EMC® Smarts®

Service Assurance Manager Notification Adapters

Version 9.2

User Guide

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PREFACE

As part of an effort to improve its product lines, EMC periodically releases revisions of its software and hardware. Therefore, some functions described in this document might not be supported by all versions of the software or hardware currently in use. The product release notes provide the most up-to-date information on product features.

Contact your EMC technical support professional if a product does not function properly or does not function as described in this document.

NOTICE

This document was accurate at publication time. Go to EMC Online Support (https://support.emc.com) to ensure that you are using the latest version of this document.

Purpose

The purpose of this guide is to provide information about how EMC Smarts Service Assurance Manager Notification Adapters manage the flow of data between your Global Manager (or Domain Manager) and other applications or locations on the network.

Audience

This guide is intended for administrators who are responsible for deploying, installing, and configuring the Global Manager. IT managers who seek to understand the role of the Global Manager in the context of an EMC Smarts solution may also find this guide useful.

In addition to the configuration guides for specific components, administrators should also read the *EMC Smarts Service Assurance Manager Deployment Guide* and the *EMC Smarts System Administration Guide* Guide.

EMC Smarts Service Assurance Manager installation directory

In this document, the term BASEDIR represents the location where EMC Smarts software is installed:

- For Windows, this location is: C:\InCharge*‹product›*.

On Windows operating systems, this product is, by default, installed to: C:\InCharge\SAM\smarts. This location is referred to as *BASEDIR*/smarts.

Optionally, you can specify the root of BASEDIR to be something other than C:\InCharge (on Windows), but you cannot change the ‹*product*› location under the root directory.

The *EMC Smarts System Administration Guide* provides more information about the directory structure of EMC Smarts software.

EMC Smarts Service Assurance Manager

The EMC Smarts Service Assurance Manager includes the following products:

- Service Assurance Manager (Global Manager), includes Business Impact Manager (BIM) and Failover System
- Global Console
- Business Dashboard
- Companion UI
- SAM Native Adapters:
  - Service Assurance Manager Notification Adapters (E-Mail Notifier Adapter, Script Notifier Adapter, SNMP Trap Notifier Adapter, Log File Notifier Adapter)
  - Adapter Platform (Adapter Platform server, Syslog Adapter, SNMP Trap Adapter, sm_ems command-line interface)
  - EMC Smarts Adapter for UIM/O
  - XML Adapter

Related documentation

In addition to this document, EMC Corporation provides a help system for command line programs as well as product documentation.

Help for command line programs

Descriptions of command line programs are available as HTML pages. The index.html file, which provides an index to the various commands, is located in the BASEDIR/smarts/doc/html/usage directory.

EMC Smarts documentation

Readers of this guide may find the following related documentation helpful:

- *Smarts Foundation EMC Data Access API (EDAA) Programmer Guide*
- *EMC Smarts Common Information Model (ICIM) 1.11 Reference for Non-Service Assurance Manager Products*
- *EMC Smarts Common Information Model (ICIM) Reference for Service Assurance Manager*
- *EMC Smarts Foundation Documentation Portfolio*
- *EMC Smarts System Administration Guide*
- *EMC Smarts ASL Reference Guide*
- *EMC Smarts Perl Reference Guide*
- *EMC Smarts Dynamic Modeling Tutorial*
- *EMC Smarts MODEL Reference Guide*
- *FlexNet Publisher License Administration Guide*

EMC Smarts Service Assurance Manager documentation

The following documents are relevant to users of the EMC Smarts Service Assurance Manager:

- *EMC Smarts Service Assurance Manager Release Notes*
- *EMC Smarts Open Source License and Copyright Information*
- *EMC Smarts Service Assurance Manager Introduction*
- *EMC Smarts Installation Guide for SAM, IP, ESM, MPLS, VoIP, and NPM Managers*
- *EMC Smarts Service Assurance Manager Deployment Guide*
- *EMC Smarts Service Assurance Manager Configuration Guide*
- *EMC Smarts Service Assurance Manager Operator Guide*
- *EMC Smarts Service Assurance Manager Dashboard Configuration Guide*
- *EMC Smarts Business Impact Manager User Guide*
- *EMC Smarts Failover System User Guide*
- *EMC Smarts Service Assurance Manager Notification Adapters User Guide*
- *EMC Smarts Service Assurance Manager Adapter Platform User Guide*

- *EMC Smarts Adapter for Unified Infrastructure Manager/Operations Configuration Guide*
- *EMC Smarts XML Adapter User Guide*
- *EMC Smarts Notification Module User Guide*
- *EMC Smarts Service Assurance Manager Troubleshooting Guide*
- *EMC Smarts Companion UI Online Help*
- *EMC Smarts Companion UI Open Source License and Copyright Information for GPLv3 as Included with a Distribution of SLES 11*
- *EMC Smarts Service Assurance Manager Documentation Portfolio*

The *EMC Smarts Documentation Catalog* provides documentation resources for other EMC Smarts products.

Suggestions for searching PDF files

You can search across multiple PDF files by using the Adobe Acrobat Reader software:

1. If the documentation is not accessible to all users of the EMC Smarts product, copy the contents of the BASEDIR/smarts/doc/pdf directory to a central location, such as a shared drive on your LAN, so that operators and others can view the documentation.
2. To search throughout the documentation library, open the Acrobat Reader software:
   a. Select **Edit › Search**, and type a word or phrase.
   b. Select **All PDF Documents** in, in the **Where would you like to search** option, and type the pathname of the location where the PDF documents reside.

If you have more than one EMC Smarts product installed, you can set up cross-product document searches by copying files from the BASEDIR/smarts/doc/pdf directory for each product into this common documentation directory path.

Conventions used in this document

EMC uses the following convention for special notices:

NOTICE

NOTICE is used to address practices not related to personal injury.

Typographical conventions

EMC uses the following type style conventions in this document:

Bold	Use for names of interface elements, such as names of windows, dialog boxes, buttons, fields, tab names, key names, and menu paths (what the user specifically selects or clicks)
Italic	Use for full titles of publications referenced in text
`Monospace`	Use for: • System output, such as an error message or script • System code • Pathnames, filenames, prompts, and syntax • Commands and options
`Monospace italic`	Use for variables.
`Monospace bold`	Use for user input.
[ ]	Square brackets enclose optional values
|	Vertical bar indicates alternate selections — the bar means “or”
{ }	Braces enclose content that the user must specify, such as x or y or z
...	Ellipses indicate nonessential information omitted from the example

Pathname conventions

Directory pathnames are shown with forward slashes (/). Users of the Windows operating systems should substitute back slashes (\) for forward slashes.

Graphical conventions

If there are figures illustrating consoles in this document, they represent the consoles as they appear in Windows. Under UNIX, the consoles appear with slight differences. For example, in views that display items in a tree hierarchy such as the Topology Browser, a plus sign appears for Windows and an open circle appears for UNIX.

Manager

Unless otherwise specified, the term Manager is used to refer to EMC Smarts programs such as Domain Managers, Global Managers, and adapters.

Where to get help

EMC support, product, and licensing information can be obtained as follows:

Product information — For documentation, release notes, software updates, or information about EMC products, go to EMC Online Support at:

https://support.emc.com

Technical support — Go to EMC Online Support and click Service Center. You will see several options for contacting EMC Technical Support. Note that to open a service request, you must have a valid support agreement. Contact your EMC sales representative for details about obtaining a valid support agreement or with questions about your account.

Your comments

Your suggestions will help us continue to improve the accuracy, organization, and overall quality of the user publications. Send your opinions of this document to:

`techpubcomments@emc.com`

Introduction

This chapter contains the following information:

- Overview 16
- Implementing adapters 17

Overview

Use an EMC® Smarts® Notification Adapter (notifier) to pass information contained in EMC Smarts Service Assurance Manager notifications to other applications or to users. For example, you can use a notifier to:

- Convert notifications into email messages or SNMP traps
- Write the notification text to a log file
- Execute a script upon receiving a notification

Table 1 on page 16 describes the purpose of each notifier.

Table 1 Notification adapters and descriptions

Adapter	Description
Email Notifier Adapter	Sends notifications from a Global Manager to specific addresses in an email system
Log File Notifier Adapter	Logs notifications from a Global Manager to a file
SNMP Trap Notifier Adapter	Converts notifications into SNMP traps and sends the traps to specified locations
Script Notifier Adapter	Calls a custom script when a notification is received

NOTICE

EMC Corporation recommends using the notification adapters with the EMC Smarts Service Assurance Manager (Global Manager). The notification adapters may also be used with Domain Managers.

The following are additional examples of typical notifier usage:

- Write notifications to a log.
- Execute a program, such as a paging service or email, upon receipt of a notification.
- Extend and get additional information about a notification:
  - Get the impact when you receive a notification.
  - Get the system location of a failing device.
- Open a trouble ticket using a third-party package.

Implementing adapters

This section describes the high-level tasks necessary to configure and start notification adapters. Before you begin, ensure that the EMC Smarts Service Assurance Manager is properly installed and functional. The notification adapters are installed automatically as part of SAM. The *EMC Smarts Installation Guide for SAM, IP, ESM, MPLS, VoIP, and NPM Managers* contains additional information. This document assumes the adapters are installed:

1. If the notification adapter is already running, stop it. "Starting and stopping notification adapters" on page 23 contains instructional information.
2. Verify the parameters in your adapter's configuration file. If necessary, use the *sm_edit* utility to modify them. For example, you might need to define a destination or modify the default value of the serverName parameter to match the name of your Global Manager or Domain Manager.

   "Configuration files" on page 20 and the respective adapter chapter contains detailed instructions.
3. Verify the SubscribesTo section in your adapter's configuration file. The default subscription is for a Global Manager. If the adapter needs to subscribe to a Domain Manager, then you need to modify the file. "Specifying subscriptions in the configuration file" on page 21 contains additional information.
4. Check that the appropriate authentication is set in the security configuration files. "Securing access" on page 22 contains additional information.
5. Start the notification adapter. "Starting and stopping notification adapters" on page 23 contains additional information.

CHAPTER 2
Running the Notification Adapters

This chapter contains the common configuration and administration tasks for the EMC Smarts Service Assurance Manager Notification Adapters and contains the following information:

- Configuration files 20
- Securing access 22
- Starting and stopping notification adapters 23
- Logging notification adapter history 28

NOTICE

Any differences between the notifiers are noted and discussed in detail in subsequent chapters.

Configuration files

When a notifier starts, it reads a configuration file (*.conf). Original versions of the adapter configuration files are installed to the BASEDIR/smarts/conf/notifier directory. Retain the original (unedited) version of each configuration file. If you intend to modify a configuration file, use the **sm_edit** utility provided with your EMC Smarts software. This will ensure that you modify a copy of the file and this copy is placed in the proper local subdirectory. "Editing notification adapter files" on page 20 contains additional information on modifying files and using **sm_edit**. Table 2 on page 20 lists the name of each notifier's configuration file.

Table 2 Notification adapter configuration files

Adapter	Configuration filename
Email Notifier Adapter	mail-notify.conf
Log File Notifier Adapter	file-notify.conf
SNMP Trap Notifier Adapter	trap-notify.conf
Script Notifier Adapter	script-notify.conf

The configuration files for each of these notifiers share some common parameters and subscription information. The configuration files are text files.

NOTICE

Whenever you modify a configuration file, you must stop and restart the notifier for the changes to take effect.

Editing notification adapter files

As part of the EMC Smarts deployment and configuration process, you need to modify certain files. User modifiable files include configuration files, rule set files, templates, and files (such as seed files, and security configuration files) that contain encrypted passwords. Original versions of these files are installed into appropriate subdirectories under the BASEDIR/smarts/ directory.

Original versions of files should not be altered. If a file requires modification, it must be stored as a local copy of the file in BASEDIR/smarts/local or one of its subdirectories.

Example 1: Modify serverConnect.conf

In UNIX:

- The original version of the server connect (serverConnect.conf) security configuration file on UNIX is installed to:

  `/opt/InCharge/SAM/smarts/conf`

- A modified serverConnect.conf security configuration file on UNIX should be saved to:

  `/opt/InCharge/SAM/smarts/local/conf`

In Windows:

- The original version of the server connect (serverConnect.conf) security configuration file on Windows is installed to:

  `C:\InCharge\SAM\smarts\conf`

- A modified serverConnect.conf security configuration file on Windows should be saved to:

  `C:\InCharge\SAM\smarts\local\conf`

EMC Smarts software is designed to first search for user modifiable files in BASEDIR/smarts/local or one of its subdirectories. If a modified version of a file is not found in the local area, EMC Smarts software then searches appropriate non-local directories.

To facilitate proper file editing, EMC Corporation provides the sm_edit utility with every EMC Smarts products. When used to modify an original version of a file, this utility automatically creates a local copy of the file and places it in the appropriate location under BASEDIR/smarts/local. This ensures that the original version of the file remains unchanged. You can invoke sm_edit from the command line. Optionally, you can configure Windows so that sm_edit is automatically invoked when user-modifiable files are double-clicked in Windows Explorer.

To invoke the sm_edit utility from the command line, specify the path and the name of the file to edit under BASEDIR/smarts. If multiple EMC Smarts products are running on the same host, invoke sm_edit from the bin directory of the product with the files to edit.

Example 2: Edit a configuration file

To edit the configuration file for connecting to a server (serverConnect.conf), invoke the sm_edit utility as follows:

```
/opt/InCharge/SAM/smarts/bin>sm_edit conf/serverConnect.conf
```

In this example, the sm_edit utility automatically creates a local copy of the serverConnect.conf file in the /opt/InCharge/SAM/smarts/local/conf directory and opens the file in a text editor. If a local version of the file already exists, the sm_edit utility opens the local version in a text editor. In addition, sm_edit creates any necessary subdirectories.

The *EMC Smarts System Administration Guide* provides additional information about the sm_edit utility.

Specifying subscriptions in the configuration file

The notifiers can subscribe to either an EMC Smarts Service Assurance Manager (Global Manager) or to a Domain Manager.

To indicate which notifications (or event information) the adapter will process, you specify this in the Subscriptions section of the notifier's configuration file. EMC Corporation recommends that you subscribe to the Global Manager.

By default, the notifiers subscribe to a Global Manager. To subscribe to a Domain Manager, you must uncomment the code in the Subscriptions section and comment out the code for the Global Manager (insert a # character at the beginning of the lines that are not needed).

EMC Smarts Service Assurance Manager

You use a notification list to subscribe an adapter to a Global Manager. For example, to subscribe the Log File Notifier Adapter to the default notification list, use the following:

```
SubscribesTo =
   {
GA_NLSubscription::file-Default-NLSubscriptions
   {
      NLName = "Default"
   }
}
```

EMC Smarts Domain Manager

Use the choice subscription to subscribe an adapter to a Domain Manager (for example, Availability Manager). For example, to subscribe the SNMP Trap Notifier Adapter to all problems reported in a Domain Manager, use the following:

```
SubscribesTo =
{
   GA_ChoiceSubscription::trap tibrv-All-Problems-Subscriptions
   {
      className = ".*"
      instanceName = ".*"
      eventName = ".*"
      problems = TRUE
      aggregates = FALSE
      symptoms = FALSE
   }
}
```

Securing access

Before you start your notification adapter, check that the appropriate authentication is set in the security configuration files. Depending on your adapter, you will need to modify default values or add authentication records to one or both of these files:

- The clientConnect.conf file since the notification adapter acts as a client when it connects to an EMC Smarts Manager.
- The serverConnect.conf file if the notification adapter acts as a server and is registered with the EMC Smarts Broker. (Table 4 on page 24 lists the --name parameters used to register the notification adapter with the Broker.) A notification adapter acting as a server will need to authenticate incoming connections from users or other applications.

These security configuration files are located in the BASEDIR/smarts/conf directory of the EMC Smarts Service Assurance Manager.

The *EMC Smarts System Administration Guide* contains information about security and configuring the clientConnect.conf and serverConnect.conf files.

Starting and stopping notification adapters

This section describes how to use:

- The **sm_notify** command to start notification adapters. This method is useful if you intend to run the adapter once for a short period of time. For example, if you need to run a Log File Notifier Adapter to log notifications for testing purposes, use the **sm_notify** command. "Using sm_notify to start notification adapters" on page 23 contains additional information.
- Platform commands to stop notification adapters that were started with **sm_notify**. "Stopping a notification adapter" on page 25 contains additional information.
- The **sm_service** utility to install notification adapters as services. This method is recommended if you intend to run the adapter for a long period of time and want it to start automatically when the system starts. For example, if a notification adapter is part of your deployment, manually install the adapter as a service. "Installing a notification adapter as a service" on page 25 contains additional information.
- The **sm_service** utility to start and stop services. "Starting and stopping a service" on page 27 contains additional information.

NOTICE

The installation process installs notification adapters but does not configure them to run as services. However, you can use the **sm_service** utility to install the notification adapters as services at any time.

Using sm_notify to start notification adapters

You start these notifiers manually. To start the notifiers, use the following syntax:

```
▼BASEDIR/smarts/bin/sm_notify --output[=<file>]
[<param> ...] <notifier> ▲
```

where *‹param›* is one or more of the parameters listed in Table 4 on page 24 and *‹notifier›* is one of the following: mail, file, trap, script, or tibrv.

NOTICE

▼▲ indicates the command must be typed as one line.

Table 3 on page 23 defines the Notification adapters names.

Table 3 Notification adapters and names

Adapter	Adapter name
Email Notifier Adapter	mail
Log File Notifier Adapter	file
SNMP Trap Notifier Adapter	trap
Script Notifier Adapter	script

Use additional parameters with the **sm_notify** command to override information about the Global Manager or the Broker, change logging information, or run the notifier as a daemon (UNIX only). Table 4 on page 24 lists some of the parameters that can be set for **sm_notify**.

Table 4 sm_notify parameters and descriptions

Parameter	Description
--server=‹*name*›	Sets the EMC Smarts Manager connection. If this is not specified, the notifier uses the value in the configuration file.
--broker=‹*location*›	Overrides the use of the variable SM_BROKER (Environment variable in UNIX and System variable in Windows). The format of ‹*location*› is ‹*host*›:‹*port*›
--name=‹*notifier_name*›	Specifies a name for the notifier. The name is used to register the notifier with the Broker. This parameter is required if you intend to use the **roll_log** command in Windows. Otherwise, this parameter is rarely used unless directed by EMC Global Services. Notification adapters are not required to be registered with the Broker. "Starting a new log file" on page 28 contains additional information.
--daemon	Runs the process as a daemon (UNIX only).
--output[=‹*file*›]	Redirects the output (stdout and stderr) to BASEDIR/smarts/local/logs/‹*file*›.log by default. The filename is ‹*file*›, or the --logname value if ‹*file*› is omitted. If you run multiple instances of the same notifier on the same machine, you must specify an output location for each of the log files. The notifiers cannot write to the same log file.
--conf[=‹*conf_file*›]	Specifies the configuration file to use for the notifier. If this is not specified, the notifier uses the default configuration file, ‹*notifier*›-notify.conf in BASEDIR/smarts/conf/notifier. This parameter is useful if you need to use the **sm_notify** command to start more than one notifier (such as two Email Notifier Adapters) on a single host. Since each notifier references a unique configuration file, the notifiers can be configured to behave differently by, for example, subscribing to different notifications or sending the notifications to different locations."Starting the customized notification adapter" on page 67 contains additional information.
--confdir[=‹*dir*›]	Specifies the location (directory) of the notifier's configuration file. If this is not specified, the notifier uses the default directory, BASEDIR/smarts/conf/notifier. This parameter can also be used to start multiple copies of a notifier on the same host or it can be used to start many notifiers from a centrally located set of configuration files.
‹*notifier*›	Notification adapter. Acceptable values are: mail, file, trap, script, or tibrv.

For additional information about the **sm_notify** command, type:

```
BASEDIR/smarts/bin/sm_notify --help
```

Running multiple copies of a notification adapter

If you want to start more than one copy of the same notifier, for example, to use two Log File Notifier Adapters with a different Global Manager or to have two Email Notifier Adapters subscribe to different notifications from the same Global Manager, you should use the --conf or --confdir parameters.

Stopping a notification adapter

To stop a notifier, terminate the process in UNIX or use the Task Manager in Windows. ("Starting and stopping a service" on page 27 contains additional information if the notification adapter was manually installed as a service.)

UNIX

To terminate the process in UNIX, locate the process ID and then terminate the process:

```
% ps -elf | grep sm_notify
janedoe  14563 3830  0 14:38:14 pts/35   0:01 sm_notify mail
% kill 14563
```

Windows

To terminate the process in Windows:

1. Press **Ctrl+Alt+Delete** and click **Task Manager**.
2. In the **Processes** tab, select the process.
3. Click **End Process**.

Installing a notification adapter as a service

NOTICE

To use the **sm_service** utility to install a service or start a service, you must have administrative privileges on the local host.

The syntax for the **sm_service** install command for a notification adapter is:

```
▼BASEDIR/smarts/bin/sm_service install --force
--name=<service_name> --startmode=<mode>
--description="<DESC>"
BASEDIR/smarts/bin/sm_notify --output[=<file>] [<param> ...]
   <notifier> ▲
```

NOTICE

▼▲ indicates the command must be typed as one line.

The parameters for the **sm_service** install command are described in Table 5 on page 26.

The **sm_service** install command uses the same **sm_notify** parameters as previously described in Table 4 on page 24. The exception is the --daemon parameter which is not applicable for the **sm_service** utility.

Table 5 sm_service install parameters and descriptions

Parameter	Description
--force	Overwrites an existing service with the same name. This parameter is used to update or modify the parameters of an existing service.
--name=‹*service_name*›	Display name of the service.
--startmode=‹*mode*›	Service start policy. The value for ‹*mode*› is one of the following: • Runonce (start automatically when **sm_serviced** starts) • Automatic (starts automatically when **sm_serviced** does not detect that it is running) • Manual (requires an explicit start request) • Disable (cannot be started) The default is runonce.
--description="‹*DESC*›"	Short description of the service. Enclose the description with double quotation marks. On UNIX platforms, the description information is printed with the name of the service when the **sm_service** show action is invoked. On Windows platforms, the description appears in the first column of the Services Control Panel window (the “Descriptive Name”).

Examples of the sm_service install command

To manually install the program for an Email Notifier Adapter as a service, issue:

UNIX

```
▼# /opt/InCharge/SAM/smarts/bin/sm_service install --force
   --name=ic-email_notifier-adapter
--startmode=manual
--description="SMARTS E-Mail Notifier Adapter"
/opt/InCharge/SAM/smarts/bin/sm_notify
--output=mail-output
--server=INCHARGE-SA
mail ▲
```

Windows

```
▼C:\InCharge\SAM\smarts\bin\sm_service install --force
--name=ic-email_notifier-adapter
--startmode=manual
--description="SMARTS E-Mail Notifier Adapter"
C:\InCharge\SAM\smarts\bin\sm_notify
--output=mail-output
--server=INCHARGE-SA
mail ▲
```

NOTICE

▼▲ indicates the command must be typed as one line.

The *EMC Smarts System Administration Guide* contains additional information about using the **sm_service** utility.

Starting and stopping a service

To start or stop a service manually, use the **sm_service** utility.

To start a service, issue the command:

```
sm_service start <service_name> [<service_name> ...]
```

To stop a service, specify *stop* instead of *start*.

For example, to start an Email Notifier Adapter that has been manually installed as a service, issue:

UNIX

```
▼# /opt/InCharge/SAM/smarts/bin>./sm_service start
ic-email_notifier-adapter ▲
```

Windows

```
▼C:\InCharge\SAM\smarts\bin>sm_service start
ic-email_notifier-adapter ▲
```

Logging notification adapter history

When the **--output** option is specified for the **sm_notify** command, each notifier stores its working history in a log file. Every time a notifier starts, when errors occur, or when the connection with a Global Manager is lost, the notifier writes information to the log file.

Each notifier writes its log file to BASEDIR/smarts/local/logs. When the notification notifiers run on the same machine, specify a unique name for the log file of each notifier.

All log files have a .log file type. The default name of a log file is based on the program's name. For a notification adapter, the default name of the log file is sm_notify.log. To change the default name, specify a filename with the **--output** option for the **sm_notify** command. For example, for an Email Notifier Adapter, specify --output=MailAdapter and the name of the log will be MailAdapter.log.

EMC Smarts software can maintain up to 1,000 different copies of backup log files. The number of saved log files is determined by the value of the SM_BACKUP_FILE_LIMIT environment variable. When an adapter starts up, it renames a file that matches its log filename and adds a .bak to the name (for example, MailAdapter.log to MailAdapter.log.bak). If a file with this name already exists, it is renamed MailAdapter.log.bak.NNN, and a new MailAdapter.log.bak is created. By default, EMC Smarts programs save two log files, which do not include the active log file.

Starting a new log file

You can request that an adapter create a new log file, often referred to as rolling over a log file. Typically, this is done when a log file becomes quite large. Log files grow indefinitely, though slowly under normal conditions.

Most notification adapter log files are small and rolling over a log file is not necessary. However, if you need to start a new log file, use the following methods:

- For UNIX systems only, use the **kill** command.
- For UNIX and Windows systems, use the **roll_log** command.

You can repeat the log file roll-over process as many times as you like. If you need to retain log files beyond the limit specified by the SM_BACKUP_FILE_LIMIT environment variable, you should copy or at least rename the .log.bak files as soon as they are created. The *EMC Smarts System Administration Guide* contains additional information about managing and rolling over log files.

The kill command method for UNIX systems

On UNIX systems only, it is possible to request that a notifier "roll over" its log files. You do this by sending a SIGUSR1 signal to the process ID writing the log file. Use the **kill** command of your shell:

```
% kill -USR1 <pid>
```

Upon receipt of the USR1 signal, a notifier first writes an informational message to the end of the current log file, repeats the steps it executed at startup, and creates a new log file and a backup log file as previously described.

The roll_log command method

The **roll_log** command is invoked through the **dmctl** utility, which requires that you attach to the adapter with administrative privileges.

NOTICE

Use the **roll_log** command to register the notification adapter with the Broker using the **--name** option. "Using sm_notify to start notification adapters" on page 23 contains additional information.

The syntax of the command is:

```
roll_log [<file-name>]
```

The ‹*file-name*› option enables you to specify a new name for current and subsequent log files. If you omit this option, the current naming convention is retained. If you specify a name, the new log file uses that name. Any new log files created with **roll_log** will also use this name if a different name is not specified. The new name specified by ‹*file-name*› is handled in exactly the same manner as the **--output** option to the **sm_notify** command.

For example, on Windows to start a new log file for an Email Notifier Adapter named MailAdapter, issue:

```
▼C:\InCharge\SAM\smarts\bin\dmctl -s MailAdapter exec roll_log ▲
```

On UNIX systems, the equivalent command is:

```
▼% /opt/InCharge/SAM/smarts/bin/dmctl -s MailAdapter exec roll_log ▲
```

NOTICE

▼▲ indicates the command must be typed as one line.

When **roll_log** is invoked, the adapter writes an informational message to the end of the current log file, repeats the steps it executed at startup, and creates a new log file and a backup log file as previously described.

CHAPTER 3
Email Notifier Adapter

This chapter contains the following information:

- Email Notifier Adapter overview..... 32
- Configuring the Email Notifier Adapter..... 33

Email Notifier Adapter overview

The Email Notifier Adapter sends email, based on notifications, to a designated list of users using an SMTP server.

All notifications received by the Email Notifier Adapter are sent as email to one or more users, as shown in Figure 1 on page 32. The Email Notifier Adapter sends the same information to all of the recipients.

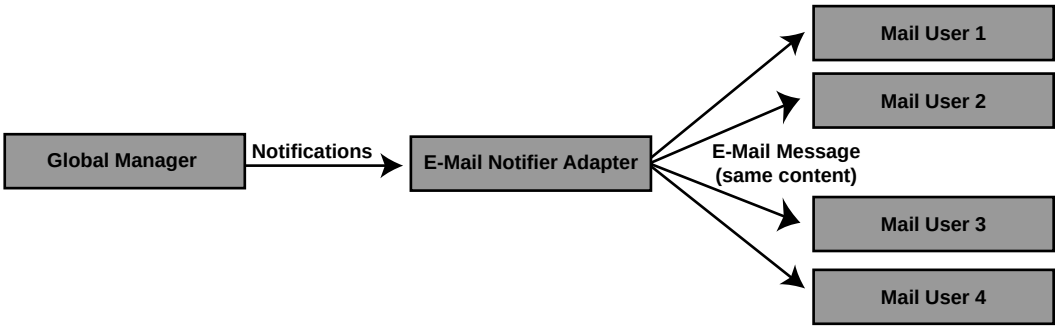

Figure 1 Email Notifier Adapter

The Email Notifier Adapter sends information about event notifications. By default, it does not send information when an event is cleared.

Each email sent has the form:

Subject:

```
NOTIFY <Affected_Instance_Name> <Event_Name>
```

Body:

```
InCharge Server <serverName>:
NOTIFY <Class_Name> <Affected_Instance_Name> <Event_Name>
   (<Certainty %>)
<Event_Description>
```

Configuring the Email Notifier Adapter

The file, mail-notify.conf, configures the notifier. The original version of the file is located in BASEDIR/smarts/conf/notifier. You should retain the original (unedited) version of the configuration file. A local copy should be made if you intend to make any modifications. If you intend to modify a configuration file, you should use the **sm_edit** utility provided with your EMC Smarts software. This will ensure that you modify a copy of the file and that the copy is placed in the proper local subdirectory. "Editing notification adapter files" on page 20 contains additional information on modifying files and using **sm_edit**.

If you modify the configuration file while the notifier is running, you will need to restart the notifier so that it rereads its configuration file.

Email Notifier Adapter parameters

Before you start this notifier, you must set values for the following parameters:

- MailServer
- SenderID
- Recipients

The other parameters may remain unchanged. You can also change the subscriptions for this notifier. "Specifying subscriptions in the configuration file" on page 21 contains additional information. Table 6 on page 33 describes each Email Notifier Adapter parameter.

Table 6 Email Notifier Adapter parameters and descriptions (page 1 of 2)

Parameter	Description
serverName	Default name of the EMC Manager to connect to. The default is INCHARGE-SA.
eventSmoothingInterval	Time that an event must remain active before the notifier sends a notification. This parameter is used only if the notifier is subscribed to a Domain Manager. If the notifier is subscribed to a Global Manager, this parameter is not applicable and the value is 0 seconds. The default is 0 seconds.
minimumCertainty	Threshold above which notifications are sent. Any notification with a certainty below the threshold is discarded. This value must be a number between 0.0 and 1.0. Service Assurance uses the value from the NotificationList definition. The default is a certainty of 0.01.
initialEventDelay	Time interval the notifier should wait after it connects to the EMC Manager before accepting events. The default is 0 seconds.

Table 6 Email Notifier Adapter parameters and descriptions (page 2 of 2)

Parameter	Description
MailServer	Name of the mail server. For example: MailServer = "localhost"
SenderId	Email address associated with the notifier. Users can reply to this address. This address must be recognized by the mail server. For example: SenderID = "daemon@localhost"
Recipients	Comma-separated list of the recipients of the emails. The recipients in the list must be recognized by the mail server. For example: Recipients = "root@localhost,recipient@your_company.com"

Appendix A, “Customizing a Notification Adapter,” contains additional information about customizing a notification adapter.

CHAPTER 4
Log File Notifier Adapter

This chapter contains the following information:

- Log File Notifier Adapter overview 36
- Configuring the Log File Notifier Adapter..... 36

Log File Notifier Adapter overview

The Log File Notifier Adapter writes notifications (that it subscribes to) to a file. This notification file can include event notifications (including cleared events). The output is a single line with the following fields:

```
Current_Time
Event_Type
Class_Name
Affected_Instance_Name
Event_Name
Certainty
Event_Description
```

The notifier saves the notification file to the BASEDIR/smarts/local/logs directory. By default, the name of the file is:

`<InCharge_Manager>-alarms.log`

Figure 2 on page 36 illustrates how the Log File Notifier Adapter receives notifications and adds them to a notification file.

Figure 2 Log File Notifier Adapter

Configuring the Log File Notifier Adapter

The configuration file, file-notify.conf, configures the notifier. The original version of the file is located in BASEDIR/smarts/conf/notifier. You should retain the original (unedited) version of the configuration file. If you intend to modify a configuration file, you should use the **sm_edit** utility provided with your EMC Smarts software. This ensures that you modify a copy of the file and the copy is placed in the proper local subdirectory.

Do not change any of the parameters in the configuration file before starting this notifier. If you decide to change a parameter, use the **sm_edit** utility to edit the configuration file. "Editing notification adapter files" on page 20 contains additional information on modifying files and using **sm_edit**.

If you edit the configuration file while the notifier is running, restart the notifier so that it rereads its configuration file.

Log File Notifier Adapter parameters

Table 7 on page 37 describes each parameter for the Log File Notifier Adapter. "Specifying subscriptions in the configuration file" on page 21 contains additional information on optionally changing the subscriptions for this notifier to receive different types of notifications.

Table 7 Log File Notifier Adapter parameters and descriptions

Parameter	Description
serverName	Default name of the EMC Manager to connect to. The default is INCHARGE-SA.
eventSmoothingInterval	Time that an event must remain active before the notifier sends a notification. This parameter is used only if the notifier is subscribed to a Domain Manager. If the notifier is subscribed to a Global Manager, this parameter is not applicable and the value is 0 seconds. The default is 0 seconds.
minimumCertainty	Threshold above which notifications are sent. Any notification with a certainty below the threshold is discarded. This value must be a number between 0.0 and 1.0. Service Assurance uses the value from the NotificationList definition. The default is a certainty of 0.01.
initialEventDelay	Time interval the notifier should wait after it connects to the EMC Manager before accepting events. The default is 0 seconds.
fileName	Full name of the notification file. The name cannot contain path separators. If you do not assign a value, the name of the notification file is ‹*InCharge_Manager*›-alarms.log.

Appendix A, "Customizing a Notification Adapter," contains additional information.

CHAPTER 5
SNMP Trap Notifier Adapter

This chapter contains the following information:

- SNMP Trap Notifier Adapter overview 40
- Configuring the SNMP Trap Notifier Adapter 41

SNMP Trap Notifier Adapter overview

The SNMP Trap Notifier Adapter converts notifications into SNMP traps. This notifier sends the traps to specific trap receivers on the network as shown in Figure 3 on page 40.

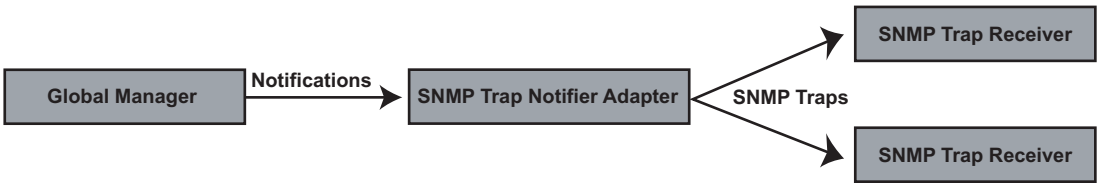

Figure 3 SNMP Trap Notifier Adapter

NOTICE

The SNMP Trap Notifier Adapter supports SNMP V1, SNMP V3, and V2C traps.

All traps sent by the SNMP Trap Notifier Adapter include the same information:

- Agent Address = IP address for host running the notifier
- Enterprise OID = enterprises.733 (Full OID is .1.3.6.1.4.1.733)
- Generic Trap Number = 6
- Varbind sequence always the same for all of the traps

Table 8 on page 40 shows the types of traps the SNMP Trap Notifier Adapter sends.

Table 8 Trap types

Trap name	Trap number
smTrapNotification	4
smTrapNotificationClear	7
smTrapNotificationChange	98
smTrapNotificationDelete	99

Table 9 on page 40 shows the varbinds of the SNMP Traps the SNMP Trap Notifier Adapter sends.

Table 9 Varbinds of the SNMP Traps (page 1 of 2)

Varbind name	Varbind number	Description
smNotifTimestamp	enterprises.733.2.1.1.0	Timestamp of the notification. (unsigned 32-bit integer)
smNotifServer	enterprises.733.2.1.2.0	Name of the Global Manager sending notifications to the SNMP Trap Notifier Adapter. (string)
smNotifClass	enterprises.733.2.1.3.0	Class name associated with an event. (string)
smNotifInstance	enterprises.733.2.1.4.0	Instance display name associated with an event. (string)

Table 9 Varbinds of the SNMP Traps (page 2 of 2)

Varbind name	Varbind number	Description
smEventName	enterprises.733.2.1.5.0	Event name. (string)
smNotifInstanceID	enterprises.733.2.1.6.0	Combination of class name and the instance name (as stored in the repository). Has the form ‹*class name*›::‹*instance* name›. (string)
smNotifDescription	enterprises.733.2.1.7.0	Description of the event. (string)
smNotifCertainty	enterprises.733.2.1.8.0	Printed value of a floating point number that is the certainty of an event. (string)
smNotifSeverity	enterprises.733.2.1.9.0	Severity of the event. (integer)

Appendix D, "EMC Smarts MIB for SNMP Traps," contains additional information on the EMC Smarts MIB implemented by EMC Corporation for SNMP Traps.

Configuring the SNMP Trap Notifier Adapter

The file, trap-notify.conf, configures this notifier. The original version of the file is located in BASEDIR/smarts/conf/notifier. You should retain the original (unedited) version of the configuration file. To modify the configuration file, use the **sm_edit** utility provided with your EMC Smarts software. This will ensure that you modify a copy of the file and that the copy is placed in the proper local subdirectory. "Editing notification adapter files" on page 20 contains additional information on modifying files and using **sm_edit**.

If you edit the configuration file while the notifier is running, restart the notifier so that it rereads its configuration file.

SNMP Trap Notifier Adapter parameters

Before this notifier will work, you must set values for the destinations. The other parameters may remain unchanged. Table 10 on page 42 describes the parameters for the SNMP Trap Notifier Adapter. "Specifying subscriptions in the configuration file" on page 21 contains additional information on changing the subscriptions for this notifier.

Table 10 SNMP Trap Notifier Adapter parameters and descriptions

Parameter	Description
serverName	Default name of the EMC Manager to connect to. The default is INCHARGE-SA.
eventSmoothingInterval	Time that an event must remain active before the notifier sends a notification. This parameter is used only if the notifier is subscribed to a Domain Manager. If the notifier is subscribed to a Global Manager, this parameter is not applicable and the value is 0 seconds. The default is 0 seconds.
minimumCertainty	Threshold above which notifications are sent. Any notification with a certainty below the threshold is discarded. This value must be a number between 0.0 and 1.0. Service Assurance uses the value from the NotificationList definition. The default is a certainty of 0.01.
initialEventDelay	Time interval the notifier should wait after it connects to the EMC Manager before accepting events. The default is 0 seconds.
Destinations	Table of destinations for the SNMP traps. Each row consists of three different values: hostname or IP address, port number, and SNMP version. The values are separated by commas. Surround each row with curly braces. Each row is also separated from the next by a comma. Also, surround the complete set of rows with curly braces.

The format for the destinations parameter is:

```
Destinations = { {"host_or_IP", port_number, "SNMP_Version"}
               }
```

You need to surround each single destination with a pair of curly braces and the entire set of destinations with another pair of curly braces. Even for a single destination, you must use both pairs of braces. For multiple destinations, separate each destination with a comma.

Surround the hostname or IP address with quotation marks.

Valid values for SNMP_Version are V1 and V2C. You must use uppercase letters and quotation marks.

An example of destinations:

```
Destinations = { {"localhost", 162, "V1"},
                 {"other-host", 30162, "V2C"}
               }
```

NOTICE

If there are any mistakes in the configuration file, the notifier will generate error messages on startup and abort.

Appendix A, “Customizing a Notification Adapter,” contains additional information on customizing a notification adapter.

CHAPTER 6
Script Notifier Adapter

This chapter contains the following information:

- Script Notifier Adapter overview 46
- Configuring the Script Notifier Adapter 46
- Script Notifier Adapter compared with sm_adapter automated tools 47

Script Notifier Adapter overview

The Script Notifier Adapter allows you to automatically take an action when a notification is received. Upon receiving a notification, the Script Notifier Adapter invokes a custom script supplied by you that performs user-defined actions. For example, you can create a Script Notifier Adapter to send a page, using a paging service. Another Script Notifier Adapter might invoke an audible alarm when mission critical notifications are received.

Figure 4 on page 46 illustrates how the Script Notifier Adapter receives notifications and invokes a script.

Figure 4 Script Notifier Adapter

Configuring the Script Notifier Adapter

The configuration file, script-notify.conf, configures this notifier. The original version of the file is located in BASEDIR/smarts/conf/notifier. Retain the original (unedited) version of the configuration file. To modify a configuration file, use the **sm_edit** utility provided with your EMC Smarts software. This will ensure that you modify a copy of the file and the copy is placed in the proper local subdirectory. "Editing notification adapter files" on page 20 contains additional information on modifying files and using **sm_edit**.

If you edit the configuration file while the notifier is running, restart the notifier so that it rereads its configuration file.

For the Script Notifier Adapter to function, create a script to perform the desired action. Whenever the notifier receives a notification, it will call the script you created. Save your custom script in BASEDIR/smarts/local/actions. The Script Notifier Adapter arguments for your script are located in BASEDIR/smarts/local/rules/notifier/script/script-custom.asl.

You also need to change the scriptName parameter in the script-notify.conf file. To do this, delete the # character at the beginning of the line and replace the string "myScript" with the name of the custom script you want to run.

The script files must have appropriate read/execute permissions, and must return an exit status of 0 for success and non-zero for failure.

Script Notifier Adapter parameters

Table 11 on page 47 describes each parameter for the Script Notifier Adapter. "Specifying subscriptions in the configuration file" on page 21 contains additional information on changing the subscriptions for this notifier to receive different types of notifications. Appendix A, "Customizing a Notification Adapter," contains additional information on customizing a notification adapter.

Table 11 Script Notifier Adapter parameters and descriptions

Parameter	Description
serverName	Default name of the EMC Manager to connect to. The default is INCHARGE-SA.
scriptName	Base name of the script to execute. The name cannot contain path separators. The custom script resides in BASEDIR/smarts/local/actions.
eventSmoothingInterval	Time that an event must remain active before the notifier sends a notification. This parameter is used only if the notifier is subscribed to a Domain Manager. If the notifier is subscribed to a Global Manager, this parameter is not applicable and the value is 0 seconds. The default is 0 seconds.
minimumCertainty	Threshold above which notifications are sent. Any notification with a certainty below the threshold is discarded. This value must be a number between 0.0 and 1.0. Service Assurance uses the value from the NotificationList definition. The default is a certainty of 0.01.
initialEventDelay	Time interval the notifier should wait after it connects to the EMC Manager before accepting events. The default is 0 seconds.

Script Notifier Adapter compared with sm_adapter automated tools

EMC Smarts Service Assurance Manager also provides the **sm_adapter** command line option, which can automate a server tool (script). The following summarizes functional differences between an automated tool action and a Script Notifier Adapter action:

- Automated Service Assurance actions execute on the Global Manager by the user running the Global Manager (with all the security implications, and the overhead for the Global Manager process); Script Notifier Adapter actions run on any **sm_notify** adapter host (with all the connectivity implications), by any user. The *EMC Smarts System Administration Guide* contains additional information on security implications.
- Parameters to automate Service Assurance actions are passed as environment variables, preconfigured (hard-coded) by EMC Corporation; parameters to Script Notifier Adapter actions are passed from the script-custom.asl, and are user configurable.

- Automated Service Assurance actions can return an output to the caller; Script Notifier Adapter actions can only return a status.
- Script Notifier Adapter actions are synchronous; by default, automated Service Assurance actions are synchronous as well, but you can use asynchronous actions if you make minor modifications to the auto-action.asl file.
- Script Notifier Adapter actions can be used with any EMC Smarts application, not just Service Assurance; meaning you can subscribe and trigger a Script Notifier Adapter action upon receipt of a notification from any EMC Smarts application.

The *EMC Smarts Service Assurance Manager Configuration Guide* contains additional information about automated tools.

CHAPTER 7
Notification Adapter Framework

This chapter contains the following information:

- ASL scripts overview 50

ASL scripts overview

The notification adapter framework is comprised of five ASL scripts (rulesets) that control the operation of a notification adapter. Each notification adapter uses its own version of each ASL script. Each ASL script performs a specific function. The original versions of the ASL scripts are located in BASEDIR/smarts/rules/notifier/‹*adapter_name*›, where ‹*adapter_name*› is the name of the notification adapter (for example, mail, file, trap, script, or tibrv).

Typically, it is unnecessary to edit the ASL scripts. This is reserved for more advanced adapter customizations. However, if you want to customize an adapter, retain the original (unedited) version of the ASL scripts. To modify an ASL script, use the **sm_edit** utility provided with your EMC Smarts software. This will ensure that you modify a copy of the file and the copy is placed in the proper local subdirectory. "Editing notification adapter files" on page 20 contains additional information on modifying files and using **sm_edit**.

If you edit the file while the notifier is running, restart the notifier so that it rereads its framework script file:

- Init ‹*adapter_name*›-init.asl
- Sync ‹*adapter_name*›-sync.asl
- Filter ‹*adapter_name*›-filter.asl
- Notify ‹*adapter_name*›-notify.asl
- Custom ‹*adapter_name*›-custom.asl

For example, the Log File Notifier Adapter's scripts are: file-init.asl, file-sync.asl, file-notify.asl, file-filter.asl, and file-custom.asl.

Table 12 on page 50 contains descriptions for the ASL scripts associated with each of the notification adapters and indicates whether an ASL script is intended to be modified during the customization process.

Table 12 **Notification adapters scripts (page 1 of 2)**

ASL script filename	To be modified	Description
Init ‹*adapter_name*›-init.asl	No	Invoked when the adapter starts and shuts down. Adapter-specific initialization and preshutdown tasks are included in this script.
Sync ‹*adapter_name*›-sync.asl	No	Invoked whenever the adapter connects or disconnects from a Domain Manager. This script is used for synchronization with the Domain Manager.

Table 12 Notification adapters scripts (page 2 of 2)

ASL script filename	To be modified	Description
Filter ‹*adapter_name*›-filter.asl	Yes	This ASL script is the first to run during normal event processing. Its purpose is twofold: • It can filter out events, terminating further processing. • It may initiate customizations that will occur before main processing. Within this script, add the “sentByCustom = TRUE” flag in order to execute customizations.
Notify ‹*adapter_name*›-notify.asl	No	This ASL script is responsible for processing notifications and contains most of the processing directions. It performs the defined actions such as sending traps or emails.
Custom ‹*adapter_name*›-custom.asl	Yes	This is the last ASL script invoked during normal event processing. Any customizations to be made belong in this ASL script.

Appendix A, “Customizing a Notification Adapter,” contains additional information on customizing an adapter.

CHAPTER 8
Attributes

This chapter contains the following information:

- Overview of current event object attributes 54

Overview of current event object attributes

Notification adapters receive events from Domain Managers or notifications from Global Managers. The information from the event or notification is available in the Notification Adapter in a current event object. The attributes of this object describe the properties of the notification or event such as the time the event occurred, the name of the object where the event occurred, the type of event, and additional information.

The filter, notify, and custom scripts, described in Chapter 7, "Notification Adapter Framework," utilize the current event object to access the attributes of an event or notification. In these scripts, the variable currentEvent represents the current event object. For example, the following code may be used to access the instance display name from a notification:

```
x = currentEvent->icInstanceDisplayName;
```

Current event object attributes for events from Domain Managers

Table 13 on page 54 describes the attributes contained in current event objects in the Notification Adapter generated by a Domain Manager. When customizing the notification adapters, use these attributes to retrieve the specific information you require regarding each event.

All attributes for timestamps represent units of time in seconds. The attribute's value is the number of seconds since January 31, 1970 (Greenwich Mean Time, GMT).

Table 13 Current event object attributes for events from Domain Managers (page 1 of 3)

Notification attribute	Type	Description
icCertainty	Float	Confidence that this notification is the correct diagnosis. Value ranges from 0 to 100.
icClass	String	The class of the object triggering the event.
icClassDisplayName	String	The display class name of the object that triggered the event.
icDisplayName	String	The display name of the object triggering the event.
icDisplayType	String	Display string of the notification type that abstracts the difference between the notifications from the Global Manager and the events from the Domain Manager (for example, NOTIFY, CLEAR, and TIMER_ALARM). **Notice:** The icType field contains the detailed type information.
icEventDescription	String	The event description.
icEventDisplayName	String	The event name, which has the same value as icEvent.

Table 13 Current event object attributes for events from Domain Managers (page 2 of 3)

Notification attribute	Type	Description
icEvent	String	The event name. **Notice:** The attribute icEventName is also available for backward compatibility and has the same value as icEvent.
icEventType	String	The event type. The valid types are: • PROBLEM • SYMPTOM • EVENT • AGGREGATION
icId	String	A unique identification for this event. As previously received notifications are cleared (CLEAR), or changed (CERTAINTY_CHANGE), these new messages have the same ID as the original event (NOTIFY). Customizations to the ASL scripts that need to match such messages should use this attribute.
icInstance	String	The instance name of the object triggering the event.
icInstanceDisplayName	String	Name of the instance that is displayed to the user.
icIsRoot	Boolean	TRUE if the notification is a root cause, FALSE if not.
icServerName	String	The name of the Domain Manager that notified the event.
icSystemDescription	String	Description of the system specified in the icSystemName field.
icSystemName	String	The display name of the computer system most closely associated with the event. In cases where there is no relevant system, the attribute's value will be an empty string.

Table 13 Current event object attributes for events from Domain Managers (page 3 of 3)

Notification attribute	Type	Description
icSystemType	String	Type of the system specified in icSystemName field. The attribute's value may be an empty string, the DisplayClassName of the system's class, or one of the following: • HOST • ROUTER • SWITCH • HUB • SERVER • BRIDGE • REPEATER • PROBE • OTHER • TERMINALSERVER
icTimestamp	Integer	The time when the Domain Manager notifies a client about an event, clears an event, or changes the certainty of an event.
icType	String	Notification Type. The valid types are: • NOTIFY • CERTAINTY_CHANGE • CLEAR

Current event object attributes for notifications from Global Managers

Table 14 on page 56 describes the attributes contained in current event objects in the Notification Adapter generated by the Service Assurance Global Manager. When customizing the notification adapters, combine these attributes to include the specific information you require regarding each notification.

All attributes for timestamps represent units of time in seconds. The attribute's value is the number of seconds since January 31, 1970 (Greenwich Mean Time, GMT).

Table 14 Current event object attributes for events from the Global Manager (page 1 of 4)

Notification attribute	Type	Description
icAcknowledged	Boolean	TRUE if the notification is acknowledged, FALSE if not.
icActive	Boolean	TRUE if the event is active, FALSE if not.
icCategory	String	Type of notification sent by the Global Manager. For example: • Availability • Discovery • Error • Operational • Performance • PowerSupply • Resource • Temperature

Table 14 Current event object attributes for events from the Global Manager (page 2 of 4)

Notification attribute	Type	Description
icCertainty	Float	Confidence that this notification is the correct diagnosis. Value ranges from 0 to 100.
icClass	String	Class of the object triggering the event.
icClassDisplayName	String	The display class name of the object triggering the event.
icDisplayName	String	Display name for the instance that triggered this event. This value is the same as icInstanceDisplayName.
icDisplayType	String	Display string of the notification type that abstracts the difference between the notifications from the Global Manager and the events from the Domain Manager (for example, NOTIFY, CLEAR, and TIMER_ALARM). **Notice:** The icType field contains the detailed type information.
icElementClassName	String	Class name of the managed element most closely related to this event. The attribute's value may be an empty string.
icElementName	String	Name of the managed element most closely related to this event. The attribute's value may be an empty string.
icEvent	String	Event name such as DOWN or NOT RESPONDING.
icEventDescription	String	Description of the event.
icEventDisplayName	String	The event name. This has the same value as icEvent.
icEventType	String	The event type. The valid event types are: • MOMENTARY • DURABLE
icFirstNotifiedAt	Integer	Timestamp of the first notification.
icId	String	A unique identification for this notification. As previously-received notifications are cleared (NL_CLEAR), these new messages have the same ID as the original notification (NL_NOTIFY). Customizations to the ASL scripts that need to match such messages should use this attribute.
icImpact	Integer	Numeric value that indicates the effect of this event on related elements.
icInMaintenance	Boolean	TRUE if the device is in maintenance mode, FALSE if not.
icInstance	String	Instance name of the object that triggered the event.
icInstanceDisplayName	String	Display name for the instance triggering this event. This value is the same as icDisplayName.

Table 14 Current event object attributes for events from the Global Manager (page 3 of 4)

Notification attribute	Type	Description
icIsRoot	Boolean	TRUE if the notification is a root cause; FALSE if not.
icIsProblem	Boolean	Yes indicates if (and only if) at least one of the source event types is “PROBLEM”, and other source event types are either “PROBLEM” or “UNKNOWN.” No indicates that one or more of the source event types is “EVENT” or “AGGREGATE.” Since filtering on IsRoot can result in transient behavior when events are received from multiple underlying sources, it is recommended to filter on IsProblem instead.
icLastChangedAt	Integer	Timestamp, in seconds, when the notification was last changed.
icLastClearedAt	Integer	Timestamp, in seconds, when the notification was last cleared.
icLastNotifiedAt	Integer	Timestamp when the Global Manager was last notified of the occurrence of this notification.
icNLObjectName	String	The object name of the notification list that generated this notification.
icNotificationName	String	Name of the notification object. It can be used to retrieve additional information about the notification not sent to the adapter by default.
icOccurrenceCount	Integer	Number of times the notification occurred.
icOwner	String	Name of the person responsible for this notification. Value is SYSTEM when acknowledged by the Global Manager.
icServerName	String	Name of the EMC Manager to whom the adapter listens.
icSeverity	Integer	Level of severity for the notification: 1 = CRITICAL 2 = MAJOR 3 = MINOR 4 = UNKNOWN 5 = NORMAL **Notice:** Only the numbers, not the text descriptions are contained in this attribute.
icSourceDomainName	String	A comma-separated list of sources for this notification. These are names of the underlying notifying sources. There may be more than one in case underlying sources have an overlapping topology.

Table 14 Current event object attributes for events from the Global Manager (page 4 of 4)

Notification attribute	Type	Description
icSourceEventType	String	Indicates the type of event from an underlying source or sources. Value can be: PROBLEM, EVENT, AGGREGATE, or UNKNOWN. The default value is UNKNOWN. (Not to be confused with Event Type.)
icSystemDescription	String	Description of the system specified in the icSystemName field.
icSystemName	String	The display name of the computer system most closely associated with the event. In cases where there is no relevant system, the attribute's value will be an empty string.
icSystemType	String	Type of the system specified in icSystemName field. The attribute's value may be an empty string, the DisplayClassName of the system's class, or one of the system's class such as HOST, ROUTER, or SWITCH.
icTimestamp	Integer	The time when the Global Manager notifies a client that a change occurred for the notification. For the Global Manager, note that the following attributes are typically used instead of icTimestamp: icFirstNotifiedAt, icLastChangedAt, icLastClearedAt, and icLastNotifiedAt.
icTroubleTicketId	String	Trouble ticket ID.
icType	String	Notification Type. The valid types are: • NL_NOTIFY • NL_CHANGE • NL_CLEAR • NL_DELETE • TIMER_ALARM **Notice:** Now the notification adapters do not send notifications for NL_CHANGE or NL_DELETE event types. You cannot use an adapter to inform another application about notification changes or deletions.
icUserDefined1-10	String	Ten user-defined fields. Reserved for custom configuration.

APPENDIX A
Customizing a Notification Adapter

This appendix describes how to customize a notification adapter and contains the following information:

- Customization overview 62

NOTICE

The tasks are essentially the same for all the notification adapters. Specific adapter parameters are described in previous chapters.

It also provides an example procedure for customizing the Email Notifier Adapter to display specific Service Assurance notification information.

Customization overview

To customize a notification adapter:

1. Stop the notification adapter if it is running
2. Modify the Filter script.
3. Modify the Custom script.
4. Modify the configuration file.
5. Start the notification adapter.

Modifying local copies of files

Original versions of the ASL and configuration files for adapters should not be changed:

- The original versions of the ASL scripts are located in BASEDIR/smarts/rules/notifier/‹*adapter_name*›, where ‹*adapter_name*› is the name of the notification adapter (for example, mail, file, trap, script, or tibrv).
- The original versions of the adapter configuration files are installed to the BASEDIR/smarts/conf/notifier directory.

Use the **sm_edit** utility to edit the configuration and rules files to ensure that the original versions are retained and that modified files are saved to the proper local directory. "Editing notification adapter files" on page 20 provides additional information on using **sm_edit**.

Stopping the notification adapter

If you are currently running a notification adapter, stop it before making any customizations. "Stopping a notification adapter" on page 25 and "Starting and stopping notification adapters" on page 23 contains detailed instructions.

Modifying the filter script

The filter script, ‹*adapter_name*›-filter.asl, filters network events from being processed any further as notifications and also contains some instructions for processing notifications that will utilize the notification adapter. Add a variable, sentByCustom, which invokes the script running the customization actions you want from the custom script, ‹*adapter_name*›-custom.asl.

To modify the filter script:

1. Using sm_edit, open the filter script.
2. Add the following line for the *sentByCustom* variable to the end of the script (as shown in bold type):

```
...
START() {
/*
 * Filter cleared events.
 */
OMIT_CLEAR_EVENTS()
   do {
      if (currentEvent->icType == "CLEAR"
       || currentEvent->icType == "NL_CLEAR" )
      {  currentEvent->filterMe = TRUE;
         currentEvent->sentByCustom = TRUE;
      }
      }
   }
```

3. Save the modified script. The sm_edit utility automatically saves the script to the appropriate local directory, located in BASEDIR/smarts/local/rules/notifier.

Email Notifier Adapter example: Modifying the mail-filter.asl script

To customize an Email Notifier Adapter, add the sentByCustom variable to the mail-filter.asl script. In addition, you need to modify the filter script to send emails when a notification is cleared:

1. Using sm_edit, open the mail-filter.asl script. Open the file using the following command:

   ```
   ▼BASEDIR/smarts/bin>sm_edit rules/notifier/mail/
   mail-filter.asl ▲
   ```

   NOTICE

   ▼▲ indicates that the command must be typed on one line.

2. Add the following line for the sentByCustom variable to the end of the script (as shown below in bold type).

   By default, when a network problem is resolved and a CLEAR notification is received, an email is not sent to the administrators involved in the repair. Within the mail-filter.asl script, you can use the filterMe variable to indicate whether or not you want an email to be delivered when a notification is cleared (when the problem is resolved).

   To have emails sent on CLEAR notifications, change the filterMe = TRUE Boolean value to FALSE (as shown in bold type):

   ```
   ...
   START() {
   /*
    * Filter cleared events.
    */
   OMIT_CLEAR_EVENTS() filter {
       (currentEvent->icType == "CLEAR" || currentEvent->icType
        == "NL_CLEAR")
   } do {
   ```

```
    currentEvent->filterMe = FALSE;
   currentEvent->sentByCustom = TRUE;
   }
}
```

3. Save the modified script. The sm_edit utility automatically saves the script to the BASEDIR/smarts/local/rules/notifier/mail directory.

Modifying the custom script

The custom script, ‹*adapter_name*›-custom.asl, contains the details of the script. Modifying the custom script allows you to specify which combination of notification attributes will be included in the adapter's output (for example, an email, information sent to a file or custom script, and SNMP traps messages).

"Attributes" on page 53 contains a list of attributes and their descriptions.

To modify the custom script:

1. Using sm_edit, open the custom script.
2. Add or comment out the attributes.
3. Save the modified script. The sm_edit utility automatically saves the script to the appropriate local directory, located in BASEDIR/smarts/local/rules/notifier.

Email Notifier Adapter example: Modifying the mail-custom.asl script

For an Email Notifier Adapter, the mail-custom.asl script contains the details of the script. Modifying the mail-custom.asl script allows you to specify which combination of notification attributes will be included in the email.

To modify the mail-custom.asl script:

1. Using sm_edit, open the mail-custom.asl script. For example:

   ```
   ▼BASEDIR/smarts/bin>sm_edit rules/notifier/mail/mail-custom.asl ▲
   ```

   NOTICE

   ▼▲ indicates that the command must be typed on one line.

   "Example: mail-custom.asl file" on page 73 contains an original version of the mail-custom.asl script.

2. Add the notification attributes for the subject and body of the email message you want generated for the notification.

   For example, if you want to add the timestamp attribute to the subject and the event type attribute to the body of the email message, edit mail-custom.asl as follows (the bold attributes indicate the modifications):

   ```
   START() {
       local subject = "";
       local body = "";
   } filter {
       /*
        * Only send here if sentByCustom is TRUE.
        */
       (currentEvent->sentByCustom)
   } do {
   ```

```
subject = currentEvent->icTimestamp." ".
currentEvent->icDisplayType." ".
currentEvent->icInstanceDisplayName." ".
currentEvent->icEventDisplayName;
    body = ("  InCharge Server " . serverName . ":\n " .
            currentEvent->icDisplayType . " " .
            currentEvent->icClassDisplayName . " " .
            currentEvent->icInstanceDisplayName . " ".
currentEvent->icEventType . " ".
currentEvent->icEventDisplayName .
" (" . string(currentEvent->icCertainty) . "%):\n " .
            currentEvent->icEventDescription . "\n");
    mailer->sendmail(sender, recipients, subject, body) ? LOG,STOP;
}
```

3. Save the modified script. The sm_edit utility automatically saves the script to the BASEDIR/smarts/local/rules/notifier/mail directory.

Modifying the configuration file

When you start and run a notification adapter, it reads a configuration file, *<adapter_name>*-notify.conf. Use the following procedure to modify the configuration file to run your customizations.

If you are developing multiple customized notification adapters with different subscriptions, you need a configuration file for each adapter. For each notification list (in Service Assurance) or event subscriptions (in Availability Manager) you subscribe to, create an individual configuration file:

NOTICE

Whenever you modify a configuration file, stop and restart the notifier for the changes to take effect.

1. Using the sm_edit utility, open the configuration file:

   ▼BASEDIR/smarts/bin>./sm_edit conf/notifier/*<adapter_name>*-notify.conf▲

   NOTICE

   ▼▲ indicates that the command must be typed on one line.

   If you are developing multiple customized notification adapters, rename the configuration file. The sm_edit utility automatically saves this file to the BASEDIR/smarts/local/conf/notifier directory.

2. Add the following lines to specify the ASL scripts that contain your customizations. The lines should be added to the end of the file below the initialEventDelay parameter:

   ```
   filterRuleSet = "notifier/mail/mail-filter.asl"
   customRuleSet ="notifier/mail/mail-custom.asl"
   ```

3. Modify the SubscribesTo parameter if necessary.

By default, the notifiers subscribe to a Global Manager. To subscribe to a Domain Manager, you must uncomment the code in the Subscriptions section and comment out the code for the Global Manager (insert a # character at the beginning of the lines that are not needed). "Specifying subscriptions in the configuration file" on page 21 contains additional information.

4. Modify other adapter parameters as desired.

   NOTICE

   For information about parameters and their acceptable values, see the chapter for the individual notification adapter.

5. Save the modified configuration file. The sm_edit utility automatically saves the file to the BASEDIR/smarts/local/conf/notifier directory.

Email Notifier Adapter example: Modifying the mail-notify.conf file

For an Email Notifier Adapter, the configuration file is mail-notify.conf:

NOTICE

Whenever you modify a configuration file, you need to stop and restart the notifier for the changes to take effect.

1. Using the sm_edit utility, open the configuration file:

   ```
   BASEDIR/smarts/bin>./sm_edit conf/notifier/mail-notify.conf
   ```

2. If you are developing multiple customized notification adapters, rename the configuration file, giving the file a relevant name (for example, if you are going to customize the Email Notifier Adapter to send emails for all problems related to Routers, you could name the file mail-notify-Router.conf). The sm_edit utility automatically saves this file to the *BASEDIR*/smarts/local/conf/notifier directory.

3. Modify the file to change the name of the Domain Manager or Global Manager:

   ```
   serverName = <YOUR_INCHARGE_MANAGER>
   ```

4. Define the hostname of the appropriate mail server:

   ```
   MailServer = "localhost"
   ```

5. Define the recipients for the notification email. Multiple email addresses should be separated by a comma:

   ```
   Recipients = "root@localhost,recipient@your_company.com"
   ```

6. Define the email address of the sender. This address will display in the **From** field of the email message:

   ```
   SenderId = "daemon@localhost"
   ```

   NOTICE

   If there is a comment character (#) beside any of the parameters you just defined (such as MailServer, Recipients, serverName, or SenderID), remove the comment character to activate the parameter.

7. Add the following lines to specify the ASL scripts that contain your customizations. The lines should be added to the end of the file below the initialEventDelay parameter:

```
filterRuleSet = "notifier/mail/mail-filter.asl"
customRuleSet ="notifier/mail/mail-custom.asl"
```

8. Modify the SubscribesTo parameter to define the specific notifications for which you want email alerts sent.

   For a Global Manager, you indicate which notifications generate emails by defining a notification list in the Subscriptions section:

```
SubscribesTo =
      {
            #
            # NL subscription.
            #
            GA_NLSubscription::mail-Default-Subscriptions
            {
                      NLName = "Default"
            }
      }
```

9. Save the modified configuration file. The sm_edit utility automatically saves the file to the BASEDIR/smarts/local/conf/notifier directory.

NOTICE

Appendix B, "Example Files," contains complete samples of the configuration file.

Starting the customized notification adapter

After creating configuration files and ASL scripts for each of the notification adapters you want to run, start each adapter. "Using sm_notify to start notification adapters" on page 23 and "Starting and stopping notification adapters" on page 23 contain detailed instructions.

Email Notifier Adapter example: Start the adapter with the sm_notify command

The Email Notifier Adapter is started manually using the **sm_notify** command or the **sm_service** start command. For a customized Email Notifier Adapter, you must also specify the location and name of the configuration file that contains the customization information.

The syntax to start a customized Email Notifier Adapter using the **sm_notify** command is:

```
▼BASEDIR/smarts/bin/sm_notify --output --confdir=<DIRECTORY>
   --conf=<CONF_FILE_NAME> mail▲
```

NOTICE

▼▲ indicates the command must be typed as one line.

The parameters --conf and --confdir are used with the **sm_notify** command to override the default configuration files for each adapter. Table 4 on page 24 describes these parameters.

NOTICE

If you have renamed your configuration files, but have kept them in default BASEDIR/smarts/local/conf/notifier directory, use the --conf startup parameter. If your configuration files retain the default names, but are in a new location, use the --confdir startup parameter.

```
# BASEDIR/smarts/bin/sm_notify --output
--confdir=BASEDIR/smarts/Custom/mail/conf
--conf=mail-notify-Router.conf mail
```

NOTICE

▼▲ indicates the command must be typed as one line.

Email Notifier Adapter example: Start the adapter as a service

To start a customized adapter as a service, use the **sm_service** start command. "Starting and stopping a service" on page 27 contains additional information.

```
# BASEDIR/smarts/bin>./sm_service start mail
```

NOTICE

The **sm_notify** parameters --conf and --confdir are specified with the **sm_service** install command.

Running multiple copies of a notification adapter

You may have developed more than one customized notification adapter (for example, more than one Email Notifier Adapter especially if you want to send emails based on different notification subscriptions). Since you created separate configuration files for each adapter, you must specify the location and filename of the configuration file at startup.

The adapters should be started individually by specifying the appropriate configuration file for that adapter. To do this, use the --confdir or --conf parameters.

APPENDIX B
Example Files

This appendix contains the following information:

- Overview 70
- Example: mail-notify.conf file for an EMC Smarts IP Availability Manager 70
- Example: mail-notify.conf file for a Global Manager 72
- Example: mail-custom.asl file 73

Overview

This appendix provides examples of the files used in the customization procedure described in Appendix A, "Customizing a Notification Adapter":

- A sample configuration file (mail-notify.conf) for the Email Notifier Adapter for EMC Smarts IP Availability Manager.
- A sample configuration file (mail-notify.conf) for the Email Notifier Adapter for a Global Manager.
- An original version of an ASL file (mail-custom.asl) for the Email Notifier Adapter for both EMC Smarts IP Availability Manager and EMC Smarts Service Assurance Manager (Global Manager). Chapter 7, "Notification Adapter Framework," contains a description of ASL files.

Example: mail-notify.conf file for an EMC Smarts IP Availability Manager

The following is a sample configuration file (mail-notify.conf) for the Email Notifier Adapter for EMC Smarts IP Availability Manager:

```
# mail-notify.conf - Configuration for the mail notification # adapter
#
# Copyright (C) 1999-2011 EMC Corporation
# All Rights Reserved
#
# $Id: mail-notify.conf,v 1.4 2000/08/22 13:16:51 boaz Exp $
#

GNA_Notifier::mail-Notifier
{
    #
    # Name of the InCharge Server from which to receive
    # notifications.
    #
    serverName = "INCHARGE-AM"

    ConfiguredBy = MailConfiguration::Mail-Configuration
    {
         #
         # Name of mail server host.
         #
         MailServer = "localhost"

         #
         # Sender identity.
         # Must be a valid email address, recognized by the
         # mail server.
         #
       SenderId = "daemon@localhost"

       #
         # Comma-separated list of users to whom notifications
         # should be sent to.
         #
         Recipients = "root@localhost"
    }
```

```
    ReadsInputFrom = GA_SubscriberFE::mail-Subscriber-
    FrontEnd
    {
         #
         # How long, in seconds, an event must remain active
         # before the adapter sends a notification.
         #
         eventSmoothingInterval = 0

         #
         # Notification threshold; discard notifications with
         # a certainty below this value, which should be
         # between 0.0 and
         # 1.0.
         #
         minimumCertainty = 0.01

         #
         # Subscriptions.
         #
         SubscribesTo =
         {
              #
              # Choice subscription.
              #
              GA_ChoiceSubscription::mail-All-Subscriptions
              {
                       className = ".*"
                     instanceName = ".*"
                       eventName = ".*"
                        problems = TRUE
                      aggregates = FALSE
                        symptoms = FALSE
              }

#              #
#              # Profile subscription.
#              #
#              GA_ProfileSubscription::file-Default-Profile-

Subscriptions
#              {
#                   profileName = "default"
#              }
         }
    }

    #
    # How long, in seconds, to ignore notifications from the
    # server after it connects.  Use this parameter to avoid
    # receiving the initial flood of notifications when the
    # server (re)connects.
    #
    initialEventDelay = 0

    filterRuleSet = "$Basedir/smarts/Custom/mail/rules/mail-
    filter.asl"

    customRuleSet = "$Basedir/smarts/Custom/mail/rules/mail-
    custom.asl"

}
```

Example: mail-notify.conf file for a Global Manager

The following is a sample configuration file (mail-notify.conf) for the Email Notifier Adapter for EMC Smarts Service Assurance Manager:

```
# mail-notify.conf - Configuration for the mail notification
# adapter
#
# Copyright (C) 1999-2011 EMC Corporation
# All Rights Reserved
#
# $Id: mail-notify.conf,v 1.4.8.1 2001/06/13 14:42:01 boaz
# Exp $
#

GNA_Notifier::mail-Notifier
{
    #
    # Name of the InCharge Server from which to receive
    # notifications.
    #
    serverName = "INCHARGE-SA"

    ConfiguredBy = MailConfiguration::Mail-Configuration
    {
         #
         # Name of mail server host.
         #
         MailServer = "localhost"

         #
         # Sender identity.
         # Must be a valid email address,
       # recognized by the mail server.
         #
         SenderId = "daemon@localhost"

         #
         # Comma-separated list of users to whom notifications
         # should be sent to.
         #
         Recipients = "root@localhost"
    }

ReadsInputFrom = GA_SubscriberFE::mail-Subscriber-FrontEnd
    {
         #
         # How long, in seconds, an event must remain active
         # before the adapter sends a notification.
         #
         eventSmoothingInterval = 0

         #
         # Notification threshold; discard notifications with
         # a certainty below this value, which should be
         # between 0.0 and 1.0.
         #
         minimumCertainty = 0.01

         #
         # Subscriptions.
         #
         SubscribesTo =
         {
              #
```

```
                # NL subscription.
                #
                GA_NLSubscription::mail-Default-Subscriptions
                {
                         NLName = "Default"
                }

            }
        }

        #
        # How long, in seconds, to ignore notifications from the
        # server after it connects.  Use this parameter to avoid
        # receiving the initial flood of notifications when the
        # server (re)connects.
        #
        initialEventDelay = 0

        filterRuleSet = "notifier/mail/mail-filter.asl"

        customRuleSet = "notifier/mail/mail-custom.asl"

    }
```

Example: mail-custom.asl file

The following is an original version of the mail-custom.asl file for the Email Notifier Adapter for both EMC Smarts IP Availability Manager and EMC Smarts Service Assurance Manager:

```
/* mail-custom.asl - Custom script for the mail notification adapter.
 *
 * Copyright (C) 1999-2011, EMC Corporation
 * All Rights Reserved
 *
 * RCS $Id:mail-custom.asl,v 1.6 2002/01/30 23:27:26 boaz Exp $
 */
/** No word delimiter needed.*/
delim = "";

/*
 * Required variables.*/

default debug = FALSE;
default test = FALSE;

default NotifierName = "<error>";
notifier = self->object("GNA_Notifier", NotifierName) ? LOG,STOP;

currentEvent = notifier->CurrentEvent ? LOG,STOP;

mailer = self->object("ACT_Mail", "ACT-Mail") ? LOG,STOP;
mailer->test = test;
mailer->trace = debug;

serverName = notifier->serverName;

/** User-provided parameters.*/

sender = notifier->ConfiguredBy->SenderId;
recipients = notifier->ConfiguredBy->Recipients;

/*
 * Rules.
```

```
 */

START() {
    local subject = "";
    local body = "";
} filter {
    /*
     * Only send here if sentByCustom is TRUE.
     */
    (currentEvent->sentByCustom)
} do {

    /*
     * This is how the adapter constructs the default message.
     * Edit to suit your tastes.
     */
    subject = currentEvent->icDisplayType." ".
              currentEvent->icInstanceDisplayName." ".
              currentEvent->icEventDisplayName;
    body = ("  InCharge Server " . serverName . ":\n " .
            currentEvent->icDisplayType . " " .
            currentEvent->icClassDisplayName . " " .
            currentEvent->icInstanceDisplayName . " ".
            currentEvent->icEventDisplayName .
            " (" . string(currentEvent->icCertainty) . "%):\n " .
            currentEvent->icEventDescription . "\n");
    mailer->sendmail(sender, recipients, subject, body) ? LOG,STOP;
}

/*
 * Local Variables:
 * mode: C++
 * End:
 */
```

APPENDIX C
Troubleshooting Adapters

This appendix contains the following information:

- Overview 76
- Notification adapter issues 77

Overview

This appendix contains resolutions to common issues experienced by adapter users involving notification adapters.

Each section begins by addressing general issues. For example, the first issue describes what to check if this type of adapter fails to start. Subsequent sections address issues specific to a particular adapter. For each issue there may be more than one suggested action to follow.

Table 15 on page 76 includes the complete list of common issues and their solutions covered in this appendix, organized by adapter.

Table 15 Issues covered in this appendix

Issues	Solution
Email Notifier Adapter	
Does not start.	"Notification adapter fails to start" on page 77
Does not connect to InChange Manager.	"Notification adapter starts, but fails to connect to the EMC Manager" on page 78
No email is received.	"Email not received" on page 79
Only some email is received.	"Email received, but not for all events" on page 79
Log File Notifier Adapter	
Does not start.	"Notification adapter fails to start" on page 77
Does not connect to EMC Manager.	"Notification adapter starts, but fails to connect to the EMC Manager" on page 78
Notification file is not created or updated.	"Notification file not created" on page 80
Notification file does not include all events.	"Information in the notification file does not include all events" on page 80
SNMP Trap Notifier Adapter	
Does not start.	"Notification adapter fails to start" on page 77
Does not connect to EMC Manager.	"Notification adapter starts, but fails to connect to the EMC Manager" on page 78
Destinations do not receive any traps.	"No traps delivered to destination" on page 81
Destinations receive only some traps.	"Not all traps delivered to destination" on page 81
Script Notifier Adapter	
Does not start.	"Notification adapter fails to start" on page 77
Does not connect to EMC Manager.	"Notification adapter starts, but fails to connect to the EMC Manager" on page 78
Script is not invoked.	"Script is not invoked for Script Notifier Adapter" on page 81

Notification adapter issues

The issues covered here apply to the:

- Email Notifier Adapters
- Log File Notifier Adapters
- SNMP Trap Notifier Adapters
- Script Notifier Adapters

Notification adapter fails to start

NOTICE

Applies to the Email Notifier Adapter, the Log File Notifier Adapter, the SNMP Trap Notifier Adapter, and the Script Notifier Adapter.

When a notification adapter appears not to start, check the status of its process or service.

For an adapter started with the sm_notify command

For Windows, check the Task Manager for the **sm_notify** process.

For an adapter started as a service

For Windows, to check the status of a service, use the Service control panel:

1. Click **Start**.
2. Select **Settings** › **Control Panel** › **Administrative Tools** › **Services**.

Notification adapter starts, but fails to connect to the EMC Manager

NOTICE

Applies to the Email Notifier Adapter, the Log File Notifier Adapter, the SNMP Trap Notifier Adapter, and the Script Notifier Adapter.

When an adapter cannot connect to an EMC Manager, it is usually for one of the following reasons:

- EMC Manager is not running.
- Name of the EMC Manager is not the same as the name specified in the adapter's configuration file.
- EMC Manager cannot be reached from the host running the adapter.

Check the status of the EMC Manager

Use the brcontrol command to check the status of the EMC Manager. The syntax is:

```
BASEDIR/smarts/bin/brcontrol
```

By default, this command returns a list of EMC Managers registered with the broker and their current state. The list indicates whether an EMC Manager's state is RUNNING or DEAD.

If the EMC Manager is not running or included in the list, restart the EMC Manager.

Check the name of the EMC Manager in the configuration file

The configuration file of each adapter contains the name of the EMC Manager to which it connects. This value in the configuration file can be overridden by using the **--server** option with the **sm_notify** command.

In cases where an adapter cannot connect, check that the **--server** option, if used, points to a valid EMC Manager. If that is not the issue, check that the appropriate EMC Manager is specified in the adapter's configuration file. Table 16 on page 78 lists the configuration file and parameter to check for each adapter.

Table 16 Adapters and EMC Manager parameters

Adapter	Location and name (relative to BASEDIR/smarts/conf)	EMC Manager parameter
Email Notifier Adapter	/notifier/mail-notify.conf	serverName
Log File Notifier Adapter	/notifier/file-notify.conf	serverName
SNMP Trap Notifier Adapter	/notifier/trap-notify.conf	serverName
Script Notifier Adapter	/notifier/script-notify.conf	serverName

Check communication to the EMC Manager's host

If the adapter and the EMC Manager run on different hosts, the adapter's host might not be able to communicate with the EMC Manager's host. From the adapter's host, run the following command:

```
dmctl --server=<InCharge_Manager> ping
```

The results of this command show whether the EMC Manager is alive or unavailable.

Email not received

NOTICE

Applies to the Email Notifier Adapter.

When the Email Notifier Adapter starts and connects to the Domain Manager and the intended recipient receives no email, the issue is usually an incorrect configuration. The configuration file for the Email Notifier Adapter is mail-notify.conf. This file resides in the BASEDIR/smarts/notifier directory.

There are three parameters that specify where the Email Notifier Adapter delivers information. Table 17 on page 79lists these parameters.

Table 17 Parameters needed to receive email

Parameter	Description
MailServer	Name for the mail server. For example: MailServer = "localhost"
SenderId	Email address associated with the adapter. Users can reply to this address. This address must be recognized by the mail server. For example: SenderId = "daemon@localhost"
Recipients	A comma-separated list of the recipients of the emails. The recipients in the list must be recognized by the mail server. For example: Recipients = "root@localhost,recipient@your_company.com"

Check the parameters in the configuration file and verify them with your email administrator. All three must have a valid value for the Email Notifier Adapter to work. For the changes to the configuration file to take effect, the adapter must be restarted.

Email received, but not for all events

NOTICE

Applies to the Email Notifier Adapter.

If the Email Notifier Adapter does not seem to be sending messages for all of the correct events, it could be that the subscription profile is incorrect or that you expect the adapter to be sending messages when notifications clear.

Modify the subscription profile

When the Email Notifier Adapter sends email, but does not send them for all expected events, the issue usually is improper subscriptions. “Specifying subscriptions in the configuration file” on page 21 contains instructions on modifying the subscription profile for this adapter.

Change the Email Notifier Adapter to send notifications of cleared events

By default, the Email Notifier Adapter does not send messages when a notification clears. It only sends messages for new notifications or when the certainty of the notification changes.

To enable the Email Notifier Adapter to send CLEAR notifications, change the following in the file, BASEDIR/rules/notifier/mail/mail-filter.asl:

```
START () {
     OMIT_CLEAR_EVENTS
}
```

to

```
START () {
//   OMIT_CLEAR_EVENTS
}
```

After making changes to the file, restart the adapter for the changes to take effect.

Notification file not created

NOTICE

Applies to the Log File Notifier Adapter.

When the Log File Notifier Adapter starts and connects to the EMC Manager, but it does not appear to create the notification file, check to ensure the filename is the one you expect. The Log File Notifier Adapter's configuration file, file-notify.conf, contains the name of the notification file. The file-notify.conf file resides in the BASEDIR/smarts/conf/notifier directory. The parameter, fileName, defines the name of the notification file that the adapter creates for its output. The adapter always creates the notification file in the BASEDIR/smarts/local/logs directory. If you do not specify a value, the adapter creates a default file named ‹*InCharge_Manager*›-alarms.log.

NOTICE

Do not confuse this adapter's output file with its log file. The log file also appears in the BASEDIR/smarts/local/logs directory. You determine the log file's name when the adapter starts using the **--output** command option. The default name of the log file is sm_notify.log.

Never use the same name for both the notification file and the Log File Notifier Adapter's log file.

Information in the notification file does not include all events

NOTICE

Applies to the Log File Notifier Adapter.

When the Log File Notifier Adapter sends information to the notification file, but does not send it for all of the correct events, the issue usually is improper subscriptions. "Specifying subscriptions in the configuration file" on page 21 contains instructions on modifying the subscription profile for this adapter.

No traps delivered to destination

NOTICE

Applies to the SNMP Trap Notifier Adapter.

When the SNMP Trap Notifier Adapter starts and connects to the EMC Manager and does not send the SNMP Traps, the issue is usually the format of the parameter Destinations.

The parameter, Destinations, is a table that contains the SNMP trap destinations. Each row in the table is surrounded by curly braces and consists of three different values: hostname or IP address, port number, and SNMP version. The values are separated by commas. There are two valid values for SNMP version: V1 and V2C. These values and the values for host name or IP address must be surrounded by quotation marks. The port number is an integer value with no quotation marks.

Each row in the table is separated from the next by a comma. Place a comma after the curly brace that marks the end of each row in the table except for the last. An outer set of curly braces defines the entire table.

For example, the Destinations parameter could appear as follows:

```
Destinations = {
                 {"localhost", 162, "V1"},
                 {"other-host", 30162, "V2C"},
                 {"195.67.23.103",21539, "V2C"}
               }
```

NOTICE

The SNMP Trap Notifier Adapter supports SNMP V1, SNMP V3, and V2C traps.

Not all traps delivered to destination

NOTICE

Applies to the SNMP Trap Notifier Adapter.

When the SNMP Trap Notifier Adapter sends traps, but does not send them for the correct events, the issue is usually improper subscriptions. “Specifying subscriptions in the configuration file” on page 21 contains instructions on modifying the subscription profile for this adapter.

Script is not invoked for Script Notifier Adapter

NOTICE

Applies to the Script Notifier Adapter.

1. Ensure your script is located in BASEDIR/smarts/local/actions, and that it is readable and executable.
2. Check the configuration file to see that you have altered the file to include the correct name for the script you want to invoke.

APPENDIX D
EMC Smarts MIB for SNMP Traps

This appendix describes:

- EMC Smarts MIB implemented by EMC Corporation for SNMP Traps 84

EMC Smarts MIB implemented by EMC Corporation for SNMP Traps

```
-- SMARTS-MIB.my:  EMC Smarts corporate MIB
--
-- Copyright 1999-2011 by EMC Corporation ("EMC").
-- All rights reserved.
--
-- UNPUBLISHED CONFIDENTIAL AND PROPRIETARY PROPERTY OF EMC.  The
-- copyright notice above does not evidence any actual or intended
-- publication of this software.  Disclosure and dissemination are
-- pursuant to separate agreements.  Unauthorized use, distribution
-- or dissemination are strictly prohibited.
--
-- RCS $Id: SMARTS-MIB.my,v 1.1.38.2 2006/02/06 23:41:15 eo1 Exp $
--
SMARTS-MIB DEFINITIONS ::= BEGIN

IMPORTS
        enterprises, Counter32, OBJECT-TYPE,
        MODULE-IDENTITY, OBJECT-IDENTITY, NOTIFICATION-TYPE
                FROM SNMPv2-SMI;

smartsMIB MODULE-IDENTITY
        LAST-UPDATED "200602070000Z"
        ORGANIZATION "EMC Corporation"
        CONTACT-INFO
                "       Support
                Postal: EMC Corporation
                        Corporate Headquarters
                        176 South Street
                        Hopkinton, MA 01748-9103
                        US
                Phone:
                  United States: (800) 782-4362 (SVC-4EMC)
                  Canada:        (800) 543-4782 (543-4SVC)
                  Worldwide:     (508) 497-7901
   Web: http://powerlink.emc.com"
                DESCRIPTION
                       "The MIB module for EMC Smarts entities defined
   by
                        EMC Corporation."
        ::= { enterprises 733 }

-- top level groups in the SMARTS-MIB

-- The smNotificationTrap Group.

smNotificationTrap OBJECT-IDENTITY
        STATUS  current
        DESCRIPTION
         "This group is acutally the prefix one uses when creating
          enterprise-specific trap OID's for an SNMPv2 trap.  It is
          used in the SMARTS MIBS when defining traps."
        ::= { smartsMIB 0 }


-- The smNotificationData Group.

smNotificationData OBJECT-IDENTITY
        STATUS  current
        DESCRIPTION
         "The members of this group are the OIDs for VarBinds
          containing notification data."
```

```
        ::= { smartsMIB 2 }


-- Group for generic notification data.

smGenericNotify OBJECT-IDENTITY
        STATUS  current
        DESCRIPTION
         "The members of this group are the OIDs for VarBinds
          containing generic notification data."
        ::= { smNotificationData 1 }

smNotifTimestamp OBJECT-TYPE
        SYNTAX Counter32
        MAX-ACCESS accessible-for-notify
        STATUS  current
        DESCRIPTION
         "The timestamp of the notification."
        ::= { smGenericNotify 1 }

smNotifServer OBJECT-TYPE
        SYNTAX OCTET STRING
        MAX-ACCESS accessible-for-notify
        STATUS current
        DESCRIPTION
         "The name of the server that is sending the notification."
        ::= { smGenericNotify 2 }

smNotifClass OBJECT-TYPE
        SYNTAX OCTET STRING
        MAX-ACCESS accessible-for-notify
        STATUS current
        DESCRIPTION
         "The class of the object associated with the notification."
        ::= { smGenericNotify 3 }

smNotifInstance OBJECT-TYPE
        SYNTAX OCTET STRING
        MAX-ACCESS accessible-for-notify
        STATUS current
        DESCRIPTION
        "The instance name of the object associated with the
   notification."
        ::= { smGenericNotify 4 }

smNotifEventName OBJECT-TYPE
        SYNTAX OCTET STRING
        MAX-ACCESS accessible-for-notify
        STATUS current
        DESCRIPTION
        "The name of the event causing the notification."
        ::= { smGenericNotify 5 }

smNotifInstanceID OBJECT-TYPE
        SYNTAX OCTET STRING
        MAX-ACCESS accessible-for-notify
        STATUS current
        DESCRIPTION
         "The unique InCharge inventory identification
          for the object associated with the notification."
        ::= { smGenericNotify 6 }

smNotifDescription OBJECT-TYPE
        SYNTAX OCTET STRING
        MAX-ACCESS accessible-for-notify
        STATUS current
```

```
        DESCRIPTION
         "A complete description of the event."
        ::= { smGenericNotify 7 }

smNotifCertainty OBJECT-TYPE
        SYNTAX OCTET STRING
        MAX-ACCESS accessible-for-notify
        STATUS current
        DESCRIPTION
         "The certainty of the event.  Floating-point number in the
          range 0-100, stored as a string."
        ::= { smGenericNotify 8 }

smNotifSeverity OBJECT-TYPE
        SYNTAX INTEGER {
                notApplicable (1),
                informational (2),
                warning (3),
                minor (4),
                major (5),
                severe (6)
        }
        MAX-ACCESS accessible-for-notify
        STATUS  current
        DESCRIPTION
         "The severity of the event.  Integer number in the range 1-6."
        ::= { smGenericNotify 9 }

-- The SMARTS enterprise Traps
--
-- These are the enterprise-specific trap codes currently in-use in
-- SMARTS software.  The final sub-OID of each object is the code sent
-- in the "specific-trap" field of an SNMPv1 Trap-PDU.
--
-- The definition of these objects mimics the SNMPv2 convention for
-- sending traps:  Take the enterprise OID, append 0, then append the
-- trap code.

-- TRAP NUMBER USE: Trap code 0 is reserved (by SNMP).
--                  Trap codes 1-3 are used by the SMARTS-OV-NV-MIB.

-- TRAPS 4-7: The "smTrap*" series of traps define "base" trap
--            numbers, ones with a generic purpose.  These traps are
--            also used by the generic Trap Adapter.

          smTrapNotification NOTIFICATION-TYPE
            OBJECTS {   smNotifTimestamp,
                        smNotifServer,
                        smNotifClass,
                        smNotifInstance,
                        smNotifEventName,
                        smNotifInstanceID,
                        smNotifDescription,
                        smNotifCertainty,
                        smNotifSeverity
                    }
            STATUS current
            DESCRIPTION
             "A trap describing an InCharge root cause notification.
              The text in smNotifDescription indicates the nature of
              the problem."
          ::= { smNotificationTrap 4 }

          smTrapCertaintyChange NOTIFICATION-TYPE
            OBJECTS {   smNotifTimestamp,
                        smNotifServer,
```

```
                    smNotifClass,
                    smNotifInstance,
                    smNotifEventName,
                    smNotifInstanceID,
                    smNotifDescription,
                    smNotifCertainty,
                    smNotifSeverity
                }
          STATUS current
          DESCRIPTION
           "A trap indicating a certainty change of an InCharge
            notification. The text in smNotifDescription indicates
            the nature of the problem."
        ::= { smNotificationTrap 5 }

        smTrapSeverityChange NOTIFICATION-TYPE
         OBJECTS {   smNotifTimestamp,
                     smNotifServer,
                     smNotifClass,
                     smNotifInstance,
                     smNotifEventName,
                     smNotifInstanceID,
                     smNotifDescription,
                     smNotifCertainty,
                     smNotifSeverity
                }
          STATUS current
          DESCRIPTION
           "A trap indicating a severity change of an InCharge
            notification. The text in smNotifDescription indicates
            the nature of the notification."
        ::= { smNotificationTrap 6 }

        smTrapNotificationClear NOTIFICATION-TYPE
         OBJECTS {   smNotifTimestamp,
                     smNotifServer,
                     smNotifClass,
                     smNotifInstance,
                     smNotifEventName,
                     smNotifInstanceID,
                     smNotifDescription,
                     smNotifCertainty,
                     smNotifSeverity
                }
          STATUS current
          DESCRIPTION
           "A trap indicating the clear of an InCharge
notification."
        ::= { smNotificationTrap 7 }

        smTrapNotificationChange NOTIFICATION-TYPE
         OBJECTS {   smNotifTimestamp,
                     smNotifServer,
                     smNotifClass,
                     smNotifInstance,
                     smNotifEventName,
                     smNotifInstanceID,
                     smNotifDescription,
                     smNotifCertainty,
                     smNotifSeverity
                }
          STATUS current
          DESCRIPTION
           "A trap indicating the change of an InCharge
notification."
        ::= { smNotificationTrap 98 }
```

```
          smTrapNotificationDelete NOTIFICATION-TYPE
           OBJECTS {   smNotifTimestamp,
                       smNotifServer,
                       smNotifClass,
                       smNotifInstance,
                       smNotifEventName,
                       smNotifInstanceID,
                       smNotifDescription,
                       smNotifCertainty,
                       smNotifSeverity
                  }
             STATUS current
             DESCRIPTION
              "A trap indicating the delete of an InCharge
   notification."
          ::= { smNotificationTrap 99 }

-- TRAP NUMBER USE: Trap codes 8-99 are reserved for future "base trap
   number"
--                  use.
--
--                  Trap codes 100-133 are used by
   SMARTS-PERFORMANCE-MIB.
--                  Trap codes 134-199 are reserved for future use by
--                  SMARTS-PERFORMANCE-MIB.

END
```

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