

[MS-XJRNL]:

Journal Record Message File Format

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Revision Summary

Date	Revision History	Revision Class	Comments
4/4/2008	0.1	New	Initial Availability.
4/25/2008	0.2	Minor	Revised and updated property names and other technical content.
6/27/2008	1.0	Major	Initial Release.
8/6/2008	1.01	Minor	Revised and edited technical content.
9/3/2008	1.02	Minor	Revised and edited technical content.
12/3/2008	1.03	Minor	Updated IP notice.
4/10/2009	2.0	Major	Updated technical content and applicable product releases.
7/15/2009	3.0	Major	Revised and edited for technical content.
11/4/2009	3.1.0	Minor	Updated the technical content.
2/10/2010	3.2.0	Minor	Updated the technical content.
5/5/2010	3.2.1	Editorial	Revised and edited the technical content.
8/4/2010	4.0	Major	Significantly changed the technical content.
11/3/2010	4.0	None	No changes to the meaning, language, or formatting of the technical content.
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11/18/2013	6.0	None	No changes to the meaning, language, or formatting of the technical content.
2/10/2014	6.0	None	No changes to the meaning, language, or formatting of the technical content.
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Date	Revision History	Revision Class	Comments
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5/26/2015	8.0	Major	Significantly changed the technical content.
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9/14/2016	8.0	None	No changes to the meaning, language, or formatting of the technical content.
7/24/2018	9.0	Major	Significantly changed the technical content.

Preliminary

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1 Introduction

The Journal Record Message File Format is used to format information about an email message that is sent through the server. The Journal Record Message File Format extends the protocols specified in [\[RFC2045\]](#) and [\[RFC2046\]](#).

Sections 1.7 and 2 of this specification are normative. All other sections and examples in this specification are informative.

1.1 Glossary

This document uses the following terms:

ASCII: The American Standard Code for Information Interchange (ASCII) is an 8-bit character-encoding scheme based on the English alphabet. ASCII codes represent text in computers, communications equipment, and other devices that work with text. ASCII refers to a single 8-bit ASCII character or an array of 8-bit ASCII characters with the high bit of each character set to zero.

Augmented Backus-Naur Form (ABNF): A modified version of Backus-Naur Form (BNF), commonly used by Internet specifications. ABNF notation balances compactness and simplicity with reasonable representational power. ABNF differs from standard BNF in its definitions and uses of naming rules, repetition, alternatives, order-independence, and value ranges. For more information, see [\[RFC5234\]](#).

blind carbon copy (Bcc) recipient: An addressee on a Message object that is not visible to recipients of the Message object.

body: The contents of a **body part** or an entire message that contains several body parts, as described in [\[RFC2045\]](#).

body part: A part of an Internet message, as described in [\[RFC2045\]](#).

carbon copy (Cc) recipient: An address on a Message object that is visible to recipients of the Message object but is not necessarily expected to take any action.

character set: A mapping between the characters of a written language and the values that are used to represent those characters to a computer.

Coordinated Universal Time (UTC): A high-precision atomic time standard that approximately tracks Universal Time (UT). It is the basis for legal, civil time all over the Earth. Time zones around the world are expressed as positive and negative offsets from UTC. In this role, it is also referred to as Zulu time (Z) and Greenwich Mean Time (GMT). In these specifications, all references to UTC refer to the time at UTC-0 (or GMT).

distinguished name (DN): A name that uniquely identifies an object by using the relative distinguished name (RDN) for the object, and the names of container objects and domains that contain the object. The distinguished name (DN) identifies the object and its location in a tree.

distribution list: A collection of users, computers, contacts, or other groups that is used only for email distribution, and addressed as a single recipient.

email address: A string that identifies a user and enables the user to receive Internet messages.

encoding: A process that specifies a Content-Transfer-Encoding for transforming character data from one form to another.

header: A name-value pair that supplies structured data in an Internet email message or MIME entity.

mailbox: A message store that contains email, calendar items, and other Message objects for a single recipient.

MIME attachment: A body part that is in a **MIME** message, for example, an email message or a file that is attached to an email message.

MIME content-type: A content type that is as described in [RFC2045], [\[RFC2046\]](#), and [\[RFC2047\]](#).

MIME message: A message that is as described in [RFC2045], [RFC2046], and [RFC2047].

Multipurpose Internet Mail Extensions (MIME): A set of extensions that redefines and expands support for various types of content in email messages, as described in [RFC2045], [RFC2046], and [RFC2047].

recipient: An entity that can receive email messages.

recipient forwarding: A feature that enables a message to be redirected to a different email address, which is referred to as the "forwarded address," from the address to which it is sent originally. Depending on the implementation, a message can be redirected to the forwarded address without sending a copy to the original email address, or the original email address can additionally receive a copy of the message.

Simple Mail Transfer Protocol (SMTP): A member of the TCP/IP suite of protocols that is used to transport Internet messages, as described in [\[RFC5321\]](#).

To recipient: See primary recipient.

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

1.2 References

Links to a document in the Microsoft Open Specifications library point to the correct section in the most recently published version of the referenced document. However, because individual documents in the library are not updated at the same time, the section numbers in the documents may not match. You can confirm the correct section numbering by checking the [Errata](#).

1.2.1 Normative References

We conduct frequent surveys of the normative references to assure their continued availability. If you have any issue with finding a normative reference, please contact dochelp@microsoft.com. We will assist you in finding the relevant information.

[MS-OXMSG] Microsoft Corporation, "[Outlook Item \(.msg\) File Format](#)".

[MS-OXOABK] Microsoft Corporation, "[Address Book Object Protocol](#)".

[RFC2045] Freed, N., and Borenstein, N., "Multipurpose Internet Mail Extensions (MIME) Part One: Format of Internet Message Bodies", RFC 2045, November 1996, <http://www.rfc-editor.org/rfc/rfc2045.txt>

[RFC2046] Freed, N., and Borenstein, N., "Multipurpose Internet Mail Extensions (MIME) Part Two: Media Types", RFC 2046, November 1996, <http://www.rfc-editor.org/rfc/rfc2046.txt>

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

[RFC5234] Crocker, D., Ed., and Overell, P., "Augmented BNF for Syntax Specifications: ABNF", STD 68, RFC 5234, January 2008, <http://www.rfc-editor.org/rfc/rfc5234.txt>

1.2.2 Informative References

[MSFT-WPXTJ] Microsoft Corporation, "White Paper: Exchange 2007 Transport Journaling", September 2007, [http://technet.microsoft.com/en-us/library/bb738122\(EXCHG.80\).aspx](http://technet.microsoft.com/en-us/library/bb738122(EXCHG.80).aspx)

1.3 Overview

Journal record messages are **MIME messages** produced by the server that capture information about other (non-journal record) messages sent through the server. These non-journal record messages are referred to as original messages. Metadata about the original message is contained in the **Envelope-Part** structure (section [2.1](#)) in the Journal Record Message File Format. This format allows an administrator, for example, to log and review the **recipient** of every outgoing message.

For background information about how journaling works, see [\[MSFT-WPXTJ\]](#).

1.3.1 Body Text of the Journal Record Message

The **body** text of the journal record message lists the **email addresses** of the sender and **recipients** of the original message, the subject, the Internet **Message-ID** field (section [2.1.3](#)), and certain other metadata about the original message. The body text is referred to as the **Envelope-Part** structure of the journal record message.

1.3.2 Original Message

The original message is attached as a **MIME attachment** to the **Envelope-Part** structure. This is referred to as the **Original-Message-Part** structure (section [2.2](#)) of the journal record message. How the **Original-Message-Part** structure is attached to the **Envelope-Part** structure is fully described in [\[RFC2045\]](#) and [\[RFC2046\]](#).

1.4 Relationship to Protocols and Other Structures

The journal record **MIME message** conforms to [\[RFC2045\]](#) and [\[RFC2046\]](#). [\[RFC2045\]](#) describes how messages with a **MIME content-type** of message/rfc822 might be nested recursively as **MIME attachments**. The outermost message/rfc822 **body part** of the journal record message contains the **Envelope-Part** structure as the **body**.

The **Envelope-Part** structure is encoded using the mechanisms described in [\[RFC2045\]](#), such as the Content-Transfer-Encoding mechanism, which specifies details such as the **character set** and **encoding** used for the data in the **Envelope-Part** structure. The mechanism for decoding the **Envelope-Part** structure is described in [\[RFC2045\]](#) section 6.

The following figure shows how the **Envelope-Part** structure is placed in relation to the various other structures in the journal record MIME message.

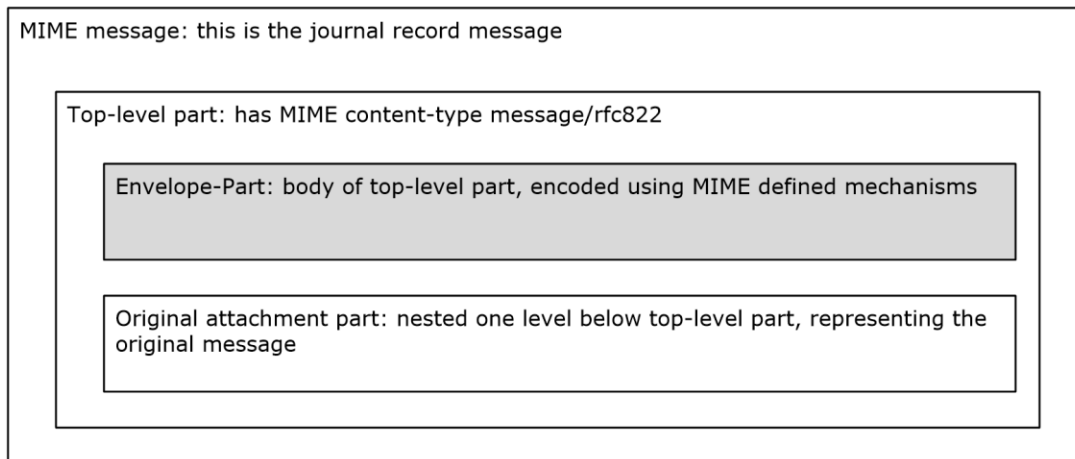


Figure 1: MIME structure of a journal record message

For conceptual background information and overviews of the relationships and interactions between this and other protocols, see [\[MS-OXPROTO\]](#).

1.5 Applicability Statement

Applications can use this format to create and consume journal record messages.

1.6 Versioning and Localization

None.

1.7 Vendor-Extensible Fields

None.

2 Structures

The Journal Record Message File Format extends the structures defined in [\[RFC2045\]](#) and [\[RFC2046\]](#) by defining a structure called the **Envelope-Part** structure, which is embedded within the **MIME message**.

2.1 Envelope-Part Structure

The **Envelope-Part** structure is the **body** text of the journal record message. The **Envelope-Part** structure contains metadata about the original message. The format of the **Envelope-Part** structure is specified by using the **Augmented Backus-Naur Form (ABNF)** notation, as specified in [\[RFC5234\]](#). The format is a series of field/value pairs on CRLF-terminated lines. The format, prior to the application of any **MIME encoding**, is as follows.

```
<Envelope-Part>          = <sender> CRLF
                          [<sent-on-behalf> CRLF]
                          (<subject> CRLF <message-id> CRLF) / (<message-id> CRLF
                          <subject> CRLF)
<subject> CRLF)          [ <label> CRLF]
                          [ <mailbox-owner> CRLF]
                          1* <recipient-specification>
                          [ <sent-time> CRLF]
                          [ <received-time> CRLF]

<sender>                  = "Sender:" SP <reverse-path>
<sent-on-behalf>         = "On-Behalf-Of:" SP <on-behalf-path>
<subject>                 = "Subject:" SP <subject-string>
<message-id>             = "Message-ID:" SP <msg-id>
<label>                  = "Label:" SP 1*255CHAR
<mailbox-owner>         = "Mailbox:" SP <mailbox-owner-address>
<recipient-specification> = <recipient-p2-type> ":" SP <forward-path>
                          [ ",", SP <redirection-type> ":" SP <original-forward-
                          path>] CRLF
<sent-time>              = "SentUtc:" SP <sent-time-string>
<received-time>         = "ReceivedUtc:" SP <received-time-string>

<recipient-p2-type>     = "Bcc" / "To" / "Cc" / "Recipient"
<redirection-type>     = "Expanded" / "Forwarded"
```

2.1.1 sender Field

Within the **sender** field, the **reverse-path** field MUST be set to the **email address** of the sender of the original message. The **reverse-path** field MUST be formatted as one of the following:

- A **Simple Mail Transfer Protocol (SMTP)** email address, as specified in [\[RFC2821\]](#).
- A **distinguished name (DN)** address formatted according to the following **ABNF** notation. The format for x500-dn is specified in [\[MS-OXOABK\]](#) section 2.2.1.1.

```
<distinguished-name-address> = "[EX:" x500-dn "]"
```

2.1.2 subject Field

Within the **subject** field, the **subject-string** field MUST contain the data from the "Subject" **header** of the original message. This header is specified in [\[RFC2822\]](#).

The value of the **subject-string** field can consist of characters outside the **ASCII character set** range, as specified in [\[RFC2045\]](#) and [\[RFC2046\]](#). The **MIME content-type** header of the respective **body part** in which the **Envelope-Part** structure is embedded MUST specify the character set to use to interpret the value of the **subject-string** field in accordance with the **MIME** specifications [\[RFC2045\]](#) and [\[RFC2046\]](#).

2.1.3 message-id Field

Within the **message-id** field, the **msg-id** field MUST contain the value of the **Message-ID** field, as specified in [\[RFC2822\]](#) section 3.6.4, of the original message.

2.1.4 recipient-specification Field

The **recipient-specification** field contains information about the **recipients** of the original message. This field can have one or more occurrences.

2.1.4.1 recipient-p2-type Field

The **recipient-p2-type** field MUST be set with a value from the following table.

Value	Meaning
Bcc	The recipient listed in the forward-path field is addressed as a blind carbon copy (Bcc) recipient .
To	The recipient listed in the forward-path field is addressed as a To recipient .
Cc	The recipient listed in the forward-path field is addressed as a carbon copy (Cc) recipient .
Recipient	The server is unable to determine how the recipient is addressed.

2.1.4.2 forward-path Field

The **forward-path** field MUST be set to the **email address** of a **recipient** of the original message. This address MUST be formatted in one of the following formats:

- An **SMTP** email address, as specified in [\[RFC2821\]](#).
- A **DN** address, as specified in section [2.1.1.<1>](#)

Neither format is preferred over the other. The choice of format is left to the implementation.

2.1.4.3 redirection-type Field

The value of the **redirection-type** field MUST be set to either "Expanded" or "Forwarded".

2.1.4.3.1 Expanded Value

The **redirection-type** field, when set to "Expanded", indicates that the sender of the message sent it originally to the address specified by the value of the **original-forward-path** field (section [2.1.4.4](#)), which was the address of a **distribution list**. This distribution list was then expanded to one or more **recipients**, perhaps expanding nested recipients repeatedly until all recipients were non-distribution list recipients. Each of these expanded recipients is listed in the **forward-path** field of an occurrence of the **recipient-specification** field.

2.1.4.3.2 Forwarded Value

The **redirection-type** field, when set to "Forwarded", indicates that the **recipient** indicated by the **original-forward-path** field was configured for **recipient forwarding**. The message was forwarded to the recipient indicated by the **forward-path** field.

2.1.4.4 original-forward-path Field

The **original-forward-path** field contains the **email address** of the **recipient** that was redirected to the address contained in the **forward-path** field. The address contained in the **original-forward-path** field MUST be formatted in one of the following formats:

- An **SMTP** email address, as specified in [\[RFC2821\]](#).
- A **DN** address, as specified in section [2.1.1.<2>](#)

Neither format is preferred over the other. The choice of format is left to the implementation.

The **original-forward-path** field, although syntactically identical to the **forward-path** field, has different semantics. The appearance of the **redirection-type** and **original-forward-path** fields in an occurrence of the **recipient-specification** field indicates that the original message was sent to the recipient with the address contained in the **original-forward-path** field and the server did one of the following:

- Changed the recipient address to the address contained in the **forward-path** field.
- Added a new recipient with the address contained in the **forward-path** field due to the recipient with the address contained in the **original-forward-path** field being present.

If the **redirection-type** and **original-forward-path** fields are omitted, the server did not have information about what type of forwarding or expansion was done on the recipient when it generated the journal record message.

2.1.5 label Field

The **label** field is optional. If present, this field MUST contain a text value, the contents of which are implementation-specific.

2.1.6 sent-on-behalf Field

The **sent-on-behalf** field is optional. If this field is present, it contains the **email address** of the sending **mailbox** owner. This email address MUST be different from the address contained in the **reverse-path** field. This address MUST be formatted in one of the following formats:

- An **SMTP** email address, as specified in [\[RFC2821\]](#).
- A **DN** address, as specified in section [2.1.1.](#)

Neither format is preferred over the other. The choice of format is left to the implementation.

2.1.7 mailbox-owner Field

The **mailbox-owner** field is optional. If this field is present, the **mailbox-owner-address** field contains the **SMTP email address** of the sending **mailbox** owner.

2.1.8 sent-time Field

The **sent-time** field is optional. If this field is present, it contains the **sent-time-string** field, which contains a string that indicates the date and time, in **Coordinated Universal Time (UTC)**, that the original message was sent. The exact format of the string contained in the **sent-time-string** field is left to the implementation.

The **sent-time** field can begin with either "SentUtc" or "Sent".[<3>](#) The meaning is the same regardless of which string is used.

2.1.9 received-time Field

The **received-time** field is optional. If this field is present, it contains the **received-time-string** field, which contains a string that indicates the date and time, in **UTC**, that the original message was received. The exact format of the string contained in the **received-time-string** field is left to the implementation.

The **received-time** field can begin with either "ReceivedUtc" or "Received".[<4>](#) The meaning is the same regardless of which string is used.

2.2 Original-Message-Part Structure

The **Original-Message-Part** structure MUST contain one of the following:

- A **MIME attachment** of type message/rfc822.
- A .msg file, as specified in [\[MS-OXMSG\]](#).

Neither format is preferred over the other. The choice of format is left to the implementation.

3 Structure Examples

The following is an example of the **Envelope-Part** structure contained in a journal record message, followed by an explanation of the various syntax elements. Note that the line numbers are not present in the actual **Envelope-Part** structure but are shown here so that the structure can be discussed line by line.

```
1 Sender: sender@contoso.com
2 Subject: Sample Message
3 Message-ID: <12345@contoso.com>
4 To: dl-to-member1@contoso.com, Expanded: dl-to@contoso.com
5 To: dl-to-member2@contoso.com, Expanded: dl-to@contoso.com
6 Cc: fwd@contoso.com, Forwarded: user@contoso.com
7 Bcc: dl-bcc-member@contoso.com, Expanded: dl-bcc@contoso.com
8 Bcc: fwd2@contoso.com, Forwarded: user2@contoso.com
9 Recipient: user-unk@contoso.com
```

1. The sender of the original message was sender@contoso.com.
2. The subject of the original message was "Sample Message".
3. The value of the **Message-ID** field, as specified in [\[RFC2822\]](#) section 3.6.4, of the original message was "12345@contoso.com".
4. The original message was sent to dl-to@contoso.com as a **To recipient**, which is a **distribution list** that was expanded to dl-to-member1@contoso.com and dl-to-member2@contoso.com (captured in line 5) by the server.
5. See (4).
6. The original message was sent to user@contoso.com as a **Cc recipient**, which was changed by the email server to fwd@contoso.com because **recipient forwarding** was configured. user@contoso.com did not receive a copy of the message because there is no occurrence of the **recipient-specification** field where user@contoso.com was listed in the **forward-path** field.
7. The original message was sent by the mail client to dl-bcc@contoso.com as a **Bcc recipient**, which is a distribution list that was expanded to dl-bcc-member@contoso.com.
8. The original message was sent to user2@contoso.com as a Bcc recipient, which was rewritten by the email server to fwd2@contoso.com because recipient forwarding was configured. user2@contoso.com did not receive a copy of the message because there is no occurrence of the **recipient-specification** field where user2@contoso.com was listed in the **forward-path** field.
9. Finally, there is no information about whether user-unk@contoso.com was sent the original message as a To recipient, Cc recipient, or Bcc recipient. It is also not known whether this **recipient** received the message due to distribution list expansion, recipient forwarding, or being directly addressed by the sender. The value of the **recipient** field indicates that the server was only able to capture that user-unk@contoso.com was a recipient of the message and no further recipient metadata was available.

4 Security

4.1 Security Considerations for Implementers

This format does not implement or concern itself with security but relies on the underlying email transport software and email storage software to provide security as applicable.

4.2 Index of Security Fields

None.

Preliminary

5 Appendix A: Product Behavior

The information in this specification is applicable to the following Microsoft products or supplemental software. References to product versions include updates to those products.

- Microsoft Exchange Server 2007
- Microsoft Exchange Server 2010
- Microsoft Exchange Server 2013
- Microsoft Exchange Server 2016
- Microsoft Exchange Server 2019 Preview
- Microsoft Office Outlook 2007
- Microsoft Outlook 2010
- Microsoft Outlook 2013
- Microsoft Outlook 2016
- Microsoft Outlook 2019 Preview

Exceptions, if any, are noted in this section. If an update version, service pack or Knowledge Base (KB) number appears with a product name, the behavior changed in that update. The new behavior also applies to subsequent updates unless otherwise specified. If a product edition appears with the product version, behavior is different in that product edition.

Unless otherwise specified, any statement of optional behavior in this specification that is prescribed using the terms "SHOULD" or "SHOULD NOT" implies product behavior in accordance with the SHOULD or SHOULD NOT prescription. Unless otherwise specified, the term "MAY" implies that the product does not follow the prescription.

<1> [Section 2.1.4.2](#): Exchange 2007 does not support the **DN** address format for the **forward-path** field.

<2> [Section 2.1.4.4](#): Exchange 2007 does not support the DN address format for the **original-forward-path** field.

<3> [Section 2.1.8](#): Exchange 2007 begins the **sent-time** field with "Sent". Exchange 2010, Exchange 2013, Exchange 2016, and Exchange 2019 Preview begin the **sent-time** field with "SentUtc".

<4> [Section 2.1.9](#): Exchange 2007 begins the **received-time** field with "Received". Exchange 2010, Exchange 2013, Exchange 2016, and Exchange 2019 Preview begin the **received-time** field with "ReceivedUtc".

6 Change Tracking

This section identifies changes that were made to this document since the last release. Changes are classified as Major, Minor, or None.

The revision class **Major** means that the technical content in the document was significantly revised. Major changes affect protocol interoperability or implementation. Examples of major changes are:

- A document revision that incorporates changes to interoperability requirements.
- A document revision that captures changes to protocol functionality.

The revision class **Minor** means that the meaning of the technical content was clarified. Minor changes do not affect protocol interoperability or implementation. Examples of minor changes are updates to clarify ambiguity at the sentence, paragraph, or table level.

The revision class **None** means that no new technical changes were introduced. Minor editorial and formatting changes may have been made, but the relevant technical content is identical to the last released version.

The changes made to this document are listed in the following table. For more information, please contact dochelp@microsoft.com.

Section	Description	Revision class
All	Updated supported products throughout document.	Major
5 Appendix A: Product Behavior	Updated list of products.	Major

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