



Whitepaper

Using the Microsoft IIS SMTP Service for LISTSERV® Deliveries

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Introduction

LISTSERV® requires an SMTP server to deliver the mail messages that it generates. While many sites simply configure LISTSERV to forward its mail to their main corporate mail server, some sites prefer to separate their list mail delivery from their “regular” mail. This is done by setting up one or more dedicated SMTP servers solely for LISTSERV’s use.

The Microsoft IIS SMTP Service (SMTPSVC) is a free SMTP server available on the Windows platforms. With careful configuration, the recent releases of IIS SMTP can work with LISTSERV to handle small to medium loads on a single server – as well as some larger loads (depending on load patterns and delivery needs). With additional servers, this configuration can be used for loads of any size (see the section on [LISTSERV Tuning](#)).

This document describes the installation and configuration of the IIS SMTP service¹ for use with LISTSERV and LISTSERV Maestro.

The IIS SMTP service should not be used to process *incoming* LISTSERV mail. The LISTSERV SMTP Listener service (SMTPL) must be used to process incoming mail on port 25, and the IIS SMTP Service (configured to listen on a different port) will be used solely to deliver mail generated by LISTSERV².

The steps required for configuring this system are:

1. [Install the Microsoft IIS SMTP Service](#) (if not already installed).
2. [Configure the properties of the Microsoft IIS SMTP Service](#) to work with LISTSERV.
3. [Configure the domains in IIS SMTP Service](#) to route LISTSERV mail.
4. [Configure LISTSERV](#) to send its outbound mail to the Microsoft IIS SMTP Service.

Installing the Microsoft IIS SMTP Service

If the IIS SMTP Service is already installed, [skip to the next section](#). Follow these steps to install the Microsoft IIS 5.1 SMTP Server on Windows XP Professional:

1. From the **Start** menu, open the **Control Panel**.
2. Click on and open **Add or Remove Programs**.
3. On the left side of the Add or Remove Programs interface, click on **Add/Remove Windows Components**. (see [Figure 1](#))

¹ Unless otherwise noted, screen shots are from IIS 5.1 running on Windows XP Professional, SP2. See the Microsoft documentation for more details on IIS running on Windows 2003 Server or Windows 2000 Server. Note that Windows XP is not intended to be a “server-class” operating system. As such, it has certain built-in limitations that make it unsuitable for large-volume production mailing. Windows 2003 Server is recommended for large volumes. The TCP connection security limit on Windows XP may slow down throughput even on moderate volumes, and in those cases a patch may be applied to TCPIP.SYS to increase that limit.[\[12\]](#)

² The IIS SMTP Service should be dedicated to LISTSERV outbound deliveries. If there is a need for handling SMTP mail on the same server from other sources, IIS 6.0 on Windows 2003 allows you to configure separate “virtual” SMTP servers for these, listening on different ports or different IP addresses on the same machine. Depending on what these other uses are, LISTSERV delivery performance may be negatively affected, therefore this is not recommended in high-volume situations.

4. In the Windows Components Wizard, select **Internet Information Services (IIS)**, and then click the **[Details]** button (see Figure 1)
5. Check the box for **SMTP Service** (see Figure 2). Several related boxes will automatically be checked when you do so. Click the **[OK]** button.
6. After the SMTP service installation completes, click the **[Finish]** button.

On Windows 2003 Server, the steps to install the IIS 6.0 SMTP Service are the same except that instead of steps 4 and 5, you should select **E-mail Services** (see Figure 3).

On Windows 2000 Server, the process is similar (see the Microsoft documentation for details).

Figure 1 SMTP Service installation steps 3 and 4

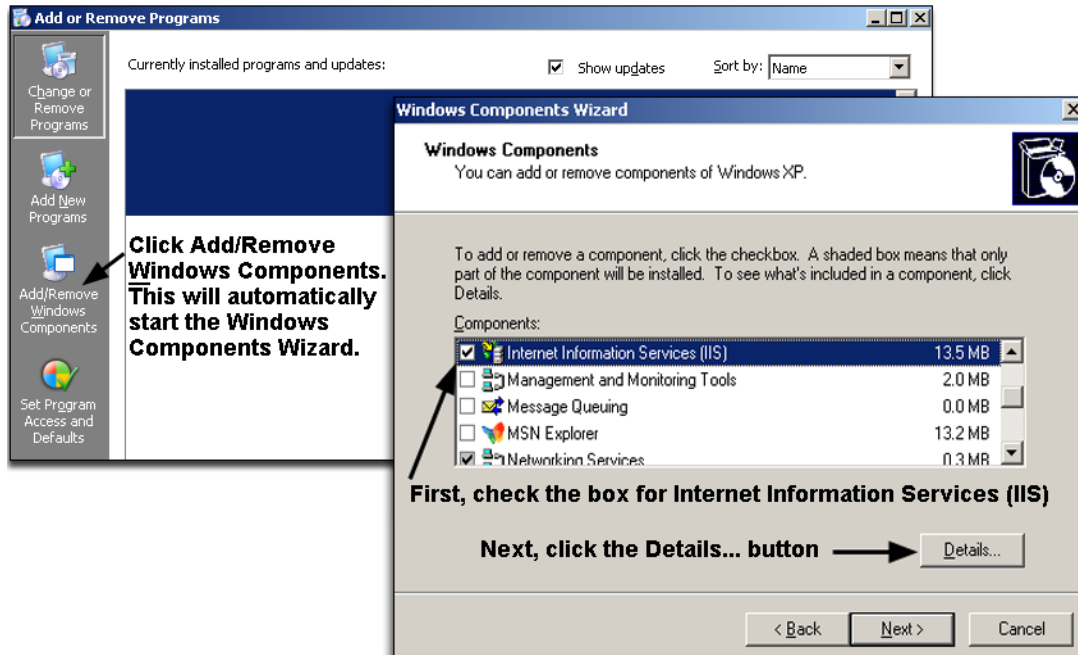


Figure 2 SMTP server installation step 5

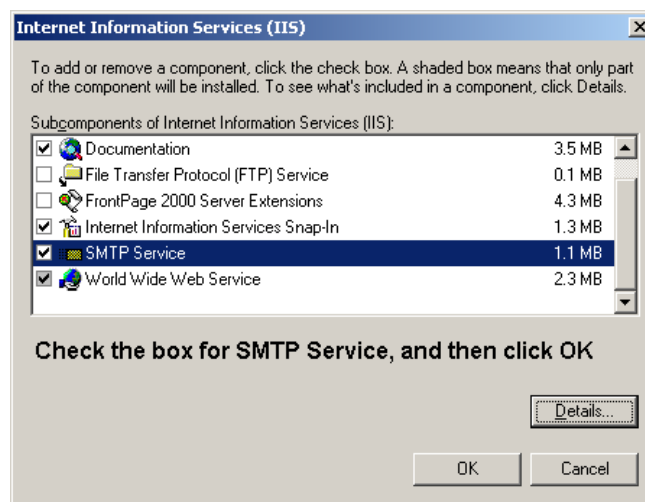
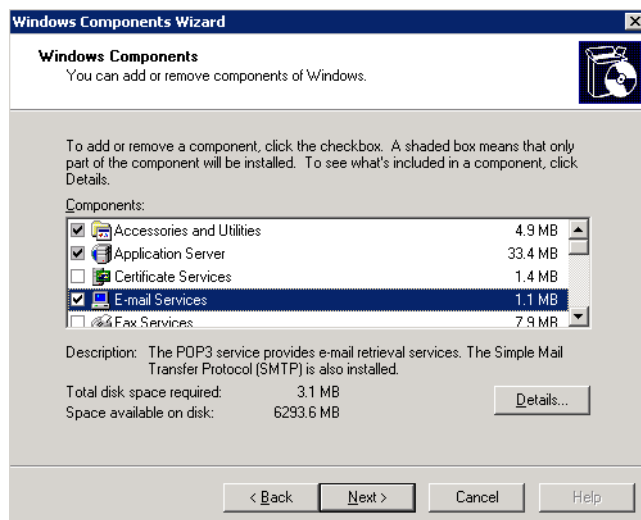


Figure 3 Windows Components Wizard on Windows 2003 Server



Minimum Required Configuration Changes

There are a number of configuration settings that are **required** otherwise LISTSERV mail may not be processed correctly.

You must set the following items in the IIS SMTP Properties applet:

- Set the TCP Port on the General tab, Advanced settings, to something other than 25 (for example, 50025)
- Set the “Recipients per message limit” on the Messages tab to a value equal to or greater than the value of LISTSERV’s MAXBSMTP site configuration parameter.
- Outbound delay notification must be disabled in the Delivery tab; Set it to 9999 days to guarantee that the messages will expire before a delay notification is sent.

And the following default settings in the IIS SMTP Properties applet must **not** be changed:

- Anonymous access must be enabled on the Access tab, Authentication settings.
- Anonymous access must be enabled on the Delivery tab, Outbound settings.
- Masquerade domain must be left undefined.

Detailed instructions for these required properties settings as well as other recommended settings are given in the [Configuring the Microsoft IIS SMTP Service Properties](#) section.

In addition, these changes are also required for a functional installation:

- The SMTP service must be configured to send bounces back to LISTSERV as described in the [Configuring the SMTP Service Domains](#) section.
- The LISTSERV site configuration must be set to forward email to the IIS SMTP Service, as described in the [Configuring LISTSERV to use the SMTP Service](#) section.
- IIS automatically puts the SMTP queue subfolder in the same folder as the Web service’s home directory subfolder. Therefore, the IIS Web service’s home directory should be on a drive with sufficient disk space to accommodate the SMTP queues. The exact size requirements will vary depending on your mailing volumes.
- If LISTSERV Maestro is or will be installed on this server, the IIS Web service must be changed as described in the box below.



LISTSERV Maestro sites: The installation program for the IIS SMTP server installs the IIS Web service. If you are running LISTSERV Maestro on this system, you must configure the IIS Web service to listen to a different port than Maestro. From the Internet Information Services management application, open “Web Sites”, right-click on “Default Web Site”, select “Properties”, and change “TCP Port” to something other than 80 (for example, 8080).

If the system is multi-homed (that is, it has more than one IP address assigned to it), you can alternatively have the IIS Web server listen on one IP address (set the “IP address” field in the Properties applet), and have LISTSERV Maestro listen on a different IP address (see Section 14 of [4] for instructions).

If you are only running LISTSERV on this server (whether without Maestro or with all the Maestro components on one or more separate servers), the IIS Web service can be used to serve the LISTSERV Web interface (see [1] and [2] for instructions).

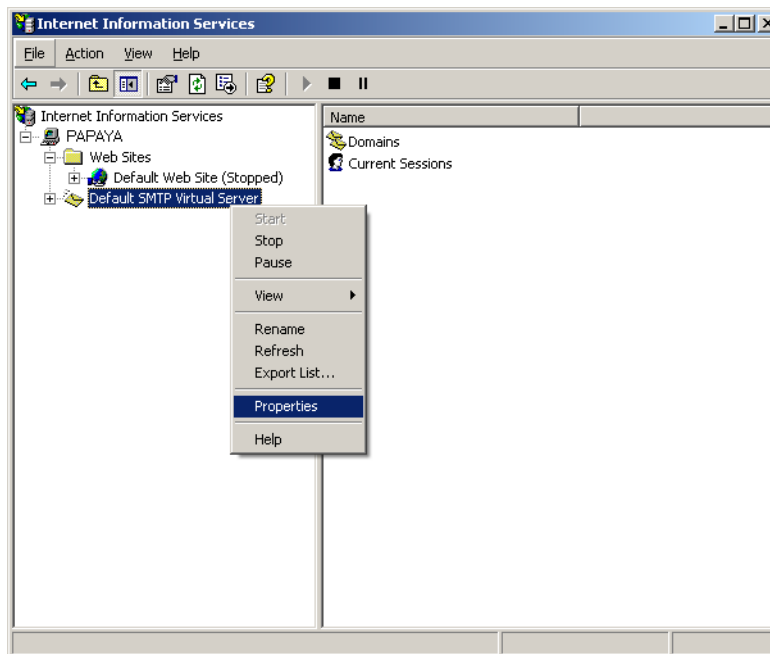
Configuring the Microsoft IIS SMTP Service Properties

Opening the IIS SMTP Properties Applet

From the Control Panel’s **Administrative Tools** folder³:

1. Start the application called **Internet Information Services**.
2. In the left panel in the IIS management application, click on the “+” sign next to your server name to reveal the IIS applications that are running on the server.
3. Right-click on **Default SMTP Virtual Server**, and then select **Properties**. This opens up the Properties applet for configuring the SMTP Server (see Figure 4).

Figure 4 Opening the SMTP Service configuration applet



³ On Windows XP Professional using the Control Panel’s “Category View”, this is found in the “Performance and Maintenance” category.

Required, Recommended, and Optional Configuration Setting Changes

Some of the configuration settings described below are required for running the SMTP Server with LISTSERV, others are recommended, and still others are optional. They are listed in the table below in their order of appearance in the “Properties” applet.




Notes: The “required” settings **must** be used otherwise LISTSERV mail will not be processed correctly.


The “recommended” settings **should** be used *unless there is a specific technical reason unique to your site that requires a change, and you understand the technical ramifications of changing it*. Changes to the recommended settings may significantly reduce delivery performance. Some of the issues to consider before making changes to the recommended settings are explained in the comments, but it is not possible to anticipate every situation.

The “suggested” settings are based on L-Soft’s experience, but may be adjusted based on your own preference, on your organization’s policies, or on your experience with your traffic patterns.




The **Settings** column indicates when the recommended setting is the default as of this writing (for IIS 5.1 and 6.0). However, since the defaults may change in future versions or service packs, you should check to make sure that the default is indeed the recommended setting.




PARAMETER	SETTINGS	IMPORTANCE	INSTRUCTIONS & COMMENTS
Tab: General			
TCP Port	Any number not assigned to any other service, specifically not port 25. For example: 50025	 Required	<ul style="list-style-type: none"> Click on “Advanced...” Click on “Edit...” Change TCP port for “(All unassigned)” to the desired setting (for example 50025) <p>See the discussion on SMTP Port below.</p> <p>This must be the same port defined for LISTSERV’s outbound mail in the SMTP_FORWARD and SMTP_FORWARD_1 site configuration parameters. See the section on Configuring LISTSERV.</p>

PARAMETER	SETTINGS	IMPORTANCE	INSTRUCTIONS & COMMENTS
Number of inbound connections limit	No limit	Recommended	<ul style="list-style-type: none"> Uncheck the box for “Limit number of connections to:” <p>If you impose a limit, make sure that it is larger than the number of SMTP workers defined in LISTSERV’s site configuration.</p> <p>Note: On Windows XP, there is a hard-coded limit of 10. This means that you should not set the LISTSERV configuration to have more than 10 SMTP workers going to any one IIS SMTP server running on XP (you can of course have more SMTP workers forwarding mail to other servers).</p>
Inbound connection time-out	10 minutes (default)	Recommended	<ul style="list-style-type: none"> For “Connection time-out (minutes)” enter “10”
Logging	Enabled	Recommended	<ul style="list-style-type: none"> Check the box for “Enable logging”
Active log format	W3C Extended Log File Format (default)	Suggested	<ul style="list-style-type: none"> In the pull-down menu labeled “Active log format” select “W3C Extended Log File Format” <p>This is the default when logging is enabled, but you may change it if a different format is better for your environment. See the discussion on logging below.</p>
Use local time for file naming and rollover	Enabled	Recommended	<ul style="list-style-type: none"> Click on “Properties...” for “Active Log Format” In “General Properties” tab, check the box for “Use local time[...]” <p>Using the local server time will make it easier to match up the SMTP log files with other log files when troubleshooting.</p>
Extended logging options (only if “W3C Extended Log File Format” was selected)	See the table in the discussion on “Logging” below.	Suggested	<ul style="list-style-type: none"> Click on “Properties...” for “Active Log Format” Go to “Extended Properties” tab (Windows XP) or “Advanced” tab (Windows 2003) Check the boxes for desired properties <p>Depending on how the logs are to be used, you may wish to select more or fewer logging options than those recommended here.</p>


PARAMETER	SETTINGS	IMPORTANCE	INSTRUCTIONS & COMMENTS
Tab: Access			
Authentication	Anonymous access enabled (default)	 Required	<ul style="list-style-type: none"> Click on “Authentication...” Check the box for “Anonymous access” <p>This is the default value.</p>
Connection control	Allow connections (default)	Recommended	<ul style="list-style-type: none"> Click on “Connection...” Select “All except the list below” Leave list blank <p>In general, it is better to allow connections and then reject unauthorized transactions through Relay Control. However, if there is a large volume of unauthorized connections, it may be preferable to limit the connections to the LISTSERV server (see instructions below). If you do so, it is important to specify <i>every</i> IP address that LISTSERV could be using to connect, otherwise delivery may be impaired.</p> <ul style="list-style-type: none"> Click on “Connection...” Select “Only allow from the list below” Click on “Add...” Select “Single computer” and enter the IP address(es) of the LISTSERV server or “Group of computers” and enter the subnet address and the subnet mask that covers all IP addresses on the LISTSERV server.

PARAMETER	SETTINGS	IMPORTANCE	INSTRUCTIONS & COMMENTS
Relay	Limit relaying to the LISTSERV server	Recommended	<ul style="list-style-type: none"> Click on “Relay...” Uncheck box for “Allow all computers which successfully authenticate to relay, regardless of the list above” Select “Only the list below” Click on “Add...” Select “Single computer” and enter the IP address 127.0.0.1 Select “Single computer” and enter the IP address of the LISTSERV server <p>If the LISTSERV server is multi-homed (has multiple IP addresses), then you should add an entry for each IP address on the server or select "Group of computers" instead of "Single computer", and then enter the subnet address and the subnet mask that covers all IP addresses on the LISTSERV server. In all cases you should be sure that 127.0.0.1 is added to the list of allowed IP addresses.</p>
Tab: Messages			
Message size limit	Disable	Recommended	<ul style="list-style-type: none"> Uncheck the box for “Limit message size to (KB)” <p>If message size limits are to be imposed, they should be imposed in LISTSERV with FILEMAXL in LISTSERV’s site configuration (or for individual lists with the Sizelim= keyword), not in the SMTP service.</p> <p>If you do set a message size limit in SMTP, you should also set FILEMAXL to be smaller. However, note that the units for this property and FILEMAXL are different.</p>
Session size limit	Disable	Recommended	<ul style="list-style-type: none"> Uncheck the box for “Limit session size to (KB)”

PARAMETER	SETTINGS	IMPORTANCE	INSTRUCTIONS & COMMENTS
Messages per connection limit	100 or higher	Recommended starting value  Tuning may be required for optimal performance	<ul style="list-style-type: none"> Make sure box is checked for “Limit number of messages per connection to” Enter 100 in the edit box <p>This property works hand in hand with the number of connections per domain limit, and they should be adjusted together based on your subscriber demographics.</p> <p>See the discussion on tuning below.</p>
Recipients per message limit	Same or higher than LISTSERV’s MAXBSTMP value (which is set to 1000 when LISTSERV is installed, but may be modified)	 Required Tuning may be applied for optimal performance or deliverability.	<ul style="list-style-type: none"> Make sure box is checked for “Limit number of recipients per message to” Enter 1000 (or current MAXBSMTP value) in the edit box provided (or leave it at 100 and change MAXBSMTP to 100) <p>This must be equal to or greater than the number specified in LISTSERV’s site configuration for MAXBSMTP. This setting may be adjusted for tuning, but only if MAXBSTMP is also adjusted.</p> <p>See the discussion on tuning below.</p>
Tab: Delivery			
First retry interval	5	Suggested starting values  Tuning may be required for optimal performance	<ul style="list-style-type: none"> Enter the recommended value in the corresponding data entry boxes <p>Each interval must be defined, but the values are a matter of preference. Retry intervals that are too small will waste effort on unresponsive destinations. Retry intervals that are too large will delay deliveries to destinations that may simply be experiencing temporary problems of short duration.</p> <p>The numbers given here are suggestions. For very large volumes, you may want to increase them.</p> <p>See the discussion on tuning below.</p>
Second retry interval	10		
Third retry interval	15		
Subsequent retry interval	30		

PARAMETER	SETTINGS	IMPORTANCE	INSTRUCTIONS & COMMENTS
Outbound Delay notification	9999 Days	 Required	<ul style="list-style-type: none"> For “Delay notification” in the “Outbound” frame, enter “9999” in the text box and select “Days” from the pull-down menu <p>The SMTP Server should never send delay notifications, or LISTSERV may count them as bounces. At the very least, they will needlessly add to LISTSERV’s processing load.</p>
Outbound Expiration timeout	5 Days	Suggested	<ul style="list-style-type: none"> For “Expiration timeout” in the “Outbound” settings, enter “5” in the text box and select “Days” from the pull-down menu <p>This is more of a policy decision than a tuning decision, but given that some Internet sites are sometimes down for days at a time, L-Soft recommends that this be set no lower than 3 days unless <i>all</i> the messages sent through LISTSERV are particularly time-sensitive and completely lose their value after a certain time (that is, you’d rather have them sent not at all than late).</p> <p>See the discussion on tuning below.</p>
Outbound Security	Anonymous access (default)	 Required	<ul style="list-style-type: none"> Click on “Outbound Security...” Make sure “Anonymous access” is selected <p>Do not change this unless LISTSERV and IIS SMTP are being used in a closed intranet situation where no connections to remote mail servers will ever be needed.</p>
Number of outbound connections limit	1000 (see comments)	Recommended starting value  Tuning may be required for optimal performance	<ul style="list-style-type: none"> Click on “Outbound connections...” Enter desired limit in “Limit number of connections to” <p>This setting may be adjusted according to your workload and hardware configuration. Start with 1000 and adjust upwards or downwards as needed.</p> <p>See the discussion on tuning below.</p>

PARAMETER	SETTINGS	IMPORTANCE	INSTRUCTIONS & COMMENTS
Outbound connection time-out	1 minute	Recommended	<ul style="list-style-type: none"> Click on “Outbound connections...” Change “Time-out (minutes)” to 1 <p>High time-out values will allow unresponsive destinations to tie up connections needlessly and potentially have a negative impact on your overall delivery performance.</p>
Number of connections per domain limit	100 (see comments)	Recommended starting value  Tuning may be required for optimal performance	<ul style="list-style-type: none"> Click on “Outbound connections...” Enter desired limit in “Limit number of connections per domain to” <p>This setting may be adjusted according to your workload and hardware configuration. Start with 100 and adjust upwards or downwards as needed. If you lower the messages per connection limit (in the “Messages” tab), you may need to adjust this setting upwards to compensate for high-volume recipient domains.</p> <p>When tuning this parameter, you should also consider the “Number of Outbound Connections Limit” and your subscriber demographics.</p> <p>See the discussion on tuning below.</p>
Outbound TCP port	25 (default)	Suggested	<p>Unlike the inbound TCP port which must be changed, the outbound TCP port is irrelevant and can be left at the default.</p>
Maximum hop count	25	Suggested start value  Tuning may be required for optimal performance	<ul style="list-style-type: none"> Click on “Advanced...” Enter the desired number <p>A setting of 25 will work in most situations. It should not be set too low, since you must account for all the mail servers the senders’ emails must go through before they reach LISTSERV, and then one or more hops through LISTSERV. If there are extra hops in your site before it gets to LISTSERV (for example, due to a firewall between the Internet and the LISTSERV server), you may need to adjust the number upward.</p>

PARAMETER	SETTINGS	IMPORTANCE	INSTRUCTIONS & COMMENTS
Masquerade domain	Leave undefined (default)	 Required	<ul style="list-style-type: none"> Click on “Advanced...” Make sure that “Masquerade domain” is left empty <p>This is the default. This property must be left undefined.</p> <p>LISTSERV handles its own bounces, so it is important not to interfere with the MAIL FROM value set by LISTSERV in the SMTP envelope.</p>
Fully-qualified domain name	Node name specified in the LISTSERV site configuration	Recommended	<ul style="list-style-type: none"> Click on “Advanced...” Make sure that the domain entered for “Fully-qualified domain name” is the same as the NODE parameter in LISTSERV’s site configuration. <p>Depending on the configuration, this may or may not be the default.</p>
Smart host	None (default)	Recommended	<ul style="list-style-type: none"> Click on “Advanced...” Make sure that “Smart host” is left empty <p>This is the default.</p> <p>If there is a “smart host” through which you want to route email, this should be configured directly in LISTSERV as SMTP_FORWARD and SMTP_FORWARD_1 rather than using IIS SMTP Service as a “middleman”.</p>
Perform reverse DNS lookup on incoming messages	Disabled (default)	Recommended	<ul style="list-style-type: none"> Click on “Advanced...” Make sure that the checkbox for “Perform reverse DNS lookup on incoming messages” is not checked <p>Disabled by default.</p> <p>Since all incoming messages will be coming from LISTSERV, reverse DNS lookups would only lower performance without increasing security. Security is handled by the “Access” tab settings. If you change the latter from the recommended values above, you may want to enable this setting, depending on the nature of the change.</p>

PARAMETER	SETTINGS	IMPORTANCE	INSTRUCTIONS & COMMENTS
Tab: LDAP Routing			
LDAP Routing	Disabled (default)	Recommended	Do not enable LDAP Routing. Concurrent use of LISTSERV and LDAP Routing has not been tested and is not recommended. The Microsoft IIS SMTP Server should be dedicated to LISTSERV deliveries.
Tab: Security			
Operators	Administrators (default)	Suggested	Follow your organization's security policies to decide who has access to change the properties of the SMTP Service. Access should be restricted to just a few people to prevent mistakes. If the LISTSERV site managers are not part of the Administrators group, consider giving them access.

Details of Selected Configuration Changes

★ SMTP Port (Required change)

LISTSERV has its own SMTP “listener” that receives mail for all the LISTSERV addresses. Therefore the IIS SMTP Server will only be used for outbound mail from LISTSERV. The LISTSERV SMTP Listener service will listen to the standard SMTP port⁴, port 25, on all IP addresses. Because of this, it is necessary for the IIS SMTP Server to be configured to listen to a different port.

The ports numbered 1 to 1023 are reserved, so the port number must be over “1023”. Windows may automatically allocate ports starting at 1024 to other services on startup. Numbers 49152 to 65535 are available as “Dynamic” or “Private Ports” (in other words, are unlikely to be reserved by other applications), so a relatively high port number such as “50025” is usually safe unless you’ve already explicitly assigned it to something else. We recommend a port ending in “25” as a memory aid that it is an SMTP port, but this is not technically required.

Note: if your server has multiple IP addresses assigned to it, it is possible to have the LISTSERV SMTP Listener listen to port 25 on one IP and the IIS SMTP listen to port 25 on a different IP. However, since this SMTP service is to be dedicated to LISTSERV deliveries, we recommend using a different port anyway, to make it clear that it is not a “general use” SMTP service.

Logging

Logging is important for troubleshooting and monitoring activity. The IIS SMTP Service offers three different text formats for logging SMTP activity. Alternatively, it is also possible to have the logging data go to an ODBC-compliant database (see [\[8\]](#) for details).

The log format is a matter of preference. Choose the format that works best for your organization. ODBC logging offers opportunities for complex reporting if your organization has database expertise and good database reporting tools available. Among the text formats, the

⁴ It is possible to change this, but not recommended, and therefore not covered in this document.

W3C Extended log file format provides the most flexibility since you can choose what data to track (see table below), and it is supported by many log analysis tools. However, if you have log analysis and reporting tools that only work with one of the other formats, then it makes sense to use the log format supported by your tools.⁵

All four log formats write multiple entries for each transaction. They write a record for each step of the SMTP transaction.

The table below describes the Extended logging options available in the “Advanced” tab of the Logging Properties applet when W3C Extended Log File Format is selected as the Active log format. The recommended options are marked in the table with “”. Options marked with “” are not recommended because they are deemed to provide little or no useful information in this particular configuration⁶. Options that are not used by the SMTP service⁷ are marked in the table with “-”.

Property name	Field name	Description	Comments
<input checked="" type="checkbox"/> Date	date	Date of activity	
<input checked="" type="checkbox"/> Time	time	Time of activity	
<input checked="" type="checkbox"/> Client IP address	c-ip	IP address of client accessing server	
<input checked="" type="checkbox"/> User Name	cs-username	Name of user accessing server	On connections from LISTSERV, this will simply be the name of the server. On outbound connections, this is “OutboundConnectionResponse”. This option makes it easy to differentiate connections from LISTSERV and connections to the remote hosts.
<input type="checkbox"/> Service Name	s-sitename	Internet service and instance number	Same for every record. E.g. “SMTPSVC1”.
<input type="checkbox"/> Server Name	s-computername	Name of the server	Same for every record.
<input type="checkbox"/> Server IP Address	s-ip	IP address of server	Always either the IP address of the server or “-”. May be used instead of User Name to differentiate between inbound and outbound mail.
<input type="checkbox"/> Server Port	s-port	Port number the client is connected to	Either 0 or 25, depending on whether connection is inbound or outbound. May be used instead of User Name.

⁵ Microsoft provides a free reporting tool called “Log Parser” [\[13\]](#)[\[14\]](#)

⁶ If the IIS SMTP service is used outside of LISTSERV (not recommended), or if particular reporting tools make use of them, they may be useful. For example, if your reporting tool combines the logs from several services, it may be necessary to check some of the boxes that are recommended here to leave unchecked due to being the same on every record.

⁷ The Logging Properties applet is used by all of the IIS services, and some options apply only to HTTP or FTP.

Property name	Field name	Description	Comments
<input checked="" type="checkbox"/> Method	cs-method	SMTP command (Action being performed)	EHLO, HELO, MAIL, RCPT, DATA, QUIT See RFC821 [11]
- URI Stem	cs-uri-stem	Not used by SMTP	
<input checked="" type="checkbox"/> URI Query	cs-uri-query	Query client was trying to perform	
<input checked="" type="checkbox"/> Protocol Status	sc-status	Status of the action in SMTP terms	Status code returned by SMTP server in response to inbound SMTP commands. 250 indicates success [11] .
- Protocol Substatus	sc-substatus	Not used by SMTP	
<input checked="" type="checkbox"/> Win32 Status	sc-win32-status	Status in terms used by Windows.	
<input checked="" type="checkbox"/> Bytes Sent	sc-bytes	Bytes sent by server	
<input checked="" type="checkbox"/> Bytes Received	cs-bytes	Bytes received by server	
<input checked="" type="checkbox"/> Time Taken	time-taken	Time action took to complete	For all log formats except ODBC logging, this is in milliseconds.
<input type="checkbox"/> Protocol Version	cs-version	Protocol used by client	Always "SMTP"
- Host	cs-host	Not used by SMTP	
- User Agent	cs(User-Agent)	Not used by SMTP	
- Cookie	cs(Cookie)	Not used by SMTP	
- Referer	cs(Referer)	Not used by SMTP	



Tuning

While the default tuning settings may be acceptable for very low-volume LISTSERV sites, most sites will need to adjust the default settings in order to optimize performance. For general information about IIS tuning options, see [\[9\]](#). For explanations and specific initial recommendations for important tuning variables, see below.

The Microsoft Management Console is useful in monitoring and tuning the performance of your SMTP server. From the "Administrative Tools" Control Panel, open "Performance". The Performance Monitor can chart CPU time, available RAM and virtual memory, disk performance, message queues, number of messages delivered per second and other information useful for tuning the SMTP server.

Messages per Connection Limit

Recommended Initial Value: 100

Sets the maximum number of messages that the server will send over a single SMTP connection. After the limit is reached, the server will close the connection and open a new one. Setting this limit to a higher number allows more messages to be sent over a single connection, reducing overhead involved in opening and closing connections. However, some receiving sites may limit the number of messages that they are willing to receive over a single inbound connection before the connection is closed and/or the messages are labeled as spam. Start with a value of 100 and adjust up or down based upon mailing volume and delivery success rate.

If you need to adjust this setting downward, it *may* be necessary to adjust the “Number of Connections per Domain” limit upward to compensate. This should only be necessary if a significant proportion of your subscriber base belongs to a single domain *and* the number of subscribers from that domain far exceeds the product of these two settings⁸.

Recipients per Message Limit

Recommended Initial Value: 1000 (or 100, see discussion)

Sets the number of recipients per message for bulk mailings. Bulk SMTP messages, such as the traditional (non-mail-merge) LISTSERV list mailings, consist of a single message with multiple recipients. Setting the Recipients per Message Limit determines how bulk messages will be broken up for multiple recipients to a single domain. For instance, if a mailing included 10000 recipients at EXAMPLE.ORG and the Recipients per Message Limit were set to 1000, the result would be ten messages to EXAMPLE.ORG with 1000 recipients each. A greater number of recipients per message mean fewer messages need to be sent, and as a result fewer sending resources are required. However, some receiving sites may limit the number of recipients allowed in any given “envelope”. Start with the recommended value of 1000, and if necessary, adjust upward to improve performance or downward to improve deliverability. Adjust MAXBSMTP in LISTSERV’s site configuration accordingly. If deliverability is a bigger concern than speed of delivery, start with 100 here and in MAXBSMTP and adjust cautiously upward.



Note: IIS SMTP also uses this setting as an *inbound* limit. If LISTSERV attempts to send a message with more addresses than allowed, SMTP will reject it. It is important that whatever limit is used here must also be used in LISTSERV’s site.cfg file as MAXBSMTP (see the [Configuring LISTSERV to use the SMTP Service](#) section).

Retry Intervals

Recommended Initial Values: 5, 10, 15, and 30

If a recipient site is unreachable for some reason, the retry intervals determine how often delivery for that site should be retried. Constantly attempting to contact sites that are unreachable consumes resources that could be better utilized for other (deliverable) sites, so it makes sense to space out retry intervals. The recommended settings of 5, 10, 15 and 30 minutes for the first, second, third and subsequent retry intervals (respectively) should work well for most sites. For particularly time-sensitive mailings, or for sites with low enough volume that resource usage is not an issue, it may make sense to shorten the later retry intervals.

⁸ When LISTSERV use is primarily for bulk (not mail-merge) mailings, the Recipients per Message limit should also be factored in.

Outbound Expiration Timeout

Recommended Initial Value: 5 days

Determines how long messages for unreachable sites will remain in the mail queue before they expire and delivery is aborted. For most sites, the recommended value of five days should be appropriate⁹. If all mailings contain particularly time-sensitive¹⁰ material or if the message queue is so backed up from unreachable sites that overall mailing performance degrades, this setting may be decreased in order to force messages to expire sooner and clear out the queue faster.

Number of Outbound Connections Limit

Recommended Initial Value: 1000

Determines the maximum number of simultaneous connections that the SMTP server will open across all remote destinations. Increasing the number of connections upward from the recommended value of 1000 has the potential to deliver mail more rapidly, but also consumes greater hardware and bandwidth resources. If such resources are ample, the number of connections may be safely increased, or the limit could even be disabled by unchecking the box. If hardware and/or bandwidth resources are limited, consider decreasing the number of connections. If you decrease the total number of connections, you should also decrease the number of connections per domain.

Number of Connections per Domain Limit

Recommended Initial Value: 100

Determines the maximum number of simultaneous connections opened to a single recipient domain. For receiving sites with a large number of subscribers, it is usually more efficient to open more than one concurrent SMTP connection to deliver messages. However, many sites limit the number of simultaneous connections that they will accept. Start with the recommended value of a maximum of 100 connections per domain, and adjust up or down from there. In some cases, it may be advisable to increase the Number of Connections per Domain Limit while decreasing the Messages per Connection Limit; in other cases, the inverse may be true.

When tuning this parameter, you should also consider the “Number of Outbound Connections Limit” and your subscriber demographics. If ten or more domains each account for very large numbers of subscribers, the settings of 100/domain and 1000/total could allow those domains to dominate the outbound connections. If the hardware and bandwidth resources allow it, you should increase the Number of Connections Limit, or even disable it. If resources are scarce, you should consider lowering the Number of Connections per Domain Limit to throttle the deliveries to the more popular domains in favor of wider coverage of domains.

Configuring the SMTP Service Domains

The LISTSERV SMTP listener must handle all incoming mail to the LISTSERV domain. However, the IIS SMTP service thinks that any mail to its domain is “local” mail, to be handled by the SMTP Service. If SMTP is not configured to pass on all emails to LISTSERV, bounces

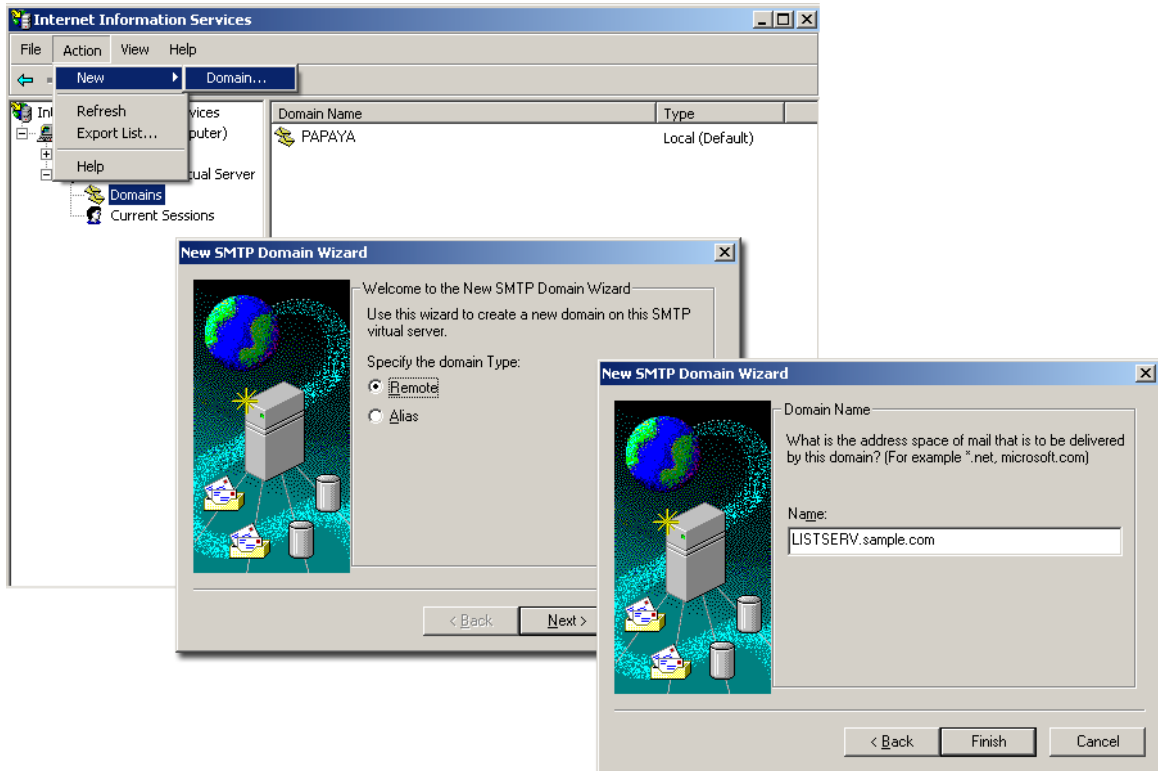
⁹ A setting of five days allows for remote sites that go down while left unattended over a long weekend, plus a couple of days for the site administrators to find and fix the problem.

¹⁰ If mailings from a certain list are time-sensitive and you want to expire only *those* messages early, this can be handled by setting up a separate SMTP server with a lower timeout (either as a virtual SMTP server listening to a different TCP port on the same machine or as an IIS SMTP installation on a separate machine), and using LISTSERV’s “worker pool” feature to forward messages for that list to that separate SMTP server. Contact support@lsoft.com for assistance in setting up worker pools.

(delivery failure notifications) will end up in SMTP's "bad mail" folder instead of being sent to LISTSERV for processing. The following steps must be used to prevent this:

1. In the IIS administration interface, double-click on **Domains**.
2. Right-click on the local domain and rename it¹¹.
3. Click on the **Action** menu, select **New**, and then **Domain** to open the New SMTP Domain Wizard (see Figure 5).
4. Select **Remote**, and then click **[Next]**.
5. Enter the LISTSERV Node Name as the **Domain Name**, and click **[Finish]**.

Figure 5 Define the LISTSERV domain name as a Remote Domain



6. Right-click on the remote domain you just defined, and select **Properties**.
7. On the General tab, check the boxes for **Allow incoming mail to be relayed to this domain** and **Send HELO instead of EHLO**. The Route domain should be set to **Use DNS to route to this domain**.¹²

¹¹ This step can be skipped if LISTSERV and the SMTP Service are running on separate servers and have different domain names.

¹² If you are running LISTSERV and the IIS SMTP service behind a firewall without a functional internal DNS configuration, you may need to explicitly define the local routing by selecting "Forward all mail to smart host" and entering the bracketed IP address of the SMTP server (for example, [127.0.0.1] to use the local machine as the smart host). Additionally, if there is an internal mail server to which mail for the local domain should be delivered that has a different internal IP address than the public MX, you may need to define a domain for that server as well. For example, a server called LISTSERV.EXAMPLE.ORG might need to route all *@EXAMPLE.ORG addresses to a smart host with some internal IP address, while routing the rest of its outbound mail through normal DNS resolution. For additional assistance with such configurations, consult L-Soft support and/or the Microsoft documentation.

Configuring LISTSERV to use the SMTP Service



LISTSERV Maestro sites: If you have not yet installed LISTSERV Maestro, the easiest way to configure LISTSERV Maestro to use the SMTP Service is to use the **Express Setup** in the LISTSERV Maestro Setup Suite.

On the SMTP Server page:

- For **Host name**, specify the domain name of the server where SMTP Server is installed.
- For **SMTP port**, enter the number used as the inbound TCP Port in the SMTP Server Properties (for example, 50025)
- Select the button for **standard SMTP server**.

If LISTSERV Maestro is already installed, follow the instructions below for changing the LISTSERV site configuration.

LISTSERV needs to send its outbound mail to the SMTP Service at the same port that was configured in the SMTP Service properties for “TCP Port”. This is defined using the `SMTP_FORWARD` and `SMTP_FORWARD_1` site configuration parameters.

1. In Notepad or a similar plain text editor, open the file called `SITE.CFG` in the `\LISTSERV\MAIN` directory. (The location of this directory will vary, depending upon the location selected during LISTSERV’s installation. Usually it is located in either `C:\LISTSERV\MAIN` or `C:\Program Files\L-Soft\LISTSERV\MAIN`.)



Warning: Do not attempt to edit `SITE.CFG` with Microsoft Word, WordPad, or a similar word-processing program. `SITE.CFG` is a plain text file, and editing it with something other than a plain text editor may introduce binary data into the configuration file, rendering it unreadable to LISTSERV.

2. Look for a line in the `SITE.CFG` file that begins with `SMTP_FORWARD`. For example:

```
SMTP_FORWARD=LISTSERV.EXAMPLE.ORG
```

Edit the `SMTP_FORWARD` setting so that it contains the fully-qualified domain name of the SMTP server followed by a colon (:) and the port number of the SMTP server. For example:

```
SMTP_FORWARD=LISTSERV.EXAMPLE.ORG:50025
```

3. If an `SMTP_FORWARD_1` setting already exists in `SITE.CFG`, edit it similarly. If not, add a new `SMTP_FORWARD_1` line to the `SITE.CFG` beneath the `SMTP_FORWARD`, specifying the number of SMTP workers to be used. Ten is a good default number, but may be adjusted up or down depending on the SMTP server’s ability to keep up with incoming mail from LISTSERV. See [\[2\]](#) for more details about SMTP workers. For example:

```
SMTP_FORWARD=LISTSERV.EXAMPLE.ORG:50025
```

```
SMTP_FORWARD_1=10*LISTSERV.EXAMPLE.ORG:50025
```

This defines ten SMTP workers to deliver mail from LISTSERV to the IIS SMTP server.

4. Add the following line (if not already present) to the `SITE.CFG` file:

```
EMBEDDED_MAIL_MERGE=1
```

5. Add the following line (if no `MAXBSTMP` line is present) or change the existing `MAXBSMTP` line (if necessary) to:

```
MAXBSMTP=1000
```

This may be adjusted as long as the IIS **Recipients per message limit** setting is similarly adjusted. `MAXBSMTP` must always be less than or equal to this IIS setting.

6. Save the changes to the `SITE.CFG` file.
7. Stop and then restart the `LISTSERV` service in order to make the changes effective.



LISTSERV Tuning

For very large delivery volumes, the following steps are recommended. The steps are progressive, each building on the previous ones and providing more volume handling. Implement the steps in order until the desired performance is achieved. If you have high delivery volumes, it is recommended that you start with steps 1 and 2 simultaneously¹³.

1. Upgrade the hardware and operating system of the `LISTSERV` server (faster CPU, more memory, faster disk, use Windows 2003 Server rather than XP) and increase the number of SMTP workers as well as the IIS SMTP Number of Outbound Connections Limit.
2. Use `LISTSERV HPO` (high performance option).
3. Set up one or more additional servers running the IIS SMTP Service, and configure additional SMTP workers to use these servers. For example:

```
SMTP_FORWARD=LISTSERV.EXAMPLE.ORG:50025
SMTP_FORWARD_1=10*LISTSERV.EXAMPLE.ORG:50025
SMTP_FORWARD_2=10*SMTP1.EXAMPLE.ORG:50025
SMTP_FORWARD_3=10*SMTP2.EXAMPLE.ORG:50025
```

4. Set up the additional server(s) from step 3 with additional `LISTSERV` installations¹⁴ to function as “Distribute workers”, each with its own dedicated IIS SMTP Service. In the primary `LISTSERV` instance, remove the additional `SMTP_FORWARD_n` settings in favor of a `DIST_FORWARD` setting.

For example, instead of the extra workers in the example for step 3, the primary `LISTSERV` instance might have the following settings:

```
SMTP_FORWARD=LISTSERV.EXAMPLE.ORG:50025
SMTP_FORWARD_1=10*LISTSERV.EXAMPLE.ORG:50025
DIST_FORWARD=DIST1.EXAMPLE.ORG DIST2.EXAMPLE.ORG
```

The `LISTSERV` instance at `DIST1` would have the following settings (the `LISTSERV` instance at `DIST2` would be the same, except using “`DIST2`” instead of “`DIST1`”):

```
SMTP_FORWARD=DIST1.EXAMPLE.ORG:50025
SMTP_FORWARD_1=10*DIST1.EXAMPLE.ORG:50025
```

¹³ If you know you will have huge delivery volumes, go directly to step 4 or 5 rather than work your way up through unsatisfactory performance at the earlier steps.


¹⁴ A separate `LISTSERV` license is required for each distribute worker. Contact your Sales representative for pricing.

The above example would split the distribution work evenly among the three LISTSERV instances. When two or more distribute workers are available, it is recommended that “0*SELF” be added to DIST_FORWARD so that the distribute workers handle all the deliveries and the primary LISTSERV is freed up for the important list management tasks. If only one distribute worker is available, use the DIST_FORWARD “weight” specification to give the distribute worker more of the distribution load, for example:

```
DIST_FORWARD=2*DIST.EXAMPLE.ORG
```

See the description of “DIST_FORWARD” in the [Site Configuration Keyword Reference for LISTSERV](#) document for details.

5. Add more servers running the IIS SMTP Service to function as additional SMTP servers for the DISTRIBUTE workers from step 4 – follow the step 3 instructions for each distribute worker.
6. Add more “Distribute worker” servers and associated SMTP servers as needed to handle the delivery load. Distribute workers can be added indefinitely to handle any load that your bandwidth can handle. Because of the way distribute workers are implemented, they scale virtually linearly¹⁵. So, for example, doubling the number of distribute workers¹⁶ really does double the throughput, assuming that bandwidth is not a bottleneck.

 **Tip:** Get help! High volume sites require a certain amount of Internet mail expertise to get the tuning “just right”. L-Soft offers comprehensive consulting services, providing your organization with in-depth customized assistance to get the tuning right for your site. See <http://www.lsoft.com/products/consulting.asp> for more information.

References

The following LISTSERV and LISTSERV Maestro manuals are available at <http://www.lsoft.com/resources/manuals.asp>

- [1] LISTSERV for Windows Installation Guide
- [2] LISTSERV Site Manager's Manual
- [3] LISTSERV Maestro Installation Guide for Windows
- [4] LISTSERV Maestro Administrator's Manual

References for IIS 6.0 on Windows Server 2003 (much of the information in these documents is also applicable to IIS 5.1 on Windows XP):

- [5] Microsoft TechNet, “SMTP Server Setup (IIS 6.0)”
<http://www.microsoft.com/technet/prodtechnol/WindowsServer2003/Library/IIS/e4cf06f5-9a36-474b-ba78-3f287a2b88f2.mspx>
- [6] Microsoft TechNet, “SMTP Administration (IIS 6.0)”
<http://www.microsoft.com/technet/prodtechnol/WindowsServer2003/Library/IIS/4b115fcd-3f3b-4d3d-8d12-f51d2e996a12.mspx>
- [7] Microsoft TechNet, “Starting IIS Manager (IIS 6.0)”
<http://www.microsoft.com/technet/prodtechnol/WindowsServer2003/Library/IIS/5056d30f-7935-4ff5-9ceb-01c8b10bc90c.mspx>

¹⁵ When the primary is not one of the workers (in other words, you should use 0*SELF in the DIST_FORWARD site configuration parameter for heavy loads).

¹⁶ Assuming all distribute workers have the same resources in terms of hardware, dedicated SMTP servers, number of SMTP workers, and network access.

[8] Microsoft TechNet, “Monitoring Message Transactions (IIS 6.0)”

<http://www.microsoft.com/technet/prodtechnol/WindowsServer2003/Library/IIS/73668849-de49-45f5-97fd-d0e3d37139bc.mspx>

[9] Microsoft Technet, “Optimizing IIS 6.0 Performance (IIS 6.0)”

<http://www.microsoft.com/technet/prodtechnol/WindowsServer2003/Library/IIS/e621190d-1015-40c2-a5ec-0dcb32c98286.mspx>

Other references:

[10] W3C, “Extended Log File Format”

<http://www.w3.org/TR/WD-logfile.html>

[11] Jonathan B. Postel, “Simple Mail Transport Protocol” (RFC 821)

<http://www.ietf.org/rfc/rfc0821.txt>

[12] LvlLord, TCPIP.SYS patcher

<http://mitglied.lycos.de/lvllord/download-mirror.htm>

[13] Gabriele Giuseppini, “How Log Parser 2.2 Works” (Microsoft Technet)

<http://www.microsoft.com/technet/community/columns/profwin/pw0505.mspx>

[14] The Unofficial Log Parser Support Site

<http://www.logparser.com/>