

MSC-LIMS™

Laboratory Information
Management System for
Microsoft Access

MSC-LIMS Messaging
Version 5.0

User's Guide

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Chapter 1: Introduction

MSC-LIMS is a Windows-based laboratory information management system (LIMS) used to manage the daily information processing requirements of an analytical laboratory. MSC-LIMS Messaging is an MSC-LIMS add-on component used to automatically send an email or fax with sample information when a sample or sample batch is logged or completed. This document provides an overview of the system's architecture, installation instructions and configuration information.

User's Guide Overview

This User's Guide is intended for both MSC-LIMS administrators and for information systems personnel responsible for software installation and configuration. This document assumes that you are familiar with the MSC-LIMS software and you understand and are comfortable installing and configuring software using the Windows operating system. This guide is organized into the following chapters:

Chapter 2: Installation

This chapter lists the system requirements and provides detailed installation instructions for the MSC-LIMS Messaging software and required components.

Chapter 3: Getting Started

This chapter includes information on starting the MSC-LIMS Messaging software, starting a MAPI session, and sending a test message.

Chapter 4: Configuration

This chapter includes configuration options for the MSC-LIMS Messaging software and the messaging options within the MSC-LIMS software.

Chapter 5: Administration

This chapter includes system administration topics for the MSC-LIMS administrator(s).

Chapter 6: XML Overview

This chapter provides a brief overview of eXtensible Markup Language (XML), which is used by the messaging software.

Messaging Overview

MSC-LIMS Messaging is available with MSC-LIMS version 2.2 or later.

MSC-LIMS Messaging is an optional component of the MSC-LIMS product. Using messaging, sample information can be sent automatically via email or fax when a sample or sample batch is logged or completed. MSC-LIMS Messaging includes a number of message styles ranging from plain text file to attached files in rich text, snapshot, Excel, HTML, PDF, XPS, and XML

formats. Message styles are available for single samples and sample batches. Messaging is enabled through MSC-LIMS' project and customer setup screens and is triggered during sample login and completion events.

To use MSC-LIMS Messaging, a single workstation acts as the messaging agent (see [Figure 1](#)). The messaging workstation uses Microsoft's Messaging Application Programming Interface (MAPI) software and MAPI-compliant transport providers to deliver messages via email, fax, etc. When messaging is enabled, the MSC-LIMS software uses its sample event model to initiate messages. During a sample login or completion event, MSC-LIMS reviews the sample's project and, if applicable, the sample's customer messaging options. If there are messages to send, MSC-LIMS adds an appropriate entry (or entries) to the message queue. The workstation running the MSC-LIMS Messaging software (LimsMapi5.mde) periodically scans the message queue for new entries. When a new entry is found, the messaging software creates the new message using the entry's message style and dispatches the message using the appropriate MAPI transport provider.

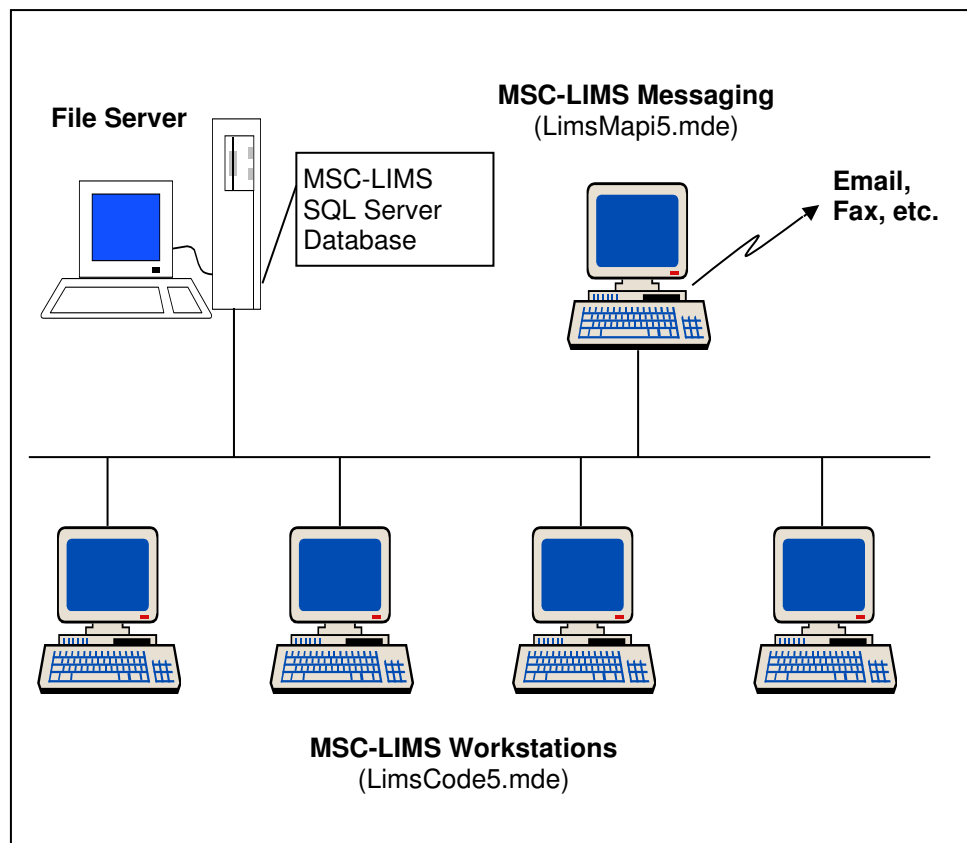


Figure 1 MSC-LIMS Messaging Architecture

See the **MSC-LIMS Release Notes** for MSC-LIMS system requirements and installation instructions.

MSC-LIMS and MSC-LIMS Messaging were developed using Microsoft's Access 2010 Relational Database Management System for Windows. MSC-LIMS can be installed on a single PC or in a multi-user configuration for small workgroups. MSC-LIMS Messaging can be installed on an

MSC-LIMS workstation or on any workstation with access to the MSC-LIMS back end SQL Server database.

NOTE

You may need to install MSC-LIMS Messaging on a workstation not used for other email activities. Some email client programs and MAPI transport providers may interfere with MSC-LIMS Messaging's operation. If you are using message styles with either attached Excel files or PDF files created from Excel files you will need to install MSC-LIMS Messaging on a workstation that is not also used as an MSC-LIMS workstation.

See pages 13 and 24 for more information on creating new message styles.

The MSC-LIMS Messaging software was designed to be easily customized. Additional message styles can be added to create messages in specific formats or to create attachment data files in additional formats.

NOTE

When sending fax messages, you should test message styles that include attached files. The MAPI fax service provider may not be able to render an image for some or all attached file formats. You may need to use a text-only message style with faxed messages.

See **Chapter 6: XML Overview** for more information.

MSC-LIMS Messaging can also be used to implement business-to-business electronic data transfer. MSC-LIMS Messaging supports eXtensible Markup Language (XML) data format which is a widely used standard for electronic data interchange. MSC-LIMS Messaging supports eXtensible Stylesheet Language Transformations (XSLT) using Microsoft's XML (MSXML) parser.

Additional Documents

Refer to the following documents for additional information on MSC-LIMS and the Access 2010 development environment.

| Document | Author |
|---|---------------------------------|
| <i>MSC-LIMS Release Notes</i> | Mountain States Consulting, LLC |
| <i>MSC-LIMS User's Guide</i> | Mountain States Consulting, LLC |
| <i>MSC-LIMS Programmer's Guide (for Full System licenses)</i> | Mountain States Consulting, LLC |
| <i>Microsoft Access 2010 Help</i> | Microsoft Corporation |
| <i>Microsoft Visual Basic Help</i> | Microsoft Corporation |
| <u>Access 2010 Developer Reference</u> | Microsoft Corporation |

Chapter 2: Installation

This chapter includes the system requirements to install MSC-LIMS Messaging and detailed installation instructions. Installation instructions for PDFCreator are also included.

System Requirements

The following are required to install MSC-LIMS Messaging 5.x:

- Microsoft Outlook 2003 or newer
 - PDFCreator 3.x or newer (for attached files in PDF format)
 - Additional MAPI transport providers (fax, etc.) as necessary
-

Installing PDFCreator

If you plan to use message styles with attached PDF files, you will need to download and install the free open source [PDFCreator](#) software. MSC-LIMS Messaging 5.x requires PDFCreator 3.x or newer.

Installing MSC-LIMS Messaging

Follow the steps below to install MSC-LIMS Messaging.

1. Close any other applications that are running. Log on to Windows as a user with administrative privileges.
2. Use WinKey+E to open Windows Explorer. Navigate to the Setup folder containing the MSC-LIMS electronic distribution files (normally C:\MSC-LIMS\Setup for a single-user license or \LIMS\Setup on your server for a multi-user license). In the Setup folder, double-click the messaging folder then double-click file Setup.exe. Click the Next button.
3. Accept the default location for the MSC-LIMS Messaging software or use the Browse button to select the destination folder. Click the Next button.
4. Click the Install button to install MSC-LIMS Messaging.
5. When installation begins, the Installing dialog box opens and shows you the progress as files are copied. When the process is complete, another dialog box tells you that MSC-LIMS Messaging has been installed successfully.
6. Click the Finish button to complete the installation.

Chapter 3: Getting Started

This chapter includes information on starting the MSC-LIMS Messaging software, starting a MAPI session, and sending a test message. The information presented assumes you have successfully installed the messaging software following the installation instructions in the previous chapter.

The MSC-LIMS Messaging Main Screen

See **All MSC-LIMS version 5.x** software runs using an isolated installation of the Microsoft Access 2010 runtime. Command line options include the paths to the Access 2010

Use Start | All Programs | MSC-LIMS | MSC-LIMS Messaging to start the MSC-LIMS Messaging software.

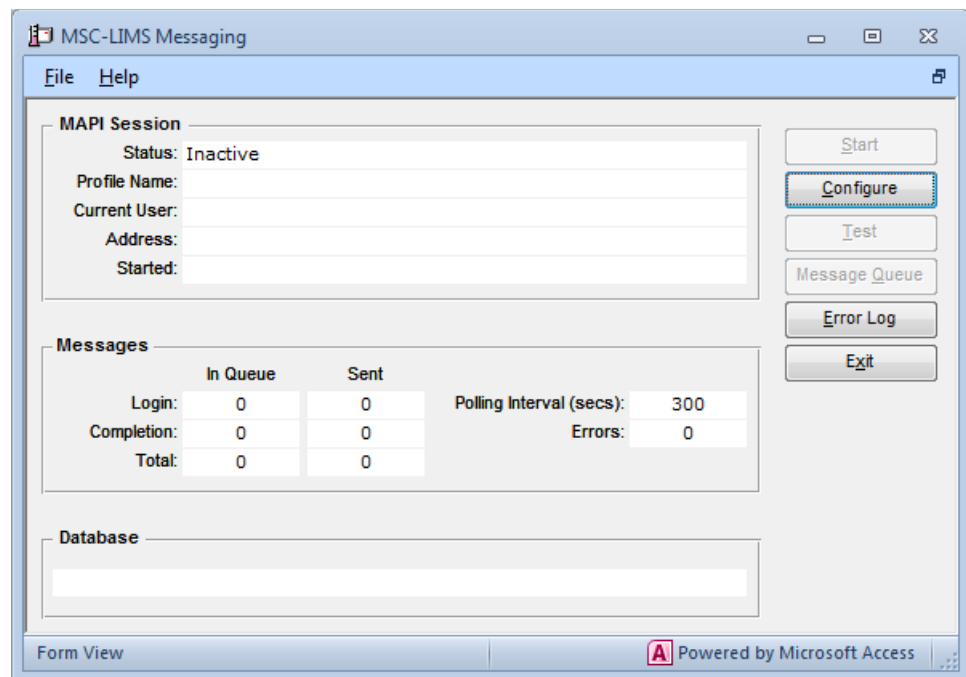


Figure 2 MSC-LIMS Messaging Main Screen

MSC-LIMS Messaging's main screen appears when the software is started. The first time you start the messaging software the screen will look similar to the example in [Figure 2](#) above. Click the [Configure] button and the Open MSC-LIMS Database dialog will appear (see [Figure 3](#) below).



Figure 3 Open MSC-LIMS Database

To open an MSC-LIMS database, select the ODBC driver from the pick list. If no drivers appear in the pick list, install the [ODBC Driver 13 for SQL Server](#). Enter the Server in the form “server\instance” then enter the name of the database and click Connect.

Next, you must activate a MAPI session which activates the messaging software. When the messaging software is active, it periodically polls the message queue database looking for new messages to send.

Use the Mail icon in Windows' Control Panel to create and configure user profiles.

Click the [Start] button to activate a MAPI session. The first time you start a session, you will be prompted to select a user profile from those set up on the messaging workstation. Profiles contain settings for address books, sets of folders, information service providers, and other MAPI settings. MSC-LIMS Messaging saves the last profile used in its configuration so the profile can be used automatically the next time a session is activated. When the MAPI session is activated, additional information such as the profile name, current user, and date and time the session was started are displayed in the MAPI session fields of the main screen.

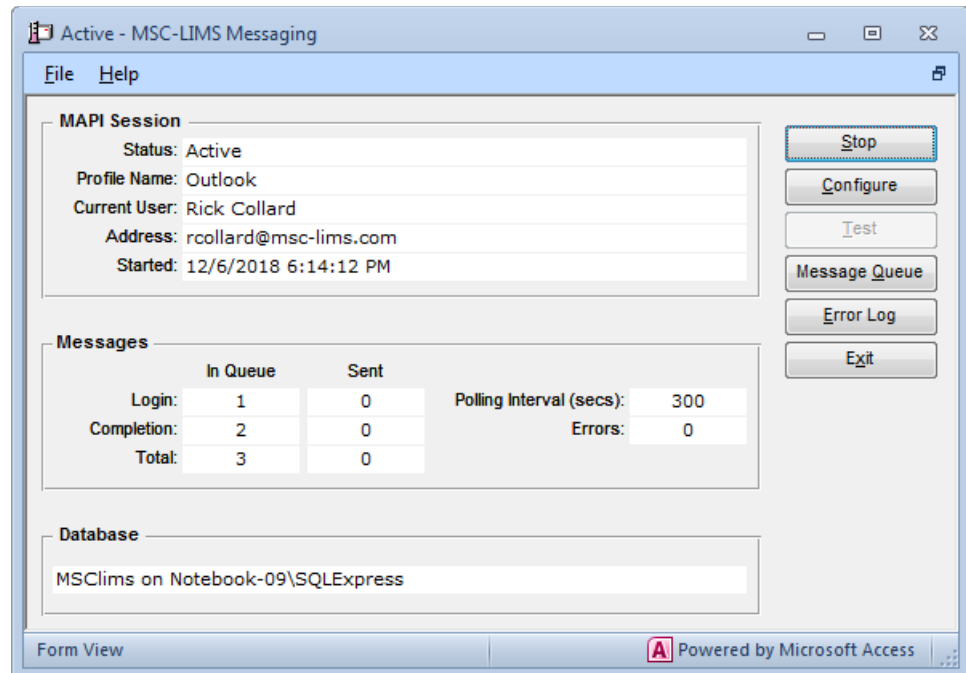


Figure 4 Active Messaging Session

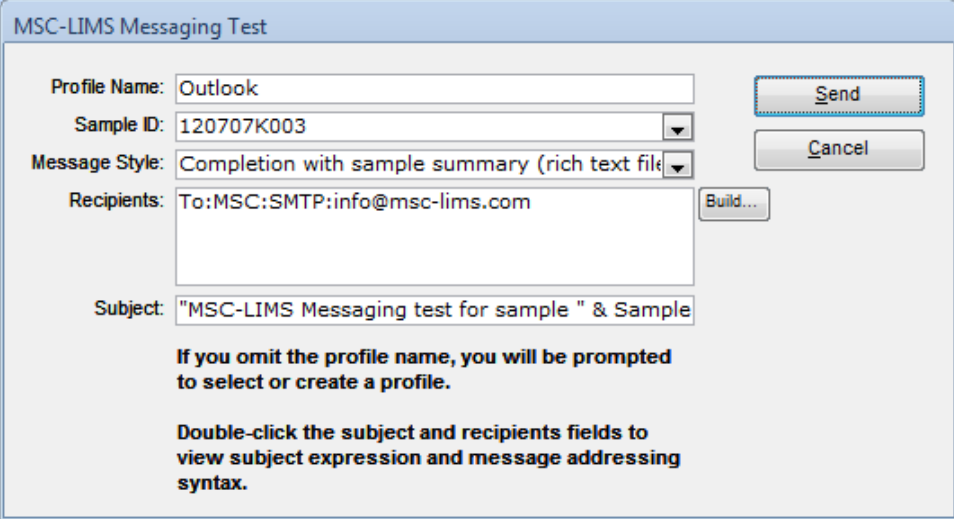
The Messages fields on the main screen show counters of the number of messages in the queue, messages sent, and errors along with the polling interval in seconds. Note that these counters are only updated during the software's message processing cycle so you should use the [Message Queue] button if you need an accurate view of the queue's contents. The Database fields show the currently attached database in the form “database on server\instance”. [Figure 4](#) shows an example of an active MAPI session.

Sending a Test Message

Follow the procedures below to send a test message using MSC-LIMS Messaging.

1. Before you attempt to send a test message, open MSC-LIMS and use the Messaging option on the System Configuration screen to specify folders for login and completion message attachments. When creating messages with file attachments, the messaging software creates the files in the folders you specify. If no folder is specified, the files are created in the folder where the LimsMapi5.mde front end database is located. The folders you specify may be located on the messaging workstation's local hard drive or they may be shared folders on a network server. Only the MSC-LIMS Messaging software needs access to these folders. By default, attachment files are named "Sample NNN Login.ext", "Sample NNN Completion.ext", "Batch NNN Login.ext", and "Batch NNN Completion.ext" so a single folder may be used. Disk space, network traffic and backup and recovery procedures are factors to consider when deciding where the folder(s) should be located. You can also enter your laboratory ID, subject line text or expression, and header and footer message text in MSC-LIMS' System Configuration screen. You do not have to enable login or completion messaging at this time.
2. Use Start | All Programs | MSC-LIMS | MSC-LIMS Messaging to start the MSC-LIMS Messaging software. If you have not previously started the messaging software use the [Configure] button to select and attach the MSC-LIMS database. If you have not previously activated a MAPI session, click the [Start] button, select a profile, then click the [Stop] button after the session has started. NOTE: the [Test] button is only enabled when the MAPI session is inactive.
3. Use the [Test] button to send a test message. Enter a sample ID you know exists in your attached database or use the pick list to select from a list of 100 recent completed samples. Select a message style then enter an address for the recipient(s) and a message subject. Double-click the recipient field to display addressing syntax or use the [Build...] button to enter addresses. The address type for internet email is normally SMTP. Double-click the subject field to display subject expression syntax. If you omit a profile name, you will be prompted when you click the [Send] button. The selected profile is saved as the default profile and can be changed using the configuration screen.
4. If your test message is successful, you can set your preferences using the [Configuration] screen then click the [Start] button to start the session. MSC-LIMS Messaging is now periodically polling the message queue looking for messages to send.
5. You can now return to MSC-LIMS' System Configuration screen to enable system-wide login and completion messaging. Before any login or completion messages can be sent, you must enable messaging by

MSC-LIMS project or customer. Use the project and customer setup screens to enable messaging, select a message style, define message subject text or expression, and enter recipient addresses. To test, enable messaging for a single project or customer then log and complete a test sample or batch.



MSC-LIMS Messaging Test

Profile Name: Outlook

Sample ID: 120707K003

Message Style: Completion with sample summary (rich text file)

Recipients: To:MSC:SMTP:info@msc-lims.com

Subject: "MSC-LIMS Messaging test for sample " & Sample

If you omit the profile name, you will be prompted to select or create a profile.

Double-click the subject and recipients fields to view subject expression and message addressing syntax.

Figure 5 Sending a Test Message

[Figure 5](#) shows an example of a test message ready to send. When the [Send] button is clicked, the messaging software sends the message just as it would if the sample, message style, and list of recipients had been read from the message queue. Use the MSC-LIMS Messaging Test screen to test message styles and message addressing. [Figure 6](#) shows the message addressing syntax that is displayed when the test screen's Recipients field is double-clicked.

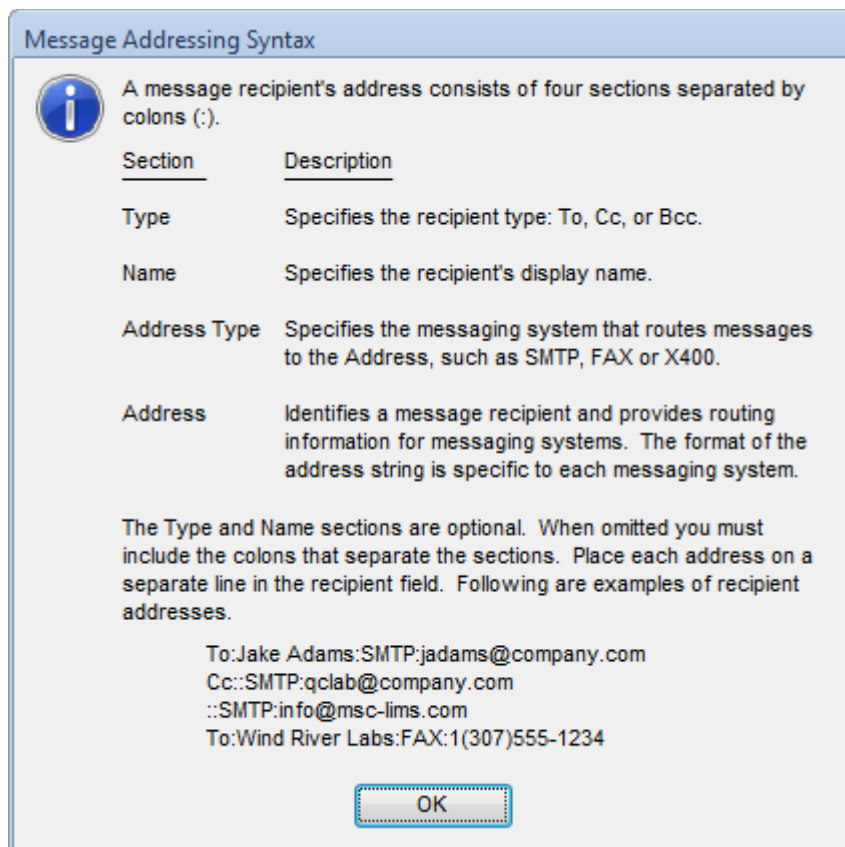


Figure 6 Message Addressing Syntax

Chapter 4: Configuration

This chapter includes configuration options for the MSC-LIMS Messaging software and the messaging configuration options within the MSC-LIMS software.

MSC-LIMS Messaging

Use the [Configure] button on the MSC-LIMS Messaging main screen to open the messaging configuration screen (see [Figure 7](#)) to set system options.

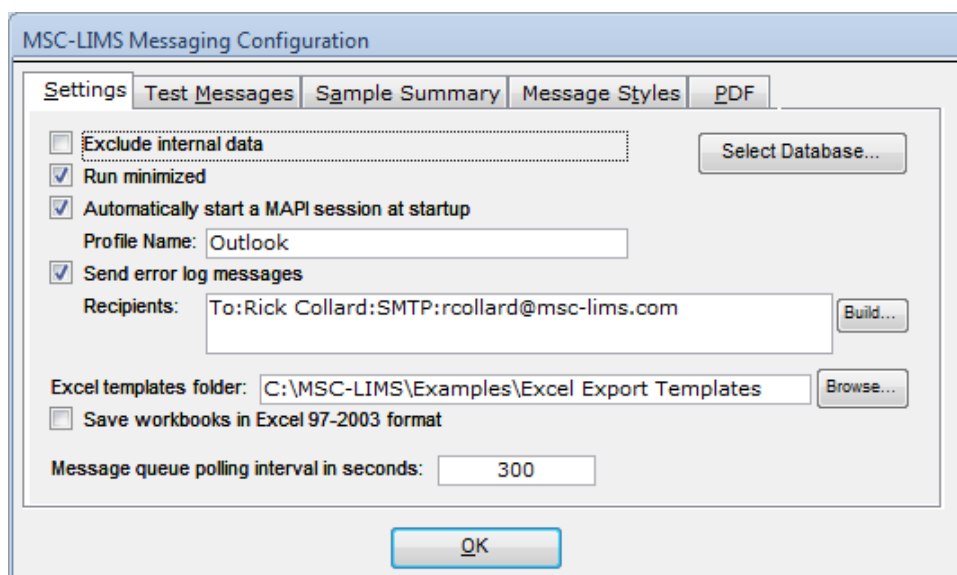


Figure 7 MSC-LIMS Messaging Configuration

Following is a description of the options on the configuration screen grouped by the screen's tab sections.

Settings

Exclude internal data

Select this option to exclude any MSC-LIMS internal data analyses from the sample's list of analyses. Analyses such as an approval analyte, surrogates, internal standards, spiking compounds, and requirement cost analyses can be marked as internal data analyses in MSC-LIMS' Analysis setup screen. Checking this option will exclude such analyses in sample messages. Note that message styles with attached Excel files do not automatically exclude internal data if this option is selected. Excel template macros must be updated to exclude internal data (see the CofA Example.xlt template's Settings worksheet and AfterTransferFromLIMS macro for an example).

See page 21 for more information on automatically starting MSC-LIMS Messaging when Windows starts.

Run minimized

Select this option to force the MSC-LIMS Messaging software to start minimized. This option is useful when MSC-LIMS Messaging has been added to the workstation's Startup folder on the All Programs menu to automatically start each time Windows starts.

Automatically start a MAPI session at startup

The messaging software only scans the message queue and dispatches new messages when a MAPI session is active. A MAPI session can be started manually by clicking the [Start] button on the main screen. When first implementing MSC-LIMS Messaging, manually starting the MAPI session can be useful. For example, you may want to review the contents of the message queue and delete entries so no message is actually sent. However, after adding MSC-LIMS Messaging to the workstation's startup folder, use this option to automatically start the MAPI session without user intervention.

Profile name

This option is only enabled when the "Automatically start a MAPI session at startup" is enabled. Enter the name of the user profile to be used. Note that this field will initially default to the name of the profile used when the [Start] button was used to manually start a MAPI session.

Send error log messages

Use this option to automatically send a message when an error is encountered and added to the system's error log. When the messaging workstation runs unattended, use this feature to keep an operator or LIMS administrator informed when any error occurs.

Recipients

This field is only enabled when "Send error log messages" is enabled. Use this field to specify the recipient(s) for any error log messages that are automatically sent when an error is encountered. Double-click the field to view message addressing syntax or use the [Build...] button to add recipients.

Message queue polling interval in seconds

Use this option to specify the time interval between message queue scans. After any messages found in the queue are sent, the messaging software will wait the number of seconds specified before it checks the message queue again. If the messaging workstation is also an MSC-LIMS workstation or is used for other purposes, a larger polling interval will reduce the impact on other workstation applications. Note that infrequent polling in an environment with many messages will also result in bursts of activity required to dispatch the messages.

Excel Templates Folder

If you are using message styles with attached Excel files, use this option to specify the location of the Excel templates. If this field is left blank, MSC-LIMS Messaging will look for Excel templates in the same folder where the MSC-LIMS Messaging software is installed. See [Message Styles](#) on page 13 for more information.

Save workbooks in Excel 97-2003 format

Use this option when Excel 2007 or newer generates an "unreadable content" error creating a pdf file from an xlsx file. This error may occur with Excel templates containing images or shapes.

Select Database

Use the [Select Database] button to select the MSC-LIMS database. Use this option, for example, when testing with an alternate database or when the location of your production database changes.

Test Messages

Use the Recipients and Subject fields on the Test Messages tab of the MSC-LIMS Messaging Configuration screen to set default values for test messages. See [Sending a Test Message](#) on page 8 for more information.

Sample Summary

The sample summary report available in rich text, snapshot, XPS, and PDF formats in login or completion message styles includes a configurable short subtitle. Use the options on the Sample Summary tab of the MSC-LIMS Messaging Configuration screen to set the subtitle's text, font size, color and bold, italic, and underline attributes.

Message Styles

The Message Styles tab of the MSC-LIMS Messaging Configuration screen lists all current message styles. Use this screen to add additional message styles for Excel templates and XSL transformations (see [XSL Transformations](#) on page 28 for more information).

MSC-LIMS Messaging includes the message styles listed below, which are derived from example Excel templates designed for MSC-LIMS' Sample Summary report. These templates can be found in the folder where MSC-LIMS Messaging was installed and in the Examples\Excel Export Templates folder in the folder where MSC-LIMS was installed. These styles are defined on the Message Styles tab as follows:

StyleID: 108
Type: Completion
Name: Completion with XLS file (CofA Example.xltm)
Expression: MsgExcel("Completion", SampleID, Recipients, Subject, "CofA Example.xltm")

StyleID: 109
Type: Completion
Name: Completion with PDF file (CofA Example.xltm)
Expression: MsgExcel("Completion", SampleID, Recipients, Subject, "CofA Example.xltm", 0, "PDF")

StyleID: 158
Type: Completion

See [Creating New Message Styles](#) on page 24 for additional information.

Name: Batch Completion XLS (Final Report Example.xltm)
Expression: MsgExcel("Completion", SampleID, Recipients, Subject, "Final Report Example.xltm", Batch)

StyleID: 159
Type: Completion
Name: Batch Completion PDF (Final Report Example.xltm)
Expression: MsgExcel("Completion", SampleID, Recipients, Subject, "Final Report Example.xltm", Batch, "PDF")

To create new message styles with attached Excel files or PDF files created from Excel templates, copy one of the above message style records (click the record selector and use Ctrl+C), then go to the new record at the bottom of the screen and paste (Ctrl+V). Now enter a unique StyleID (Tip: use 200, 201, etc. to identify your custom styles) and Name then replace “CofA Example.xltm” or “Final Report Example.xltm” with the name of your template. Note that batch message style names must begin with the word “Batch”.

Similarly, new message styles that use XSL transformations can be created by copying one of the following message style records:

StyleID: 107
Type: Completion
Name: Completion with HTML sample summary
Expression: MsgXML("Completion", SampleID, Recipients, Subject, 0, True, "SampleSummary.xml", ".htm")

StyleID: 157
Type: Completion
Name: Batch Completion with sample summary (HTML)
Expression: MsgXML("Completion", SampleID, Recipients, Subject, Batch, True, "SampleSummary.xml", ".htm")

After pasting one of the above records, enter a unique StyleID and Name then replace “SampleSummary.xml” with the new XSL transformation file and “.htm” with the appropriate file extension for the transformation’s output file. Note that batch message style names must begin with “Batch”.

PDF

Use the options on the PDF tab of the MSC-LIMS Messaging Configuration screen to enable security in all PDF files created by MSC-LIMS Messaging. Use the available security options to require a password to open the PDF file or to restrict editing, printing, or copying the document.

MSC-LIMS

The following sections describe the screens and options used in the MSC-LIMS software to configure messaging. The MSC-LIMS Messaging software is only concerned with messages once they have been added to the message queue. The MSC-LIMS software and its configuration determine when and what sample messages are added to the message queue.

Message Subjects

The sections below describe MSC-LIMS' features used to configure system-wide and customer and project-specific messaging. Each MSC-LIMS screen used for messaging configuration includes a field to specify the message's subject line. The subject can be either literal text or an expression to create a subject that includes text and sample characteristics. When an expression is used, MSC-LIMS Messaging uses the following SQL statement to evaluate the expression:

```
SELECT expression AS Subject
FROM qrySampleSummary
WHERE SampleID='nnn';
```

Any valid SQL expression that returns a single result field can be used to construct appropriate subject lines. Any sample characteristic can be included in the expression using the appropriate LIMS database field. When invalid syntax is encountered in a subject expression and the expression cannot be evaluated, the entire expression is treated as literal text and is inserted into the message's subject line. Following are examples of valid subject expressions.

```
"Sample " & SampleID & " completed"
"Batch " & Batch & " completed"
Project.Name & " sample " & SampleID & " completed"
"Results for " & Project.Name & " collected " &
Format(CollectedDate, "dd-mmm-yy")
"Your sample " & CustomerSampleID & " received " &
AddedDate
SampleType.Name & " sample " & SampleID & " completed " &
CompletedDate
```

To view a list of LIMS sample characteristic fields, including all fields added to MSC-LIMS through customization, simply export an MSC-LIMS sample summary report to the MSC-LIMS Export Template.xltm Excel template. The resulting Excel workbook's LimsData sheet will include a list of available field names on the first row.

MSC-LIMS Messaging will use the following default subject expressions if no system default, project, or customer-specific subject is specified.

```
Login:      "Sample " & SampleID & " Logged"
           "Batch " & Batch & " Logged"
```

Completion: "Sample " & SampleID & " Completed"
 "Batch " & Batch & " Completed"

System Configuration

Use the Messaging tab on MSC-LIMS' System Configuration screen (see [Figure 8](#)) to set system-wide messaging options.

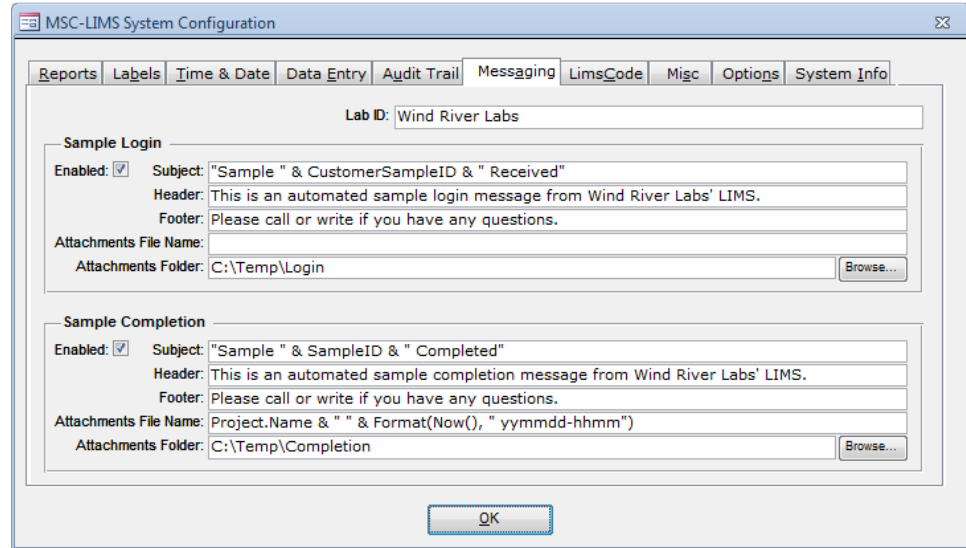


Figure 8 MSC-LIMS System Configuration - Messaging

Following is a description of the fields and controls on the System Configuration screen's Messaging tab.

| Field/Control | Description/Notes |
|---------------|--|
| Lab ID | Enter optional laboratory identification information for XML data files. Use Shift+F2 to open the zoom window and use Ctrl+Enter to insert a new line. This field can contain up to 255 characters and may include multiple lines, for example, with name, address, and phone number. Note that the Lab ID may also be used in message styles with attached HTML files (or any style using XSL transformations). |
| Enabled | Use this option to enable/disable system-wide login or completion messaging. When disabled, no messages for the specified type (login or completion) are added to the message queue. Note that this option takes precedence over the equivalent Customer and Project messaging options (see below). |

See **Chapter 6: XML Overview** for more information on XSL transformations.

| Field/Control | Description/Notes |
|-----------------------|--|
| Subject | Enter text or an expression for the message type's (login or completion) subject line. See Message Subjects on page 15 for more information. |
| Header, Footer | Enter any text that should be included at the beginning and end of all messages for the specified type (login or completion). These fields support unlimited length text so they can be used for disclaimers, descriptions about the origins of the automated messages, company name and contact information, etc. Use Shift+F2 to open the zoom window and use Ctrl+Enter to insert a new line. |
| Attachments File Name | <p>Enter text or an expression for the names of attached files. Omit the file extension. Double-click the field for example file name expressions, which are used in the following SQL statement to construct an attachment file name:</p> <pre>SELECT <i>expression</i> AS FileName FROM qrySampleSummary WHERE SampleID='nnn';</pre> <p>See Message Subjects on page 15 for more information on expressions. If this option is omitted, the MSC-LIMS Messaging software uses the following default attachment file names:</p> <pre>Sample NNN Login.ext Sample NNN Completion.ext Batch NNN Login.ext Batch NNN Completion.ext</pre> <p>Note that file names cannot contain the following characters:</p> <pre>[/ \ : * ? " < >]</pre> |
| Attachments Folder | If this option is omitted, the MSC-LIMS Messaging software creates message attachment files in the folder where the LimsMapi5.mde front end is located. You may specify a folder on the messaging workstation's local hard drive or a shared file server folder. Note that attachment files are named "Sample NNN Login.ext", "Batch NNN Login.ext", "Sample NNN Completion.ext", and "Batch NNN Completion.ext" so you may use the same folder for both login and completion messages. |
| [Browse] | Use this button to select the attachments folder. |

Customer and Project Messaging

The System Configuration screen's messaging options described in the previous section do not determine what samples will produce automated messages. Whether a sample generates a message is determined by its project, its customer, or both. When a sample login or completion event occurs, the MSC-LIMS software first verifies that messaging for that event type is enabled in the System Configuration screen. If messaging is enabled the system then checks the sample's project and, if applicable, customer messaging configuration. If there are project, customer, or combination of customer and project messaging options the system adds appropriate entries to the message queue.

To send a message, MSC-LIMS uses the following rules for both login and completion messaging types:

1. Project Messaging. If the project's message type (i.e. login or completion) is enabled with defined message style and recipients, the message is sent.
2. Customer Messaging. Only one of the following rules is used and they are evaluated in the order listed.
 - 2.1 If the customer has messaging configured for the project (type enabled, style and recipients defined), the message is sent using the customer's project messaging.
 - 2.2. If the customer has default messaging (type enabled, style and recipients defined), the message is sent using the customer's default messaging.
 - 2.3. If the project's type is enabled and it has a style with no recipients AND the customer's message type is enabled and it has recipients with no style, a message is sent using the project's style and the customer's recipients.

Note that the order of precedence for which Subject field to use for the message is the customer's, followed by the project's, then the system configuration screen's default.

Customer and project messaging options are configured using the Messaging tab on MSC-LIMS' customer and project setup screens (see [Figure 9](#)).

Figure 9 MSC-LIMS Customer Messaging Configuration

Following is a description of the fields and controls on the Messaging tab of the Customer and Project setup screens.

| Field/Control | Description/Notes |
|---|--|
| Enabled | Use this option to enable/disable login or completion messaging for the current customer or project. When disabled, no messages for the specified type (login or completion) are added to the message queue. |
| System Messaging | This control indicates the state of system-wide login or completion messaging as specified on MSC-LIMS' System Configuration screen. Enabling customer or project messaging has no effect if system messaging is disabled. |
| Project Messaging Customer Messaging | Use these buttons on the Customers and Projects setup screens to configure customer project messaging. |
| Message Style | Choose one of the available message styles. To view the format of a message style, use the messaging software's [Test] button to send a test message. See Sending a Test Message on page 8 for more information. |
| Recipients | Enter one or more recipients using the proper message addressing syntax for the address type. Double-click the recipients field to view message addressing syntax (see Figure 6 on page 10). |

| Field/Control | Description/Notes |
|---------------|--|
| Subject | Enter text or an expression for the message type's (login or completion) subject line. See Message Subjects on page 15 for more information. |

Chapter 5: Administration

This chapter describes important system administration issues. The MSC-LIMS administrator(s) should be familiar with topics in this chapter.

Command Line Options

All MSC-LIMS version 5.x software runs using an isolated installation of the Microsoft Access 2010 runtime. Command line options include the paths to the Access 2010 runtime, workgroup security file, and MSC-LIMS Messaging software. Right-click the MSC-LIMS Messaging shortcut and select Properties to view the command line in the shortcut's Target property. Following is an example of an MSC-LIMS Messaging command line:

```
"C:\Program Files (x86)\Common Files\Sagekey  
Software\StartAccess5_2010.exe" /profile "MSC-LIMS  
Messaging" /wrkgrp "C:\MSC-LIMS\System.mdw" /runtime /excl  
"C:\MSC-LIMS\LimsMapi5.mde"
```

Following is a list of the command line options supported by MSC-LIMS. Note that command line options are not case-sensitive.

| Option | Description/Notes |
|--|--|
| <code>d:\path\StartAccess5_2010.exe</code> | Like other versions of Access, the Access 2010 runtime (<code>msaccess.exe</code>) redirects a number of Windows registry keys to itself each time the program runs including the key that registers the MDB extension. This causes problems if a user later double-clicks an MDB file in Windows Explorer expecting to open the file in a full copy of Access. File <code>StartAccess5_2010.exe</code> is a special-purpose utility used by all MSC-LIMS software to overcome this problem. <code>StartAccess5_2010.exe</code> records the state of the registry keys, starts the Access 2010 runtime, then waits a few seconds and restores the keys so a full copy of Access operates normally. |
| <code>/runtime</code> | When the workstation has a full copy of Access this option forces Access to behave like the runtime version. This option is ignored with runtime versions of Access. Omit this option when creating an "Edit LimsCode" shortcut (see the <i>MSC-LIMS Programmer's Guide</i>). |

| Option | Description/Notes |
|-------------------------------|---|
| /excl | This option forces the database to be opened exclusively preventing Access from opening multiple instances of a database on a single machine. This switch should only be used with front end databases such as LimsCode5 and LimsMapi5. |
| /profile "MSC-LIMS Messaging" | This option instructs the Access runtime to use the MSC-LIMS Messaging profile, which identifies the program's title, icon, etc. |
| /wrkgrp | This option is followed by the full path name of the default workgroup file (System.mdw). |

Adding to Startup Folder

After you have manually started MSC-LIMS Messaging and tested its messaging capabilities, you will want the software to run automatically each time the messaging workstation is started. Follow these steps to configure MSC-LIMS Messaging to start automatically:

1. Manually start MSC-LIMS Messaging. Use the [Configure] button and select the "Run Minimized" and "Automatically start a MAPI session at startup" options. Make sure a profile name is also specified. Exit MSC-LIMS Messaging
2. Click the Start button, select All Programs, right-click the Startup folder and choose Open. Put a copy of the MSC-LIMS Messaging shortcut in the Startup folder. To open the Startup folder in Windows 10 use WinKey+R then type `shell:common_startup` and click OK.
3. Restart Windows on the workstation to test.

See **Command Line Options** above for more information.

NOTE

Be sure to add the shortcut to the Startup folder in the **All Users** profile. This ensures the software is started regardless of who logs on to the workstation.

Reattaching Databases

Just like LimsCode, the LimsMapi front end remembers the last attached database. When an updated LimsMapi with a different attach location is copied to the messaging workstation, the startup software will automatically attempt to reattach the last database. If the database cannot be found, a message will identify the problem. Simply use the [Configure] button to

reselect the MSC-LIMAS database. Note that you can use the [Select Database] button on the MSC-LIMS Messaging Configuration screen to reattach the database at any time.

Compacting

The LimsMapi5.mde file will automatically compact whenever the software exits.

Error Log

Use the [Error Log] button on the MSC-LIMS Messaging main screen to view the contents of the messaging error log. Error log records can also be deleted from this screen. Since the messaging software is designed to run unattended, errors encountered are written to the error log without displaying on screen. The error counter displayed on the main screen lists the number of errors encountered since the current MAPI session was started. Use the [Configure] button on the MSC-LIMS Messaging main screen to enable automatic dispatching of error log messages to the designated recipient(s). See [MSC-LIMS Messaging](#) configuration on page 11 for more information.

Message Queue

Use the [Message Queue] button on the MSC-LIMS Messaging main screen to view the current contents of the message queue. This screen lists the sample ID, message style, recipients, and the date, time and name of the current MSC-LIMS user when the message was added to the queue.

NOTE

The message queue counters on the main screen are only updated during each message processing cycle. Use the message queue screen to get an accurate list of the current contents of the message queue.

If an error occurs when attempting to send the messages for an item in the message queue, the messaging software will log the error to the error log and will clear the Send option for the item in the queue. The messaging software only attempts to dispatch messages where the Send option is checked. This feature preserves a record of all messages that could not be sent. The LIMS administrator can review such records in the message queue and attempt to correct the error condition. For example, if the message addressing syntax in the recipients field is incorrect, correct the address and check the Send option. The messaging software will attempt to send the message again during its next message queue processing cycle.

Creating New Message Styles

Since message styles can have many different layouts and attached file formats, fully documenting the processes involved in their development is beyond the scope of this document. This section is included to describe the features supporting the addition of custom message styles for users with MSC-LIMS Full System licenses. Contact MSC if you would like to add a new message style and need assistance customizing LimsMapi. See [Message Styles](#) on page 13 to add additional message styles for Excel templates and XSL transformations using the MSC-LIMS Messaging Configuration screen.

Adding a new message style requires the addition of a record to the MessageStyle table in the MSC-LIMS database. Fields in this record define the message type (login or completion) and the software procedure that is invoked to process the message. The functions listed below implement the default message styles included with MSC-LIMS Messaging.

| Function | Description/Notes |
|-------------|--|
| MsgSimple | This function provides text-only login and completion messages without analyses. The function inserts the header text, sample characteristics, followed by the footer text. NOTE: The header and footer text are obtained from MSC-LIMS' System Configuration screen data. |
| MsgAnalyses | This function provides text-only login and completion messages with analyses. The function inserts the header text, sample characteristics, and analyses followed by the footer text. |
| MsgReport | This function creates login and completion messages with attached files created from an Access report in LimsMapi. LimsMapi includes a modified version of the MSC-LIMS Sample Summary report. This function can create attachments in any of the formats listed when you click the Send toolbar button in an MSC-LIMS print preview window. |
| MsgExcel | This function creates login and completion messages with an attached Excel file created by exporting the Sample Summary report's data to a specific Excel template. Any template that works with MSC-LIMS' Sample Summary report can be used with this function. |

| Function | Description/Notes |
|----------|---|
| MsgXML | This function creates login and completion messages with an attached file in either XML format or any format created using an XSL transformation. The "Completion with HTML sample summary" style is created using this function and the SampleSummary.xsl transformation file. |

There are a couple of relatively simple methods to add new message styles. For example, by adding a new Access report object to LimsMapi (e.g. copying and customizing rptSampleSummary) new records can be added to MAPIMessageStyle to use the MsgReport function with the new report object for rich text, snapshot, XPS, and PDF formats. By creating a new XSL file (e.g. copying and customizing SampleSummary.xsl) new records can be added to MAPIMessageStyle to use the MsgXML function with the new XSL transformation file. By creating a new Excel template (e.g. copying and customizing CofA Example.xltn or Final Report Example.xltn) new records can be added to MessageStyle to use the MsgExcel function with the new template. Note that new records can be added to MessageStyle using MSC-LIMS Messaging's Configuration screen (see [Message Styles](#) on page 13) and from the Messaging tab of the System Configuration screen in MSC-LIMS.

To provide support for additional site-specific customization, LimsMapi includes form frmConfigureCustom, a subform of frmConfigure, and special customization *hook* functions that are called at well-defined points in the message processing event model. These functions are located in the "Custom Messaging Functions" module. The functions in message processing event order are:

| | |
|-----------------|---|
| BeforeStyleEval | This function is called just prior to calling the message processing function. The function is passed the Eval expression that will be used to call the messaging function so the hook could be used to alter the expression. |
| BeforeMessage | All of the messaging functions call this function before they do any other work. This function is passed the message type, sampleID, and recipients list so the function could alter these parameters before the messaging function begins normal processing. |
| AfterMessage | Each messaging function calls this function only after the message is sent successfully and the message queue record is deleted. |
| AfterStyleEval | This function is called only when the Eval expression used to invoke the messaging function returns a value of True (i.e. no error occurred). |

Chapter 6: XML Overview

This chapter provides a brief overview of eXtensible Markup Language (XML) used by the messaging software.

eXtensible Markup Language

In a very short period of time, eXtensible Markup Language (XML) has emerged as a powerful platform-independent markup language standard used to represent data. Similar to HyperText Markup Language (HTML) which is used to create web content, XML is also text-based and uses literal strings of characters called **tags** to delimit data. HTML tags, such as to begin bold text and <P> to begin a new paragraph, are used to describe the layout of a page but offer little help in managing the content of the page as data. In contrast, XML tags are used to describe what the data means not how the data should look. Unlike HTML where the tags are defined by the HTML standard, XML allows developers to define unlimited set of tags, or a vocabulary, to describe structured data.

```
<Samples LabID="Wind River Labs">
  <Sample ID="0008081708">
    <CollectedDate>8/8/2000</CollectedDate>
    <CompletedDate>8/8/2000 5:08:51 PM</CompletedDate>
    <Project>My Project</Project>
    <SampleType>Wastewater</SampleType>
    <Location>Site 1</Location>
    <Sampler>Doe, John</Sampler>
    <Customer Name="M.S.C.">
      <Contact>Rick</Contact>
      <VoicePhone>307-733-1442</VoicePhone>
    </Customer>
    <Analyses>
      <Analysis Analyte="Total Suspended Solids">
        <AnalysisResult>4</AnalysisResult>
        <AnalysisDate>8/8/2000</AnalysisDate>
        <Units>mg/L</Units>
      </Analysis>
      <Analysis Analyte="Volatile Suspended Solids">
        <AnalysisResult>2</AnalysisResult>
        <AnalysisDate>8/8/2000</AnalysisDate>
        <Units>mg/L</Units>
      </Analysis>
      <Cost>$43.95</Cost>
    </Analyses>
  </Sample>
</Samples>
```

The example above is an excerpt from an XML data file created by MSC-LIMS Messaging. You can see that the data has a well-defined hierarchy. Elements such as a <Sample> can include other elements,

attributes (e.g. ID="0008081708") and data. Tag names describe the data content between the start tag (<Location>) and end tag (</Location>).

The XML example above is self-documenting. XML is a substantial improvement over other text file formats, which are often used to transfer data between different systems and applications. For example, a comma-delimited or tab-delimited text file can not easily provide multilevel data hierarchies, has no simple method for describing each data field, and requires cooperation between the parties generating and receiving the data when the file format is defined and modified.

*MSC-LIMS Messaging
uses Microsoft's XML
(MSXML) parser.*

XML parsers, which are used to read and write XML documents, are readily available for all major operating systems and software development platforms. Developers can easily add XML document processing capabilities to their applications without writing their own file-specific parsing software.

XSL Transformations

The eXtensible Stylesheet Language (XSL) is an XML-based language designed to transform an XML file into another XML file, into HTML for presentation, or into other text-based file formats. XSL can also be used to extract pieces from large XML documents.

Developers can use XSL to transform an XML document in one vocabulary to a completely different vocabulary. Developers no longer have to agree on the vocabulary in advance to make interoperability possible between different platforms, applications, and operating systems.

MSC-LIMS Messaging supports XSL transformations using the MsgXML messaging function (see [Message Styles](#) on page 13 and [Creating New Message Styles](#) on page 24). The MsgXML function first creates an XML document from an MSC-LIMS sample's data and optionally applies an XSL transformation to produce a new document. Using XSL transformations, new message styles can be added to create additional HTML documents, XML files with different vocabularies, and other text file formats used to exchange data with different applications and systems.