



Whitepaper

Sending MIME Messages in LISTSERV® DISTRIBUTE Jobs

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Introduction

A DISTRIBUTE job is a series of commands to LISTSERV that essentially says, “Take this message and send it to these recipients.” In order to successfully process a DISTRIBUTE job, LISTSERV needs to have a list of recipients (email addresses), and the message itself. A complete DISTRIBUTE job must include one or more command lines giving instructions to LISTSERV, an authenticating password, and a //TO DD segment that tells LISTSERV where to find the recipient addresses.

This document provides a brief overview and examples detailing the necessary steps to prepare the message (the //DATA DD segment of the JOB) to send MIME mail as part of a LISTSERV DISTRIBUTE job. Full details on the overall structure of DISTRIBUTE jobs may be found in the [LISTSERV Advanced Topics Manual](#).

LISTSERV operates by email using SMTP (Simple Mail Transfer Protocol [RFC 821]), therefore all commands and messages (data) must be in simple 7-bit text format. Sending DISTRIBUTE jobs when the message is plain text is not a complex task. Coding the command and sending it to LISTSERV is a straightforward operation. (See the [Simple Mail](#) section for examples.) The challenge comes in when a MIME (Multipurpose Internet Mail Extensions) message needs to be sent through LISTSERV in a DISTRIBUTE job.

This process entails creating proper mail headers, encoding binary files and then correctly ordering the pieces of hand coded MIME messages to adhere to all the standards, (because LISTSERV itself has no internal utility to do this).

Tip: LISTSERV Maestro can easily handle all of these steps automatically. LISTSERV Maestro is a Web based application that works with LISTSERV and a SMTP server to quickly format and assemble DISTRIBUTE jobs for bulk or mail-merge delivery. LISTSERV Maestro handles alternative, mixed and related MIME messages with a few mouse clicks. LISTSERV Maestro can easily work with an external database (whether or not it is connected directly to LISTSERV). LISTSERV Maestro also has a tracking component that will track and produce reports on recipients opening the message or clicking on Web links in the message. For more information on LISTSERV Maestro, visit <http://www.lsoft.com/products/default.asp?item=maestro>

The remaining body of this white paper describes the procedures for composing the message manually, without the assistance of LISTSERV Maestro.

Multipurpose Internet Mail Extensions or MIME are extensions to the Internet mail format that allows it to carry multiple types of data including binary, HTML, audio, video, graphics and others as attachments or additional parts to email messages. There are three basic types of MIME messages:

- **Alternative** – These messages include two or more different ways of presenting the same content, such as an HTML and a text version of the same message. The email client or mail recipient then chooses the desired format to display the message.
- **Mixed** – These messages allow the recipient to view different data formats at the same time, such as a text message that includes a spreadsheet file as an attachment. The email client will display the text message and present a clickable icon or actually open up the attachment in an application.
- **Related** – These messages are HTML messages that have embedded graphic files that display within the message when it is opened.

Messages may include data that is not formatted in 7-bit text such as binary files or foreign language text, which may include 8-bit characters. 8-bit characters transferred over SMTP can

lose one-eighth of their data as the last bit is dropped. To prevent this from happening, this type of data has to be temporarily encoded into a 7-bit format. Since LISTSERV cannot read or interpret any data unless it is in text format, sending attachments, HTML or other data becomes a challenge. This is because LISTSERV itself provides no mechanism for creating, encoding and assembling the message properly. LISTSERV expects to receive messages that are already correctly and completely formed and ready to send.

It is necessary then to “translate” the MIME message into straight 7-bit text. The type of MIME message to be distributed will determine the content of the headers, the complexity of the commands and encoding that needs to happen before the message can be successfully delivered. This entails creating and formatting the message with all applicable MIME headers and message parts, as well as encoding binary files by hand. A MIME message constructed by hand must follow all the applicable RFC standards, starting with [RFC822], which defines the proper From:, To:, Subject:, and Date: headers as well as others, and then proceed through the MIME RFC Standards ([RFCs 2045-2049], and others). A listing of applicable RFCs may be found at <http://www.imc.org/rfcs.html#mime>

When LISTSERV Maestro or a regular MIME-capable email program sends an HTML email message or an email message with an attachment, it is constructing the message the same way as described here. The only difference is that LISTSERV Maestro and the mail program hide all this "messy" stuff and keep it behind the scenes, much the same way as a WYSIWYG HTML editor hides all the HTML coding.

All the examples below relate to sending DISTRIBUTE jobs to LISTSERV **by email**.

Simple mail

Below is an example of the message part from a simple DISTRIBUTE MAIL-MERGE job. The message is plain text so no special headers or encoding is necessary.

(Upper portions of DISTRIBUTE job have been deleted.)

```
//DATA DD *,EOF
To: Business Briefing SERVICE Subscriber <*&to:>
From: BBS@listserv.lsoft.com
Date: &*date;
Subject: Faster Internet Access for BBS
```

Dear Subscriber:

As part of our commitment to continually improve Business Briefing Service (BBS) for the Web, I am pleased to announce an alternative URL that will provide many users with a faster connection and more consistent performance: <http://www.lsoft.com>

Simple HTML mail

Below is the same example message, configured as a simple HTML message.

```
//DATA DD *,EOF
To: Business Briefing SERVICE Subscriber <*&to;>
From: BBS@listserv.lsoft.com
Date: &*date;
Subject: Faster Internet Access for BBS
MIME-Version: 1.0
Content-Type: text/html; charset=us-ascii
Content-Transfer-Encoding: 7bit
Content-Disposition: inline

<html>
<body bgcolor="#00FF00" text="#000000">
<p>Dear Subscriber:

<p>As part of our commitment to continually improve Business
Briefing Service (BBS) for the Web, I am pleased to announce an
alternative URL that will provide many users with a faster
connection and more consistent performance:
<a href="http://www.lsoft.com">http://www.lsoft.com</a>
</body>
</html>
```

The message header sequence conventions above are important to follow. All message headers defined by RFC822 are placed first, followed by all necessary MIME headers. This is not a technical requirement, but it helps keep the functions and priorities clear. Note that **no** blank line can separate the RFC822 headers from the MIME headers. This is because **one** blank line is required to separate all of the message headers (RFC822+MIME) from the actual message body part(s). Below is a breakdown of the definitions of each of the data lines.

//DATA DD *,EOF	DIST JOB segment
To: Business Briefing SERVICE Subscriber <*&to;>	RFC822 header
From: BBS@listserv.lsoft.com	RFC822 header
Date: &*date;	RFC822 header
Subject: Faster Internet Access for BBS	RFC822 header
MIME-Version: 1.0	MIME header
Content-Type: text/html; charset=us-ascii	MIME header
Content-Transfer-Encoding: 7bit	MIME header
Content-Disposition: inline	MIME header
[blank line]	blank line required
[message body]	message body lines

Multipart Alternative HTML mail

Here is the same example message part, configured as a multipart/alternative of plain text and HTML. There is a considerable difference in additional and required header fields and values. In addition to the header fields and values, boundary separator lines are required between each part of the message. Configuration and use of these lines is detailed in [RFC2045] and [RFC2046].

```
//DATA DD *,EOF
To: Business Briefing SERVICE Subscriber <*&to;>
From: BBS@listserv.lsoft.com
Date: &*date;
Subject: Faster Internet Access for BBS
MIME-Version: 1.0
Content-Type: multipart/alternative;
boundary="06986E0E1E196312E032AFBC"

This is a multi-part message in MIME format.

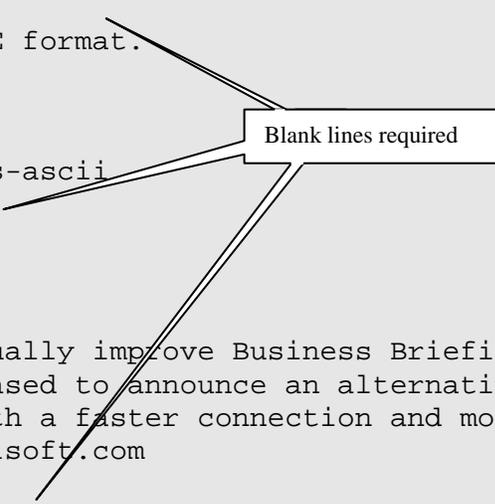
--06986E0E1E196312E032AFBC
Content-Type: text/plain; charset=us-ascii
Content-Transfer-Encoding: 7bit

Dear Subscriber:

As part of our commitment to continually improve Business Briefing
Service (BBS) for the Web, I am pleased to announce an alternative
URL that will provide many users with a faster connection and more
consistent performance: http://www.lsoft.com

--06986E0E1E196312E032AFBC
Content-Type: text/html; charset=us-ascii
Content-Transfer-Encoding: 7bit

<html>
```



```
<body bgcolor="#00FF00" text="#000000">
<p>Dear Subscriber:

<p>As part of our commitment to continually improve Business Briefing
Service (BBS) for the Web, I am pleased to announce an alternative
URL that will provide many users with a faster connection and more
consistent performance:
<a href="http://www.lsoft.com">http://www.lsoft.com</a>

</html>

--06986E0E1E196312E032AFBC--
```

It is important to remember that the line:

```
Content-Type: multipart/alternative; boundary="06986E0E1E196312E032AFBC"
```

is frequently longer than 70 characters and must **never** be allowed to wrap or it will always fail and cause unpredictable and incorrect results. This means that the mail program used to send DISTRIBUTE jobs to LISTSERV must **not** line-wrap **any** lines no matter how long they may be.

Multipart Mixed - Adding attachments

Adding attachments to a message is basically dividing the text-based message into segments, separated by boundary markers. Fundamentally it is just one big piece of mail. Here is the same message part configured with a MS Word attachment. The Word file is a binary file that has been transformed by Base64 encoding. This encoding is necessary for the correct transmission of **any** binary file (8-bit) by the 7-bit mail system. A mail program normally (and invisibly) encodes and decodes attachments as necessary, but with DISTRIBUTE jobs, it is necessary to do this kind of encoding with separate encoding software.

```
//DATA DD *,EOF
To: Business Briefing SERVICE Subscriber <*&to;
From: BBS@listserv.lsoft.com
Date: &*date;
Subject: Faster Internet Access for BBS
MIME-Version: 1.0
Content-Type: multipart/mixed; boundary="06986E0E1E196312E032AFBC"
```

This is a multi-part message in MIME format.

```
--06986E0E1E196312E032AFBC
Content-Type: text/plain; charset=us-ascii
Content-Transfer-Encoding: 7bit
Content-Disposition: inline
```

Dear Subscriber:

As part of our commitment to continually improve Business Briefing Service (BBS) for the Web, I'm pleased to announce an alternative URL that will provide many users with a faster connection and more consistent performance: <http://www.lsoft.com>

The boundary can be any text that does not appear elsewhere in the message

A new line containing only the boundary text preceded by two dashes signals the start of a new MIME "part"

```

--06986E0E1E196312E032AFBC
Content-Type: application/msword; name="sample.doc"
Content-Transfer-Encoding: base64
Content-Disposition: attachment; filename="sample.doc"

0M8R4KGxGuEAAAAAAAAAAAAAAAAAAAAAPgADAP7/CQAGAAAAAAAAAAAAAAAAADAAAFQEAA
AAAAA
lAEAAA8AAACcAQAAEAAAAKQBAAATAAAArAEAAAIAAADkBAAAHgAAADoAAABSVUxFUyAtL
SBISVR
Q0hJIERBVVEEgU1lTVEVNUyCTMywgMiwgMZQgSU5DRU5USVZFIFBST0dSQU0AIAAeAAAA
QAAAAB
<this example is truncated for display purposes>
bQAAAG4AAABvAAAAcAAAAHEAAABYAAAAcWAAAHQAAAB1AA
HoAAAB
AAAAfAAAAH0AAAB+AAAAfwAAAIAAAA=
--06986E0E1E196312E032AFBC--

```

A new line containing only the boundary text preceded by two dashes **and** followed by two dashes signals the end of the MIME message

Multipart Related - Embedding Graphics in HTML Email

One of the reasons HTML mail is popular is its ability to include graphic images embedded in the message. When graphic files are embedded in the message they are sent to the mail recipient with the HTML document so that the sending Web site is not bombarded with requests to serve the images. Use caution when adding graphics to messages because doing so increases the overall mail size significantly. A 5k mail in plain text may bloat to 15k or 20k in HTML. Adding embedded graphics may cause the total size to bloom to 60k. This will slow down message delivery since the file is 12 times larger, end users on slower connections will have a huge file to download they may not be expecting. Keep the embedded graphics small by design and as few in number as possible.

Below is again the HTML example message with one included graphic. The graphic image is purposely small and like all binary files has been encoded using Base64 encoding.

```

//DATA DD *,EOF
To: Business Briefing SERVICE Subscriber <*>
From: BBS@listserv.lsoft.com
Date: &*>
Subject: Faster Internet Access for BBS
MIME-Version: 1.0
Content-Type: multipart/related; boundary="06986E0E1E196312E032AFBC"

```

This is a multi-part message in MIME format.

This text is not within any of the MIME "parts" so MIME-capable email clients will not display it, but text-only email clients will

```
--06986E0E1E196312E032AFBC
Content-Type: text/html; charset=us-ascii
Content-Transfer-Encoding: 7bit
Content-Disposition: inline; filename="xyz.htm"
```

```
<html>
<p>Dear Subscriber:
<p>&nbsp;
<p>As part of our commitment to continually improve Business Briefing Service (BBS) for the Web, I'm pleased to announce an alternative URL that will provide many users with a faster connection and more consistent performance:
```

```
<a href="http://www.lsoft.com/">
<img SRC="cid:part1.36D1BAA3.964C82C@lsoft.com" ALT="[Link to L-soft home.]"></a>
</html>
```

The "cid" in the HTML reference

```
--06986E0E1E196312E032AFBC
Content-Type: image/gif
Content-ID: <part1.36D1BAA3.964C82C@lsoft.com>
Content-Transfer-Encoding: base64
Content-Disposition: inline; filename="C:\WINDOWS\TEMP\nsmail7M.gif"
```

```
R0lGODlhWAAAnALMAAP///9bn99LS1aXO5625wnu13oKerVeTuWl4hC98sjFejKpRYwBKjCUl
KQUnVwAAACH5BAQUAP8ALAAAAABYACcAAAT/EMhJq7046817DwNxJMdhDIGnruxXjAkjz7Ji
pG2uewFO9b1QSbArGiWEAio4KDidhxcpoUgYjtjVILoEBp4wmsyhyJrPAKZogG5PvHD4IARN
2EkHtts8ID3ngHNngdmIzDg5Xe1g+KyAFBiMHCgoOjIqXF1+PjyUmmDt4T6JgnTAXhQyHDgSf
OZYsAQSynZMLrbdpILIGkCUICkQXBAgIvAAEvAayy7LBFALQ0dICrXIBDH6j2oOnqKoOthcP
4+MBDeTo6BYL6ekNGCDV8EBNJXaTkwwLhxcC6Qtn2qmrwe7guHeKpC0zgcAcQXfdiKFruEBZ
gwYLiBi4GPDgRQQY/yRl+xNIEBRTqMY4eOBSQkdyFAIiBPDyQSIJAZVwicOzBzdvdqh6wqkCu
ozOZEgx4PPgmpyIQIXj5athg6AQEMAOCxMkUANYHILsC8AdzA5WRJEUkSkdFAQO3qYJalRDQ
lteZRZEcNPcgIxGy4zhEirJNG9uU31a2BMwqALlgecei+zvuhtM2AQQAWkhsWYIGjAo+wCg6
UeSaBBzbBHBZGDYnXSzRk/ViRBV8tTgSNTiaa2/AHQOmbm3hmg7pcKkNJS47zPe44jkJQBT
dHTADzpAk1dB14EC93DnPtDStGfPha/kVW1TwEsE2DsMqFLiu7KSIZI4kdoJwQFiCnw2k7Bk
```

```
ZU2QV2TWtRNfB8st50BciX0jFAVKnXOTBKK5J9ZG6GB00YIdEIBfIAuVQsIvv4znUBbSVNCi
B/jgYQIkNCa j jAn/EUPRRSzh0gIB38SVCg2HQBJhIWD5mMMWJsJwm3i1nMf jikquYIAC/s2Y
DDLKJKP j jhhVucMBR5bZXG9i7rDFJcmKt0CAAp6zwFzPfiEAnF92JuVFF9ZppwH78NYAfH6i
EcuV5xWjR6GMNkpBBAA7
```

```
--06986E0E1E196312E032AFBC--
```

If attachments and/or embedded graphics are part of the message, a Base64 encoding program will be necessary to translate 8-bit binary files to 7-bit text files so that they can be sent over the Internet. Once all the pieces of the message are created and put together, it is very important to test the message in various email client programs before sending the DISTRIBUTE job. For more examples, look at how mail programs assemble and configure complex mail pieces. Also consult the various RFC Standards specifications to learn how to correctly form and successfully make LISTSERV send similar complex mail pieces.

Tips: One way that may assist the assembly and encoding process is to use a MIME-capable email program to send the mail to oneself as HTML, with the attachments or embedded graphics. Next, capture the mail in its “raw” form and use that as the message, boundary markers and Content-Type: and Content-Transfer-Encoding: headers as well as the properly encoded binary part(s). Use a mail program that makes it easy to save the entire message to a file, such as Pegasus Mail, Eudora®, or Netscape®*. Avoid programs that save the mail in their own proprietary format, as the file they produce may not adhere to Internet standards.

Occasionally a mail program will try to automatically “correct” a carefully prepared text file that is being sent to LISTSERV for a DISTRIBUTE job. The file winds up being corrupted and unusable. If this is happening, it is possible to bypass the mail client by putting the DISTRIBUTE job in a text file delivered directly to LISTSERV. To learn how, refer to the [Using LISTSERV to Feed Custom Written Mail Messages to SMTP](#) white paper.

Binary to Text Encoding Programs: There are many commercial, shareware, and freeware programs that will convert binary files and 8-bit text to 7-bit text. To locate these programs, try an online search engine using the search terms “base64 encoding”, “quoted-printable”, or “mimify” with the terms “programs”, “software” or “utility”.

References

The LISTSERV Advanced Topics Manual

<http://www.lsoft.com/resources/manuals.asp>

With respect to the MIME message structures, interested readers should refer to the applicable RFC source documents for complete information:

RFC 821, *Simple Mail Transfer Protocol* "<http://www.ietf.org/rfc/rfc0821.txt>

RFC 822. *Standard For The Format Of ARPA Internet Text Messages*

<http://www.ietf.org/rfc/rfc0822.txt>

RFC 2045 Multipurpose Internet Mail Extensions (MIME) Part One: Format of Internet Message Bodies <http://www.ietf.org/rfc/rfc2045.txt>

* These three free email products are provided as examples. Citing them in this document does not constitute an endorsement of any of them by L-Soft international, Inc.

RFC 2046 Multipurpose Internet Mail Extensions (MIME) Part Two: Media Types
<http://www.ietf.org/rfc/rfc2046.txt>

RFC 2047 MIME (Multipurpose Internet Mail Extensions) Part Three: Message Header Extensions for Non-ASCII Text <http://www.ietf.org/rfc/rfc2047.txt>

RFC 2048 Multipurpose Internet Mail Extensions (MIME) Part Four: Registration Procedures
<http://www.ietf.org/rfc/rfc2048.txt>

RFC 2049 Multipurpose Internet Mail Extensions (MIME) Part Five: Conformance Criteria and Examples <http://www.ietf.org/rfc/rfc2049.txt>

An excellent compilation of the details of MIME and all other email protocols may be found in:

"Internet Email Protocols, A Developer's Guide" by Kevin Johnson
Published by Addison Wesley Longman, Inc. ISBN 0-201-43288-9