eHealth™ AIM for Apache User Guide

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Patent Information

U. S. Patent 5,615,323
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Preface

This guide describes how to install and use the *e*Health™ application insight module (AIM) for Apache for Solaris™ SPARC™; Linux™ x86; HP-UX™; and Windows NT® 4.0, Windows® 2000, and Windows XP systems. This guide supports the following:

- *e*Health AIM for Apache Release 1.0 Patch level 3 and later
- *e*Health SystemEDGE™ Release 4.0 Patch level 3 and later

This product supports the Apache Web server Version 1.3.2 and later.

Audience

This guide is intended for the person responsible for installing and configuring *e*Health AIM for Apache. To use *e*Health AIM for Apache, you should have a basic understanding of the Apache Web server, *e*Health SystemEDGE, and your host's operating system environment. For more information, refer to Apache documentation (http://www.apache.org) and the *eHealth SystemEDGE User Guide*.

About This Guide

This section describes the changes and enhancements that have been made since the last release of this guide. It also includes the documentation conventions used in this guide.

Revision Information

Since the last release, this guide has been updated to provide additional instructions for setting up the mod_status and mod_info facilities.

Documentation Conventions

Table 1 lists the conventions used in this document.

Table 1. Documentation Conventions (Page 1 of 2)

Convention	Description
File or Directory Name	Text that refers to file or directory names.
`code`	Text that refers to system, code, or operating system command line examples.
emphasis	Text that refers to guide titles or text that is emphasized.
`enter`	Text that you must type exactly as shown.
Name	Text that refers to menus, fields in dialog boxes, or keyboard keys.
New Term	Text that refers to a new term, that is, one that is being introduced.
`Variable`	Text that refers to variable values that you substitute.
→	A sequence of menus or menu options. For example, **File** → **Exit** means "Choose **Exit** from the **File** menu."

Table 1. Documentation Conventions (Page 2 of 2)

Convention	Description
NOTE	Important information, tips, or other noteworthy details.
CAUTION	Information that helps you avoid data corruption or system failures.
WARNING	Information that helps you avoid personal physical danger.

Technical Support

If you have a Support Contract ID and password, you can access our Support Express knowledgebase at the following URL: http://search.support.concord.com.

If you have a software maintenance contract, you can obtain assistance with *e*Health. Have your Support Contract ID available and contact Technical Support at the following:

Phone: (888) 832-4340

(508) 303-4300

E-mail: support@concord.com

Web site: http://www.concord.com

Professional Services

If you need any assistance with customizing this product, contact Professional Services at the following:

Phone: (800) 851-8725

Fax: (508) 486-4555

E-mail: proserv@concord.com

Web site: http://www.concord.com

Introduction

This chapter provides an overview of *e*Health™ AIM for Apache.

Introducing *e*Health AIM for Apache

*e*Health AIM for Apache is a plug-in for *e*Health SystemEDGE™ that enables Information Technology (IT) operators to monitor the Apache Web server. The power and flexibility of the Apache Web server make it the server of choice for many corporations.

*e*Health AIM for Apache enables you to monitor the Apache server's performance and availability on these operating systems:

- Sun™ Solaris Release 2.5 and later
- RedHat™ Linux™ Release 6.0 and later
- HP-UX™ Release 10.x and 11.x (not including 10.01)
- Microsoft® Windows NT® 4.0, Windows® 2000, and Windows XP

To use *e*Health AIM for Apache, you must install it on every Apache server that you want to monitor. For more information, refer to Chapter 2, "Installing eHealth AIM for Apache."

NOTE

This guide does not describe how to install, administer, or use the Apache Web server. For help with Apache, refer to your Apache Web server documentation.

Features

*e*Health AIM for Apache monitors the following:

- Apache server processes
- Apache server log files
- Performance metrics that are specific to Apache
- Web service response and availability

*e*Health AIM for Apache monitors httpd process attributes. For example, it monitors whether each process is running (alive). It can also restart processes, if necessary. In addition, it monitors memory usage, memory size, and page faults.

Because the Apache Web server records Web accesses and errors in log files, *e*Health AIM for Apache can use the SystemEDGE agent log-file monitoring capability to scan those logs and forward certain events as Simple Network Management Protocol (SNMP) traps when appropriate.

*e*Health AIM for Apache is designed to monitor one or more Apache servers running on a single system. To support multiple servers, the data presented in the *e*Health AIM for Apache management information base (MIB) is organized into tables that are indexed by server port number. For instance, if you have a server running on port 80 and another on port 8080, entries appear in each table for index 80 and index 8080. For more information, refer to Chapter 3, "Using the eHealth AIM for Apache MIB."

Using the mod_info and mod_status Modules

*e*Health AIM for Apache obtains server status and behavior information from the Apache server through the Apache mod_info and mod_status modules. To access this type of information, you must enable these modules in your Apache configuration file (httpd.conf). If these modules are secured through the use of an authentication mechanism, you must also provide a valid user name and password for accessing these resources in the apachemod.cf file. For more information, refer to "Enabling mod_status and mod_info" on page 23 and "Editing the apachemod.cf File" on page 28.

Caching Disk Space Information

As part of the application footprint calculations, *e*Health AIM for Apache can calculate the total amount of disk space used by your Apache server. On some systems with large amounts (greater than 1 GB) of Web data, this calculation can take a long time. For this reason, *e*Health AIM for Apache is designed to cache the disk space information to avoid frequent recalculations. You can control the frequency of the disk space calculations in the *e*Health AIM for Apache configuration file (apachemod.cf). For more information, refer to "Editing the apachemod.cf File" on page 28.

Using *e*Health AIM for Apache

*e*Health AIM for Apache provides you with the tools and information that are necessary for monitoring the health and availability of the Apache Web server. It provides important information about Apache to management software through the SystemEDGE agent and SNMP.

*e*Health AIM for Apache works with the SystemEDGE agent to closely manage the Apache Web server, providing real-time fault detection and automatically correcting problems, if necessary. You can use *e*Health AIM for Apache with any SNMP-compliant management software, including the Concord *e*Health Suite™ of products, AdvantEDGE™ View, HP OpenView,™ and others.

*e*Health AIM for Apache and the SystemEDGE agent can provide you with the following types of information:

- Number of "hits" your Web server is receiving, which can help you keep up with daily volume and set monitor points to watch for unusual traffic loss or denial of service attacks
- Amount of space your Web log and Web server files are consuming
- How effectively the Apache processes monitor idle services, warn you when the number of idle services is too low, and monitor the number of active processes
- How much of your system resources (CPU and memory) Apache is using on your server
- Whether bottlenecks on your Web servers are caused by problems with the CPU, memory, disk, or network

Using *e*Health AIM for Apache with *e*Health AdvantEDGE View

You can use *e*Health AdvantEDGE View™ with the *e*Health AIM for Apache to monitor the performance, configuration, availability, and health of the Apache Web server.

To run an AdvantEDGE View query for Apache:

1. Select the target system or group from the **System** or **Group** list in the AdvantEDGE View interface.
2. Select **Apache** from the **Applications** list.
3. Click the **Applications** icon.



Figure 1 shows a sample image map that AdvantEDGE View displays when you run a query on the target Apache workstation. Click the area for which you want to display information.

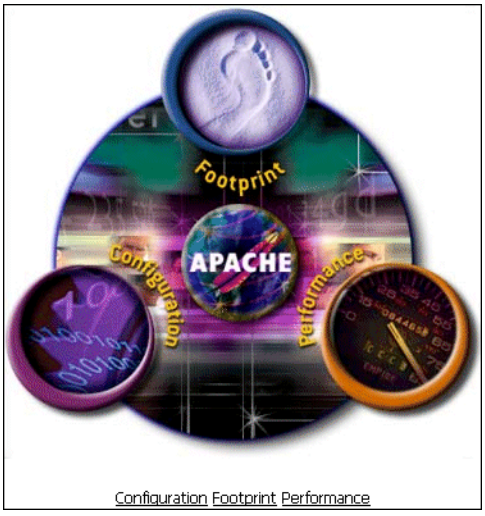


Figure 1. AdvantEDGE View Image Map for Apache Queries

For example, if you click the **Footprint** area, AdvantEDGE View displays information about Apache's CPU, memory, and disk resource consumption. Figure 2 shows the Disk Usage section of the AdvantEDGE View Footprint query for an Apache Web server.

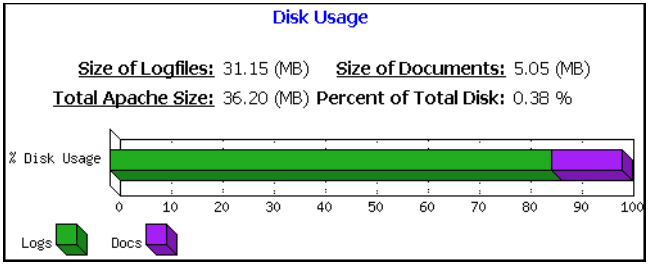


Figure 2. Sample Section of an AdvantEDGE View Footprint Query for Apache

Using *e*Health AIM for Apache with *e*Health

In previous releases, eHealth – Application Insight was called eHealth – Application Assessment.

You can use *e*Health AIM for Apache and the SystemEDGE agent with the *e*Health product suite to provide historical data for long-term trending analysis and capacity planning. With *e*Health – Application Insight, you can run At-a-Glance, Trend, Top N, and MyHealth reports for the following types of information:

- Amount of CPU, total memory, and disk space the Apache Web server is using
- Number of users who are connected to the Apache server
- Number and type of processes that are running
- Amount of Web traffic
- Total size of the Apache service logs
- End-to-end performance summaries for your Apache application, host system, and network

For more information about the variables you can monitor and reports that you can run when you integrate *e*Health AIM for Apache with *e*Health, refer to the *e*Health Web Help.

Using *e*Health AIM for Apache with Live Health

You can also use *e*Health AIM for Apache and the SystemEDGE agent with Live Health™ for real-time detection of potential problems. Live Health applies intelligent algorithms to the data, resulting in precise assessments of application health and performance. For more information about how Live Health can detect "brownouts" and service delays across applications, systems, and networks, refer to the Live Health Web Help.

Installing eHealth AIM for Apache

This chapter explains how to install, configure, and license *e*Health AIM for Apache.

NOTE

For the most current information about installing this module, refer to the relnotes.txt file on the *e*Health AIM for Apache installation CD-ROM.

Installation Requirements

Before you install *e*Health AIM for Apache, you must first install, license, and configure the SystemEDGE agent Release 4.1, Patch level 1 or later. For more information, refer to the *eHealth SystemEDGE User Guide*. Also, your system must be running the Apache Web server Release 1.3.2 or later on one of these operating systems:

- Sun Solaris (SPARC) Release 2.5 or later
- Red Hat Linux (x86) Release 6.0 or later
- HP-UX Release 10.x and 11.x (not including 10.01)
- Microsoft Windows NT 4.0, Windows 2000, or Windows XP

Installing the Software

This section describes how to install *e*Health AIM for Apache for Solaris, Linux, HP-UX, and Windows operating systems.

Installing the Software for UNIX Systems

For Solaris, Linux, and HP-UX systems, *e*Health AIM for Apache is distributed as a tar file.

To install *e*Health AIM for Apache:

1. Locate the Apache server that you want to monitor.
2. Log in to the UNIX system where that server is located as root.
3. Copy the apachemod.tar file from the CD-ROM to the /tmp directory:
4. Change directory to the SystemEDGE agent directory on your system by entering the following:

   ```
   cd /opt/EMPsysedge
   ```

5. Create the plugins directory, if it is not already present, by entering the following:

   ```
   mkdir plugins
   ```

6. Change directory to the plugins directory by entering the following:

   ```
   cd plugins
   ```

7. Enter the following to start the installation.

   ```
   tar xvf /tmp/apachemod.tar
   ```

   The installation creates files in the plugins/apachemod directory. *e*Health AIM for Apache is now installed.

Installing the Software for Windows Systems

Throughout this guide, the term Windows encompasses Windows NT 4.0, Windows 2000, and Windows XP.

For Windows NT 4.0, Windows 2000, and Windows XP systems, *e*Health AIM for Apache is distributed as a self-extracting executable named apachemod.exe.

NOTE

When you are using AdvantEDGE View 3.0 or later with *e*Health AIM for Apache (for Windows systems), you can automatically deploy and license the *e*Health AIM from AdvantEDGE View. For more information, refer to the *AdvantEDGE View User Guide* and AdvantEDGE View Web Help.

To install *e*Health AIM for Apache:

1. Log in to the Windows system as administrator.
2. Click **Start**.
3. Select **Programs** → **Command Prompt**.
4. Insert the CD containing the Concord software distributions into the CD-ROM drive.
5. Windows automatically mounts the drive using the CD-ROM drive's corresponding drive letter. The particular drive letter is specific to your system and depends on the number and types of disks attached to your system.
6. Determine which directory you want to use as the installation directory for *e*Health AIM for Apache. If the SystemEDGE agent is installed in C:\sysedge, the recommended installation directory is C:\sysedge\plugins.

NOTE

You *cannot* run apachemod.exe by double-clicking the executable from the CD-ROM.

7. Run the self-extracting executable by entering the following at the command prompt, where `D:` is the CD-ROM drive for your system, and `C:sysedge\plugins` is the installation directory:

```
D:\apachemod\ntx86\apachemod.exe -dir C:\sysedge\plugins
```

The -dir option instructs the self-extracting executable to create the specified subdirectory hierarchy (C:\sysedge\plugins) and then places the distribution in an apachemod subdirectory within that target directory.

*e*Health AIM for Apache is now installed.

*e*Health AIM for Apache Files

Table 2 describes the files created by the *e*Health AIM for Apache installation procedure.

Table 2. Files Installed by *e*Health AIM for Apache (Page 1 of 2)

File Name	Description
apachemod.asn1	*e*Health AIM for Apache MIB specification
apachemod.cf	*e*Health AIM for Apache configuration file
apachemod.pdf	*eHealth AIM for Apache User Guide*
apachemod.dll (Windows only)	*e*Health AIM for Apache dynamic link library (DLL) module for Windows NT, Windows 2000, and Windows XP
apachemod.so (Solaris and Linux only)	*e*Health AIM for Apache shared library for 32-bit Solaris and Linux operating systems
apachemod-sparcv9.so (Solaris only)	*e*Health AIM for Apache shared library for 64-bit Solaris operating systems

Table 2. Files Installed by *e*Health AIM for Apache (Page 2 of 2)

File Name	Description
apachemod-hpux.so (HP-UX only)	*e*Health AIM for Apache shared library for 32-bit HP-UX (10.x and 11.x) operating systems
apachemod-hpux11-64.so (HP-UX only)	*e*Health AIM for Apache shared library for 64-bit HP-UX (11.x) operating systems
relnotes.txt	Release notes for *e*Health AIM for Apache

Configuring *e*Health AIM for Apache

After you install *e*Health AIM for Apache, you must configure it by editing the following files:

- sysedge.cf
- httpd.conf
- apachemod.cf

Editing the sysedge.cf File

By default, the SystemEDGE agent does not load any plug-ins at initialization time, but you can edit the sysedge.cf file to configure the agent to load any *e*Health AIMs that you have installed. To enable the SystemEDGE agent to load *e*Health AIM for Apache at startup, you must edit the sysedge.cf configuration file. This file is located in your system directory by default; for example, it is located in the /etc/sysedge.cf directory on UNIX systems and in C:\winnt\system32 for Windows systems. Use the sysedge_plugin keyword as described in the following sections to configure SystemEDGE to load *e*Health AIM for Apache at startup.

NOTE

To configure the SystemEDGE agent to start *e*Health AIM for Apache, you must provide the *complete pathname* to the shared library file for your system.

Enabling *e*Health AIM for Apache for UNIX Systems

Add one of the following lines to the sysedge.cf file.

For Solaris or Linux systems in 32-bit mode, add the following line:

```
sysedge_plugin /opt/EMPsysedge/plugins/apachemod/apachemod.so
```

For Solaris 2.7 and later systems in 64-bit mode, add the following line:

```
sysedge_plugin /opt/EMPsysedge/plugins/apachemod/apachemod-sparcv9.so
```

For HP-UX 10.x systems in 32-bit mode, add the following line:

```
sysedge_plugin /opt/EMPsysedge/plugins/apachemod/apachemod-hpux.so
```

For HP-UX 10.x and 11.x systems in 64-bit mode, add the following line:

```
sysedge_plugin /opt/EMPsysedge/plugins/apachemod/apachemod-hpux11-64.so
```

Enabling *e*Health AIM for Apache for Windows Systems

To enable *e*Health AIM for Apache for Windows NT 4.0, Windows 2000, and Windows XP systems, you must provide the complete path name to apachemod.dll. The actual path depends on the location you selected when you installed *e*Health AIM for Apache. For example, enter the following command if you installed the files in the C:\sysedge\plugins\apachemod directory:

```
sysedge_plugin C:\sysedge\plugins\apachemod\apachemod.dll
```

For more information about the sysedge.cf file, refer to the *eHealth SystemEDGE User Guide*.

Enabling mod_status and mod_info

You must enable the Apache mod_info and mod_status modules in the httpd.conf file. If you are using *e*Health AIM for Apache on an *e*Health system, you must update these modules in your httpd.tpl file. (The httpd.tpl file overwrites the httpd.conf file on an *e*Health system whenever the configuration changes.)

The mod_info and mod_status modules control access to HTML pages that provide information about the server's status and behavior. When these modules are enabled, *e*Health AIM for Apache can use them to obtain information about the Apache server's status and behavior. For more information about the mod_info and mod_status modules, refer to Apache documentation (at http://www.apache.org).

NOTE

You must ensure that your server has server-status and server-info built into Apache by enabling the mod_status and mod_info modules. If you do not, you may experience process-termination errors.

To enable the mod_status and mod_info modules in your Apache server (on a system that does not include *e*Health):

1. Remove the pound sign (#) in front of the following lines in httpd.conf.

   For a UNIX system, remove the pound sign (#) from the following lines:

   ```
   LoadModule status_module modules/mod_status.so
   LoadModule info_module modules/mod_info.so
   ```

   For a Windows system, remove the pound sign (#) from the following lines:

```
LoadModule mod_status modules/ApacheModulemod_status.dll
LoadModule mod_info modules/ApacheModulemod_info.dll
```

2. Add one of the following sets of lines to httpd.conf, depending on how you want to restrict all access to your Apache server.

   NOTE

   The lines that you add differ for *e*Health systems and systems that are not running *e*Health. If you are using an *e*Health system for an *e*Health release prior to Release 5.6, you must add the lines described in "To enable the mod_status and mod_info modules on an eHealth system:" on page 26. For a Release 5.6 or later *e*Health system, the correct lines are automatically added to your httpd.conf file during the *e*Health installation process, and you do not need to perform any additional configuration steps.

- **To restrict access to your Apache server to one system**, add the following lines to http.conf, substituting the IP address of that system in the Allow from field:

```
# Turn on Extended Status Information
ExtendedStatus On
# Enable server-status access from the local host
<Location /server-status>
    SetHandler server-status
    Order deny,allow
    Deny from all
    Allow from 127.0.0.1
</Location>

   # Enable server-info access from the local host
   <Location /server-info>
      SetHandler server-info
       Order deny,allow
       Deny from all
       Allow from 127.0.0.1
   </Location>
```

- **To restrict access to your Apache Web server to only valid users**, add the following lines to httpd.conf, where *validSystem* is the name of the system from which you want to accept access:

```
# Turn on Extended Status Information
ExtendedStatus On
# Enable server-status access from the local host
<Location /server-status>
    SetHandler server-status
    AuthType Basic
    AuthName validSystem
    AuthUserFile $NH_HOME/web/webCfg/passwd
    require valid-user
</Location>

   # Enable server-info access from the local host
   <Location /server-info>
     SetHandler server-info
    AuthType Basic
```

```
 AuthName validSystem
 AuthUserFile $NH_HOME/web/webCfg/passwd
 require valid-user
</Location>
```

NOTE

You must restart the Apache server after you make these changes to ensure that they take effect.

To enable the mod_status and mod_info modules on an *e*Health system:

1. Open httpd.tpl file for editing.
2. Remove the pound sign (#) in front of the following lines in httpd.tpl.

   For a UNIX system, remove the pound sign (#) from the following lines:

   ```
   LoadModule status_module modules/mod_status.so
   LoadModule info_module modules/mod_info.so
   ```

   For a Windows system, remove the pound sign (#) from the following lines:

```
LoadModule mod_status modules/ApacheModulemod_status.dll
LoadModule mod_info modules/ApacheModulemod_info.dll
```

3. Add one of the following sets of lines to httpd.tpl, depending on how you want to restrict all access to your Apache server.
   - **To restrict access to your Apache server to one system**, add the following lines to http.tpl, substituting the IP address of that system in the Allow from field:

```
# Turn on Extended Status Information
ExtendedStatus On
# Enable server-status access from the local host
<Location /server-status>
    Order deny,allow
```

```
    Allow from 127.0.0.1
    Deny from all
    SetHandler server-status
</Location>

  # Enable server-info access from the local host
  <Location /server-info>
     SetHandler server-info
      Order deny,allow
      Allow from 127.0.0.1
      Deny from all
      SetHandler server-info
  </Location>
```

- To restrict access to your Apache Web server to only eHealth users, add the following lines to httpd.tpl:

```
# Turn on Extended Status Information
ExtendedStatus On
# Enable server-status access from the local host
<Location /server-status>
    SetHandler server-status
    AuthType Basic
    AuthName eHealth
    AuthUserFile $NH_HOME/web/webCfg/passwd
    require valid-user
</Location>

  # Enable server-info access from the local host
  <Location /server-info>
     SetHandler server-info
    AuthType Basic
    AuthName eHealth
    AuthUserFile $NH_HOME/web/webCfg/passwd
    require valid-user
  </Location>
```

NOTE

You must restart the Apache server after you make these changes to ensure that they take effect.

4. Regenerate the httpd.conf file by entering the following command at a command prompt, where *ehealth* is the *e*Health home directory:

```
ehealth/web/webCfg/nhiHttpdCfg -user $NH_USER -nhDir ehealth
-grp USERGROUP -cfg ehealth/web/webCfg/users.cfg
-protect > ehealth/web/httpd/httpd.conf
```

Editing the apachemod.cf File

You can edit the apachemod.cf file to do the following:

- Indicate which TCP port your Apache server is using.
- Assign user names and passwords for the mod_info and mod_status modules. You must include user names and passwords to the apachemod.cf file, even if they are not specifically required by the Apache Web server. The Apache Web server requires these fields *only* if you have enabled the mod_info and mod_status modules as described in the previous section, "Enabling mod_status and mod_info," and you are using authentication (through user names and passwords) to restrict access to those modules. The apachemod.cf file, however, *always* requires these fields.

NOTE

Even if you do not password protect your server-info and server-status pages, you must configure artificial user name/password combinations in apachemod.cf. The Apache Web server and *e*Health AIM for Apache then ignore those user names and passwords.

- Indicate which Apache server(s) *e*Health AIM for Apache should monitor if you are running more than one Apache server on your system through port numbers. Port 80 is the default Web server port.
- Set the interval for calculating the total amount of disk space being used by the Apache server, or disable this checking.

Sample apachemod.cf File

The following is a sample apachemod.cf file:

```
# apachemod.cf
# Configuration file for eHealth AIM for Apache
#
# For each apache server running on your system, specify the following:
# apache port username password filestat-interval
#  port - port number on which the server is running
#  username - the username for accessing server-status and server-info pages
#  password - the password for accessing server-status and server-info pages
#  filestat-interval - interval in seconds between checks of the file sizes
#                      specify "0" to disable file size checking
# Primary server - example
# apache 80 status statpass1 3600
# Application server - example
# apache 8080 status statpass1 3600
```

NOTE

After you make any changes to the apachemod.cf file, you must restart the SystemEDGE agent to ensure that the changes take effect.

Licensing *e*Health AIM for Apache

Like the SystemEDGE agent, *e*Health AIM for Apache utilizes a host-based license method. Copies of *e*Health AIM for Apache can run only on systems that possess a valid license key. This license is separate from the one used for the SystemEDGE agent.

The first time that you attempt to start the SystemEDGE agent after installing *e*Health AIM for Apache, the agent displays a message stating that it could not find a valid license for *e*Health AIM for Apache. It then provides you with a public key that is used to generate a permanent license key for your host machine.

A license key is composed of four space-separated, 8-character sequences, totaling 32 characters. The sysedge.lic file contains the *e*Health AIM for Apache license, as well as the SystemEDGE agent license and other *e*Health AIM licenses. For an example, refer to the sample license file in "Sample License File" on page 37.

Obtaining a License

To obtain a license, you can do any of the following:

- Run the Concord-supplied licenseutil.pl script.
- Run the licenseme.exe license utility.
- Complete the online license form through the Internet, as described in the next section, "Generating the License through the Web-Based License Form."
- Use AdvantEDGE View to receive an SNMP license trap or to query and license the plug-in without a trap. For more information, refer to "Generating a License through AdvantEDGE View Event Processing" on page 33 or "Generating a License through AdvantEDGE View Host Administration" on page 36.
- Use the AdvantEDGE View automated deployment and licensing feature. For more information refer to the *eHealth AdvantEDGE View User Guide* or AdvantEDGE View Web Help.
- Send an e-mail request to licenses@concord.com, and place the returned license key in the sysedge.lic file. Always include your user name in license requests that you send through e-mail.

For more information about licensing, refer to the *eHealth SystemEDGE User Guide* and the *Automating the Licensing of the AdvantEDGE Point Plug-in Modules* white paper.

Generating the License through the Web-Based License Form

This section describes how to generate the *e*Health AIM for Apache license through the Web-based license form.

NOTE

If you are using an evaluation copy of *e*Health AIM for Apache, you must request a temporary license to enable it to operate during the evaluation period.

To generate a license:

1. Start the SystemEDGE agent as follows:
   a. Log in as root.
   b. Change directory (cd) to `/opt/EMPsysedge`.
   c. Enter the following:

      `bin/sysedge`

      The SystemEDGE agent displays a message indicating that you need a license for the *e*Health AIM for Apache module on this host system. It then displays a message similar to the following:

```
SystemEDGE Version 4.1 Patch level 3
Copyright 2003 by Concord Communications, Inc.
Please contact Concord Communications, Inc. to obtain a license
http://www.concord.com/support, Email: licenses@concord.com
Provide this: apachemod neptune sol2 5.9 346561363366b19c 1.0 PL 3
```

2. Using a Web browser, go to the licensing Web site at http://license.concord.com, and select the **Create License** option that matches your use of the *e*Health AIM.

   NOTE

   You must supply a user name and password to access the license form.

3. Complete the license form, entering the information that was printed by the SystemEDGE agent. You must supply the following information:

   - Name
   - E-mail address
   - Software version number (1.0 in the example)
   - Patch level (3 in the example)
   - System name (neptune in the example)
   - Operating system name (sol2 in the example)
   - Operating system version (5.9 in the example)

   NOTE

   When you request a license, select the option for *e*Health AIM for Apache in the product field of the licensing form.

   After you submit the license request form, the Concord Web server generates a license and displays it on your Web browser. It also e-mails the license to the contact person in your organization.

4. Copy the license into the sysedge.lic file. This file is located in the /etc directory for UNIX operating systems and in the \winnt\system32 directory for Windows operating systems.

   The license key is case sensitive. Copy it exactly as it appears. If possible, use your system's copy-and-paste facility instead of typing it by hand. If you are entering the license key manually, be careful not to confuse characters such as the letters l and I and the number 1, or the letter O and the number 0.

5. Save the sysedge.lic file.

6. Restart the SystemEDGE agent.

   For UNIX systems, restart the SystemEDGE agent by entering the following when you are logged in as root:

   ```
   bin/sysedge -b
   ```

   For Windows systems, stop and restart the Windows Master agent by entering these commands at the command prompt:

   ```
   net stop snmp
   net start snmp
   ```

Generating a License through AdvantEDGE View Event Processing

You can use this option only if you are using the standalone version of AdvantEDGE View.

In order to use AdvantEDGE View event processing to license *e*Health AIM for Apache, your system must meet the following requirements:

- You must be using SystemEDGE Release 4.0 Patch level 3 or later with AdvantEDGE View.
- You must configure the SystemEDGE agent to send SNMP traps to AdvantEDGE View. For more information, refer to the section on configuring the SystemEDGE agent in the *eHealth SystemEDGE User Guide*.

- You must configure the SystemEDGE agent with a read-write community so that AdvantEDGE View can issue an SNMP Set to transmit the license key to it. For more information, refer to the section on configuring the SystemEDGE agent in the *eHealth SystemEDGE User Guide*.
- Your AdvantEDGE View system must have access to the Internet, either directly or through a Web proxy.
- The AdvantEDGE View User who is generating the license must have either write or admin permissions.

To generate a license through AdvantEDGE View:

1. Start the SystemEDGE agent with *e*Health AIM for Apache in unlicensed mode. SystemEDGE sends a license trap to AdvantEDGE View for that module.

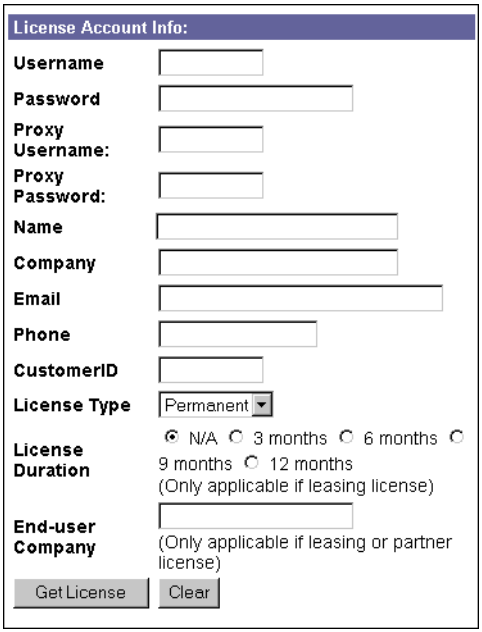


2. Start AdvantEDGE View, and click the **Events** icon to display the Event Processing screen.



   AdvantEDGE View displays a license trap for the system that requires a license.

3. Click the index number for that system to view the Trap Details form for **License Software** to display the AdvantEDGE View Software Licensing form.



4. Complete the licensing form, and click **Get License**.

NOTE

If you have configured AdvantEDGE View preferences, AdvantEDGE View fills in all of the information (except password) on this form. You must enter the password each time you use the form for security purposes.

AdvantEDGE View contacts the Web-based license server, obtains a license for *e*Health AIM for Apache and issues an SNMP Set to the target SystemEDGE agent to inform it of the new software license key.

Generating a License through AdvantEDGE View Host Administration

You can use this option only if you are using the standalone version of AdvantEDGE View.

You can also license systems through AdvantEDGE View Host Administration.

To access Host Administration:



1. Start AdvantEDGE View, and click the **Administration** icon. AdvantEDGE View displays the Administration page.



2. Click the **Host Administration** icon. AdvantEDGE View displays the host list.

SystemEDGE Host Configuration

System Name	Community	Read/Write Community	Port	Timeout	Retries
aviewdemo	public		161	2	2
mailserver	public		161	6	3
nethealth	public		161	3	3
ntclient	public		161	6	3
ntserver	public		161	3	2
unixclient	public		161	6	3
unixserver	public		161	3	3
win2kclient	public		161	5	3
www	public		161	6	3

Add New Host

3. Click the name of the system that you want to license from the **System Name** column. AdvantEDGE View displays the Modify Host form.

Modify Host aview:

Community:	public	Read community string for use with this host
Read/Write Community:		Read/Write community string for use with this host
Port:	161	UDP Port to use with this host (e.g. 161 or 1691)
Timeout:	5	Timeout value (in seconds) to use with this host (e.g. 3)
Retries:	3	Number of times to retry an operation on this host (e.g. 3)

Update Host | License Host/Software | Delete Host

4. Click **License Host/Software** to display the licensing form.
5. Select the product you want to license from the **Product** list, and then click **License Software**.

   AdvantEDGE View contacts the Web-based license server, obtains a license for the software, and issues an SNMP Set to the target SystemEDGE agent, informing it of the new software license key.

Sample License File

The following is a sample SystemEDGE agent license file. A pound character (#) in column 1 indicates that the entire line is a comment.

```
# license file for SystemEDGE Agent
# Concord Communications, Inc.
# http://www.concord.com
#
# file /etc/sysedge.lic or %SystemRoot%\system32\sysedge.lic
# A valid license key has four parts of 8 characters per part
# parts are separated by space(s) with one license key per line

# sysedge neptune sol2 5.8 807cb1da007cb1da 4.1 Patch level 3
e13311d3 0F2a7cb1 abC512dc fF8C923a
# apachemod neptune sol2 5.8 807cb1da007cb1da 1.0 Patch level 3
a7943fde 098a87ij a4kiuf39 afafEkj4
```

Using the eHealth AIM for Apache MIB

This chapter explains the organization and content of the Concord Communications MIB for the Apache Web server. The MIB specification (apachemod.asn1) defines a collection of objects for monitoring and managing Apache. You must configure the SystemEDGE agent to monitor the MIB objects that are relevant for your configuration. For more information, refer to Chapter 4, "Using eHealth AIM for Apache." Figure 3 shows the organization of the Apache MIB.

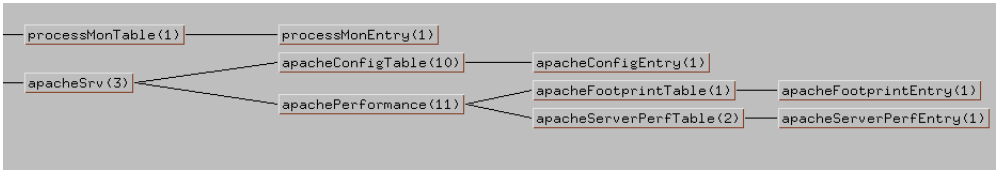


Figure 3. *e*Health AIM for Apache MIB

The figures in the following sections represent AdvantEDGE View queries on information that is available through the eHealth AIM for Apache MIB.

The MIB is organized into sections for server configuration and performance. Within the performance section, a footprint section defines MIB objects that convey how much of the underlying system's resources are consumed by Apache. This chapter defines all sections of the Apache MIB and highlights important MIB objects from each section. For a complete list of MIB objects, refer to the *e*Health AIM for Apache MIB specification (apachemod.asn1).

Configuration Section

The Configuration section of the *e*Health AIM for Apache MIB contains configuration parameters and settings that are important for streamlining the health and performance of the Apache Web server. It also includes information about server configuration.

Server Configuration

The Server Configuration group contains configuration parameters, process IDs, and version numbers. Table 3 defines important Server Configuration parameters.

Table 3. Selected MIB Objects – Apache Server Configuration Group (Page 1 of 2)

MIB Object	Description
apacheConfigTable	Table of configuration settings for each Apache installation.
apacheConfigEntry	Entry in the Apache configuration table.
apacheConfigPort	TCP port currently used by this Apache configuration. NOTE: This value serves as the index for this table.
apacheConfigVersion	Apache Web server version.
apacheConfigPID	Process ID (PID) of the master Apache process; zero if the server is not running.
apacheConfigRunMode	Current operating mode (for example, standalone).
apacheConfigUser	User who is currently running the server processes.
apacheConfigGroup	Group that is currently running the server processes.
apacheConfigHostname	Hostname used by this Apache configuration.
apacheConfigStartProcs	Number of server processes started by the Apache server at startup.
apacheConfigMinIdleProcs	Minimum number of idle server processes maintained by the Apache server.

Table 3. Selected MIB Objects – Apache Server Configuration Group (Page 2 of 2)

MIB Object	Description
apacheConfigMaxIdleProcs	Maximum number of idle server processes allowed by the Apache server.
apacheConfigMaxProcs	Maximum number of server processes allowed by the Apache server.
apacheConfigRequestsMaxPerChild	Number of requests handled by a server process before it is recycled by the Apache server.
apacheConfigRequestsKeepAlive	Status of whether keep-alive mode is enabled for persistent connections. The following are possible values: • 0 – disabled • 1 – enabled
apacheConfigRequestsMaxPerConn	Number of requests handled in a single connection if keep-alive mode is enabled.
apacheConfigThreadsPerChild	Maximum number of threads per child process.
apacheConfigConnectionTimeout	Timeout value for closing inactive connections.
apacheConfigKeepAliveTimeout	Keep-alive timeout value for open connections.
apacheConfigServerRoot	Root directory for this Apache installation.
apacheConfigConfigFile	Current configuration file for this Apache installation.
apacheConfigPIDFile	Current PID file for this Apache installation.
apacheConfigScoreboardFile	Current scoreboard file for this Apache installation.
apacheConfigDocumentRoot	Current document root directory for this Apache installation.
apacheConfigAccessLogFile	Current access or transaction log file for this Apache installation.
apacheConfigErrorLogFile	Current error log file for this Apache installation.
apacheConfigScriptLogFile	Current script log file for this Apache installation.

Figure 4 shows a sample AdvantEDGE View Apache Server Configuration query.

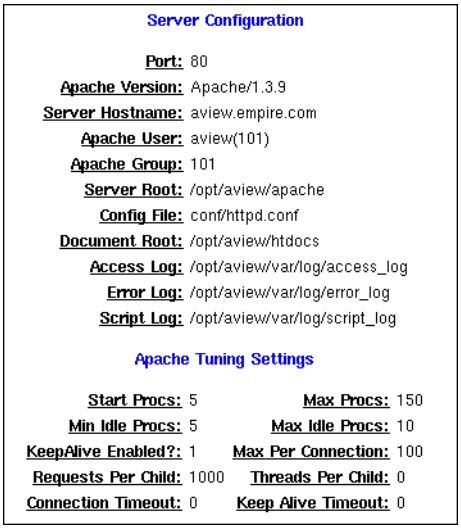


Figure 4. Sample AdvantEDGE View Server Configuration Query for Apache

Performance Section

The Performance section of the *e*Health AIM for Apache MIB contains performance data that is necessary for capacity planning and trend analysis, as well as real-time performance and availability monitoring. The Performance group is divided into subgroups for footprint data and server performance.

Apache Footprint

The Footprint group provides information about the Apache CPU, memory, data flow, and disk-resource consumption, which is more commonly called the *footprint*. Long-term trending analysis of footprint information is useful for anticipating and avoiding problems due to resource exhaustion.

You can also monitor footprint information in real time to detect and correct temporary resource exhaustion due to viruses, security incidents, and hardware failures. Table 4 defines important Apache Footprint metrics.

Table 4. Selected MIB Objects – Apache Footprint Group (Page 1 of 2)

MIB Object	Description
apacheFootprintTable	Table that reports the performance footprint for each Apache service.
apacheFootprintEntry	Entry in the Apache Performance Footprint table.
apacheFootprintPort	TCP port that is currently used by this Apache configuration. NOTE: This value serves as the index for this table.
apacheFootprintCPUTime	CPU time, in seconds, accumulated by the Apache server, including all Apache processes.
apacheFootprintPercentCPU	Percentage of CPU utilization by the Apache server over the last sample interval; the value reported is percentage multiplied by 100.
apacheFootprintTotalMEMSize	Combined size of Apache's text, data, and stack segments in KB; summation of the process sizes for all Apache server processes.
apacheFootprintTotalRSS	Real memory (resident set) size (RSS) of the Apache server in KB; summation of all process RSS for all Apache server processes.
apacheFootprintPercentMEM	Percentage (0 to 100) of real memory used by the Apache server, which includes all Apache server processes.
apacheFootprintNumThreads	Number of threads executing within all Apache processes of which the operating system is aware.
apacheFootprintInBlks	Number of blocks of data input by the processes.
apacheFootprintOutBlks	Number of blocks of data output by the processes.
apacheFootprintMsgsSent	Number of messages sent by the processes.
apacheFootprintMsgsRecv	Number of messages received by the processes.
apacheFootprintSysCalls	Number of system calls invoked by the processes.

Table 4. Selected MIB Objects – Apache Footprint Group (Page 2 of 2)

MIB Object	Description
apacheFootprintMinorPgFlts	Number of minor page faults (which do not require I/O to retrieve the page) incurred by the processes.
apacheFootprintMajorPgFlts	Number of major page faults (which require I/O to retrieve the page) incurred by the processes.
apacheFootprintNumSwaps	Number of times the processes have been swapped.
apacheFootprintVolCtx	Number of voluntary context switches incurred by the processes.
apacheFootprintInvolCtx	Number of involuntary context switches incurred by the processes.
apacheFootprintTotalLogSize	Size in KB of the Apache service logs; sum of the access and error log file sizes.
apacheFootprintDocSize	Size in KB of the Apache document root directory and all files beneath it.
apacheFootpringTotalDiskSize	Size in KB of all the Apache disk storage areas; summation of log sizes and service directories.

The following figures show sample AdvantEDGE View Footprint queries for an Apache system that is serving a medium-sized company. Figure 5 shows a sample Disk Usage query.

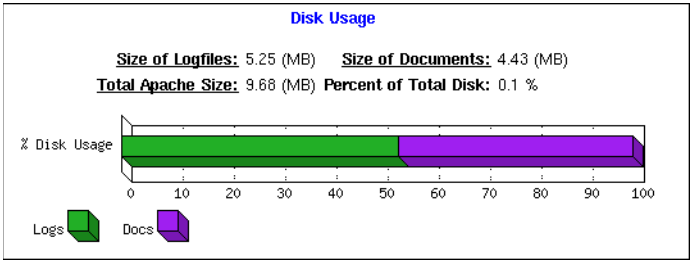


Figure 5. AdvantEDGE View Disk Usage Query for Apache

Figure 6 shows a sample CPU and Memory Footprint query.

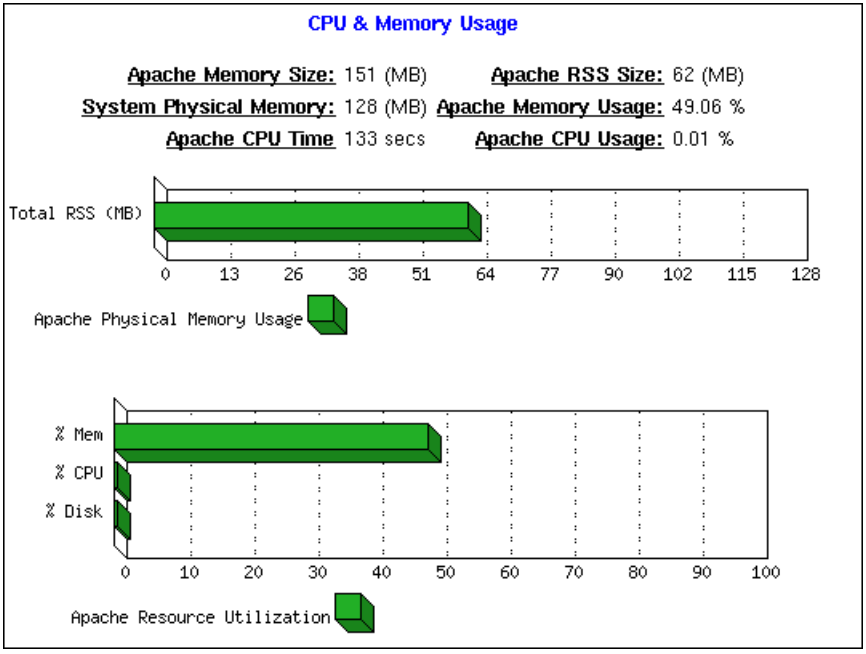


Figure 6. AdvantEDGE View CPU and Memory Footprint Query for Apache

Server Performance

The Server Performance group provides performance metrics and counters for the Apache Web server, including user statistics and transfer statistics. These metrics include those useful for real-time management and longer-term capacity planning and trend analysis. Table 5 defines important Server Performance metrics.

Table 5. Selected MIB Objects – Apache Server Performance Group (Page 1 of 2)

MIB Object	Description
apacheServerPerfTable	Table that reports the performance of each Apache service.
apacheServerPerfEntry	Entry in the Apache Server Performance table.
apacheServerPerfPort	TCP port that is currently used by this Apache configuration; this value serves as an index for this table.
apacheServerPerfUptime	Number of seconds that the Apache server has been running.
apacheServerPerfTotalAccesses	Number of accesses (hits) to this server since it was last started.
apacheServerPerfTotalTraffic	Number of KB transferred by this server since it was last started.
apacheServerPerfCurrentUsers	Number of current active users (connections) maintained by the Apache server.
apacheServerPerfCurrentIdleProcs	Number of current idle processes available on the Apache server.
apacheServerPerfCurrentStartupProcs	Number of processes that are currently in startup mode on the Apache server.
apacheServerPerfCurrentReadProcs	Number of processes that are currently reading requests on the Apache server.
apacheServerPerfCurrentReplyProcs	Number of processes that are currently replying to requests on the Apache server.
apacheServerPerfCurrentKeepAliveProcs	Number of processes that are currently in keep-alive mode on the Apache server.
apacheServerPerfCurrentDNSProcs	Number of processes that are currently doing a Domain Name System (DNS) lookup on the Apache server.

Table 5. Selected MIB Objects – Apache Server Performance Group (Page 2 of 2)

MIB Object	Description
apacheServerPerfCurrentLoggingProcs	Number of processes that are currently logging transactions on the Apache server.
apacheServerPerfCurrentFinishingProcs	Number of processes that are currently finishing transactions on the Apache server.
apacheServerPerfCurrentTotalProcs	Total number of Apache processes that are currently running on the Apache server.

Figure 7 shows an Apache server Performance summary.

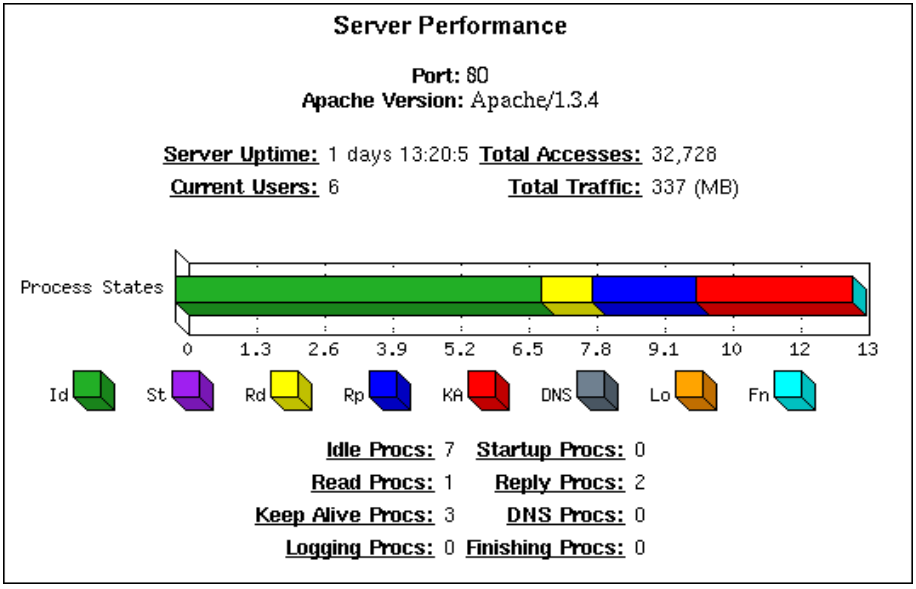


Figure 7. AdvantEDGE View Server Performance Summary for Apache

Using eHealth AIM for Apache

This chapter describes how to use *e*Health AIM for Apache. This module is implemented as a SystemEDGE agent plug-in. After you enable this plug-in in the sysedge.cf file and obtain a license for it, it loads automatically at SystemEDGE start time. For more information, refer to "Editing the sysedge.cf File" on page 21 and "Licensing eHealth AIM for Apache" on page 29.

Overview

The *e*Health AIM for Apache plug-in implements additional MIB objects that provide advanced information about the health and availability of the Apache Web server. It can operate with any SNMP-compliant management software such as Concord's *e*Health suite of products, AdvantEDGE View, HP OpenView, and others. If you are using *e*Health AIM for Apache with *e*Health, refer to the *e*Health Web Help for more information about the reports you can generate.

The default configuration settings of *e*Health AIM for Apache enable you to use the advanced self-monitoring capabilities of the SystemEDGE agent in conjunction with *e*Health AIM for Apache.

*e*Health AIM for Apache MIB Branch

You can use AdvantEDGE View or another SNMP tool to edit the SystemEDGE configuration file to utilize the MIB objects found in *e*Health AIM for Apache with the process-monitoring, threshold-monitoring, and history-collection features of the SystemEDGE agent. All MIB objects related to *e*Health AIM for Apache exist at object identifier (OID) branch 1.3.6.1.4.1.546.16.3 in the Concord Systems Management MIB. The MIB is defined in the `apachemod.asn1` file, which is available in the *e*Health AIM for Apache product installation.

Assigning Entry Rows for the SystemEDGE Self-Monitoring Tables

All SystemEDGE self-monitoring tables require the use of unique row numbers. Each table contains an Index column which acts as a key field to distinguish rows in the table. This section describes the benefits of reserving a block of rows (in the range of 11 to the maximum number of rows in your table) for use by the system or application administrator.

Setting Local Policy

You may choose, as a matter of local policy, to reserve a block of rows for system administration. This policy allows you to define row entries within a reserved block of rows without being concerned that the row might already be taken by another user's entry. In compliance with the local policy, all other users should use row indices that are outside the reserved range when defining user-configured entries.

Reserving Blocks of Rows

By reserving a block of rows, you can define a consistent set of conditions (row entries) to be monitored across all machines such that the same condition is defined in the same row number on each machine. For example, you can use row 3000 in each table to define entries monitoring the number of accesses to the server (apacheServerPerfTotalAccesses). You can

then distribute this configuration to every host so that every system that is running Apache uses row 3000 for monitoring the number of accesses to the server in any of the SystemEDGE agent monitoring tables.

To reserve a block of rows for monitoring Apache:

1. Decide which block of rows you want to reserve for use with monitoring Apache and use that block of rows to define a set of row entries for each SystemEDGE self-monitoring table. For more information, refer to the chapter on self monitoring in the *eHealth SystemEDGE User Guide*.
2. Distribute configuration file entries to all hosts that are running the Apache Web server and *e*Health AIM for Apache. For more information, refer to the *Automating the Deployment of SystemEDGE and the AdvantEDGE Point Plug-in Modules* white paper.

   NOTE

   As an alternative, you can use this row-number assignment policy with AdvantEDGE View for group-configuration operations.

3. Require end users to avoid your block of rows when defining their own self-monitoring table entries.

Using the SystemEDGE Self-Monitoring Features

This section provides examples of how to use SystemEDGE process, threshold, and history monitoring to monitor the Apache Web server. Add these commands to the `sysedge.cf` file to enable monitoring of the MIB objects that they specify. Modify these examples as necessary to monitor the MIB objects and thresholds that are relevant for your configuration.

The examples in the following sections present row numbers in the 5000 range; select a row number for your configuration that conforms to local policies. For more information on row assignment, refer to "Assigning Entry Rows for the SystemEDGE Self-Monitoring Tables" on page 50.

The following command, for example, instructs the SystemEDGE agent to monitor whether the Apache process is alive at 30-second intervals and to store the data in row 5000 of the Process Monitoring table:

```
watch process procAlive 'httpd' 5000 0x0100 30 'Apache Web Server' ' '
```

For more information about the syntax for the commands in this section, refer to the *eHealth SystemEDGE User Guide*.

NOTE

Enter the commands throughout this chapter on one line. Do *not* use a carriage return to match the formatting shown here.

Using SystemEDGE Process Monitoring

This section provides an example of how to use the SystemEDGE agent to monitor the availability of a critical Apache process. For more information, refer to the section on process and service monitoring in the *eHealth SystemEDGE User Guide*.

To ensure that the Apache Web server is running, enter the following command in the sysedge.cf file:

```
watch process procAlive 'httpd' 5000 0x0100 30 'Apache Web Server' ' '
```

You must include the 0x0100 flag to force the SystemEDGE agent to monitor the parent process of the Apache process group.

Using SystemEDGE Threshold Monitoring

This section provides examples of how to use the SystemEDGE agent to monitor thresholds for important Apache metrics. Add the commands in the following sections to the sysedge.cf file to monitor thresholds for these MIB objects. For more information, refer to the section on threshold monitoring in the *eHealth SystemEDGE User Guide*.

NOTE

The thresholds in this section may not be appropriate for your Apache Web server. Select thresholds that are appropriate for your environment.

Monitoring Idle Apache Processes

To monitor the number of idle Apache processes on the server that is running on port 80, enter the following:

```
monitor oid apacheServerPerfCurrentIdleProcs.80 5000 0x0 60
absolute < 10 'Idle Server Processes' ' '
```

Monitoring Total Resident Memory Size of an Apache Service

To monitor the total resident memory size of the Apache service that is running on port 80, enter the following:

```
monitor oid apacheFootprintTotalRSS.80 5001 0x0 60 absolute > 50000
'Total Resident Memory' ' '
```

Monitoring Total Size of Apache Service Log Files

To monitor the total size of the log files for the Apache service that is running on port 80, enter the following:

```
monitor oid apacheFootprintTotalLogSize.80 5002 0x0 60
absolute > 100000 'Total Log Size' ' '
```

Monitoring Total Size of Apache Service Document Files

To monitor the total size of the document files for the Apache service that is running on port 80, enter the following:

```
monitor oid apacheFootprintTotalDocSize.80 5003 0x0 60
absolute > 500000 'Total Document Size' ' '
```

Using SystemEDGE History Collection

This section provides examples of how to use SystemEDGE history collection to track the value of important Apache metrics over time. Add the commands in the following sections to the sysedge.cf file to collect history for these MIB objects. For more information, refer to the section on history collection in the *eHealth SystemEDGE User Guide*.

NOTE

The number of samples and the interval between samples used in this section may not be appropriate for your Apache system; select values that are suitable for your environment.

Collecting History on Number of Hits to the Server

To collect history on the number of hits to the server on port 8080, enter the following:

```
emphistory 5000 60 apacheServerPerfTotalAccesses.8080 300 'Total Hits
To Port 8080 Server'
```

Collecting History on the Number of Current Active Users

To collect history on the number of current active users that are being maintained by the Apache server on port 8080, enter the following:

```
emphistory 5001 60 apacheServerPerfCurrentUsers.8080 300 'Total Users
On Port 8080 Server'
```

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