PidTagSendRichInfo.....	25
2.2.1.36	PidTagSenderAddressType.....	26
2.2.1.37	PidTagSenderEmailAddress	26
2.2.1.38	PidTagSenderEntryId.....	26
2.2.1.39	PidTagSenderName	26
2.2.1.40	PidTagSenderSearchKey	26
2.2.1.41	PidTagSentRepresentingAddressType.....	26
2.2.1.42	PidTagSentRepresentingEmailAddress	27
2.2.1.43	PidTagSentRepresentingEntryId	27
2.2.1.44	PidTagSentRepresentingName	27
2.2.1.45	PidTagSentRepresentingSearchKey	27
2.2.1.46	PidTagSubjectPrefix	27
2.2.1.47	PidTagTransportMessageHeaders	27
2.2.1.48	PidLidInternetAccountName.....	28
2.2.1.49	PidLidInternetAccountStamp	28
2.2.1.50	PidTagPrimarySendAccount	28
2.2.1.51	PidTagNextSendAcct.....	28
2.2.1.52	PidLidUseTnef	28
2.2.1.53	Attachments.....	29
2.2.1.54	Categories and Keywords.....	29
2.2.1.55	Contacts	29
2.2.1.56	Flags	29

2.2.1.57	Reminders.....	29
2.2.1.58	Recipients	29
2.2.1.59	PidLidAutoProcessState.....	29
2.2.1.60	PidLidVerbStream	29
2.2.1.60.1	VoteOption Structure	30
2.2.1.60.2	VoteOptionExtras Structure	32
2.2.1.61	PidLidVerbResponse	33
2.2.1.62	PidTagTargetEntryId.....	33
2.2.2	Message Status Reports.....	33
2.2.2.1	PidTagMessageClass	33
2.2.2.2	PidTagOriginalDeliveryTime	34
2.2.2.3	PidTagOriginalDisplayTo.....	34
2.2.2.4	PidTagOriginalDisplayCc.....	34
2.2.2.5	PidTagOriginalDisplayBcc.....	34
2.2.2.6	PidTagOriginalSenderAddressType	35
2.2.2.7	PidTagOriginalSenderEmailAddress.....	35
2.2.2.8	PidTagOriginalSenderEntryId	35
2.2.2.9	PidTagOriginalSenderName.....	35
2.2.2.10	PidTagOriginalSenderSearchKey.....	35
2.2.2.11	PidTagOriginalSentRepresentingAddressType	35
2.2.2.12	PidTagOriginalSentRepresentingEmailAddress.....	36
2.2.2.13	PidTagOriginalSentRepresentingEntryId	36
2.2.2.14	PidTagOriginalSentRepresentingName.....	36
2.2.2.15	PidTagOriginalSentRepresentingSearchKey.....	36
2.2.2.16	PidTagOriginalSubject.....	36
2.2.2.17	PidTagOriginalSubmitTime.....	36
2.2.2.18	PidTagParentKey	37
2.2.2.19	PidTagReportTag	37
2.2.2.20	PidTagReportText.....	38
2.2.2.21	PidTagReadReceiptEntryId	39
2.2.2.22	PidTagReadReceiptSearchKey.....	39
2.2.2.23	PidTagSubjectPrefix	39
2.2.3	E-mail Submission Properties.....	39
2.2.3.1	PidTagRecipientType.....	39
2.2.3.2	PidTagDeferredSendNumber.....	40
2.2.3.3	PidTagDeferredSendUnits	40
2.2.3.4	PidTagDeferredSendTime	41
2.2.3.5	PidTagExpiryNumber	41
2.2.3.6	PidTagExpiryUnits	41
2.2.3.7	PidTagExpiryTime.....	42
2.2.3.8	PidTagDeleteAfterSubmit	42
2.2.3.9	PidTagMessageDeliveryTime.....	42

2.2.3.10	PidTagSentMailSvrEID	42
2.2.3.11	PidTagClientSubmitTime	43
2.2.4	ROPs Used in Sending Message	43
2.2.4.1	RopSubmitMessage	43
2.2.4.1.1	Request Buffer	43
2.2.4.1.2	Response Buffer	43
2.2.4.2	RopAbortSubmit	44
2.2.4.2.1	Response Buffer	44
2.2.4.3	RopGetAddressTypes	45
2.2.4.3.1	ResponseBuffer	45
2.2.5	E-mail Sending and Delivery ROPs	46
2.2.5.1	RopSetSpooler	46
2.2.5.1.1	Request Buffer	46
2.2.5.1.2	Response Buffer	46
2.2.5.2	RopGetTransportFolder	46
2.2.5.2.1	Request Buffer	46
2.2.5.2.2	Response Buffer	46
2.2.5.3	RopSpoolerLockMessage	47
2.2.5.3.1	Request Buffer	47
2.2.5.3.2	Response Buffer	47
2.2.5.4	RopTransportSend	48
2.2.5.4.1	Request Buffer	48
2.2.5.4.2	Response Buffer	48
2.2.5.5	RopTransportNewMail	49
2.2.5.5.1	Request Buffer	49
2.2.5.5.2	Response Buffer	49
3	<i>Protocol Details</i>	50
3.1	Client Details.....	50
3.1.1	Abstract Data Model.....	50
3.1.1.1	Storage	50
3.1.1.2	Core Objects	51
3.1.1.3	Other Informational Messaging Properties	54
3.1.1.4	Message Delivery Properties	55
3.1.2	Timers.....	55
3.1.3	Initialization	56
3.1.4	Higher-Layer Triggered Events	56
3.1.4.1	Sending a Message	56
3.1.4.1.1	Represented Sender Properties	56
3.1.4.1.2	Actual Sender Properties.....	56
3.1.4.1.3	Sending the Message as the Sender Itself.....	56
3.1.4.1.4	Sending the Message on Behalf of Another Person.....	56
3.1.4.2	Deferring Sending a Message.....	56

3.1.4.3	Sending a Message with Expiry Time	56
3.1.4.4	Optimizing Send	57
3.1.4.5	Resending a Message	57
3.1.5	Message Processing Events and Sequencing Rules	57
3.1.5.1	Client-to-Client Interop: Voting	57
3.1.5.1.1	Sending a Voting Message	58
3.1.5.1.2	Interpreting a Voting Message	58
3.1.5.1.3	Crafting a Voting Response Message	58
3.1.5.1.4	Aggregating Voting Responses	58
3.1.5.2	Controlling the Sending of Mail	58
3.1.5.3	Processing a Mail in the Spooler Queue	58
3.1.5.4	Delivering Mail to the Server	59
3.1.6	Timer Events	59
3.1.7	Other Local Events	59
3.2	Server Details	59
3.2.1	Abstract Data Model	59
3.2.2	Timers	59
3.2.3	Initialization	59
3.2.4	Higher-Layer Triggered Events	59
3.2.5	Message Processing Events and Sequencing Rules	60
3.2.5.1	Handling a RopSubmitMessage Request	60
3.2.5.1.1	Permission Check	60
3.2.5.1.2	Properties Read and/or Set Upon Submission	60
3.2.5.1.3	Rule Processing	63
3.2.5.2	Handling a RopAbortSubmit Request	63
3.2.5.3	Handling a RopSetSpooler Request	63
3.2.5.4	Handling a RopGetTransportFolder Request	63
3.2.5.5	Handling a RopSpoolerLockMessage Request	63
3.2.5.6	Delivering mail on a RopSubmitMessage or RopTransportSend Request 64	
3.2.5.7	Handling a RopTransportNewMail Request	64
3.2.6	Timer Events	64
3.2.7	Other Local Events	64
4	Protocol Examples	64
4.1	Submitting a Message	64
4.1.1	ROP Request Buffer	64
4.1.2	ROP Response Buffer	65
4.2	Submitting a Deferred Message	65
4.2.1	ROP Request Buffer	65
4.2.2	ROP Response Buffer	66
4.3	Aborting a Message Submission	67
4.3.1	ROP Request Buffer	67

4.3.2	ROP Response Buffer.....	67
4.4	Sending an E-mail from a Messaging User to Another Messaging User	68
4.5	Sending a Message with Voting Options	72
4.6	Sending Mail to a Specific Server.....	74
4.6.1	Initialization	74
4.6.1.1	ROP Request Buffer	75
4.6.1.2	ROP Response Buffer.....	75
4.6.2	Submitting the Message to the Spooler Queue Folder.....	75
4.6.3	Locking the Message in the Spooler Queue Folder for Processing	75
4.6.3.1	ROP Request Buffer	75
4.6.3.2	ROP Response Buffer.....	76
4.6.4	Determining the Transport Folder.....	76
4.6.4.1	ROP Request Buffer	76
4.6.4.2	ROP Response Buffer.....	76
4.6.5	Sending the Message	77
4.6.5.1	ROP Request Buffer	77
4.6.5.2	ROP Response Buffer.....	77
4.6.6	Marking the Message as Ready for Post-Send Server Processing.....	80
4.6.6.1	ROP Request Buffer	80
4.6.6.2	ROP Response Buffer.....	81
5	Security.....	81
5.1	Security Considerations for Implementers	81
5.2	Index of Security Parameters	81
6	Appendix A: Office/Exchange Behavior.....	81
	Index.....	84

1 Introduction

An e-mail client provides the user interface for composing, reading and sending messages, and for accessing and modifying the message items contained in message **stores**. An **E-mail object** represents a single message in a folder of the message store used to send or receive e-mail.

The E-mail Object Protocol specifies:

- The properties of a **Message object** in the message store mailbox
- The transport features specific to an **E-mail object**

1.1 Glossary

The following terms are defined in [MS-OXGLOS]:

ANSI character set

ASCII

big-endian

blind carbon copy recipient

carbon copy (Cc) recipient

Coordinated Universal Time (UTC)

Drafts folder

EntryID

folder associated information (FAI)

folder ID (FID)

Folder object

from properties

GUID

handle

Inbox folder

Inter-Personal Mail (IPM)

little-endian

message ID (MID)

Message object

MIME

Outbox folder
primary recipient
property (3)
property ID
recipient
remote procedure call (RPC)
Rich Text Format (RTF)
ROP request buffer
ROP response buffer
search folder
sender properties
Sent Mail folder
store
Transport Neutral Encapsulation Format (TNEF)
Unicode

The following terms are specific to this document:

conversation thread: A series of messages and their responses (usually related by subject).

E-mail object: A **Message object** that represents an e-mail message in a messaging **store** and that adheres to the **property** specifications in this document. An **e-mail object** models the electronic equivalent of mail.

mail spooler: A program or function that receives requests to send mail to and deliver mail for a user. It determines which mail transport **handles** the sending or receipt of mail.

messaging transport: A networking protocol that facilitates the transfer of messages between a messaging client and a messaging server.

recipient properties: A group of properties that identify an intended **recipient** or **recipients** of a **message**.

resend message: A message that is submitted for message delivery after it has failed to be sent to all or some of its **recipients**.

spooler queue: A series of outgoing messages that are ready for delivery to **recipients**.

UUENCODED attachments: See [IEEE1003.1].

MAY, SHOULD, MUST, SHOULD NOT, MUST NOT: These terms (in all caps) are used as described in [RFC2119]. All statements of optional behavior use either MAY, SHOULD, or SHOULD NOT.

1.2 References

1.2.1 Normative References

[MS-OXBBODY] Microsoft Corporation, "Best Body Retrieval Protocol Specification", April 2008.

[MS-OXCDATA] Microsoft Corporation, "Data Structures Protocol Specification", April 2008.

[MS-OXCFOLD] Microsoft Corporation, "Folder Object Protocol Specification", April 2008.

[MS-OXCMAIL] Microsoft Corporation, "RFC2822 and MIME to E-mail Object Conversion Protocol Specification", April 2008.

[MS-OXCMSG] Microsoft Corporation, "Message and Attachment Object Protocol Specification", April 2008.

[MS-OXCPRPT] Microsoft Corporation, "Property and Stream Object Protocol Specification", April 2008.

[MS-OXCROPS] Microsoft Corporation, "Remote Operations (ROP) List and Encoding Protocol Specification", April 2008.

[MS-OXCSPAM] Microsoft Corporation, "Spam Confidence Level, Allow and Block Lists Protocol Specification", April 2008.

[MS-OXCSTOR] Microsoft Corporation, "Store Object Protocol Specification", April 2008.

[MS-OXCSYNC] Microsoft Corporation, "Mailbox Synchronization Protocol Specification", April 2008.

[MS-OXGLOS] Microsoft Corporation, "Office Exchange Protocols Master Glossary", April 2008.

[MS-OXOAB] Microsoft Corporation, "Offline Address Book (OAB) Format and Schema Protocol Specification", April 2008.

[MS-OXOABK] Microsoft Corporation, "Address Book Object Protocol Specification", April 2008.

[MS-OXOCAL] Microsoft Corporation, "Appointment and Meeting Object Protocol Specification", April 2008.

[MS-OXOFLAG] Microsoft Corporation, "Informational Flagging Protocol Specification", April 2008.

[MS-OXORMDR] Microsoft Corporation, "Reminder Settings Protocol Specification", April 2008.

[MS-OXORULE] Microsoft Corporation, "E-mail Rules Protocol Specification", April 2008.

[MS-OXOSFLD] Microsoft Corporation, "Special Folders Protocol Specification", April 2008.

[RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, March 1997, <http://www.ietf.org/rfc/rfc2119.txt>.

[RFC2821] Klensin, J., "Simple Mail Transfer Protocol", RFC 2821, April 2001, <http://www.ietf.org/rfc/rfc2821.txt>.

[RFC2822] Resnick, P., Ed., "Internet Message Format", RFC 2822, April 2001, <http://www.ietf.org/rfc/rfc2822.txt>.

1.2.2 Informative References

None.

1.3 Protocol Overview

The E-mail Object Protocol specifies the representation of an e-mail message in a messaging **store**. The E-mail Object Protocol extends the Message and Attachment Object Protocol in that it defines new properties and adds restrictions to the properties that are specified in [MS-OXCMSG].

An **E-mail object** represents a single e-mail message. The properties that are specific to an **E-mail** object facilitate retaining information about the e-mail message's sender, **recipients**, subject, message content, and all the options associated with this e-mail set by the sender or recipient. An **E-mail** object is stored in a **Folder object**. The E-mail Object Protocol also specifies how an **E-mail** object is used to represent a special type of message: a Report Message, which is generated to report the status of a sent message either at the sender's request or at the request of the system administrator.

1.3.1 E-mail Objects

1.3.1.1 Creating, Opening, and Saving E-mail Objects

E-mail objects adhere to the specifications in [MS-OXCMMSG].

1.3.1.2 Sending Messages

A client submits a request to a server to send an e-mail message to another messaging user. The server can defer or reject the request based on the properties and permissions associated with the **E-mail object**.

While the message is queued in the server, the client can abort the send operation.

1.3.1.3 Replying and Forwarding Messages

Replying to a message or forwarding a message is identical to sending a message except that both actions have an expanded set of properties that are specified in section 2.2.1.

1.3.2 Report Messages

Report messages are an extension of the **E-mail object**. Report messages present status information about a sent message to its sender. There are two general types of reports:

- **Read status reports.** Read receipt reporting occurs when the sent e-mail is read/opened by the **recipient**. Nonread receipt reporting occurs when the sent e-mail is not read before it is deleted or expired.
- **Delivery status reports.** Delivery receipt reporting occurs when the sent e-mail is delivered to the recipient. Nondelivery receipt reporting occurs when the sent e-mail cannot be delivered.

1.3.2.1 Read Receipt

A read receipt report indicates that a sent e-mail message was read or opened by a **recipient**.

Read receipts are not generated automatically. Senders that want to receive read receipts explicitly request them.

1.3.2.2 Nonread Receipt

A nonread receipt is generated during e-mail message deletion operations as specified in [MS-OXCFOLD], at the expiration of a time limit, or according to client specific criteria. A nonread receipt is sent to the e-mail's sender or a designated **recipient** by the e-mail sender's request.

1.3.2.3 **Delivery Receipt**

A delivery receipt is generated and sent by the messaging system to the e-mail's sender or designated **recipient** when an e-mail has reached its intended recipient.

1.3.2.4 **Non-Delivery Receipt**

The nondelivery receipt is generated and sent to the e-mail's sender by the messaging system when an e-mail could not reach an intended **recipient**. Nondelivery receipts are sent automatically unless a request is made to suppress them.

1.3.2.5 **Voting and Tracking**

Voting and tracking capabilities are an extension of the **E-mail object**. When composing a survey-type e-mail message, a client can add voting options to the e-mail message by setting voting verb properties as specified in section 2.2.1.60 on an outgoing message and send it to **recipients**. A recipient's client can respond to the voting survey by setting response properties on a reply message. The sender's client processes the reply message and maintains the response tracking information in the original message's recipient tracking status properties, as specified in section 2.2.1.61.

1.3.3 **Controlling sending and delivery of mail**

If a client is connected to several e-mail servers at once (not necessarily using the same protocol), it can choose to control how mail is sent by manipulating the **spooler queue** of the message **store**. If a client delivers mail into a folder on the server (such as delivering POP3 messages), it can inform the server of the new mail through ROP requests.

1.4 **Relationship to Other Protocols**

The E-mail Object Protocol has the same dependencies as the Message and Attachment Object Protocol, which it extends. For details about the Message and Attachment Object Protocol, see [MS-OXCMSG].

1.5 **Prerequisites/Preconditions**

The E-mail Object Protocol specification is an extension of [MS-OXCMSG], and no further prerequisites or preconditions exist.

1.6 **Applicability Statement**

The E-mail Object Protocol is used to model the exchange of interpersonal mail and messages.

1.7 **Versioning and Capability Negotiation**

None.

1.8 Vendor-Extensible Fields

None.

1.9 Standards Assignments

None.

2 Messages

2.1 Transport

The E-mail Object Protocol uses the protocols specified in [MS-OXCPRPT] and [MS-OXCMSG] as its primary transport mechanism.

The **ROP request buffers** and **ROP response buffers** specified by this protocol are respectively sent to and received from the server using the underlying **remote procedure call (RPC)** transport as specified in [MS-OXCROPS].

2.2 Message Syntax

An **E-mail object** can be created and modified by clients and servers. Except where noted below, this section defines constraints to which both clients and servers **MUST** adhere when operating on **E-mail** objects.

Clients operate on **E-mail** objects by using the Message and Attachment Object Protocol [MS-OXCMSG]. How a server operates on **E-mail** objects is implementation-dependent, but the results of any such operations **MUST** be exposed to clients in a manner that is consistent with the E-mail Object Protocol.

Unless otherwise specified, **E-mail** objects adhere to all **property** constraints specified in [MS-OXPROPS] and all property constraints specified in [MS-OXCMSG]. An **E-mail** object can also contain other properties as described in [MS-OXPROPS], but these properties have no impact on this protocol.

When a property is referred to as "read-only for the client" the server **MUST** return an error and ignore any request to change the value of that property.

2.2.1 E-mail Object Properties

The following properties are specific to **E-mail objects**.

2.2.1.1 PidTagBlockStatus

Type: **PtypInteger32**

Indicates the user's preference for viewing external content (such as links to images on an HTTP server) in the message body. A client **MAY** ignore this value and always allow or block external content based on other factors (such as whether the sender is on a safe list). If this

property is used, then the default action is to block the external content. However, if the value of this property falls within a certain range, then viewing external content is allowed. The allowed value is computed from **PidTagMessageDeliveryTime**: since the sender of a message does not have knowledge of this value, the sender cannot reliably set **PidTagBlockStatus** to the allowed values.

To compute the allowed values, convert the value of **PidTagMessageDeliveryTime** to a **PtypDouble**, *floatdate*, where the date is represented as the number of days from 00:00:00, December 30, 1899 UTC. Apply the following formula:

$$result = ((floatdate - floor(floatdate)) * 100000000) + 3;$$

where *floor(x)* returns the largest integer $\leq x$.

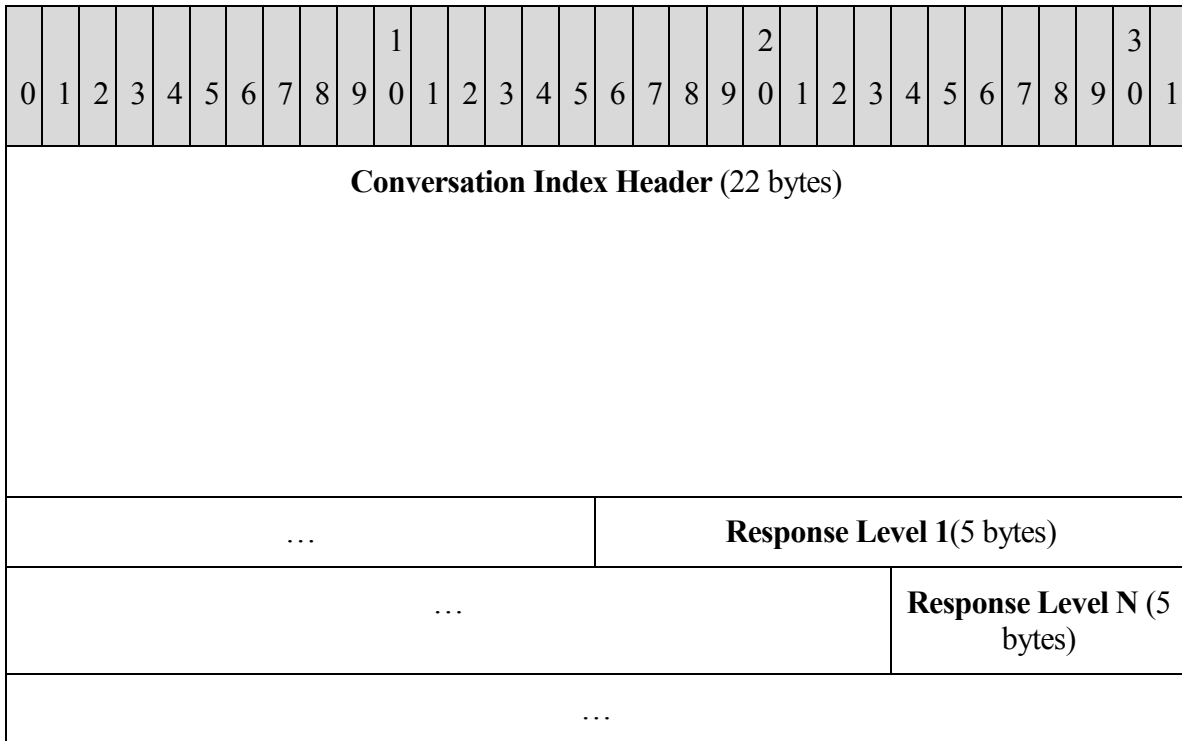
Convert the **PtypDouble** value *result* to a 32-bit integer *computedvalue*.

Clients SHOULD set **PidTagBlockStatus** to *computedvalue* to allow external content. However, when determining whether to accept external content, clients SHOULD allow external content if the absolute value of the difference between *computedvalue* and the value of **PidTagBlockStatus** is 1 or less.

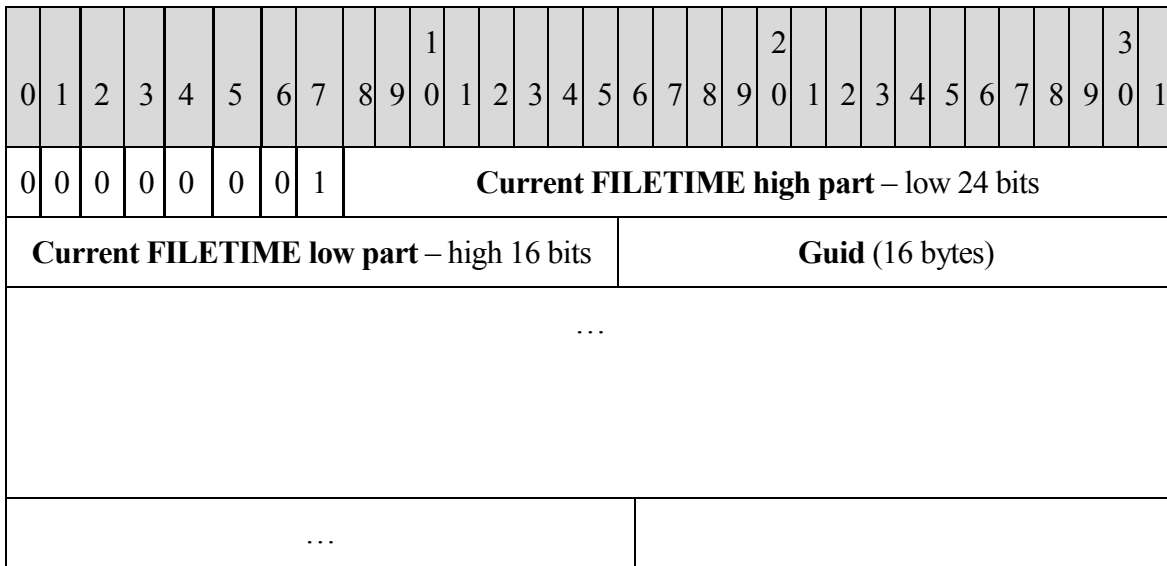
2.2.1.2 PidTagConversationIndex

Type: **PtypBinary**

Indicates the relative position of this message within a **conversation thread**. It MUST be set according to the description in the following diagram.



Conversation Index Header (22 bytes): MUST be set according to the description in the following diagram:



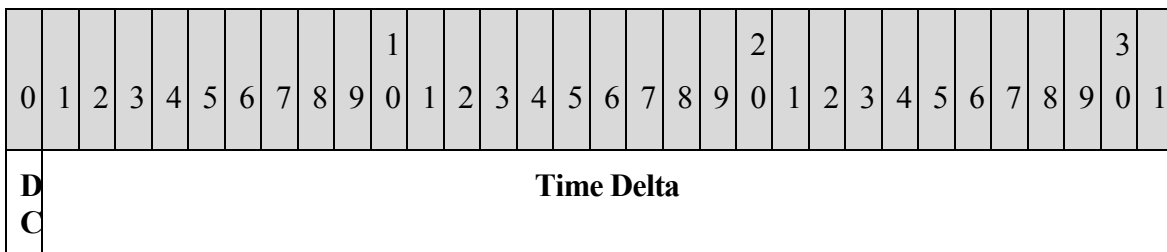
Current FILETIME: The current time in UTC expressed as a **PtypTime** is obtained, where only the 24 low bits of the high part and the 16 high bits of the low part of the FILETIME are included in **Current FILETIME high part** and **Current FILETIME low part**, as shown in the following table.

8 most significant bits	40 bits	16 least significant bits
Excluded	Included	Excluded

The data is stored in **big-endian** format – the 5 bytes of the time are written from most significant byte to least significant byte.

Guid (16 Bytes, PtypGuid): Generated for each new conversation thread. The **Data1**, **Data2**, and **Data3** fields are stored in big-endian format in the packet.

Response Levels (5 bytes each): MUST be set according to the description in the following diagram.



Random	Response level
---------------	-----------------------

DC (Delta code) (1 bit) and **Time Delta** (31 bits) are calculated based on the difference between the current time and the time stored in the **Conversation Index Header**:

- If the difference is less than 1.7 years (high order part of the delta file time bitwise AND with “0x00FE0000” resulting in “0”), the **Delta Code** is “0” and the **Time Delta** is the least significant 31 bits of the difference remaining once the 18 least significant bits are excluded.

15 most significant bits	31 bits	18 least significant bits
Excluded	Included	Excluded

- If the difference is greater than or equal to 1.7 years (high order part of the delta file time bitwise AND with “0x00FE0000” resulting non-zero), the **Delta Code** is 1 and the **Time Delta** is the least significant 31 bits of the difference remaining once the 23 least significant bits are excluded.

10 most significant bits	31 bits	23 least significant bits
Excluded	Included	Excluded

For both cases, **Time Delta** is stored in big-endian format.

Random (4 bits): Random value generated using an implementation-specific algorithm.

Response level (4 bits): This field SHOULD always be set to all 0's.

2.2.1.3 **PidTagConversationTopic**

Type: **PtypString**

Contains an unchanging copy of the original subject. MUST be set to the same value as **PidTagNormalizedSubject**, as specified in [MS-OXCMMSG], on an **E-mail object** when it is submitted.

2.2.1.4 **PidTagDeferredDeliveryTime**

Type: **PtypTime**

Contains the date and time, in **UTC**, at which the sender prefers the message to be delivered. This **property** MAY be absent; if so, the message is delivered as soon as possible. If present, it MUST have the same value as **PidTagDeferredSendTime** specified in section 2.2.3.4<1>.

2.2.1.5 PidTagDisplayBcc

Type: **PtypString**

MUST be set to a list of **blind carbon copy recipient** display names, separated by semicolons, if an e-mail has blind carbon copy recipients. Otherwise, this **property** MUST contain an empty string as specified in [MS-OXCMSG]. This property is read-only for the client.

2.2.1.6 PidTagDisplayCc

Type: **PtypString**

MUST be set to a list of **carbon copy recipient** display names, separated by semicolons, if an e-mail has carbon copy recipients. Otherwise, this **property** MUST contain an empty string as specified in [MS-OXCMSG]. This property is read-only for the client.

2.2.1.7 PidTagDisplayTo

Type: **PtypString**

MUST be set to a list of the **primary recipient** display names, separated by semicolons, if an e-mail has primary recipients. Otherwise, this **property** MUST contain an empty string as specified in [MS-OXCMSG]. This property is read-only for the client.

2.2.1.8 PidTagIconIndex

Type: **PtypInteger32**

Specifies the icon to be used by the user interface when displaying a group of **E-mail objects**. This **property**, if it exists, is a hint to the client: it MAY <2> ignore the value of this property and use another method of determining what icon to display to the user (such as using the value of **PidTagMessageClass** or **PidTagMessageFlags**). Table 2 shows examples of **PidTagIconIndex** values.

Mail Item State	Mail Item Icon Index
New mail	0xFFFFFFFF
Read mail	0x00000100
Unread mail	0x00000101
Submitted mail	0x00000102
Unsent mail	0x00000103
Receipt mail	0x00000104

Replied mail	0x00000105
Forwarded mail	0x00000106
Remote mail	0x00000107
Delivery Receipt	0x00000108
Read Receipt	0x00000109
Nondelivery Receipt	0x0000010A
Nonread Receipt	0x0000010B
Recall_S mails	0x0000010C
Recall_F mail	0x0000010D
Tracking mail	0x0000010E
Out of Office mail	0x0000011B
Recall mail	0x0000011C
Tracked mail	0x00000130

2.2.1.9 PidTagInternetMailOverrideFormat

Type: **PtypInteger32**

Indicates the encoding method and HTML inclusion for attachments and SHOULD be set on outgoing mail. This **property** is broken up into sub-portions as shown in the following table. Note that "X" indicates that the bit is not to be set, and if set, the bit is to be ignored; the format of the diagram is **little-endian**.

0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1
X	X	X	X	X	Format1			X	X	X	X	X	X	X	X	X	X	X	X	X	E18	M4	P2	X	X	X	X	X	X	X	X

Format1 (3 bits): MUST be set to one of the following values.

Value	Meaning
-------	---------

0x0	Default value. The mail system chooses the default encoding scheme, based on other fields in this property value.
0x1	The message is sent in MIME format with text/plain and text/html body parts.
0x2	The message is sent as plain text with UUENCODED attachments .
0x4	The message is sent in MIME format with text/plain and text/html body parts. This value is treated the same as the “0x1” value.

P2 (1 bit): MUST be ignored if **Format1** == 0; otherwise, indicates the preference, as follows.

Value	Meaning
0	Ignore M4 .
1	Use M4 to determine encoding.

M4 (1 bit): MUST be ignored if **Format1** == 0 or **P2** == 0; otherwise, indicates the encoding, as follows.

Value	Meaning
0	Use UUENCODE, and ignore E18 .
1	Use MIME encoding, and use E18 to determine body inclusions.

E18 (2 bits): MUST be ignored if **Format1** == 0 or **P2** == 0 or **M4** == 0. Otherwise, MUST be one of the following values to indicate the HTML inclusion.

Value	Meaning
0x0	Text/plain only.
0x1	Text/plain and text/html.
0x2	Text/plain and text/html. This value is treated the same as the “0x1” value.

2.2.1.10 PidTagInternetMessageId

Type: **PtypString**

Corresponds to the **message-id** field as specified in [RFC2822]. The **property** SHOULD be present on all e-mail messages. For more details about **PidTagInternetMessageId**, see[MS-OXCMAIL].

2.2.1.11 **PidTagInReplyToId**

Type: **PtypString**

Corresponds to the **in-reply-to** field as described in [RFC2822] and contains the original message's **PidTagInternetMessageId** value. This **property** MUST be set on all message replies.

2.2.1.12 **PidTagMessageClass**

Type: **PtypString**

Contains the object type classification. This **property** MUST be set to "IPM.Note" on **E-mail objects**. The value of **PidTagMessageClass** for report objects is specified in section 2.2.2 of this document.

2.2.1.13 **PidTagMessageToMe**

Type: **PtypBoolean**

Indicates that the receiving mailbox owner is one of the **primary recipients** of this e-mail. This **property** MAY be absent; if so, the default value of "0x00" is used. If the property is present, it MUST be set to either "0x01", in which case, the receiving mailbox owner is specifically named as a primary recipient of this e-mail and is not part of a distribution list; or "0x00", in which case the receiving mailbox owner is not a primary recipient of this e-mail.

2.2.1.14 **PidTagMessageCcMe**

Type: **PtypBoolean**

Indicates that the receiving mailbox owner is a **carbon copy recipient** of this e-mail. This **property** MAY be absent; if so, the default value of "0x00" is used. If the property is present, it MUST be set to either "0x01", in which case, the receiving mailbox owner is specifically named as a carbon copy recipient of this e-mail and is not part of a distribution list; or "0x00", in which case, the receiving mailbox owner is not a carbon copy recipient of this e-mail.

2.2.1.15 **PidTagMessageRecipientMe**

Type: **PtypBoolean**

Indicates that the receiving mailbox owner is a primary or a **carbon copy recipient** of this e-mail. This **property** MAY be absent; if so, the default value of "0x00" is used. If the property is present, it MUST be set to either "0x01", in which case, the receiving mailbox owner is specifically named as a primary or a carbon copy recipient of this e-mail and is not

part of a distribution list; or “0x00” in which case the receiving mailbox owner is not a primary and not a carbon copy recipient of this e-mail.

2.2.1.16 **PidTagOriginatorDeliveryReportRequested**

Type: **PtypBoolean**

Indicates whether an e-mail sender requests an e-mail delivery receipt from the messaging system. This **property** MUST be set to either “0x01”, in which case, the sender requests the delivery report be sent to the e-mail sender or designated report receiver when the e-mail is delivered; or “0x00” if the e-mail sender does not want to receive the delivery receipt.

2.2.1.17 **PidTagOriginatorNonDeliveryReportRequested**

Type: **PtypBoolean**

Specifies whether an e-mail sender requests suppression of nondelivery receipts. This **property** MAY be absent, if so, the server automatically generates and sends a nondelivery receipt to the e-mail sender. If this property is present, it MUST be set to either “0x00”, in which case the e-mail sender requests suppression of nondelivery receipt; or “0x01”, in which case the nondelivery receipt is generated and sent.

2.2.1.18 **PidTagOriginalSensitivity**

Type: **PtypInteger32**

Contains the sensitivity value of the original e-mail message. This **property** MUST be set on the replying and forwarded e-mail messages using the **PidTagSensitivity** value of the original message, as specified in [MS-OXCMMSG] section 2.2.1.13.

2.2.1.19 **PidTagReceivedRepresentingAddressType**

Type: **PtypString**

Contains the e-mail address type for the end user represented by the receiving mailbox owner, as specified in the **RecipientRow AddressType** field ([MS-OXCDATA] section 2.10.3.2) and section 2.2.4.3 of this document. If the receiving mailbox owner receives the e-mail on his or her own behalf, this **property** MUST be set to the value of **PidTagReceivedByAddressType** (section 2.2.1.25).

2.2.1.20 **PidTagReceivedRepresentingEmailAddress**

Type: **PtypString**

Contains the e-mail address for the end user represented by the receiving mailbox owner, as specified in the **RecipientRow EmailAddress** field ([MS-OXCDATA] section 2.10.3.2). If the receiving mailbox owner receives the e-mail on his or her own behalf, this **property** MUST be set to the value of **PidTagReceivedByEmailAddress** (section 2.2.1.26).

2.2.1.21 **PidTagReceivedRepresentingEntryId**

Type: **PtypBinary**

Contains an address book **EntryID** that identifies the end user represented by the receiving mailbox owner, as specified in the **RecipientRow EntryID** field ([MS-OXCDATA] section 2.10.3.2). If the receiving mailbox owner receives the e-mail on his or her own behalf, this **property** MUST be set to the value of **PidTagReceivedByEntryId** (section 2.2.1.27).

2.2.1.22 **PidTagReceivedRepresentingName**

Type: **PtypString**

Contains the display name, for the end user represented by the receiving mailbox owner, as specified by the **RecipientRow DisplayName** field ([MS-OXCDATA] section 2.10.3.2). If the receiving mailbox owner receives the e-mail on his or her own behalf, this **property** MUST be set to the value of **PidTagReceivedByName** (section 2.2.1.28).

2.2.1.23 **PidTagReceivedRepresentingSearchKey**

Type: **PtypBinary**

Identifies an address book search key containing a binary-comparable key of the end user represented by the receiving mailbox owner, as specified by the **RecipientRow SearchKey** field ([MS-OXCDATA] section 2.10.3.2). This **property** is computed in the same way that **PidTagReceivedBySearchKey** is computed. If the receiving mailbox owner receives the e-mail on his or her own behalf, this **property** MUST be set to a value identical to the value of **PidTagReceivedBySearchKey** (section 2.2.1.29).

2.2.1.24 **PidTagReadReceiptRequested**

Type: **PtypBoolean**

Specifies whether the e-mail sender requests a read receipt from all **recipients** when this e-mail is read or opened. This **property** MAY be absent, in which case, no read receipt is sent to the e-mail's sender. If the property is present, it MUST be set to either "0x01", in which case the e-mail's sender requests the read receipt from the messaging system; or "0x00" in which case no read receipt is requested by the e-mail's sender.

If an **E-mail object**, with **PidTagReadReceiptRequested** set to "0x01", is deleted, or expires due to the time limit set by **PidTagExpiryTime** (section 2.2.3.7) before the read receipt for this e-mail is generated, a nonread receipt is generated and sent to the e-mail's sender or designated receipt recipient.

2.2.1.25 **PidTagReceivedByAddressType**

Type: **PtypString**

MUST contain the e-mail message receiver's e-mail address type as specified by the **RecipientRow AddressType** field ([MS-OXCDATA] section 2.10.3.2) and section 2.2.4.3 of this document.

2.2.1.26 **PidTagReceivedByEmailAddress**

Type: **PtypString**

MUST contain the e-mail message receiver's e-mail address as specified by the **RecipientRow EmailAddress** field ([MS-OXCDATA] section 2.10.3.2).

2.2.1.27 **PidTagReceivedByEntryId**

Type: **PtypBinary**

Identifies an address book **EntryID** that MUST contain the e-mail message receiver of the **E-mail object**. The address book EntryID data format is specified by the **RecipientRow EntryID** field ([MS-OXCDATA] section 2.10.3.2).

2.2.1.28 **PidTagReceivedByName**

Type: **PtypString**

MUST contain the e-mail message receiver's display name, as specified by the **RecipientRow DisplayName** field ([MS-OXCDATA] section 2.10.3.2).

2.2.1.29 **PidTagReceivedBySearchKey**

Type: **PtypBinary**

Identifies an address book search key that contains a binary-comparable key used to identify correlated objects for a search. This **property** MUST be computed and set by concatenating the message receiver's **AddressType** and **EmailAddress** with a colon in between, (for example, <TYPE>:<E-MAIL ADDRESS>) as specified by the **RecipientRow SearchKey** field ([MS-OXCDATA] section 2.10.3.2).

2.2.1.30 **PidTagRecipientReassignmentProhibited**

Type: **PtypBoolean**

Specifies whether adding additional or different **recipients**, when forwarding the message, is prohibited for the e-mail message. This **property** is set based on the e-mail message's **PidTagSensitivity** value as specified in [MS-OXCMSG] section 2.2.1.13. If **PidTagSensitivity** is set to "0x00000000" (normal) or "0x00000003" (confidential), this property MUST be set to "0x00" or absent meaning that adding additional or different recipients to the e-mail message is allowed. If the **E-mail object's PidTagSensitivity** is set to "0x00000001" (personal) or "0x00000002" (private), this property MUST be set "0x01" to prevent adding additional or different recipients of this e-mail through forwarding.

2.2.1.31 **PidTagReplyRecipientEntries**

Type: **PtypBinary**

Identifies a **FlatEntryList** of address book **EntryIDs** for **recipients** that are to get a reply. When **PidTagReplyRecipientEntries** and **PidTagReplyRecipientNames** are defined, the reply is sent to all of the recipients identified by these two properties. This **property** MAY be absent, in which case, a reply is sent only to the user identified by **PidTagSenderId**. If present, the property MUST be set to a **FlatEntryList** of recipient EntryIDs as specified in [MS-OXCDATA] section 2.3.3.

PidTagReplyRecipientEntries and **PidTagReplyRecipientNames** properties MUST be set in a way that they contain the same number of recipients in the same order.

2.2.1.32 **PidTagReplyRecipientNames**

Type: **PtypString**

Contains a list of display names for **recipients** that are to get a reply. The **property** MAY be absent, in which case, a reply is sent only to the user identified by **PidTagSenderName**. If present, the property MUST be set to one string, with the address book entry's recipient display names separated by semicolons.

2.2.1.33 **PidTagReplyRequested**

Type: **PtypBoolean**

Specifies whether a reply to the e-mail is requested by the e-mail's sender. The **property** MAY be absent, in which case, the reply to the e-mail message is not requested. If the property is present, it MUST be set to either "0x01" if an e-mail sender requests a reply to the e-mail from **recipients**; or "0x00" which is the same handling as if the property is absent.

2.2.1.34 **PidTagResponseRequested**

Type: **PtypBoolean**

Specifies whether an e-mail sender requests a response to a meeting request as specified in [MS-OXOCAL] section 2.2.1.36 or a voting response (section 2.2.1.60 of this document). This **property** MAY be absent; if so, the default value "0x00" is used. If present, it MUST be set to either "0x01", in which case, the response to the e-mail message is requested; or "0x00" in which case, the response to the e-mail is not requested.

2.2.1.35 **PidTagSendRichInfo**

Type: **PtypBoolean**

Specifies whether the sender can receive all message content, including **Rich Text Format (RTF)** and OLE objects. This **property** MAY be absent, in which case the default value of "0x00" is used. If the property is present, this property MUST be set to either "0x01"

indicating that the sender can receive all message contents, or “0x00” indicating that the sender of the e-mail message is using a different type of e-mail client.

2.2.1.36 **PidTagSenderAddressType**

Type: **PtypString**

MUST contain the sending mailbox owner's e-mail address type as specified by the **RecipientRow AddressType** field ([MS-OXCDATA] section 2.10.3.2) and section 2.2.4.3 of this document.

2.2.1.37 **PidTagSenderEmailAddress**

Type: **PtypString**

MUST contain the sending mailbox owner's e-mail address as specified by the **RecipientRow EmailAddress** field ([MS-OXCDATA] section 2.10.3.2).

2.2.1.38 **PidTagSenderEntryId**

Type: **PtypBinary**

Identifies an address book **EntryID** that MUST contain the sending mailbox owner's address book EntryID as specified by the **Address Book EntryID** ([MS-OXCDATA] section 2.2.4.2).

2.2.1.39 **PidTagSenderName**

Type: **PtypString**

MUST contain the sending mailbox owner's display name as specified by the **RecipientRow DisplayName** field ([MS-OXCDATA] section 2.10.3.2).

2.2.1.40 **PidTagSenderSearchKey**

Type: **PtypBinary**

Identifies an address book search key that MUST contain a binary-comparable key computed by concatenating sending mailbox owner's **PidTagAddressType** and **PidTagEmailAddress** with a colon in between (for example, <TYPE>:<E_MAIL ADDRESS>) as specified by the **RecipientRow SearchKey** field ([MS-OXCDATA] section 2.10.3.2).

2.2.1.41 **PidTagSentRepresentingAddressType**

Type: **PtypString**

Contains an e-mail address type (section 2.2.4.3) for the end user represented by the sending mailbox owner. If the sending mailbox owner is sending on his or her own behalf, this **property** MUST be set to the value of **PidTagSenderAddressType**.

2.2.1.42 **PidTagSentRepresentingEmailAddress**

Type: **PtypString**

Contains an e-mail address, as specified by the **RecipientRow EmailAddress** field ([MS-OXCDATA] section 2.10.3.2), for the end user represented by the sending mailbox owner. If a sending mailbox owner is sending on his or her own behalf, this **property** MUST be set to the value of **PidTagSenderEmailAddress**.

2.2.1.43 **PidTagSentRepresentingEntryId**

Type: **PtypBinary**

Identifies an address book **EntryID**, as specified by the **Address Book EntryID** ([MS-OXCDATA] section 2.2.4.2), that contains the identifier of the end user represented by the sending mailbox owner. If the sending mailbox owner is sending on his or her own behalf, this **property** MUST be set to the value of **PidTagSenderEntryId**.

2.2.1.44 **PidTagSentRepresentingName**

Type: **PtypString**

Contains the display name for the end user represented by the sending mailbox owner. If a sending mailbox owner is sending on his or her own behalf, this **property** MUST be set to the value of **PidTagSenderName**.

2.2.1.45 **PidTagSentRepresentingSearchKey**

Type: **PtypBinary**

Identifies an address book search key, as specified by the **RecipientRow SearchKey** field ([MS-OXCDATA] section 2.10.3.2), containing a binary-comparable key which represents the end user represented by the sending mailbox owner. If a sending mailbox owner sends on his or her own behalf, this **property** MUST be set to the value of **PidTagSenderSearchKey**.

2.2.1.46 **PidTagSubjectPrefix**

Type: **PtypString**

Specified in [MS-OXCMSG] section 2.2.1.9. On an **E-mail object**, this **property** typically represents an action on the e-mail message, such as "RE: " for replying and "FW: " for forwarding. This property MAY be absent in which case, there is no subject prefix for the e-mail message.

2.2.1.47 **PidTagTransportMessageHeaders**

Type: **PtypString**

Contains transport specific message envelope information for e-mail, as specified in [RFC2821]. For outgoing messages with **recipients** who have a Simple Mail Transfer

Protocol (SMTP) address type, the client **MUST** set this **property**, and for incoming messages from a sender who has an SMTP address type, the server **MUST** set this property to a copy of the beginning of the message stream as received from SMTP, up to the first blank line (double **CRLF**).

2.2.1.48 **PidLidInternetAccountName**

Type: **PtypString**

Specifies the user-visible e-mail account name through which the e-mail message is sent. The format of this string is implementation dependent. This **property** can be used by the client to determine which server to direct the mail to, but is optional and the value has no meaning to the server.

2.2.1.49 **PidLidInternetAccountStamp**

Type: **PtypString**

Specifies the e-mail account ID through which the e-mail message is sent. The format of this string is implementation dependent. This **property** can be used by the client to determine which server to direct the mail to, but is optional and the value has no meaning to the server.

2.2.1.50 **PidTagPrimarySendAccount**

Type: **PtypString**

Specifies the first server that a client **SHOULD** attempt to send the mail with. The format of this **property** is implementation dependent. This property can be used by the client to determine which server to direct the mail to, but is optional and the value has no meaning to the server.

2.2.1.51 **PidTagNextSendAcct**

Type: **PtypString**

Specifies the server that a client is currently attempting to use to send mail. The format of this **property** is implementation dependent. This property can be used by the client to determine which server to direct the mail to, but is optional and the value has no meaning to the server.

2.2.1.52 **PidLidUseTnef**

Type: **PtypBoolean**

Specifies whether **Transport Neutral Encapsulation Format (TNEF)** **SHOULD** be included on a message when the message is converted from TNEF to **MIME** or SMTP format. This **property** **MAY** be absent, and if so, implementers of this protocol **MUST NOT** include TNEF on the message.

2.2.1.53 Attachments

The client MAY use attachments as specified in [MS-OXCMSG] section 1.3.4.

2.2.1.54 Categories and Keywords

The client MAY set categories or keywords on an e-mail message as specified in [MS-OXCMSG] section 2.2.1.17

2.2.1.55 Contacts

The client MAY set the contacts on an e-mail message as specified in [MS-OXOCNTC] and [MS-OXCMSG] section 2.2.1.21.2.

2.2.1.56 Flags

The client MAY set flags as specified in [MS-OXOFLAG].

2.2.1.57 Reminders

The client MAY set reminders as specified in [MS-OXORMDR].

2.2.1.58 Recipients

The client MUST add **recipients** to an e-mail message using **RopModifyRecipients** as specified in [MS-OXCMSG] section 2.2.3.5. **PidTagRecipientType** MUST be set to “0x00000001” for the **primary recipients**, “0x00000002” for **carbon copy recipients**, or “0x00000003” for **blind carbon copy recipients**. For the complete **RecipientRow** definition, see [MS-OXCDATA] section 2.10.3.

2.2.1.59 PidLidAutoProcessState

Type: **PtypInteger32**

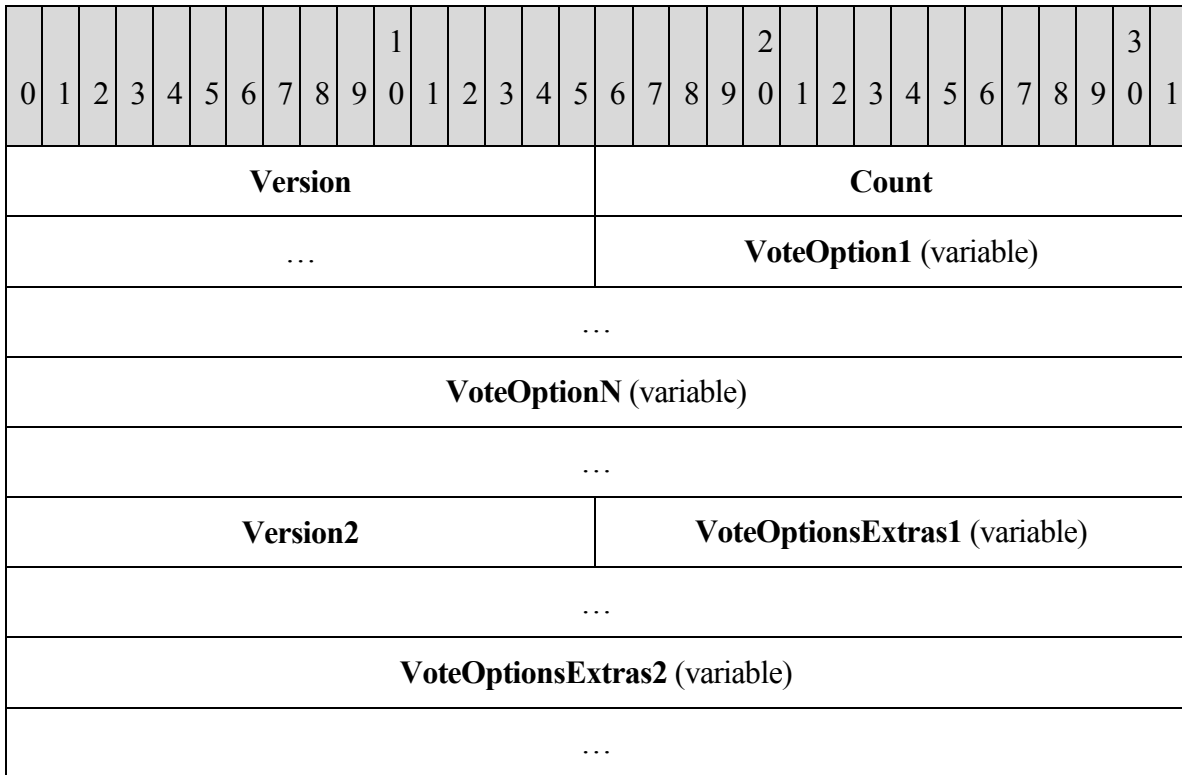
Specifies the options used in automatic processing of e-mail messages. The **property** MAY be absent, in which case the default value of “0x00000000” is used. If set, this property MUST be set to one of the values in the following table.

Value	Description
0x00000000	Do not auto-process the message.
0x00000001	Process the message automatically or when the message is opened.
0x00000002	Process the message only when the message is opened.

2.2.1.60 PidLidVerbStream

Type: **PtypBinary**

Specifies what voting responses the user can make in response to the message. For more information about client processing of this stream (or the lack of this stream), see section 3.1.5. The format is of this property described in the following diagram.



Version (WORD): MUST be set to “0x0102”.

Count (DWORD): Specifies the number of **VoteOption** and **VoteOptionExtras** to follow.

VoteOption1 (variable length structure): The first **VoteOption** structure described in section 2.2.1.60.1.

VoteOptionN (variable length structure): The last **VoteOption** structure described in section 2.2.1.60.1.

Version2 (WORD): MUST be set to “0x0104”.

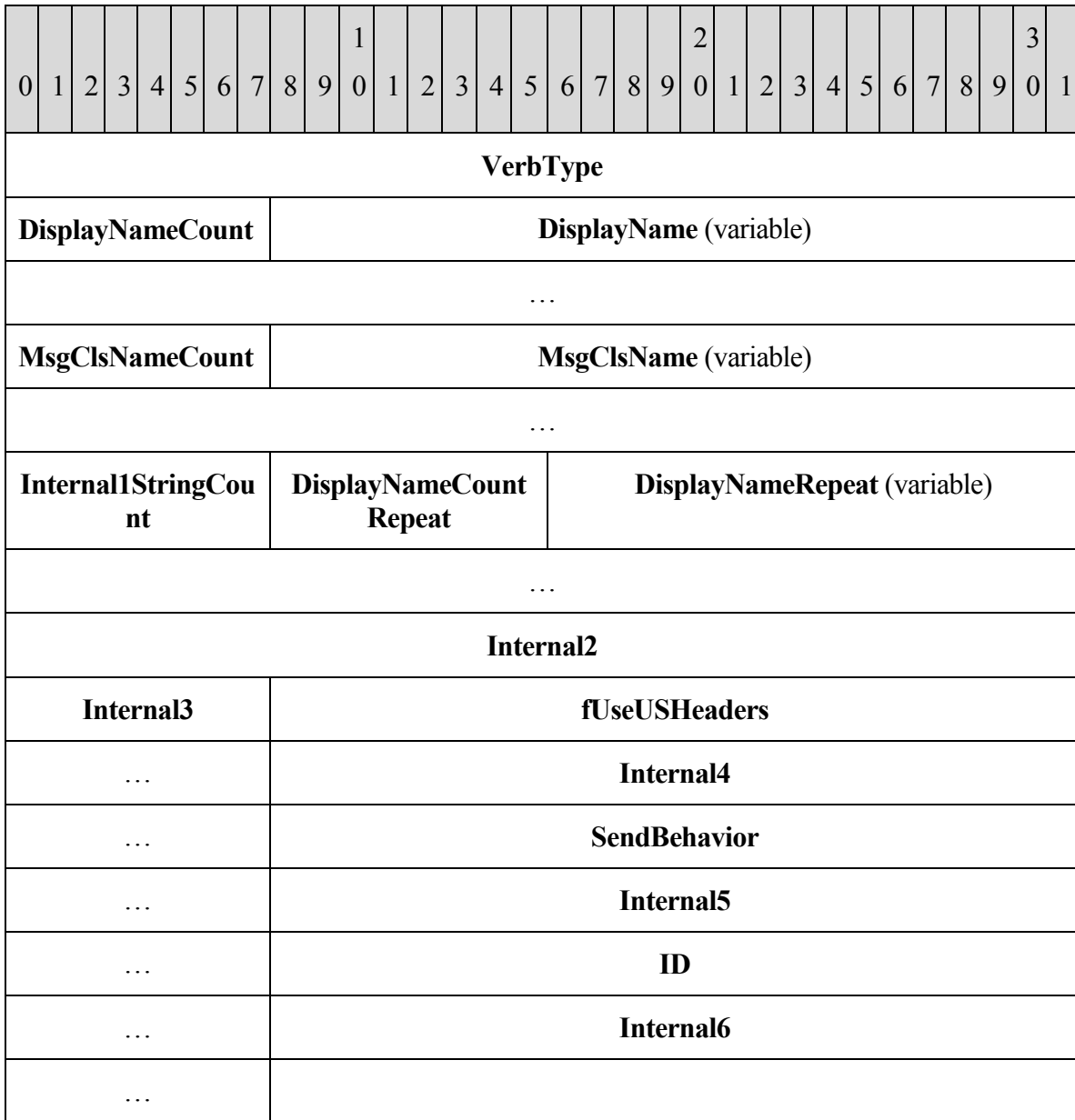
VoteOptionExtras1 (variable length structure): The first **VoteOptionExtras** structure described in section 2.2.1.60.2.

VoteOptionExtrasN (variable length structure): The last **VoteOptionExtras** structure described in section 2.2.1.60.2.

2.2.1.60.1 VoteOption Structure

The verb stream contains two parallel arrays of **VoteOption** and **VoteOptionExtra** structures. Each element in these two arrays, when combined, describe a single voting option

which can be taken by the user in response to the message. The format of the **VoteOption** structure is described in the following diagram.



VerbType (DWORD): MUST be 4 (0x00000004).

DisplayNameCount (1 byte): Count of characters in the following string.

DisplayName [ANSI String (NOT null terminated)]: The localized display name of the Voting option (for example, "Yes"), without the null terminating character.

MsgClsNameCount (1 byte): Count of characters in the following string. MUST be 8 (0x08).

MsgClsName [ANSI String (NOT null terminated)]: MUST be "IPM.Note", without the null terminating character.

Internal1StringCount (1 byte): Count of characters in the following string. MUST be "0x00" for voting options.

Internal1String [ANSI String (NOT null terminated)]: MUST not be present, as **Internal1StringCount** is always "0x00" for a voting option.

DisplayNameCountRepeat (1 byte): MUST have the same value as **DisplayNameCount**.

DisplayNameRepeat [ANSI String (NOT null terminated)]: MUST have the same value as **DisplayName**.

Internal2 (DWORD): MUST be 0 (0x00000000).

Internal3 (1 byte): MUST be "0x00".

fUseUSHeaders (DWORD): Indicates that a US style reply header is to be used in the response message (as opposed to a localized response header). The value MUST be either "0x00000001", using US style reply header, or "0x00000000" otherwise.

Internal4 (DWORD): MUST be "0x00000001".

SendBehavior (DWORD): Indicates the behavior on send. When a user chooses a voting option, **SendBehavior** specifies if the user is to be prompted to edit the response mail, or automatically send it on behalf of the user. The value of this field MUST be one of the values defined in the following table.

Value	Description
0x00000001	Automatically send the voting response message.
0x00000002	Prompt the user if he or she would like to automatically send or edit the voting response first..

Internal5 (DWORD): MUST be 2 (0x00000002).

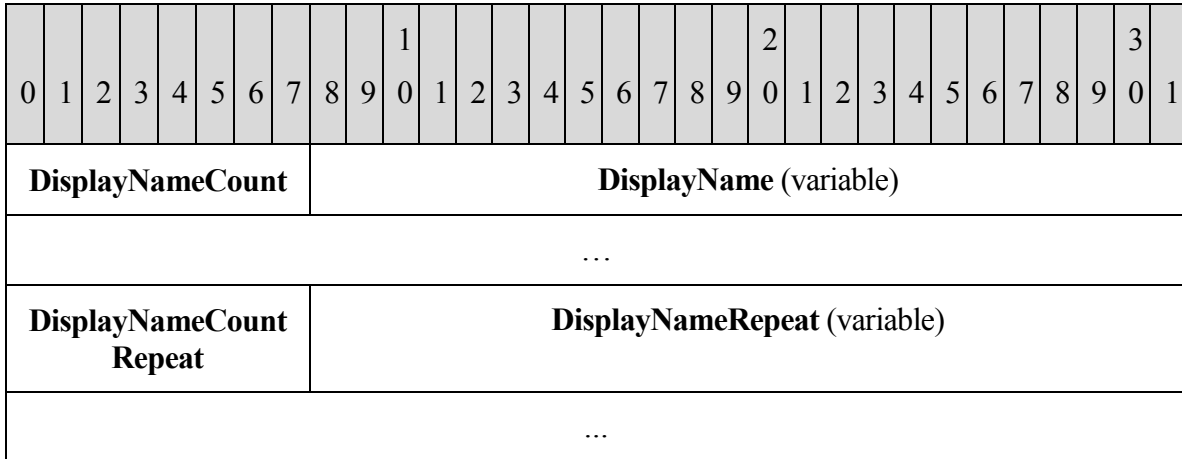
ID (DWORD): Specifies a numeric identifier for this voting option. The client SHOULD specify 1 for the first **VoteOption**, and monotonically increase this value for each subsequent **VoteOptions**.

Internal6 (DWORD): MUST be -1 (0xFFFFFFFF).

Note that because the **DisplayNameCount** (and **DisplayNameCountRepeat**) fields are 1-byte long and contain the count of characters in **DisplayName** (and **DisplayNameRepeat**), this implies a length limit of 255 characters in the **DisplayName** of any voting option.

2.2.1.60.2 VoteOptionExtras Structure

Each element contains additional information about the corresponding **VoteOptions** entry. The format is described in the following diagram.



DisplayNameCount (1 byte): Count of **Unicode** characters (NOT bytes) in the following string.

DisplayName [Unicode String (NOT null terminated)]: The display name of this voting option, as a Unicode string, without a null terminator.

DisplayNameCountRepeat (1 byte): Count of characters in the following string. MUST have the same value as **DisplayNameCount**.

DisplayNameRepeat [Unicode String (NOT null terminated)]: MUST have the same value as **DisplayName**.

2.2.1.61 PidLidVerbResponse

Type: **PtypString**

Specifies the voting option a respondent has selected. This **property** SHOULD be set to one of the voting button display names on which the respondent votes.

2.2.1.62 PidTagTargetEntryId

Type: **PtypBinary**

Used in conjunction with an optimizing send client. For more details, see sections 3.1.4.4 and 3.2.5.1.2.8

2.2.2 Message Status Reports

2.2.2.1 PidTagMessageClass

Type: **PtypString**

Contains a **Message object** class name. For report messages, the **property** MUST be set to the value in the form: "REPORT.X.<receipt types>" where X is the original message class name, such as "IPM.NOTE" for an **E-mail object**, and <receipt-type> is one of the following receipt types:

- **IPNRN**: Read receipt
- **IPNNRN**: Non-read receipt
- **DR**: Delivery receipt
- **NDR**: Non-delivery receipt

Therefore, the report messages of the IPM.NOTE message class name listed in the following table.

Report type	Message class name (PtypString)
Read Receipt	REPORT . IPM . NOTE . IPNRN
Nonread Receipt	REPORT . IPM . NOTE . IPNNRN
Delivery Receipt	REPORT . IPM . NOTE . DR
Nondelivery Receipt	REPORT . IPM . NOTE . NDR

2.2.2.2 PidTagOriginalDeliveryTime

Type: **PtypTime**

MUST be set on read/nonread **Report** objects or replying/forwarding **Message objects** using the value of **PidTagMessageDeliveryTime** from the original message.

2.2.2.3 PidTagOriginalDisplayTo

Type: **PtypString**

MUST be set on report messages using the value of **PidTagDisplayTo** from the original message, if present.

2.2.2.4 PidTagOriginalDisplayCc

Type: **PtypString**

MUST be set on report messages using the value of **PidTagDisplayCc** from the original message, if present.

2.2.2.5 PidTagOriginalDisplayBcc

Type: **PtypString**

MUST be set on report messages using a copy of the **PidTagDisplayBcc** value from the original message, if present.

2.2.2.6 **PidTagOriginalSenderAddressType**

Type: **PtypString**

MUST be set on delivery report messages using the value of the original message sender's **PidTagSenderAddressType** as specified by the **RecipientRow AddressType** field ([MS-OXCDATA] section 2.10.3.2).

2.2.2.7 **PidTagOriginalSenderEmailAddress**

Type: **PtypString**

MUST be set on delivery report messages to the value of the original message sender's **PidTagSenderEmailAddress** property as specified in section 2.2.1.37.

2.2.2.8 **PidTagOriginalSenderEntryId**

Type: **PtypBinary**

Contains an address book **EntryID** that MUST be set on delivery report messages to the value of the **PidTagSenderEntryId** property from the original e-mail, as specified in section 2.2.1.38.

2.2.2.9 **PidTagOriginalSenderName**

Type: **PtypString**

MUST be set on delivery report messages to the value of the original message sender's **PidTagSenderName** property, as specified in section 2.2.1.39.

2.2.2.10 **PidTagOriginalSenderSearchKey**

Type: **PtypBinary**

Contains an address book search key that MUST be set on delivery report messages to the value of the **PidTagSenderSearchKey** property of the original e-mail message, as specified in section 2.2.1.40.

2.2.2.11 **PidTagOriginalSentRepresentingAddressType**

Type: **PtypString**

Contains the address type of the end user represented by the original e-mail message sender. It MUST be set to the value of the **PidTagSentRepresentingAddressType** property of the original e-mail message, as specified in section 2.2.1.41.

2.2.2.12 **PidTagOriginalSentRepresentingEmailAddress**

Type: **PtypString**

Contains the e-mail address of the end user represented by the original e-mail message sender. It **MUST** be set to the value of the **PidTagSentRepresentingEmailAddress** property of the original e-mail message, as specified in section 2.2.1.42.

2.2.2.13 **PidTagOriginalSentRepresentingEntryId**

Type: **PtypBinary**

Identifies an address book **EntryID** containing the entry identifier of the end user represented by the original message sender. It **MUST** be set to the value of the **PidTagSentRepresentingEntryId** property of the original message, as specified in section 2.2.1.43.

2.2.2.14 **PidTagOriginalSentRepresentingName**

Type: **PtypString**

Contains the display name of the end user represented by the original e-mail message sender; **MUST** be set to the value of the **PidTagSentRepresentingName** property of the original e-mail message, as specified in section 2.2.1.44.

2.2.2.15 **PidTagOriginalSentRepresentingSearchKey**

Type: **PtypBinary**

Identifies an address book search key containing the **SearchKey** of the end user represented by the original message sender. It **MUST** be set to the value of the **PidTagSentRepresentingSearchKey** property of the original message, as specified in section 2.2.1.45.

2.2.2.16 **PidTagOriginalSubject**

Type: **PtypString**

Specifies the subject of the original message and **MUST** be set to the concatenated values of the **PidTagSubjectPrefix** and **PidTagNormalizedSubject** properties of the original message.

2.2.2.17 **PidTagOriginalSubmitTime**

Type: **PtypTime**

Specifies the original e-mail's submission date and time and **MUST** be set to the value of the **PidTagClientSubmitTime** property. The **property** is used in reports only and once set, it **MUST NOT** be changed.

2.2.2.18 PidTagParentKey

Type: **PtypBinary**

Contains the search key used to correlate the original message and the reports about the original message. The server **MUST** set the **property** on the report message to the value of the **PidTagSearchKey** property of the original e-mail message, as specified in [MS-OXCMMSG].

2.2.2.19 PidTagReportTag

Type: **PtypBinary**

Contains the data used to correlate the report and the original message. The **property** **MAY** be absent if the sender does not request a reply or response to the original e-mail. If the original **E-mail object** has either the **PidTagResponseRequested** property set to “0x01” or the **PidTagReplyRequested** property set to “0x01”, the property **MUST** be set on the original **E-mail object** using the following format.

0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1
Cookie																															
Continue Cookie																															
0x00										Version																					
Continue version										StoreEntryIdSize																					
Continue size										StoreEntryId (variable)																					
FolderEntryIdSize																															
FolderEntryId (variable)																															
MessageEntryIdSize																															
MessageEntryId (variable)																															
SearchFolderEntryIdSize																															
SearchFolderEntryId (variable)																															

MessageSearchKeySize
MessageSearchKey(variable)
Ansi Text Size
Ansi Text (variable)

Cookie (9 bytes: string): Nine characters used for validation; MUST be "PCDFEB09".

Version (4 bytes): MUST be either **CurrentVersion** (0x00010002) or **NoSearchFolderVersion** (0x00010001).

StoreEntryIdSize (4 bytes): Size of **StoreEntryId**.

StoreEntryId (variable length of bytes): If **StoreEntryIdSize** is "0x00000000", this field MUST be omitted. If the size is not zero, this field MUST be filled with the specified number of bytes.

FolderEntryIdSize (4 bytes): Size of **FolderEntryId**.

FolderEntryId (variable length of bytes): If **FolderEntryIdSize** is "0x00000000", this field MUST be omitted. If the size is not zero, the field MUST be filled with the specified number of bytes.

MessageEntryIdSize (4 bytes): Size of **MessageEntryId**.

MessageEntryId (variable length of bytes): If **MessageEntryIdSize** is "0x00000000", this field MUST be omitted. If the size is not zero, the field MUST be filled with the specified number of bytes.

SearchFolderEntryIdSize (4 bytes): If **Version** equals to the **CurrentVersion**, this MUST be the real size of **SearchFolderEntryId**. Otherwise, MUST be set to "0x00000000".

SearchFolderEntryId (variable length of bytes): If **SearchFolderEntryIdSize** is not zero, this field MUST be the specified number of bytes of **SearchFolderEntryId**. Otherwise, if size is zero, this field MUST be omitted.

MessageSearchKeySize (4 bytes): Size of **MessageSearchKey**.

MessageSearchKey (variable length of bytes): MUST be set to the specified number of bytes.

Ansi Text Size (4 bytes): Number of characters in the **Ansi Text** field.

Ansi Text (variable bytes): The subject of the original message.

2.2.2.20 PidTagReportText

Type: **PtypString**

Contains the optional text for a report message. This **property** MAY be absent, in which case, there is no report text from the server. If present, the server MUST set this property to the text string in response to a report type from the underlying messaging system.

2.2.2.21 PidTagReadReceiptEntryId

Type: **PtypBinary**

Contains an address book **EntryID**, as specified in [MS-OXCDATA] section 2.2.4.2, representing the user to whom a read receipt is directed. This property is only used and validated if the **PidTagReadReceiptRequested** property is set to “0x01”. This property MAY be absent, in which case, the **PidTagReportEntryId** property is used as an alternative value. If neither property is present, the **PidTagSenderEntryId** property value is used to identify the user who receives the read receipt.

2.2.2.22 PidTagReadReceiptSearchKey

Type: **PtypBinary**

Contains an address book search key, as specified in [MS-OXCDATA] section 2.10.3.2, representing the user to whom a read receipt is directed. This property is only used and validated if the **PidTagReadReceiptRequested** property is set to “0x01”. The property MAY be absent, in which case, the **PidTagReportSearchKey** property value is used as an alternative. If neither property is present, the **PidTagSenderSearchKey** property value is used to identify the user who receives the read receipt.

2.2.2.23 PidTagSubjectPrefix

Specified in section 2.2.1.46.<3>

2.2.3 E-mail Submission Properties

The following properties are specified in [MS-OXPROPS], and are properties of the **recipients** identified in the recipient table. These properties are used to control server behavior during message submission.

2.2.3.1 PidTagRecipientType

Type: **PtypInteger32**

Represents the **recipient** type of a recipient on the message. This property MUST be set on each recipient. The format of this **property** is listed in the following table.

Value	Description
0x00000000	The recipient is the message originator.
0x00000001	The recipient is a primary recipient .

0x00000002	The recipient is a carbon copy recipient
0x00000003	The recipient is a blind carbon copy recipient .

Additionally, the flags in the following table can be combined with the above values.

Flag	Description
0x10000000	If a message failed to be delivered to some recipients, the client can mark the message as a resend message by setting the mfResend bit (0x00000080) in the PidTagMessageFlags property. Combining this flag with the value of the PidTagRecipientType property indicates that the server MUST resend the message to the recipient.
0x80000000	On a resend message, the recipient received the message successfully and does not need to receive it again. The server MUST NOT send the resend message to the recipient.

2.2.3.2 PidTagDeferredSendNumber

Type: **PtypInteger32**

When sending a message is deferred, the **PidTagDeferredSendNumber** property **SHOULD** be set along with the **PidTagDeferredSendUnits** property if the **PidTagDeferredSendTime** property is absent. The value **MUST** be set between “0x00000000” and “0x000003E7” (0 and 999).

PidTagDeferredSendNumber is used for computing **PidTagDeferredSendTime** when **PidTagDeferredSendTime** is not present. For more details about **PidTagDeferredSendUnits** and **PidTagDeferredSendTime**, see sections 2.2.3.3 and 2.2.3.4 respectively.

2.2.3.3 PidTagDeferredSendUnits

Type: **PtypInteger32**

Specifies the unit of time that the **PidTagDeferredSendNumber** property value **SHOULD** be multiplied by. For more details about the **PidTagDeferredSendTime** property, see section 2.2.3.4. If set, **PidTagDeferredSendUnits** **MUST** have one of the following values.

PidTagDeferredSendUnits	Description
0x00000000	Minutes, for example 60 seconds
0x00000001	Hours, for example 60x60 seconds
0x00000002	Day, for example 24x60x60 seconds
0x00000003	Week, for example 7x24x60x60 seconds

2.2.3.4 **PidTagDeferredSendTime**

Type: **PtypTime**

MAY be present if a client would like to defer sending the message after a certain amount of time.

If **PidTagDeferredSendUnits** and **PidTagDeferredSendNumber** are present, the value of **PidTagDeferredSendTime** is recomputed using the following formula and the old value is ignored.

$$\text{PidTagDeferredSendTime} = \text{PidTagClientSubmitTime} + \text{PidTagDeferredSendNumber} * \text{TimeOf}(\text{PidTagDeferredSendUnits})$$

If **PidTagDeferredSendTime** value is earlier than the current time (in UTC), the message is sent immediately.

2.2.3.5 **PidTagExpiryNumber**

Type: **PtypInteger32**

Used along with **PidTagExpiryUnits** to define the expiry send time. If **PidTagExpiryNumber** is present, the value MUST be set between “0x00000000” and “0x000003E7” (0 and 999).

2.2.3.6 **PidTagExpiryUnits**

Type: **PtypInteger32**

Used to describe the unit of time that **PidTagExpiryNumber** multiplies. If set, **PidTagExpiryUnits** MUST be one of the following values.

PidTagExpiryUnits	Meaning (TimeOf)
0x00000000	Minutes, for example 60 seconds
0x00000001	Hours, for example 60x60 seconds
0x00000002	Day, for example 24x60x60 seconds
0x00000003	Week, for example 7x24x60x60 seconds

2.2.3.7 **PidTagExpiryTime**

Type: **PtypTime**

MAY be present when a client wants to receive an expiry event if the message arrives late.

If **PidTagExpiryNumber** and **PidTagExpiryUnits** are present, the value of **PidTagExpiryTime** is recomputed by the following formula and the old value is ignored.

$$\text{PidTagExpiryTime} = \text{PidTagClientSubmitTime} + \text{PidTagExpiryNumber} * \text{TimeOf}(\text{PidTagExpiryUnits})$$

2.2.3.8 **PidTagDeleteAfterSubmit**

Type: **PtypBoolean**

Indicates that the original message MUST be deleted after the message is sent. If the **property** is not present, the server uses the value is “0x00”.

2.2.3.9 **PidTagMessageDeliveryTime**

Type: **PtypTime**

The server MUST set the value of this property to the current time (in **UTC**) when it receives a message.

2.2.3.10 **PidTagSentMailSvrEID**

Type: **PtypBinary**

Represents the **Sent Mail folder** for the message. This folder MUST not be a **search folder**. The server requires write permission on the folder so that the sent e-mail message can be copied to the Sent Mail folder.

If present, a copy of the message MUST be created in the specified folder after the message is sent.

2.2.3.11 PidTagClientSubmitTime

Type: **PtypTime**

The server **MUST** set the value of this property to the current time (in **UTC**) when the e-mail message is submitted.

2.2.4 ROPs Used in Sending Message

The format of the **RopSubmitMessage** and **RopAbortSubmit** request and response buffers are specified in [MS-OXCROPS] sections 2.2.6.1 and 2.2.6.2 respectively.

2.2.4.1 RopSubmitMessage

A **RopSubmitMessage** request is sent to the server when the client has an **E-mail object** to send.

The client **MUST** log on as a user with sufficient permissions to write messages because the server needs to modify certain properties (section 3.2).

The message is identified by the **handle** index which is maintained by both the server and client for the **Message** object. The handle index **MUST** be acquired by a previous **RopOpenMessage** or **RopCreateMessage** request.

When a message is submitted, any pending changes on the message are saved to the server.

2.2.4.1.1 Request Buffer

SubmitFlags (X bytes): When the client submits the message, the **SubmitFlags** value indicates how the message **SHOULD** be delivered. The following table lists the possible values.

Name	Value	Description
None	0x00	None.
PreProcess	0x01	The message needs to be preprocessed by the server.
NeedsSpooler	0x02	The message is to be processed by a client spooler.

2.2.4.1.2 Response Buffer

ReturnValue (4 bytes): The following table describes the valid return values.

Name	Value	Meaning
ecNone	0x00000000	Success.

ecShutoffQuotaExceeded	0x000004DD	Indicates that the maximum storage shut-off quota has been exceeded.
ecQuotaExceeded	0x000004D9	Indicates that the storage quota is exceeded for the mailbox, but the user can still receive mail.
ecNotSupported	0x80040102	Indicates that the server object associated with the input handle index in the server object table is not of type Message or the current logon session is a public logon.
ecTooManyRecips	0x00000505	Indicates that the number of recipients on the message exceeds the allowed limit. If this error occurs, none of the recipients will receive this message.
ecAccessDenied	0x80070005	Indicates that the message is a folder associated information (FAI) message.
ecRequiresRefResolve	0x0000047E	Indicates that the attachments contain references to paths that are inaccessible to the server and need to be resolved.

2.2.4.2 RopAbortSubmit

Before an **E-mail object** is actually processed by the server or a client **mail spooler**, a client can send a **RopAbortSubmit** request in an attempt to abort the submission.

If the operation succeeds, the message currently queued on the server will be removed from the server. Unless the message is submitted for sending again, the message will not be delivered to its **recipients**.

The message to be aborted is identified by the **FolderId** and **MessageId** fields in the request buffer. **RopSubmitMessage** MUST have been invoked on this message previously.

2.2.4.2.1 Response Buffer

ReturnValue (4 bytes): The following table describes the valid return values.

Name	Value	Meaning
ecNone	0x00000000	Success.

ecUnableToAbort	0x80040114	The operation cannot be aborted.
ecNotInQueue	0x80040601	The message is no longer in the message store's spooler queue .
ecNotSupported	0x80040102	The server object associated with the input handle index in the server object table is not of type logon or the current logon session is a public logon.
ecNotFound	0x8004010F	The parent folder ID (FID) or message ID (MID) is invalid.

2.2.4.3 RopGetAddressTypes

A **RopGetAddressTypes** request is sent by a client to retrieve the address types of **recipients** supported by server.

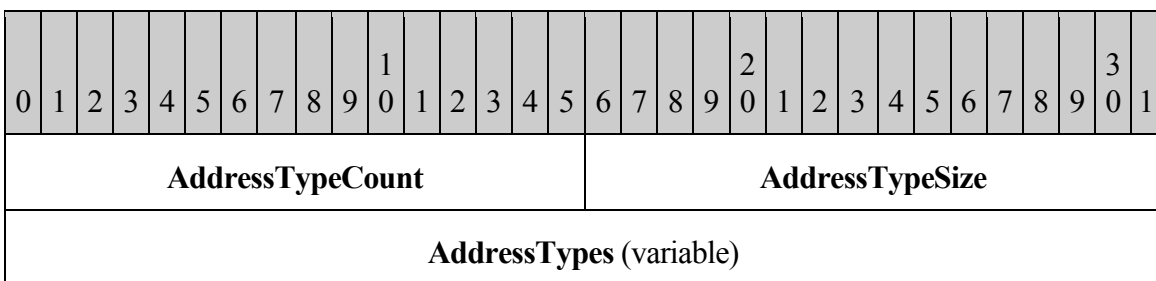
In the request, the server object associated with the input **handle** index in the server object table is ignored by the server.

2.2.4.3.1 ResponseBuffer

ReturnValue (4 bytes): The following table describes the valid return values.

Name	Value	Meaning
ecNone	0x00000000	Success.
ecBufferTooSmall	0x0000047D	The response buffer is not large enough to hold the results.
ecNotSupported	0x80040102	The server does not support returning address types.

Also in the response buffer, address types are returned in the format specified in the following diagram.



AddressTypeCount (2 bytes): The number of address types returned.

AddressTypeSize (2 bytes): The total length of the **AddressTypes** that follows.

AddressTypes (variable): An array of NULL terminated **ASCII** strings each representing an address type.<4>

2.2.5 E-mail Sending and Delivery ROPs

The following ROP requests can be used by a client if it needs to control the receipt of mail that is not delivered directly to the server, or sending of mail from an e-mail account not supported on the server.

2.2.5.1 RopSetSpooler

The **RopSetSpooler** request is sent to inform the server that the client intends to act as a **mail spooler**. The syntax of the **RopSetSpooler** request and response buffers are specified in [MS-OXCROPS] section 2.2.6.4. This section specifies the syntax and semantics of various fields that are not fully specified in the [MS-OXCROPS]. The server allows multiple clients to act as spoolers.

2.2.5.1.1 Request Buffer

InputHandleIndex: The input **handle** for this operation is a logon object handle.

2.2.5.1.2 Response Buffer

ReturnValue (4 bytes): The following table describes the valid return values.

Name	Value	Meaning
ecNone	0x00000000	Success.

2.2.5.2 RopGetTransportFolder

The **RopGetTransportFolder** request is sent to retrieve the FID of the transport folder. Outgoing messages can be stored in this folder before a **RopTransportSend** request is issued. The syntax of the **RopGetTransportFolder** request and response buffers are specified in [MS-OXCROPS]. This section specifies the syntax and semantics of various fields that are not fully specified in [MS-OXCROPS].

2.2.5.2.1 Request Buffer

InputHandleIndex: The input **handle** for this operation is a logon object handle.

2.2.5.2.2 Response Buffer

ReturnValue (4 bytes): The following table describes the valid return values.

Name	Value	Meaning
ecNone	0x00000000	Success.
ecLoginFailure	0x80040111	The logon object handle is not valid.

FolderID: Contains the FID of the transport folder.

2.2.5.3 RopSpoolerLockMessage

The **RopSpoolerLockMessage** request is sent to lock the specified message for spooling. When a message is locked, the server **MUST** deny **RopAbortSubmit** requests and other requests to lock or access the message. Once a client makes a successful request to mark the message as locked, it **MUST** subsequently make a request to mark the message as unlocked or finished. The syntax of the **RopSpoolerLockMessage** request and response buffers are specified in [MS-OXCROPS]. This section specifies the syntax and semantics of various fields that are not fully specified in the [MS-OXCROPS].

2.2.5.3.1 Request Buffer

InputHandleIndex (1 byte): The input **handle** for this operation is a logon object handle.

MessageId (8 bytes): Specifies the message to be locked.

LockState (1 byte): Specifies a status to set on the message. The following table describes the valid values.

Name	Value	Meaning
lstLock	0x00	Mark the message as locked.
lstUnlock	0x01	Mark the message as unlocked.
lstFinished	0x02	Mark the message as ready for processing by the server. The server MUST move or delete the message based on the presence of PidTagSentMailSvrEID and PidTagDeleteAfterSubmit properties on the message, as specified in sections 2.2.3.8 and 2.2.3.10 respectively.

2.2.5.3.2 Response Buffer

ReturnValue (4 bytes): The following table describes the valid return values:

Name	Value	Meaning
ecNone	0x00000000	Success.

ecNoSupport	0x80040102	The server does not support sent message processing, or if the client is not the spooler.
ecNotInQueue	0x80040601	An attempt was made to lock an already locked message.

2.2.5.4 RopTransportSend

The **RopTransportSend** request is used to have the server send an e-mail message to **recipients**. The message to be sent is identified by the **handle** index which is maintained by both the server and client. The syntax of the **RopTransportSend** request and response buffers are specified in [MS-OXCROPS]. This section specifies the syntax and semantics of various fields that are not fully specified in [MS-OXCROPS]. If there was a failure to submit the message, the ROP does not fail – in this case the server generates an NDR to the message instead.

2.2.5.4.1 Request Buffer

InputHandleIndex (1 byte): The input **handle** for this operation is the handle of the **Message object** to be sent.

2.2.5.4.2 Response Buffer

ReturnValue (4 bytes): The following table describes the valid return values:

Name	Value	Meaning
ecNone	0x00000000	Success.
ecNotMe	0x80040502	The server could not handle the message and the message was not sent. The client SHOULD try another server if available.

Following the ReturnValue, the following fields are returned.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31		
NoPropertiesReturned										PropertyValueCount										PropertyValues (variable)													
...																																	

NoPropertiesReturned (X bytes): “0x00” if properties are returned; otherwise, “0x01”.

PropertyValueCount (X bytes): The number of properties in the following **PropertyValues** array. Only exists if **NoPropertiesReturned** is “0x00”.

PropertyValues (variable): A **PropertyTagArray**, as specified in [MS-OXCDATA] section 2.12. This field contains the properties set on the message by the server in the process of sending the message. Only exists if **NoPropertiesReturned** is “0x00”. This field MUST contain **PropertyValueCount** tags.

2.2.5.5 RopTransportNewMail

The **RopTransportNewMail** request is used to notify the server of new mail delivered to the message store. The syntax of the **RopTransportNewMail** request and response buffers are specified in [MS-OXCROPS]. This section specifies the syntax and semantics of various fields that are not fully specified in [MS-OXCROPS].

2.2.5.5.1 Request Buffer

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
RopId										LogonId										InputHandleIndex						MessageId					
...																															
...																											FolderId				
...																															
...																											MessageClass (variable)				
...																											MessageFlags				
...																															

InputHandleIndex (1 byte): The input **handle** for this operation is a logon object handle.

MessageId (8 bytes): Specifies the **MID** of the new message.

FolderId (8 bytes): Specifies the location of the new message.

MessageClass (variable): Zero-terminated ANSI string that specifies the value of **PidTagMessageClass** of the message.

MessageFlags (4 bytes): Specifies the value of **PidTagMessageFlags** of the message.

2.2.5.5.2 Response Buffer

ReturnValue (4 bytes): The following table describes the valid return values.

Name	Value	Meaning
ecNone	0x00000000	Success.

3 Protocol Details

3.1 Client Details

3.1.1 Abstract Data Model

This section describes a conceptual model of possible data organization that an implementation maintains to participate in this protocol. The described organization is provided to facilitate the explanation of how the protocol behaves. This document does not mandate that implementations adhere to this model as long as their external behavior is consistent with that described in this document.

The E-mail Object Protocol abstract data model extends objects specified by other protocols, as listed in the following table.

Object	Protocol
Property Property Bag Messaging Item	[MS-OXPROPS] [MS-OXCMSG]
Messaging User	[MS-OXCDATA] RecipientRow structure, [MS-OXOABK]
Store	[MS-OXCSTOR]
Folder	[MS-OXCFOLD], [MS-OXOSFLD]

An **E-mail object** is a type of **property** bag, distinguished from other messaging items and property bag types by its default storage location, its message class (the value of its **PidTagMessageClass** property), and the inclusion of certain sub-objects, as specified in the following sections.

3.1.1.1 Storage

An **E-mail object** is a messaging object with a message class of "IPM.Note". By default, a client implementation stores e-mail items in a **Folder object** that has the container class of "IPF.Note".

From the point of view of the currently logged-on messaging user, an **E-mail** object is either a send note, meaning that the e-mail is to be or has been sent *to* an external messaging user or user agent, or it is a receive note, meaning that the e-mail was sent to the current messaging user *from* an external user or user agent.

Within these groupings, an e-mail exists in one of a small number of abstract states, which determines the default storage location for that particular **E-mail** object, as specified in the following table.

E-mail state	Description	Special folder
Saved	A send note stored within an Inter-Personal Mail (IPM) folder within a Store object.	Drafts folder
Submitted	A send note that is marked to be sent by the server.	Outbox folder
Sent	A send note that has been claimed by the messaging transport for delivery to another messaging user.	Sent Mail folder
Received	A receive note that has been placed in the default receive folder by the server.	Inbox folder (default Receive Folder)

3.1.1.2 Core Objects

The abstract sub-objects which are required for every **E-mail object** are: Sender, **Recipients**, Subject, and Body.

3.1.1.2.1 Sender Sub-object

Message senders are identified by the **from properties** and the **sender properties** on an **E-mail object**. In general, the from properties and the sender properties will identify the same messaging user; for example, the message appears to have been sent by the actual sender of the message. In some cases, however, a message is sent by one user (the actual sender) on behalf of another user (the represented sender). In this case, the from properties identify the represented sender and the sender properties identify the actual sender.

3.1.1.2.1.1 Represented Sender

The represented sender of a message is the messaging user or user agent on whose behalf the message was sent (or will be sent). The **from properties** associated only with the represented sender are:

- **PidTagSentRepresentingAddressType**
- **PidTagSentRepresentingEmailAddress**

- **PidTagSentRepresentingEntryId**
- **PidTagSentRepresentingName**
- **PidTagSentRepresentingSearchKey**
- **PidTagOriginalSentRepresentingAddressType**
- **PidTagOriginalSentRepresentingEmailAddress**
- **PidTagOriginalSentRepresentingEntryId**
- **PidTagOriginalSentRepresentingName**
- **PidTagOriginalSentRepresentingSearchKey**

3.1.1.2.1.2 Actual Sender

The actual sender is the owner of the mailbox that sent (or will send) the e-mail. The **from properties** associated with the actual sender are:

- **PidTagSenderAddressType**
- **PidTagSenderEmailAddress**
- **PidTagSenderEntryId**
- **PidTagSenderName**
- **PidTagSenderSearchKey**
- **PidTagOriginalSenderAddressType**
- **PidTagOriginalSenderEmailAddress**
- **PidTagOriginalSenderEntryId**
- **PidTagOriginalSenderName**
- **PidTagOriginalSenderSearchKey**

3.1.1.2.2 Recipients Sub-object

The **Recipients** sub-object is a collection of recipients, each of which is a messaging user to whom e-mail will be (or has been) delivered. As with senders, there are two types of recipients: represented recipients and actual recipients. Within each of these types, there are three subclasses of recipients for an e-mail: To, Carbon Copy (CC), and Blind Carbon Copy (BCC).

3.1.1.2.2.1 Represented Recipients

A represented recipient is the messaging user or user agent on whose behalf the message is being received. The **recipient properties** associated with represented **recipients** are:

- **PidTagReceivedRepresentingAddressType**
- **PidTagReceivedRepresentingEmailAddress**

- **PidTagReceivedRepresentingEntryId**
- **PidTagReceivedRepresentingName**
- **PidTagReceivedRepresentingSearchKey**

3.1.1.2.2.2 Actual Recipients

An actual **recipient** is the owner of the mailbox that receives the message. The **recipient properties** associated with actual recipients are:

- **PidTagMessageRecipientMe**
- **PidTagReceivedByAddressType**
- **PidTagReceivedByEmailAddress**
- **PidTagReceivedByEntryId**
- **PidTagReceivedByName**
- **PidTagReceivedBySearchKey**
- **PidTagRecipientType**

3.1.1.2.2.3 Other From Properties

Another set of **from properties** are used to identify three subclasses of **recipients** for an e-mail: To, Carbon Copy (CC), and Blind Carbon Copy (BCC).

The from properties associated with To Recipients are:

- **PidTagDisplayTo**
- **PidTagMessageToMe**
- **PidTagOriginalDisplayTo**

The from properties associated with CC Recipients are:

- **PidTagDisplayCc**
- **PidTagMessageCcMe**
- **PidTagOriginalDisplayCc**

The from properties associated with BCC Recipients are:

- **PidTagDisplayBcc**
- **PidTagOriginalDisplayBcc**

3.1.1.2.3 Subject Sub-object

The **Subject** sub-object is a short text string intended to inform a recipient as to the contents or purpose of the e-mail. The properties associated with the **Subject** are:

- **PidTagNormalizedSubject**

- **PidTagSubjectPrefix**
- **PidTagOriginalSubject**

3.1.1.2.4 **Body Sub-object**

The **Body** sub-object, as specified in [MS-OXBBODY], contains the main contents of the e-mail. The properties associated with the **Body** are:

- **PidTagBlockStatus**
- **PidTagBody**
- **PidTagBodyHtml**
- **PidTagRtfCompressed**
- **PidTagRtfInSync**
- **PidTagMessageEditorFormat**

3.1.1.3 **Other Informational Messaging Properties**

Many properties not associated with the preceding core **E-mail objects** are included with an e-mail in support of other particular sub-objects. These sub-objects, along with their associated properties, are:

- Conversations
 - **PidTagConversationIndex**
 - **PidTagConversationTopic**

If an e-mail message in the **conversation thread** is given a new subject, this e-mail message starts the new conversation thread with a new **PidTagConversationTopic** and **PidTagConversationIndex**.

- Client Options
 - **PidTagIconIndex**
 - **PidTagMessageClass**
 - **PidTagReadReceiptRequested**
 - **PidTagReadReceiptEntryId**
 - **PidTagReadReceiptSearchKey**
 - **PidTagOriginalSensitivity**
 - **PidTagRecipientReassignmentProhibited**
 - **PidTagReplyRequested**
 - **PidTagResponseRequested**

- **PidTagReplyRecipientEntries**
- **PidTagReplyRecipientNames**
- **PidLidAutoProcessState**
- **PidLidVerbStream**
- **PidLidVerbResponse**

3.1.1.4 Message Delivery Properties

Many properties are set by the messaging system itself or by a client implementation to control the behavior of the messaging system. These properties are:

- **PidTagExpiryTime**
- **PidTagInternetMessageId**
- **PidTagOriginatorDeliveryReportRequested**
- **PidTagOriginatorNonDeliveryReportRequested**
- **PidTagSendRichInfo**
- **PidTagTransportMessageHeaders**
- **PidTagOriginalDeliveryTime**
- **PidTagOriginalSubmitTime**
- **PidTagParentKey**
- **PidTagReportTag**
- **PidTagReportText**
- **PidTagMessageFlags**
- **PidTagMessageDeliveryTime**
- **PidTagDeferredSendNumber**
- **PidTagDeferredSendUnits**
- **PidTagDeferredSendTime**
- **PidTagExpiryNumber**
- **PidTagExpiryUnits**

3.1.2 Timers

None.

3.1.3 Initialization

A client can choose to control how mail is sent to the mail transport by implementing its own **mail spooler**. To do so, the client sends the **RopSetSpooler** request after logging on to the server using **RopLogon**. The client also needs to save the FID of the **spooler queue** folder retrieved from the **RopLogon** request for later use.

3.1.4 Higher-Layer Triggered Events

None.

3.1.4.1 Sending a Message

A client sends a message by sending a **RopSubmitMessage** request to the server. The client can specify the submit flags for sending the message, as specified in section 2.2.4.1. The client can also set the sender information of the message to instruct the server on how to properly process the message.

3.1.4.1.1 Represented Sender Properties

The represented **sender properties** SHOULD be set by the client to represent the sender the message is intended to be sent from.

3.1.4.1.2 Actual Sender Properties

Actual **sender properties** MUST be set to represent the sending mailbox owner.

3.1.4.1.3 Sending the Message as the Sender Itself

When a user intends to represent him or herself as the actual sender of a message, and if the represented **sender properties** are present, they MUST be set to the values representing the user itself.

3.1.4.1.4 Sending the Message on Behalf of Another Person

If a user sends the message on behalf of another user, the represented **sender properties** MUST be set to the user the actual sender intends to represent. For more details, see [MS-OXODLGT] section 3.1.4.6.

3.1.4.2 Deferring Sending a Message

A client MAY set **PidTagDeferredSendTime** to send a message at a later time.

If both **PidTagDeferredSendNumber** and **PidTagDeferredSendUnits** are present, **PidTagDeferredSendTime** SHOULD be computed from **PidTagDeferredSendNumber** and **PidTagDeferredSendUnits**.

3.1.4.3 Sending a Message with Expiry Time

A client MAY set **PidTagExpiryTime** to set an expiry time on a message.

If both **PidTagExpiryNumber** and **PidTagExpiryUnits** are present, **PidTagExpiryTime** SHOULD be computed from **PidTagExpiryNumber** and **PidTagExpiryUnits**.

3.1.4.4 Optimizing Send

When a messaging client sends a message in a client implementation of an optimization, the client can set the **PidTagTargetEntryId** value to the **PidTagEntryId** value of the message being submitted. If this is done, the client MUST move the sent message to its local SentItems folder after submission. Eventually, when the client imports its local **Sent Mail folder** changes to server, on the server side, the server can make use of **PidTagTargetEntryId** to optimize the operation by moving a copy of the submitted **Message object** to the Sent Items folder instead of requiring the client to upload the **Message** object content again. For more details about the server operation, see section 3.2.5.1.2.8.

3.1.4.5 Resending a Message

If a message fails to be delivered to all **recipients**, a client MAY mark this message as re-send by setting **mfResend** in the **PidTagMessageFlags** property.

The server will attempt to re-deliver this message only to the recipients who did not get the message in the previous delivery attempt.

3.1.5 Message Processing Events and Sequencing Rules

3.1.5.1 Client-to-Client Interop: Voting

Voting is composed of a specific set of properties on a message used to communicate voting options and responses to one another. An overview of the sequence of events is as follows:

- A client (*sender*) sends a voting message to a variety of **recipients** (*voters*). This message contains a well-formed **PidLidVerbStream** as specified in section 2.2.1.60, but is otherwise identical to a non-voting message.
- The voters, upon receiving the message and displaying it to the user, take note of the existence of the **PidLidVerbStream** and use the property information to display an additional voting user interface to the user.
- If and when a voter selects a voting option, a specifically crafted response mail is generated and addressed to the sender.
- The sender, upon receiving response messages, aggregates them for display to the user.

It is important to note that at each point in this process, the messages sent are identical to non-voting messages except for the presence of the **PidLidVerbStream** and **PidLidVerbResponse** properties.

3.1.5.1.1 Sending a Voting Message

A client wishing to associate a series of voting options with a message MUST set the **PidLidVerbStream** property as described in section 2.2.1.60.

3.1.5.1.2 Interpreting a Voting Message

When a client receives a message, it MUST check the **PidLidVerbStream** property. If the client encounters a **VoteOption** structure that does not have "0x00000004" set for the **VerbType** field, the client MUST ignore the existence of that **VotingOption**. <5>

3.1.5.1.3 Crafting a Voting Response Message

A voting response message MUST contain all of the following:

- **PidTagSubjectPrefix** set to the **DisplayName** of the voting option chosen by the user.
- **PidLidVerbResponse** set to the voting option chosen by the user (section 2.2.1.61).

Otherwise, the message MUST be formatted as a regular reply e-mail addressed to the initial voting sender; respecting all user preferences that are applicable to such.

The client MUST honor the **SendBehavior** field of the **VoteOption** structure. If the **SendBehavior** field specifies **SendPrompt**, and if the user selects "Edit", the user MUST be displayed with the appropriate user interface to edit the automatically generated response.

3.1.5.1.4 Aggregating Voting Responses

The exact method for aggregating and displaying voting responses is a client implementation detail.<6>

3.1.5.2 Controlling the Sending of Mail

When a client wishes to control the specific server that sends a message, the message MUST be sent using the **RopSubmitMessage** request with the **NeedsSpooler** flag (0x02) set. The message is then put into the **spooler queue** folder of the message **store** on the server.

3.1.5.3 Processing a Mail in the Spooler Queue

When the client finds an **E-mail object** in the **spooler queue** folder that the client can handle <7>, it takes control of the message by sending the **RopSpoolerLockMessage** request with the **LockState** field set to **lstLock**. The client then performs any implementation dependent processing. If the client determines that the message can be handled by a particular server, it sends the **RopGetTransportFolder** request to retrieve the **FID** of a folder where temporary transport objects can be stored (clients can cache the returned FID and avoid having to send the request multiple times), creates the message to be sent to the folder, and then sends the **RopTransportSend** request to have that server deliver the message. If the client handles

delivering the mail itself, it MUST set the **R** flag (0x8000) of the **RecipientFlags** field of each **recipient** in the recipient table that it successfully delivers mail to.

After completing the previous steps, the client sends the **RopSpoolerLockMessage** request with the **LockState** field set to **lstFinished** if the all recipients have been sent the message, or **lstUnlock** if some recipients have not yet been sent the message. If some recipients have yet to be processed, the client MUST determine if there is another server that can deliver the e-mail. If another server is found, the client attempts to resubmit the message to the remaining recipients. If no remaining transports can deliver the mail, the client SHOULD generate a non-delivery report (NDR), or notify the user of the error.

3.1.5.4 Delivering Mail to the Server

When a message is delivered to an account on the server by the client, such as a message received from a POP3 server that is set to deliver the message into a folder on the server, then it SHOULD send a **RopTransportNewMail** request for each mail delivered to inform the server of the new mail so that the server can do new mail processing.

3.1.6 Timer Events

None.

3.1.7 Other Local Events

None.

3.2 Server Details

3.2.1 Abstract Data Model

The server role for the E-mail Object Protocol follows the abstract data model specified by the Message and Attachment Object Protocol ([MS-OXCMMSG]).

3.2.2 Timers

None.

3.2.3 Initialization

None.

3.2.4 Higher-Layer Triggered Events

None.

3.2.5 Message Processing Events and Sequencing Rules

3.2.5.1 Handling a RopSubmitMessage Request

The server performs the following operations on receipt of the **RopSubmitMessage** request.

3.2.5.1.1 Permission Check

There are restrictions on the messages that can be submitted. The server checks the submitted messages against the restrictions and returns the corresponding error code if any of the conditions in the following table are met.

Condition	Error code	Value
FAI message is submitted	ecAccessDenied	0x80000009
Embedded message is submitted	ecNotSupported	0x80040102
Upper limit of recipients is exceeded	ecTooManyRecips	0x00000505
Mailbox is running out of quota	ecQuotaExceeded	0x000004D9
No write permission on the message	ecAccessDenied	0x80070005

Further, the server **MUST** check that the sender has sufficient permissions to send this message on behalf of the actual sender that the current sender intends to represent.

If the message is sent by another user or user agent, the represented **sender properties** **MUST** be set to the user that the actual sender intends to display on the message.

3.2.5.1.2 Properties Read and/or Set Upon Submission

The following properties are checked and modified by the server on the submitted message.

3.2.5.1.2.1 PidTagSentMailSvrEID

If **PidTagSentMailSvrEID** is present, the message **MUST** be copied to the folder identified by this **property** after the message is sent out.

3.2.5.1.2.2 PidTagDeleteAfterSubmit

If **PidTagDeleteAfterSubmit** is set to “0x01”, the message **MUST** be deleted after the message is sent.

3.2.5.1.2.3 PidTagClientSubmitTime

PidTagClientSubmitTime **MUST** be set to the current time in **UTC**.

3.2.5.1.2.4 PidTagContentFilterSpamConfidenceLevel

The server SHOULD set **PidTagContentFilterSpamConfidenceLevel** to “0xFFFFFFFF” (-1). A client MAY use this value as part of junk e-mail or "spam" filtering. For more details, see [MS-OXCSPAM].

3.2.5.1.2.5 PidTagMessageLocaleId

The server SHOULD set **PidTagMessageLocaleId** to the current user logon's locale ID.

3.2.5.1.2.6 PidTagMessageFlags

If **PidTagMessageFlags**'s **mfResend** is set, the message is considered a **resend message** and the server will only try to re-deliver the message to those **recipients** who failed to receive it previously. For more details, see section 3.2.5.1.2.7.

3.2.5.1.2.7 PidTagRecipientType

If a message is a **resend message**, and if a **recipient's PidTagRecipientType** has the “0x80000000” bit set, the server will ignore this recipient; if a recipient's **PidTagRecipientType** has the “0x10000000” bit set, the server will try to re-deliver the message to this recipient.

3.2.5.1.2.8 PidTagTargetEntryId<8>

When working in optimizing send mode and sending a message, a client creates a copy of the message in a server folder and MAY set the new message's **PidTagTargetEntryId** value equal to the value of **PidTagEntryId** on the original message. Upon the invocation of **PropSubmitMessage**, the server creates a copy of the submitted message and sets the value of the **PidTagEntryId** property to the value obtained from **PidTagTargetEntryId**.

If the client sets the **PidTagTargetEntryId** property value, the client MUST keep a copy of the submitted message in the **Sent Mail folder** after submission. Eventually, the client will import the move in its local Sent Mail folder to the server. The server will find the matching item due to the value of **PidTagEntryId** already existing on server. Instead of requiring the client to upload the message content again, the server completes the operation by moving the copy of the submitted message already persisted on server to the Sent Mail folder (server side). For more details, see [MS-OXCSYNC] section 3.1.5.2.2.1.2.

The following table lists other properties that SHOULD be set at the same time as the **PidTagTargetEntryId** property.

Property	Value
PidTagEntryId	Contains the same value as PidTagTargetEntryId if PidTagTargetEntryId , if present. Otherwise, a new ID is generated by the server.
PidTagMessageFlags	The mfUnsent and mfRead bits MUST be cleared.

PidTagInternetMessageId	The value SHOULD be copied from the original message.
--------------------------------	---

3.2.5.1.2.9 Represented Sender Properties

If the user or user agent who is sending the message is the mailbox owner and the represented **sender properties** are currently not present, the following represented sender properties MUST be set to the mailbox owner:

- **PidTagSentRepresentingAddressType**
- **PidTagSentRepresentingEmailAddress**
- **PidTagSentRepresentingEntryId**,
- **PidTagSentRepresentingName**
- **PidTagSentRepresentingSearchKey**

3.2.5.1.2.10 Actual Sender Properties

If the message is sent on-behalf-of another user and the represented **sender properties** represent a public folder or a distribution list, the actual sender properties MUST not be set. Otherwise, the following actual sender properties MUST be set using the values of the mailbox owner:

- **PidTagSenderAddressType**
- **PidTagSenderEmailAddress**
- **PidTagSenderEntryId**
- **PidTagSenderName**
- **PidTagSenderSearchKey**

3.2.5.1.2.11 Deferred Properties

When a message arrives with the deferred send properties set, then the server MUST honor the deferred send time.

For a message with both **PidTagDeferredSendNumber** and **PidTagDeferredSendUnits** properties present, the server will re-compute **PidTagDeferredSendTime** from **PidTagDeferredSendNumber** and **PidTagDeferredSendUnits** during message submission.

3.2.5.1.2.12 Expiry Properties

When a message arrives with the expiry properties set, then the server MUST honor the expiry time.

For a message with both **PidTagExpiryNumber** and **PidTagExpiryUnits** properties present, the server will recompute **PidTagExpiryTime** from **PidTagExpiryNumber** and **PidTagExpiryUnits** during message submission.

3.2.5.1.3 Rule Processing

When a message is submitted or delivered, it is subject to further processing by rules, as specified in [MS-OXORULE].

3.2.5.2 Handling a RopAbortSubmit Request

When a message is submitted and is still queued on the server pending delivery, the submission can be terminated by sending a **RopAbortSubmit** request.

If a submitted message's **PidTagMessageFlags's mfSubmitted** bit has not been set yet, sending the **RopAbortSubmit** request indicates to the server that SHOULD stop delivering the message by removing the message from the **spooler queue**. The **mfUnsent** bit of the message's **PidTagMessageFlags** MUST be set and the **mfSubmitted** bit of the message's **PidTagMessageFlags** MUST be cleared. Even if the message's **PidTagDeferredSendTime** has been set, the client will not be notified of the defer send event.

RopAbortSubmit MAY fail at the server's discretion. When **RopAbortSubmit** fails, the message MAY still be sent.

3.2.5.3 Handling a RopSetSpooler Request

When the **RopSetSpooler** request is received, the server marks the user logon to indicate that this is a spooler logon.

3.2.5.4 Handling a RopGetTransportFolder Request

The server MUST return an **FID** that identifies a folder that the client can use to temporarily store messages to be sent.

3.2.5.5 Handling a RopSpoolerLockMessage Request

On receipt of a **RopSpoolerLockMessage**, a server MUST take the following actions based on the value of the **LockState** field:

Value	Action
lstLock	Locks the message for the client sending the request. The request MUST fail if the message is locked by some other client.
lstUnlock	Unlock the message
lstFinish	Unlock the message and complete post-processing of sent mail as described in section 2.2.5.3.

3.2.5.6 Delivering mail on a RopSubmitMessage or RopTransportSend Request

When a client sends either the **RopSubmitMessage** request with the **NeedsSpooler** flag (0x02) not set, or the **RopTransportSend** request, the server is to attempt to send the e-mail to the intended **recipients**. For each recipient in the **recipient table** that it can send the e-mail to, it **MUST** set the **R** flag (0x8000) of the **RecipientFlags** field.

When the **NeedsSpooler** flag is set, the server **MUST** place the message into the **spooler queue** folder.

3.2.5.7 Handling a RopTransportNewMail Request

When a server receives a **RopTransportNewMail** request, it **MUST** notify all clients connected to the mailbox of the receipt of new mail using **RopNotify** and a **NewMailNotification** as described in [MS-OXCADATA] section 2.6.1.

3.2.6 Timer Events

None.

3.2.7 Other Local Events

None.

4 Protocol Examples

This section includes examples of **Message object** operations using sequences of ROP requests and responses that a client and a server might exchange. Note that the examples listed here only show the relevant portions of the specified ROPs; this is not the final byte sequence which gets transmitted over the wire. Also note that the data for multi-byte fields appears in **little-endian** format, with the bytes in the field presented from least significant to most significant. Generally speaking, these ROP requests are packed with other ROP requests, then compressed and packed in one or more RPC calls as specified in [MS-OXCROPS]. These examples assume the client has already successfully logged on to the server and has the appropriate permissions to the **Message** objects that the operations are being performed on.

4.1 Submitting a Message

In this example, suppose the client has created a new **Message object** in the mailbox and wishes to submit the **Message** object. The client previously set a few message properties to values that are not of interest to this example and are not documented here.

4.1.1 ROP Request Buffer

The **ROP request buffer** in this example resembles the following:

```
0000: 32 00 02 00
```

The composition of the bytes is as follows:

RopId: 0x32 (**RopSubmitMessage**)

LogonIndex: 0x00

HandleIndex: 0x02

SubmitFlags: 0x00 (**None**)

The first 3 bytes refer to the **RopId**, **LogonIndex**, **HandleIndex**, which are the same for all ROPs specified in [MS-OXCROPS]. The **SubmitMessageFlags** is **None**. The message identified by a **HandleIndex** value of “0x02” was submitted.

4.1.2 ROP Response Buffer

The **ROP response buffer** in this example resembles the following:

```
0000: 32 02 00 00 00 00
```

The composition of the response buffer is as follows:

RopId: 0x32 (**RopSubmitMessage**)

HandleIndex: 0x02

ReturnValue: 0x00000000 (**ecNone**)

The response's **HandleIndex** is same as the **HandleIndex** of the **RopSubmitMessage** and the return value of “0x00000000” indicates success. From the response, the client is aware that the message was submitted successfully.

4.2 Submitting a Deferred Message

In this example, suppose the client has created a new **Message object** in the mailbox and wishes to submit the **Message** object. The client sets properties related to a deferred send. The client also sets other message properties that are not described in Section 4.2.1, but the properties are not of interest to this example and are not included.

4.2.1 ROP Request Buffer

The **ROP request buffer** in this example resembles the following:

```
0000: 0A 01 01 0E 00 01 00 40 00 EF 3F 96 3F 7F F4 5E
```

```
0010: 6F C8 01
```

...

```
00xx: 32 01 01 00
```

The composition of the bytes is as follows:

RopId: 0x0A (**RopSetProperties**)

LogonIndex: 0x01

HandleIndex: 0x01
Size: 0x000E
PropertyCount: 0x0001
PropertyTag: 0x3FEF0040 (**PidTagDeferredSendTime**)
PropertyValue: 0x01C86F5EF47F3F96 (**UTC FILETIME:** 11:11:39PM 02/14/2008)
...
RopId: 0x32 (**RopSubmitMessage**)
LogonIndex: 0x01
HandleIndex: 0x01
SubmitMessageFlags: 0x00 (**None**)

The **PidTagDeferredSendTime** value of the message (identified by a **HandleIndex** of “0x01”) was set to 11:11:39PM 02/14/2008 (UTC). The client intends to defer the submission until 11:11:39PM on 02/14/2008.

4.2.2 ROP Response Buffer

The **ROP response buffer** in this example resembles the following:

```
0000: 0A 01 00 00 00 00 00 00  
...  
0000: 32 01 00 00 00 00 00
```

The composition of the response buffer is as follows:

RopId: 0x0A (**RopSetProperties**)
HandleIndex: 0x01
ReturnValue: 0x00000000 (**ecNone**)
ProblemPropertyTagCount: 0x0000
RopId: 0x32 (**RopSubmitMessage**)
HandleIndex: 0x01
ReturnValue: 0x00000000 (**ecNone**)

The response messages to both **RopSetProperties** and **RopSubmitMessage** indicate that the two remote procedure operations succeeded.

If the **RopSubmitMessage** was issued before UTC time 11:11:39PM 02/14/2008, the message would be submitted immediately. If the **RopSubmitMessage** was issued after this

time, the message is deferred for submission until the current time is equal to or is later than the deferred send time.

4.3 Aborting a Message Submission

In this example, suppose a client has submitted a **Message object**. While the message is still queued in the server, the client would like to terminate the submission.

4.3.1 ROP Request Buffer

The **ROP request buffer** in this example resembles the following:

```
0000: 34 00 00 01 00 00 03 b4-79 ca 47 01 00 00 03 b7 4  
0010: e6 5f a7
```

The composition of the request buffer is as follows:

RopId: 0x34 (**RopAbortSubmit**)

LogonIndex: 0x00

HandleIndex: 0x00

FolderId: 0001-0003b479ca47 (the **FID** of the parent folder)

MessageId: 0001-0003b7e65fa7 (the **MID** of the message submitted)

The message identified by the **HandleIndex** “0x00” was submitted previously. While the message is still queued in the server, the client sends the **RopAbortSubmit** request related to this message to terminate the submission.

4.3.2 ROP Response Buffer

The **ROP response buffer** in this example would look like:

```
0000: 34 00 00 00 00 00
```

The composition of the response buffer is as follows:

RopId: 0x34 (**RopAbortSubmit**)

HandleIndex: 0x00

ReturnValue: 0x00000000 (**ecNone**)

The response message indicates that **RopAbortSubmit** succeeded. The message has been removed from the server. The **mfUnsent** bit is set (restored) and **mfSubmitted** bit is cleared on the message's **PidTagMessageFlags**. Unless another **RopSubmitMessage** is issued on this **Message object**, the message will not be sent.

4.4 Sending an E-mail from a Messaging User to Another Messaging User

Consider the following scenario: Joe Healy needs to send a high importance e-mail to inform his customer, Ed Banti, that the order request form that Ed sent needs to be signed. Joe also wants to get a read receipt when Ed read this e-mail. The following is a description of what a client might do to accomplish Joe's intentions and the responses a server might return.

To create an **E-mail object**, the client uses **RopCreateMessage**. The server returns a success code and a **handle** to a **Message object**. Joe types in the e-mail subject and message text (plain text format), sets the e-mail to high importance, and requests a read receipt. The client then uses **RopSetProperties** to transmit Joe's e-mail message data to the server. The following table describes the value of each of the properties set by **RopSetProperties**.

Property	Property ID	Type	Value
PidTagBody	0x1000	0x001f (PtypString)	"Please sign the order request.\LF\CR"
PidTagMessageClass	0x001A	0x001F (PtypString)	"IPM.Note"
PidTagMessageFlags	0x0E07	0x0003 (PtypInteger32)	mfUnsent
PidTagConversationTopic	0x0070	0x001f (PtypString)	"Order Request"
PidTagConversationIndex	0x0071	0x0102 (PtypBinary)	22 bytes 01 c8 74 0b 0f 9c 35 2c 02 17 93 af 43 a9 8b b4 c1 bb ef 97 7d 4f
PidTagImportance	0x0017	0x0003 (PtypInteger32)	0x00000002 High Importance
PidTagMessageDeliveryTime	0x0E06	0x0040 (PtypTime)	2008/02/20 21:53:00.000
PidTagReadReceiptRequested	0x0029	0x000B (PtypBoolean)	0x01 (TRUE)
PidTagSentMailSvrEID	0x6740	0x00FB (PtypUnspecified)	21 bytes 01 01 00 00 00 00 f0 e7 c1 00 00 00 00 00 00

Property	Property ID	Type	Value
			00 00 00 00 00 00
PidTagIconIndex	0x1080	0x0003 (PtypInteger32)	0xFFFFFFFF
PidTagMessageEditorFormat	0x5909	0x0003 (PtypInteger32)	0x00000001 Plain Text
PidTagPrimarySendAccount	0x0E28	0x001F (PtypString)	000000023659R9-A11/o=First Organization/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=JoeHealy Microsoft Exchange
PidTagNextSendAcct	0x0E29	0x001F (PtypString)	000000023659R9-A11/o=First Organization/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=JoeHealy Microsoft Exchange
PidTagMessageLocaleId	0x3FF1	0x0003 (PtypInteger32)	1033 (en-us)
PidTagReportTag	0x0031	0x0102 (PtypBinary)	100 bytes (See Note 1 below)

The value of the **PidTagReportTag** property is as follows:

```

0000: 50 43 44 46 45 42 30 39-00 01 00 02 00 00 00 00
0010: 00 00 00 00 00 00 00 00-00 2e 00 00 00 00 00 00
0020: 00 1a f8 62 55 f6 35 01-4f b0 20 ce 17 75 e8 64
0030: 0b 01 00 61 2a 7b ab 49-f6 4e 4b 9c 52 db fb 5a
0040: 53 aa 1c 00 00 00 f0 e7-c1 00 00 10 00 00 00 fd

```

0050: 02 6f a5 55 15 2a 41 ab-1f 64 5d 1b da 0c 38 01

0060: 00 00 00 00

Joe then addresses this e-mail to Ed Banti as the **primary recipient**. The client locates Ed Banti's address data from the client's address book and adds Ed Banti's address data to this **E-mail object's recipient** table using **RopAddRecipients**. The following table describes the values of the **RecipientRow** elements.

RecipientRow element	Value	Description
RowID	0x00000001	Row ID number
RecipientType	0x00000001	Primary recipient
DataSize	399	
RecipientFlag	0x0651	AddressType.EXCH DisplayName XmitSameAsDisplay StandardPropsUnicode SimpleDisplayName
DNPrefixLen	0x5A (90)	
EX-Address.Type	0x00000000	DT_MAILUSER
EX-Address.EmailAddress	edbanti	
DisplayName	Ed Banti	
SimpleDisplayName	Ed Banti	

The client adds the following additional properties to the **RecipientRow** structure.

Property	PropertyID	Type	Value
PidTagObjectType	0x0FFE	0x0003 (PtypInteger32)	0x00000006

)	(MAILUSER)
PidTagDisplayType	0x3900	0x0003 (PtypInteger32)	0x00000000 DT_MAILUSER
PidTag7BitDisplayName	0x39FF	0x001F (PtypString)	Ed Banti
PidTagSmtpAddress	0x39FE	0x001F (PtypString)	edbanti@example.com
PidTagSendInternetEncoding	0x3A71	0x0003 (PtypInteger32)	0x00000000
PidTagNickname	0x6001	0x001F (PtypString)	edbanti@example.com
PidTagAccount	0x3A00	0x001F (PtypString)	edbanti
PidTagDisplayTypeEx	0x3905	0x0003 (PtypInteger32)	1073741824
PidTagRecipientTrackStatus	0x5FFF	0x0003 (PtypInteger32)	0x00000000
PidTagRecipientResourceStat e	0x5FDE	0x0003 (PtypInteger32)	0x00000000
PidTagRecipientFlags	0x5FFD	0x0003 (PtypInteger32)	0x00000001
PidTagRecipientDisplayNam e	0x5FF6	0x001F (PtypString)	Ed Banti
PidTagRecipientEntryId	0x5FF7	0x0102 (PtypBinary)	126 bytes (see the sample value for PidTagRecipientEntryI

			d following this table)
PidTagRecipientOrder	0x5FDF	0x0003 (PtypInteger32)	0x00000000

The value of the **PidTagRecipientEntryId** property is as follows:

```

0000: 00 00 00 00 dc a7 40 c8-c0 42 10 1a b4 b9 08 00
0010: 2b 2f e1 82 01 00 00 00-00 00 00 00 2f 6f 3d 46
0020: 69 72 73 74 20 4f 72 67-61 6e 69 7a 61 74 69 6f
0030: 6e 2f 6f 75 3d 45 78 63-68 61 6e 67 65 20 41 64
0040: 6d 69 6e 69 73 74 72 61-74 69 76 65 20 47 72 6f
0050: 75 70 20 28 46 59 44 49-42 4f 48 46 32 33 53 50
0060: 44 4c 54 29 2f 63 6e 3d-52 65 63 69 70 69 65 6e
0070: 74 73 2f 63 6e 3d 65 64-62 61 6e 74 69 00

```

Last, Joe sends the e-mail. The client sets the following calculated subject properties on the **E-mail object** based on the subject text on Joe's submitted message using **RopSetProperties**.

Property	PropertyID	Type	Value
PidTagSubjectPrefix	0x0003	0x001F (PtypString)	Empty string
PidTagNormalizedSubject	0x0E1D	0x001F (PtypString)	"Order Form Issue"

The client then sends a **RopSubmitMessage** request to ask server to deliver this e-mail message to Ed Banti and sends a **RopRelease** request to release the **E-mail object**.

For more details about all the ROP operations used in this example, see [MS-OXCROPS], [MS-OXCMSG], and [MS-OXOMSG] section 2.2.4. For more details about client's offline e-mail address book and recipient address data entry, see [MS-OXOAB] and [MS-OXOABK].

4.5 Sending a Message with Voting Options

In this example, a user wants to send a message with "Yes", "No", and "Maybe" voting options. To do so, the client **MUST** construct the message containing a **PidLidVerbStream** as described in section 2.2.1.60.

The complete contents of **PidLidVerbStream** in this example are show in the following stream. The other properties of the message are not specific to voting, and are omitted.

```

0000: 02 01 03 00 00 00 04 00-00 00 03 59 65 73 08 49

```



```

0010: 50 4D 2E 4E 6F 74 65 00-03 59 65 73 00 00 00 00
0020: 00 00 00 00 00 01 00 00-00 02 00 00 00 02 00 00
0030: 00 01 00 00 00 FF FF FF-FF 04 00 00 00 02 4E 6F
0040: 08 49 50 4D 2E 4E 6F 74-65 00 02 4E 6F 00 00 00
0050: 00 00 00 00 00 00 01 00-00 00 02 00 00 00 02 00
0060: 00 00 02 00 00 00 FF FF-FF FF 04 00 00 00 05 4D
0070: 61 79 62 65 08 49 50 4D-2E 4E 6F 74 65 00 05 4D
0080: 61 79 62 65 00 00 00 00-00 00 00 00 00 01 00 00
0090: 00 02 00 00 00 02 00 00-00 03 00 00 00 FF FF FF
00A0: FF 04 01 03 59 00 65 00-73 00 03 59 00 65 00 73
00B0: 00 02 4E 00 6F 00 02 4E-00 6F 00 05 4D 00 61 00
00C0: 79 00 62 00 65 00 05 4D-00 61 00 79 00 62 00 65
00D0: 00

```

The first 6 bytes contain the **Version** and **Count** fields as described in section 2.2.1.60.

```
0000: 02 01 03 00 00 00
```

Version: 0x0102

Count: 0x00000003

This indicates that the structure contains three **VoteOptions**. The first **VoteOption** begins at byte "0x0006".

```

0006: 04 00 00 00 03 59 65 73-08 49 50 4D 2E 4E 6F 74
0016: 65 00 03 59 65 73 00 00-00 00 00 00 00 00 01
0026: 00 00 00 02 00 00 00 02-00 00 00 01 00 00 00 FF
0036: FF FF FF

```

VerbType: 0x00000004

DisplayNameCount: 0x03

DisplayName: ANSI String (not null terminated): "Yes"

MsgClsNameCount: 0x08

MsgClsName: ANSI String (not null terminated): "IPM.Note"

Internal1: 0x00

DisplayNameCountRepeat: 0x03

DisplayNameRepeat: ANSI String (not null terminated): "Yes"

Internal2: 0x00000000

Internal3: 0x00

fUseUSHeaders: False (0x00000000)

Internal4: 0x00000001

SendBehavior: 0x00000002 (SendPrompt)

Internal5: 0x00000002

ID: 0x00000001

Internal6: 0xFFFFFFFF

The second and third **VoteOption** structures (for "No" and "Maybe") begin at bytes **0x0039** and **0x006A** respectively. The third **VoteOption** concludes at byte "0x00A0", and byte "0x00A1" begins the **Version2** field.

00A1: 04 01

Version2: 0x0104

This is followed by three **VoteOptionExtras** structures; a parallel array containing additional information about the three **VoteOption** structures seen earlier. The first begins at byte "0x00A3".

00A3: 03 59 00 65 00 73 00 03-59 00 65 00 73 00

DisplayNameCount: 0x03

DisplayName: Unicode String (not null terminated): "Yes"

DisplayNameCountRepeat: 0x03

DisplayNameRepeat: Unicode String (not null terminated): "Yes"

The second and third **VoteOptionExtras** structures (for "No" and "Maybe") begin at bytes "0x00B1" and "0x00BB" respectively, and constitute the remainder of the buffer.

4.6 Sending Mail to a Specific Server

Ellen Adams is using a mail client that is connected to both her work and personal e-mail accounts. Her personal e-mail account is accessed through a protocol which is not the Office/Exchange protocol, but through some other standard such as POP3. Her personal e-mail is set to deliver mail to a folder in her work account.

4.6.1 Initialization

When the mail client first initializes, it sends a **RopSetSpooler** request to inform the server that the client wants to be responsible for routing mail to the **messaging transport**:

4.6.1.1 ROP Request Buffer

The **ROP request buffer** in this example resembles the following:

```
0000: 47 06 00
```

The composition of the bytes is as follows:

RopId: 0x47 (**RopSetSpooler**)

LogonId: 0x06

InputHandleIndex: 0x00 (Handle to the logon object)

4.6.1.2 ROP Response Buffer

The server then returns a response buffer:

```
0000: 47 00 00 00 00 00
```

The composition of the response buffer is as follows:

RopId: 0x47 (**RopSetSpooler**)

InputHandleIndex: 0x00

ReturnValue: ecNone (Success)

4.6.2 Submitting the Message to the Spooler Queue Folder

Ellen then sends a mail from her work account. The client follows the example in section 4.1, except setting the **NeedsSpooler** (0x2) bit in the **SubmitFlags** field, as well as setting a **property** or somehow informing the spooler which mail transport to use. <9> The server places the message in the **spooler queue** folder (the **FID** of this folder is returned in the response buffer of a **RopLogon** request).

4.6.3 Locking the Message in the Spooler Queue Folder for Processing

Next, the client finds that a message has been placed in the **spooler queue** folder. Through an implementation dependent mechanism, it determines that it can handle the message. <10> It sends the **RopSpoolerLockMessage** request to lock the message.

4.6.3.1 ROP Request Buffer

The **ROP request buffer** in this example resembles the following:

```
0000: 48 06 00 01 00 00 03 BB-97 31 A7 00
```

The composition of the bytes is as follows:

RopId: 0x48 (**RopSpoolerLockMessage**)

LogonId: 0x06

InputHandleIndex: 0 (Handle to the logon object)

MessageId: 0001-0003bb9731a7

LockState: 0x00 (lock)

4.6.3.2 ROP Response Buffer

The server then returns a response buffer:

0000: 48 00 00 00 00 00

The composition of the response buffer is as follows:

RopId: 0x48 (**RopSpoolerLockMessage**)

InputHandleIndex: 0x00

ReturnValue: ecNone (success) (0x00000000)

4.6.4 Determining the Transport Folder

The client determines which server to route the message to (Ellen's work server). The server can be the same or different than the server holding the **spooler queue**. The client sends a **RopGetTransportFolder** request to request the location of a temporary folder for transport.

4.6.4.1 ROP Request Buffer

The **ROP request buffer** in this example resembles the following:

0000: 6D 07 01

The composition of the bytes is following:

RopId: 0x6D (**RopGetTransportFolder**)

LogonId: 0x07

InputHandleIndex: 0x01 (**Handle** to the **Logon** object)

4.6.4.2 ROP Response Buffer

The server then returns a response buffer with the **FID** of a folder that can be used to store temporary transport objects:

0000: 6D 01 00 00 00 00 01 00-00 00 00 00 00 25

The composition of the response buffer is as follows:

RopId: 0x6D (**RopGetTransportFolder**)

InputHandleIndex: 0x01

ReturnValue: ecNone (success) (0x00000000)

FolderId: 0001-0000000000025

4.6.5 Sending the Message

The client examines the locked message, performs any required processing (for example, determining whether there are any **recipients** that it knows the server cannot deliver to), and creates a copy of the message to be delivered in the folder just retrieved using the **RopCreateMessage** request ([MS-OXCMSG] section 2.2.3.2).

The client then sends a **RopTransportSend** request to have the server send the message.

4.6.5.1 ROP Request Buffer

The **ROP request buffer** in this example resembles the following:

0000: 4A 07 00

The composition of the bytes is following:

RopId: 0x4A (**RopTransportSend**)

LogonId: 0x07

InputHandleIndex: 0x00 (**Handle** to the message from **RopCreateMessage**)

4.6.5.2 ROP Response Buffer

The server then returns the following response buffer:

0000: 4A 00 00 00 00 00 00 08-00 40 00 48 00 B0 5D 07

0010: 11 A1 AF C8 01 0A 00 47-00 0F 01 04 80 1E 00 1A

0020: 0C 75 73 65 72 31 00 02-01 19 0C 7C 00 00 00 00

0030: 00 DC A7 40 C8 C0 42 10-1A B4 B9 08 00 2B 2F E1

0040: 82 01 00 00 00 00 00 00-00 2F 4F 3D 46 49 52 53

0050: 54 20 4F 52 47 41 4E 49-5A 41 54 49 4F 4E 2F 4F

0060: 55 3D 45 58 43 48 41 4E-47 45 20 41 44 4D 49 4E

0070: 49 53 54 52 41 54 49 56-45 20 47 52 4F 55 50 20

0080: 28 46 59 44 49 42 4F 48-46 32 33 53 50 44 4C 54

0090: 29 2F 43 4E 3D 52 45 43-49 50 49 45 4E 54 53 2F

00a0: 43 4E 3D 55 53 45 52 31-00 02 01 1D 0C 63 00 45

00b0: 58 3A 2F 4F 3D 46 49 52-53 54 20 4F 52 47 41 4E

00c0: 49 5A 41 54 49 4F 4E 2F-4F 55 3D 45 58 43 48 41

00d0: 4E 47 45 20 41 44 4D 49-4E 49 53 54 52 41 54 49

00e0: 56 45 20 47 52 4F 55 50-20 28 46 59 44 49 42 4F

00f0: 48 46 32 33 53 50 44 4C-54 29 2F 43 4E 3D 52 45

```

0100: 43 49 50 49 45 4E 54 53-2F 43 4E 3D 55 53 45 52
0110: 31 00 1E 00 42 00 75 73-65 72 31 00 02 01 41 00
0120: 7C 00 00 00 00 00 DC A7-40 C8 C0 42 10 1A B4 B9
0130: 08 00 2B 2F E1 82 01 00-00 00 00 00 00 00 2F 4F
0140: 3D 46 49 52 53 54 20 4F-52 47 41 4E 49 5A 41 54
0150: 49 4F 4E 2F 4F 55 3D 45-58 43 48 41 4E 47 45 20
0160: 41 44 4D 49 4E 49 53 54-52 41 54 49 56 45 20 47
0170: 52 4F 55 50 20 28 46 59-44 49 42 4F 48 46 32 33
0180: 53 50 44 4C 54 29 2F 43-4E 3D 52 45 43 49 50 49
0190: 45 4E 54 53 2F 43 4E 3D-55 53 45 52 31 00 02 01
01a0: 3B 00 63 00 45 58 3A 2F-4F 3D 46 49 52 53 54 20
01b0: 4F 52 47 41 4E 49 5A 41-54 49 4F 4E 2F 4F 55 3D
01c0: 45 58 43 48 41 4E 47 45-20 41 44 4D 49 4E 49 53
01d0: 54 52 41 54 49 56 45 20-47 52 4F 55 50 20 28 46
01e0: 59 44 49 42 4F 48 46 32-33 53 50 44 4C 54 29 2F
01f0: 43 4E 3D 52 45 43 49 50-49 45 4E 54 53 2F 43 4E
0200: 3D 55 53 45 52 31 00

```

The composition of the response buffer is as follows:

RopId: 0x4A (**RopTransportSend**)

InputHandleIndex: 0x00

ReturnValue: ecNone (success) (0x00000000)

NoPropertiesReturned: 0x00 (FALSE)

PropertyValueCount: 0x08

PropertyValues: The following table describes the properties included in the response buffer.

Property ID	Property name	Type	Data
0x00480040	PidTagProviderSubmitTime	PtypTime	2008/05/06 17:46:09.035
0x0047000A	PidTagMessageSubmissionId	PtypErrorCode	Error: 0x8004010f (MAPI_E_NOT_FOUND)

0x0C1A001E	PidTagSenderName	PtypString 8	"user1"
0x0C190102	PidTagSenderEntryId	PtypBinary	See PidTagSenderEntryId data following the table(1).
0x0C1D0102	PidTagSenderSearchKey	PtypBinary	See PidTagSenderSearchKey data following the table (2).
0x0042001E	PidTagSentRepresenting Name	PtypString 8	"user1"
0x00410102	PidTagSentRepresenting EntryId	PtypBinary	See PidTagSentRepresentingEntryId data following the table (3).
0x003B0102	PidTagSentRepresenting SearchKey	PtypBinary	See PidTagSentRepresentingSearchKey data following the table (4).

PidTagSenderEntryId data (1)

Size: 124

```

0000: 00 00 00 00 DC A7 40 C8-C0 42 10 1A B4 B9 08 00 .....@..B.....
0010: 2B 2F E1 82 01 00 00 00-00 00 00 00 2F 4F 3D 46 +/...../O=F
0020: 49 52 53 54 20 4F 52 47-41 4E 49 5A 41 54 49 4F IRST ORGANIZATIO
0030: 4E 2F 4F 55 3D 45 58 43-48 41 4E 47 45 20 41 44 N/OU=EXCHANGE AD
0040: 4D 49 4E 49 53 54 52 41-54 49 56 45 20 47 52 4F MINISTERATIVE GRO
0050: 55 50 20 28 46 59 44 49-42 4F 48 46 32 33 53 50 UP (FYDIBOHF23SP
0060: 44 4C 54 29 2F 43 4E 3D-52 45 43 49 50 49 45 4E DLT)/CN=RECIPIEN
0070: 54 53 2F 43 4E 3D 55 53-45 52 31 00 TS/CN=USER1.

```

idTagSenderSearchKey data (2)

Size: 99

```

0000: 45 58 3A 2F 4F 3D 46 49-52 53 54 20 4F 52 47 41 EX:/O=FIRST ORGA
0010: 4E 49 5A 41 54 49 4F 4E-2F 4F 55 3D 45 58 43 48 NIZATION/OU=EXCH
0020: 41 4E 47 45 20 41 44 4D-49 4E 49 53 54 52 41 54 ANGE ADMINISTRAT

```

```

0030: 49 56 45 20 47 52 4F 55-50 20 28 46 59 44 49 42 IVE GROUP (FYDIB
0040: 4F 48 46 32 33 53 50 44-4C 54 29 2F 43 4E 3D 52 OHF23SPDLT)/CN=R
0050: 45 43 49 50 49 45 4E 54-53 2F 43 4E 3D 55 53 45 ECIPIENTS/CN=USE
0060: 52 31 00 R1.

```

PidTagSentRepresentingEntryId data (3)

Size: 124

```

0000: 00 00 00 00 DC A7 40 C8-C0 42 10 1A B4 B9 08 00 .....@..B.....
0010: 2B 2F E1 82 01 00 00 00-00 00 00 00 2F 4F 3D 46 +/...../O=F
0020: 49 52 53 54 20 4F 52 47-41 4E 49 5A 41 54 49 4F IRST ORGANIZATIO
0030: 4E 2F 4F 55 3D 45 58 43-48 41 4E 47 45 20 41 44 N/OU=EXCHANGE AD
0040: 4D 49 4E 49 53 54 52 41-54 49 56 45 20 47 52 4F MINISTRATIVE GRO
0050: 55 50 20 28 46 59 44 49-42 4F 48 46 32 33 53 50 UP (FYDIBOHF23SP
0060: 44 4C 54 29 2F 43 4E 3D-52 45 43 49 50 49 45 4E DLT)/CN=RECIPIEN
0070: 54 53 2F 43 4E 3D 55 53-45 52 31 00 TS/CN=USER1.

```

PidTagSentRepresentingSearchKey data (4)

Size: 99

```

0000: 45 58 3A 2F 4F 3D 46 49-52 53 54 20 4F 52 47 41 EX:/O=FIRST ORGA
0010: 4E 49 5A 41 54 49 4F 4E-2F 4F 55 3D 45 58 43 48 NIZATION/OU=EXCH
0020: 41 4E 47 45 20 41 44 4D-49 4E 49 53 54 52 41 54 ANGE ADMINISTRAT
0030: 49 56 45 20 47 52 4F 55-50 20 28 46 59 44 49 42 IVE GROUP (FYDIB
0040: 4F 48 46 32 33 53 50 44-4C 54 29 2F 43 4E 3D 52 OHF23SPDLT)/CN=R
0050: 45 43 49 50 49 45 4E 54-53 2F 43 4E 3D 55 53 45 ECIPIENTS/CN=USE
0060: 52 31 00 R1.

```

4.6.6 Marking the Message as Ready for Post-Send Server Processing

Finally, the client sends the **RopSpoolerLockMessage** request with the finish flag to the server to have it perform any post-processing on the sent message:

4.6.6.1 ROP Request Buffer

The **ROP request buffer** in this example resembles the following:

```
0000: 48 06 00 01 00 00 03 BB-97 31 A7 02
```

The composition of the bytes is following:

RopId: 0x48 (**RopSpoolerLockMessage**)

LogonId: 0x06

InputHandleIndex: 0x00 (**Handle** to the logon object)

MessageId: 0001-0003bb9731a7

LockState: 0x02 (finish)

4.6.6.2 ROP Response Buffer

The server then returns a response buffer:

0000: 48 00 00 00 00 00

The composition of the response buffer is as follows:

RopId: 0x48 (**RopSpoolerLockMessage**)

InputHandleIndex: 0x00

ReturnValue: ecNone (success) (0x00000000)

5 Security

5.1 Security Considerations for Implementers

There are no security considerations specific to the [MS-OXOMSG] protocol. General security considerations pertaining to the underlying RPC-based transport apply ([MS-OXCROPS]).

5.2 Index of Security Parameters

None.

6 Appendix A: Office/Exchange Behavior

The information in this specification is applicable to the following versions of Office/Exchange:

- Office 2003 with Service Pack 3 applied
- Exchange 2003 with Service Pack 2 applied
- Office 2007 with Service Pack 1 applied
- Exchange 2007 with Service Pack 1 applied

Exceptions, if any, are noted below. Unless otherwise specified, any statement of optional behavior in this specification prescribed using the terms SHOULD or SHOULD NOT implies Office/Exchange behavior in accordance with the SHOULD or SHOULD NOT prescription. Unless otherwise specified, the term MAY implies that Office/Exchange does not follow the prescription.

<1> Section 2.2.1.4: The **PidTagDeferredDeliveryTime** property is can be handled by Exchange Server 2003 SP2. In Exchange 2007 SP1, only **PidTagDeferredSendTime** is used. A client SHOULD set both **PidTagDeferredDeliveryTime** and **PidTagDeferredSendTime** for deferred delivery message before submission.

<2> Section 2.2.1.8: Outlook 2003 SP3 and Outlook 2007 SP1 compute this value most of the time, and do not store the result on the object.

<3> Section 2.2.2.23: On report messages, the value of the **PidTagSubjectPrefix** property is typically set as :

Delivery receipts: *"Delivered: "*

Read receipts: *"Read: "*

Sender Response on read receipt request: *"Approved: "*

Non-deliverable receipts: *"Undeliverable: "*

Non-read receipts: *"Not Read: "read: "*

<4> Section 2.2.4.3.1: Examples of address types are: "EX", "MAPIPD", "SMTP", "MHS", "PROFS", "X400". It is possible that there are other custom address types generated by third-party applications.

<5> Section 3.1.5.1.2: Outlook 2007 SP1 also uses **PidLidVerbStream** for non-voting related actions not covered in this protocol. Each of this actions has a specific **VerbType** associated with it. The format of the **VoteOption** structure is identical for these non-voting related actions; however, the internal values specific in the structure will vary. Future versions of Outlook may further define additional **VerbTypes**; it is therefore advised that clients ignore **VoteOption** structures which do not specify **VerbTypes** that they understand. Likewise, Outlook 2007 SP1 ignores **VoteOption** structures with unknown **VerbTypes**.

<6> Section 3.1.5.1.4: Outlook 2007 SP1 uses a system similar to meeting responses in order to track voting options. When it receives a voting response, it finds the initial voting message in the sent mail folder. It then updates the recipients table for the recipient who sent the response to store the index of their response. If the user opens a voting message from the sent mail folder, it then sums the total of each response received thus far from the recipient table and displays it to the user.

<7> Section 3.1.5.3: Outlook 2003 SP3 and Outlook 2007 SP1 set the **PidTagNextSendAcct** property to a user-specified value before submitting the message using **RopSubmitMessage** to inform the spooler of the desired mail transport to use.

<8> Section 3.2.5.1.2.8: **PidTagTargetEntryId** is optimized and supported by Outlook 2007 SP1 and Exchange 2007 SP1.

<9> Section 4.6.2: The mail spooler provided in Outlook 2003 SP3 and Outlook 2007 SP1 use the value of **PidTagNextSendAcct** to determine the desired mail transport.

<10> Section 4.6.3: Outlook 2003 SP2 and Outlook 2007 SP1 examine the property **PidTagNextSendAcct**.

Index

- Aborting a message submission, 67
- Applicability statement, 13
- Client details, 50
- Glossary, 8
- Index of security parameters, 81
- Informative references, 11
- Message syntax, 14
- Messages, 14
 - Message syntax, 14
 - Transport, 14
- Normative references, 10
- Office/Exchange behavior, 81
- Prerequisites/preconditions, 13
- Protocol details, 50
 - Client details, 50
 - Server details, 59
- Protocol examples, 64
 - Aborting a message submission, 67
 - Sending an e-mail from a messaging user to another messaging user, 68
 - Submitting a deferred message, 65
 - Submitting a message, 64
- Protocol overview (synopsis), 11
- References, 10
 - Informative references, 11
 - Normative references, 10
- Relationship to other protocols, 13
- Security, 81
 - Index of security parameters, 81
 - Security considerations for implementers, 81
- Security considerations for implementers, 81
- Sending a Message Protocol examples
 - Message with voting options, 72
- Sending a Message with voting options, 72
- Sending an e-mail from a messaging user to another messaging user, 68
- Server details, 59
- Standards assignments, 14
- Submitting a deferred message, 65
- Submitting a message, 64
- Transport, 14
- Vendor-extensible fields, 14
- Versioning and capability negotiation, 13

