WebAccelerator Administration Guide

version 5.1

MAN-0206-00

Service and Support Information

Product Version

This manual applies to product version 5.1 of the WebAccelerator™.

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Preface

The F5 WebAccelerator is a distributed system that is designed to improve your site's performance while off-loading traffic from your site's origin servers.

This administration guide describes the administrative concepts and procedures surrounding the WebAccelerator. Its intended audience is the IT or operations professional responsible for the configuration and ongoing management of a WebAccelerator software installation.

All tasks described in this book require that you access the WebAccelerator machine, either by attaching a console to it or by some form of remote login such as `ssh`.

This guide provides information on:

- core concepts and features of interest to the WebAccelerator administrator
- log file management
- backup and recovery
- monitoring using SNMP

Related Information

In addition to this administration guide, there are several other sources of information about the F5 WebAccelerator product:

- the *Getting Started Guide*, which provides information on the initial installation and configuration of the F5 WebAccelerator
- the *Policy Management Guide*, which provides information on creating and managing policies that influence WebAccelerator behavior, and on using the WebAccelerator Administration Tool
- the online help that is part of the Administration Tool user interface, which provides information on each screen that is part of the user interface
- the release notes, which provide information about known issues and workarounds and any information that was too late to be included in the product documentation

Conventions Used in this Book

This section explains the conventions used in this book.

`Monospaced font` – This font is used for examples, text that appears on the screen, command line utility names, and filenames.

`<bracketed text>` or *`italic text`* represents elements in a path or example that are intended to be replaced with information specific to your installation or procedural requirements.

Text of this color indicates a link in PDF or HTML that you can click on to navigate to a related section.

Note: Notes mark important information. Make sure you read this information before continuing with the task.

Chapter 1

Introduction

The WebAccelerator is a distributed system for accelerating content served by your application servers. Using unique algorithms that describe the contents of a web page based on the information found in the HTTP request, the WebAccelerator is capable of efficiently caching, reassembling and serving the content most commonly requested from your website.

Most sites are built on a collection of web servers, application servers, and database servers that we refer to collectively as origin servers. Unlike the F5 WebAccelerator, your origin servers can serve all possible permutations of the content offered by your site. The WebAccelerator only stores and serves page content combinations that were previously requested by visitors to your site.

The first time that a request for a specific page is made, the WebAccelerator proxies the request to your origin server, and attempts to cache the response. The next time that page is requested, the WebAccelerator can serve the response instead of your origin servers. By serving the bulk of common requests, the WebAccelerator greatly reduces the load on your origin servers. By working together with your origin servers, it improves performance and distributes the load experienced by your site.

WebAccelerator Components

The WebAccelerator consists of two major parts:

- the Management Console

  The Management Console controls and manages the WebAccelerator. The Management Console also provides internal communications for the rest of the WebAccelerator. Every WebAccelerator installation has one active Management Console. You cannot have two Management Consoles actively running in a single WebAccelerator installation.

  Because the Management Console is the central point of control for the WebAccelerator, logging into the WebAccelerator means you log into the interface for the Management Console. The WebAccelerators receive most of their configuration from the Management Console.

- the WebAccelerator

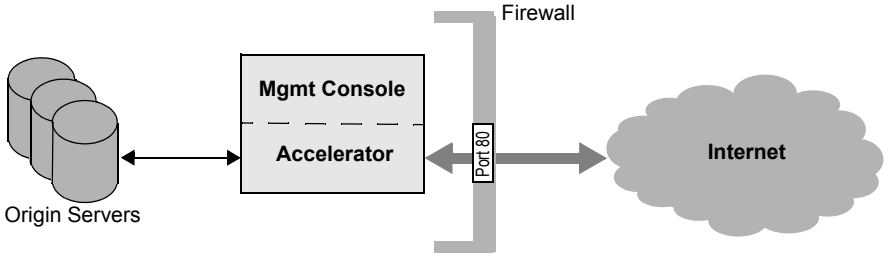
  WebAccelerators provide core content serving abilities. Every WebAccelerator installation includes one or more WebAccelerators.

  The Swan Labs WebAccelerator Remote product is a type of WebAccelerator, specially designed to be installed at remote user or data locations and proxy for content to other WebAccelerators that are front-ending your web applications.

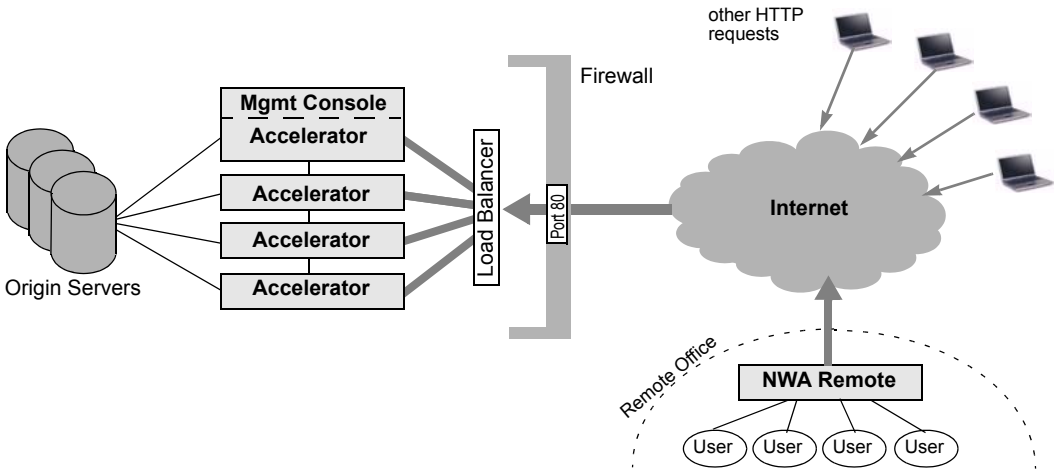
  WebAccelerators and WebAccelerator Remotes are grouped into clusters, to make them easier to manage.

These components both run some key processes that help monitor and manage the system, including the Watchdog Daemon, Communication Managers, and Log Management processes.

For single machine installations, one Management Console and one WebAccelerator are installed together on the same machine:



For a multi-machine WebAccelerator installation, one machine has the Management Console and an Accelerator, and the other machines each have a single Accelerator or WebAccelerator Remote:



The Management Console

The Management Console is responsible for:

- hosting the Administration Tool user interface, used to administer and manage the WebAccelerator
- providing a central point of control for the configuration of the WebAccelerators and WebAccelerator Remotes that are part of this WebAccelerator
- storing log files
- hosting a database that is used to store your cache policies, performance monitoring information, user and organization information, and a mechanism called invalidation rules. Cache policies and invalidation triggers are described in the *Policy Management Guide*.
- providing time synchronization for the WebAccelerator and WebAccelerator Remote machines
- running a communication manager process. This process is used as a communications channel between the Management Console and the rest of the WebAccelerator installation.

Accelerators

Every WebAccelerator installation includes one or more WebAccelerators or WebAccelerator Remotes. Because you manage a WebAccelerator Remote just like a regular WebAccelerator, assume that unless WebAccelerator Remote is specifically

referred to, the term WebAccelerator can be referring to either an WebAccelerator or a WebAccelerator Remote.

Each WebAccelerator machine is responsible for:

- responding to client HTTP requests
- compiling, assembling, and caching content
- pushing log files to the Management Console for processing and archiving
- synchronizing its time with the NTP server running on the Management Console

WebAccelerator Processes

Watchdog Daemon

All machines participating in a WebAccelerator installation run the Watchdog daemon. This daemon is responsible for ensuring that all other WebAccelerator processes that should be running on the local machine are actually running on the local machine. In the event of a process failure, the Watchdog daemon restarts the process. Optionally, the Watchdog daemon can also email you in the event of a failure.

Finally, the Watchdog daemon is responsible for rotating the event and error message log files that are written by the local WebAccelerator processes.

You can use the Watchdog daemon to interactively ensure that all the appropriate processes are running on the local machine. You do this through the use of the Watchdog client, which can be found here:
`/opt/pivia/dac/rc/watchdog_client`

Communication Managers

The WebAccelerator uses a private message queueing system to transfer information between the various machines and processes that make up your WebAccelerator installation. This communications system is managed by a central communications manager that runs at the Management Console. By default, the local Accelerator uses this communications manager. Accelerators on their own machines can also use this communications manager, or they can have their own communications managers, controlled by the central communications manager.

The communications managers run as separate processes from the rest of the WebAccelerator software. The communications traffic uses TCP/IP and by default is not encrypted. This generally works well for most sites, but if your WebAccelerator

installation has special security requirements, contact Swan Labs Customer Confidence group for help in setting an option to encrypt communications traffic.

When a WebAccelerator process wants to send another process a message, that message is placed in an outgoing message queue. Messages on the outgoing queue are sent by the queue's communications manager to the receiving process. The messages are then moved from the outgoing queue to a retry message queue.

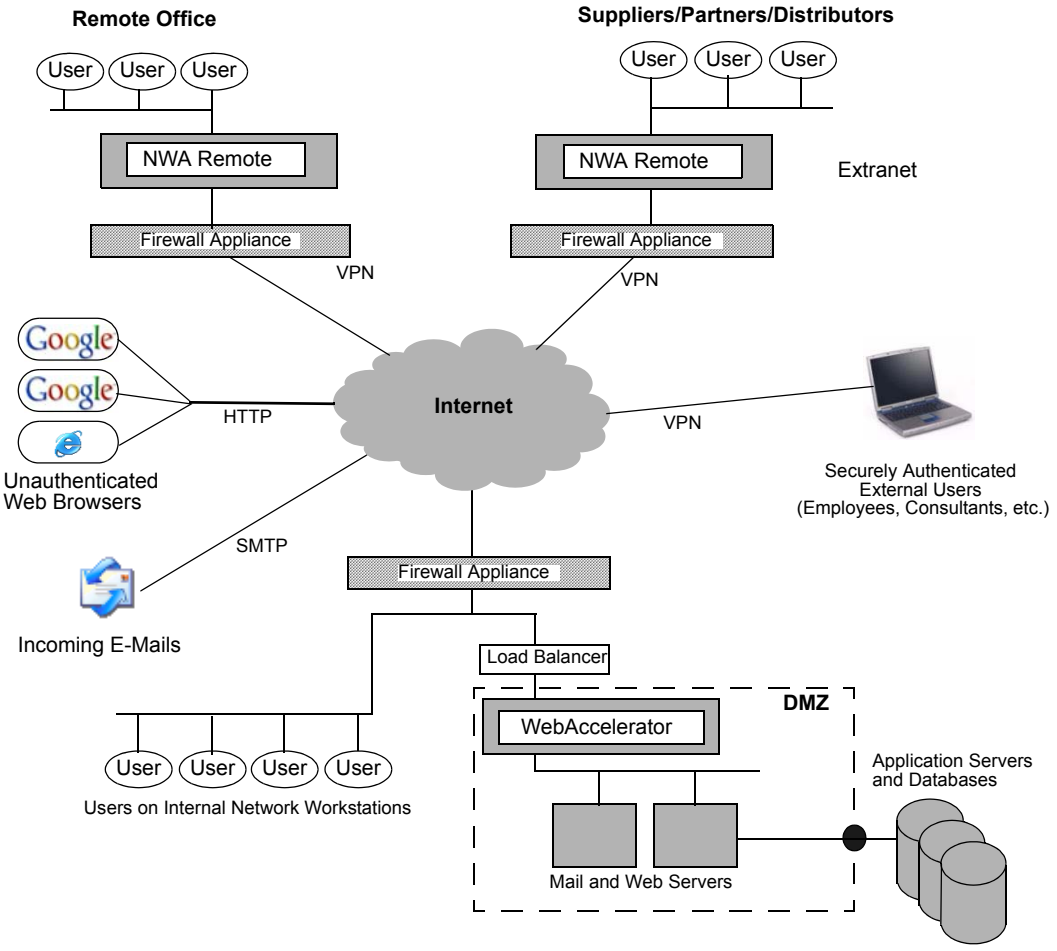
When the receiving process gets a message, it checks to see if the message is valid. Expired or duplicated messages are ignored by the receiving process. If the message is valid, the receiving process sends back an acknowledgement.

The communications manager continues to resend messages in the retry queue, at intervals determined by the message type, until it receives an acknowledgement for the message or until the message expires. Once the communications manager receives an acknowledgement or a message expires, that message is removed from the retry queue.

Installation Architecture

To use the WebAccelerator, you place a Management Console and one or more WebAccelerators (or a single machine running both the Management Console and an WebAccelerator) in advantageous locations around the network. The diagram shows how F5' web acceleration technologies fit into a simple enterprise network.

The main WebAccelerator, located in the DMZ in front of the web and mail servers, accelerates responses to anyone requesting information from those servers, including information that is ultimately stored on the application servers and databases. This improves performance and productivity for any of the users shown. To further improve response times and data sharing with the remote office and the key suppliers and distributors, a Swan Labs WebAccelerator Remote (NWA Remote) is located at each office location.



In this case, all the WebAccelerator Remotes and WebAccelerators belong to one cluster, and this cluster is assigned to both the mail server and web server applications. A cluster can be assigned to more than one application, but an application can only have one cluster assigned to it.

Servicing HTTP Traffic

After the WebAccelerator is configured with caching policies appropriate for your site, you must configure DNS so that future HTTP and HTTPS queries for your site are routed to the WebAccelerators. For more information on configuring DNS, see the *Getting Started Guide*.

For each request it receives, an WebAccelerator either:

- services the request from its cache
- proxies the request to your origin servers. Upon receiving a response from an origin server, the WebAccelerator decides whether the response is cacheable. If it is, the response is cached. Either way, the response is forwarded on to the originating client.
- redirects the request to your origin servers. Redirects occur for some pre-defined types of content such as requests for streaming video.
- tunnels the request to your origin servers. Tunneling can be used to handle encrypted traffic (HTTPS) whose content is not to be processed by the WebAccelerator. Note that the WebAccelerators are capable of responding to and caching SSL traffic without using tunneling.

For each request it receives, a WebAccelerator Remote either:

- services the request from its cache
- proxies the request to the WebAccelerator front-ending the origin server. The WebAccelerator treats the request like any other request it receives (see above). Upon receiving a response from the Accelerator, the WebAccelerator Remote decides whether the response is cacheable. If it is, the response is cached. Either way, the response is forwarded on to the originating client.

For a detailed description of how the WebAccelerator decides what requests it must proxy to your origin servers, how content is to be accelerated, and what responses it can cache, see the *Policy Management Guide.*

Administration Tool

Your Management Console is your central point of control for your entire WebAccelerator installation. All account management is performed through the user interface provided by the Administration Tool, also called the Admin Tool. The Admin Tool enables you to manage clusters, applications, caching policies, and monitor performance.

Its interface is web-based, and you access it by pointing your web browser to the host on which you installed your WebAccelerator Management Console.

The *Policy Management Guide* and the online help for the Admin Tool provide all the information you need on using the tool to configure and administer the WebAccelerator. Initial configuration using the Admin Tool is described in the *Getting Started Guide*.

Configuration

Most of the configuration is performed through the Admin Tool, by changing your WebAccelerator clusters, your application profiles, and your policies. However, some tailoring and tuning of your WebAccelerator is done by changing option settings in one of two configuration files:

- `pvsystem.conf`, a configuration file part of each WebAccelerator that must be edited on each WebAccelerator machine. In general, any changes made to this file should be copied to every WebAccelerator in a single F5 WebAccelerator system.
- `globalfragment.xml`, a configuration file found on the Management Console machine that publishes its settings to all WebAccelerators that are part of the F5 WebAccelerator system

For more information on these configuration files, see Chapter 3, Configuration Files.

Log Management

WebAccelerators generate two types of logs:

- change logs, which contain information on page requests seen by the WebAccelerators, the frequency of those requests, and how well the WebAccelerators serviced those requests from cache. This data forms the basis of the information displayed in the Performance Monitor.
- hit logs, which contain the same kind of information that you see in your web server log files. The exact content contained here is customizable. See the *Policy Management Guide* for information on how to customize your hit logs.

Change logs are generated at the WebAccelerators and generally are moved to the Management Console for further processing. A special program called the Log Mover is responsible for transferring the information. The Log Mover is run at both the Management Console and the WebAccelerators. On the Management Console, it runs in collection mode, while on the WebAccelerators it runs in push mode.

Essentially, Log Mover on the WebAccelerators is responsible for periodically collecting the log files and pushing them to the Management Console. On the Management Console, Log Mover is responsible for accepting the logs, performing further processing on them, and then archiving them so that you can retrieve them for any additional processing required by your site.

Note: The Log Mover does not operate on a WebAccelerator Remote. Because WebAccelerator Remotes are usually located far from the Management Console and their purpose is to reduce long-distance traffic, they do not send their logs to the Management Console.

For more information on the Log Mover, see Chapter 5, Log Mover.

Compile and Assembly Queues

WebAccelerators make use of several queues when caching data and responding to HTTP requests. It is important for you to monitor these queues because their size can limit an Accelerator's performance.

Compile Queues

When an Accelerator proxies a request to your origin servers and receives a response to be accelerated, it compiles that response into an internal format. This compiled response is the object that is actually used by the WebAccelerators to assemble responses. For more information on compiled responses and requirements for content acceleration, see the *Policy Management Guide*.

This compilation is performed using one of two queues:

- compile queue, used for compilation of non-ESI responses
- ESI compile queue, used for compilation of responses that contain ESI (Edge-Side Include) data. An Accelerator assumes a response contains ESI data if the Accelerator sees the Surrogate-Control header in the response.

Compilation is a very efficient process. However, it should be monitored to ensure objects are not backing up in the compile queues. For information on monitoring the compile queues, see "Monitoring the Compile Queue" on page 63, and "Monitoring the ESI Compile Queue" on page 63.

Assembly Queues

Whenever an WebAccelerator responds to a client request, it must assemble the compiled response. This assembly involves performing any required parameter substitution and executing any ESI statements embedded in the page. At the end of assembly, the WebAccelerator has the final web page it uses to respond to the client request.

All HTTP requests that the WebAccelerator can service are placed on an assembly queue. If the assembly queue is large, then your site appears slow to its users. Always monitor the assembly queue to make sure that it is not growing too large. For more information, see "Monitoring the Assembly Queue" on page 64.

Chapter 2

Directories and Files

Regardless of the directory location where you have installed WebAccelerator, you can always find its installation files under `/opt/pivia`. This is true of both Management Console and WebAccelerator installations. If you cause the software to be installed in a location other than `/opt/pivia`, then a symbolic link is created from `/opt/pivia` to your actual installation directory.

You can always find the current release of the WebAccelerator software in the `/opt/pivia/dac` directory.

The installation software creates symbolic links as required to ensure this path always takes you to the current version of the software.

The Manifest File

The installation software always creates a manifest file in this location:
`/etc/pivia_xxx.manifest`

where *xxx* indicates the release level of the WebAccelerator software. This manifest file identifies all the choices that you made during the installation process in terms of physical installation locations. The manifest file also indicates the total number of bytes available on the file systems used for the installations.

General Directory Hierarchy

For both a Management Console and WebAccelerator installation, these directories are used:

Directory	Description
`/opt/pivia/dac`	Symbolic link to the software's installation files.
`/opt/pivia/dac/bin`	Installation location of various tools used to manage the software.
`/opt/pivia/dac/conf`	Location of configuration files used to manage the software, such as `pvsystem.conf`.
`/opt/pivia/dac/docs`	Location of the product documentation, including this book and the release notes.
`/opt/pivia/dac/mib`	Location of the F5 mib. This mib is used for SNMP monitoring of the WebAccelerator installation. See Chapter 7, Monitoring with SNMP for more information.
`/opt/pivia/dac/policies/conf`	Location of the global configuration fragment file which controls definitions of object types and redirect criteria.
`/opt/pivia/dac/rc`	Contains software used to manage and monitor the WebAccelerator. For example, the Watchdog client is found here.
`/opt/pivia/log`	Symbolic link to the directory where the hit and change log files are kept. For more information, see Chapter 5, Log Mover.

Directory	Description
/opt/pivia/proc_log	Location where process log files are kept. These log files receive informational, debug, and error messages related to the operation of the various processes comprising your WebAccelerator installation.

WebAccelerator Directory Hierarchy

In addition to the directories noted above, WebAccelerator uses this directory:
/opt/pivia/hds

as the directory location where the on-disk cache is kept.

Error and Status Reporting Files

Each of the processes in your WebAccelerator installation issues error and informational messages to a different file. When troubleshooting, you can look through the log files for each process to see if any error conditions are being reported.

Note: Use these files for troubleshooting only. For day to day monitoring of your WebAccelerator installation, use SNMP. See Chapter 7, Monitoring with SNMP for more information.

Communications Manager Log Files

/opt/pivia/proc_log/ccm_pri_current.log

If your communications system is not working correctly, this file contains messages indicating the source of the problem. In particular, this can contain messages related to problems with certificates, problems related to binding to ports, and problems related to connecting to remote hosts.

Watchdog Log Files

/opt/pivia/proc_log/watchdog_current.log

Holds any messages regarding the execution status of your WebAccelerator processes as issued by the watchdog. In particular, this file contains process startup, shutdown, and abnormal exit status messages.

Tomcat Log Files

`/opt/pivia/proc_log/tomcat_current.log`

This file exists only on the Management Console. Tomcat is used to host the Admin Tool user interface. If you are experiencing problems with your user interface, look in the Tomcat file to see if it is reporting any problems.

Intelligence Interface Log File

`/opt/pivia/proc_log/ii_current.log`

This file is found only on the Management Console. The intelligence interface is used to publish policies from your Management Console to your WebAccelerators. If you are experiencing problems with publishing policies, examine these log files in this order for warnings or error messages:

1. `/opt/pivia/proc_log/ccm_pri_current.log`
2. `/opt/pivia/proc_log/ii_current.log`
3. `/opt/pivia/proc_log/tomcat_current.log`

For multi-machine installs, the source of many problems is often clock drift. If you are experiencing unusual symptoms in your installation, check to make sure the clocks on all the machines in your installation are in sync. If they are more than a few seconds out of sync, use `ntpdate` on each of the machines in your installation to force their clocks into sync.

Database Log File

`/opt/pivia/proc_log/db`

This file is found only on the Management Console. It reports informational and error messages related to the database used to store your policies, user and organization information, and performance data. If you see errors reported in this file, contact Swan Labs Customer Confidence group.

Log Collector Log File

`/opt/pivia/proc_log/log_collector_current.log`

This file is found only on the Management Console. This file contains informational and error messages related to the log collector. As described in "Processing Change Log Files" on page 38, the log collector is responsible for accepting change and hit logs from your Accelerators, processing them, and then placing them to an archive location on your Management Console. If this process is not working correctly, look in this file to see if the log collector is reporting any problems.

Log Pusher Log File

`/opt/pivia/proc_log/log_pusher_current.log`

This file is found only on your WebAccelerators. This file contains informational and error messages related to the log pusher. As described in "Transferring Change Log Files" on page 38, the log pusher is responsible for sending change and hit logs to your Management Console for processing. If this process is not working correctly, look in this file to see if the log pusher is reporting any problems.

Accelerator Log File

`/opt/pivia/proc_log/pvac_current.log`

This file is found only on your WebAccelerators. This file reports informational and error messages for Accelerator operations. Depending on the log level you set, this file can contain information on whether traffic is served from the in-memory or on-disk cache, or if requests are cache misses. During production use, set logging so that only error messages are logged. Otherwise, this log file grows large rapidly.

HDS Prune Log File

`/opt/pivia/proc_log/hds_prune_current.log`

This file is found only on the WebAccelerators on which `hds_prune` is running. This script deletes old compiled responses from your on-disk cache. If `hds_prune` does not run, your on-disk cache partition eventually fills up. This file reports informational and error messages related to the `hds_prune`. If your on-disk cache is filling up, make sure `hds_prune` is running. Check this file to see if `hds_prune` has reported any error conditions.

Log File Archiving

`/opt/pivia/proc_log/proc_archive`

Old versions of your log files can be found in this directory. Monitor this directory to make sure that it is not filling up with too many files.

Transforms File

The WebAccelerator Rewrite Engine provides a procedural language used to manipulate HTTP responses received from your origin servers. This manipulation occurs before the response is processed by the WebAccelerator, so it is the

manipulated response that the WebAccelerator manages, not the actual response as sent by your origin servers. You can use predefined procedures or create your own.

These procedures, including any created or customized by you or other WebAccelerator users, are zipped and stored in `/opt/pivia/dac/transforms` on the machine where the Management Console resides.

Backup: You are responsible for backing up a copy of these procedures to another machine or to media like a floppy or CD, so that you can restore them in the event your Management Console machine crashes.

Chapter 3

Configuration Files

Once you have your WebAccelerator installed and running, you can configure your WebAccelerators to change them from the default settings. Most of their configuration is based on the policies and host mappings you configure in the Management Console, and these apply to all the WebAccelerators in the WebAccelerator installation. However, there are some configuration options specific to each WebAccelerator, set in their local `pvsystem.conf` configuration file.

There is also a global configuration fragment file, which contains configuration options for response object types and URL normalization that are published to all the WebAccelerators. This is a global file that you edit on the Management Console machine.

Changing pvsystem.conf

On each WebAccelerator machine, you can find the file as:
`/opt/pivia/dac/conf/pvsystem.conf`

To make a configuration change to an WebAccelerator installation:

1. Log in as root to the local machine on which the WebAccelerator is running.
2. Edit `pvsystem.conf`
3. Restart your WebAccelerator installation using:
   `/etc/init.d/pivia restart`

Backup: Whenever you change your `pvsystem.conf` file, create a backup copy of it on another machine or on media like a floppy disk or CD. If you ever need to restore this WebAccelerator, or if this machine crashes and you need to recreate the system on another machine, you must have a backup of this file to use.

Managing Log File Creation

Change logs and hit logs are described in Chapter 5, Log Mover. Accelerators buffer change and hit log information in memory until a threshold is reached. Once the threshold is reached, the information is written to disk. Later, the Log Mover moves the change logs to the Management Console for processing and archiving.

Note: The default values for log file creation work well for the recommended hardware. Do not change these values unless instructed to by Swan Labs Customer Confidence group.

The threshold for when hit and change data is written to disk is based on a size limit and a time limit. Use these `pvsystem.conf` parameters to set the limits:

Parameter	Description
`changeLogFileSize`	Change log data is written to disk if the amount of change log data buffered in memory meets the threshold defined by this parameter. Default is `1000000` (1MB).
`hitLogFileSize`	Hit log data is written to disk if the amount of hit log data buffered in memory meets the threshold defined by this parameter. Default is `1000000` (1MB).

Parameter	Description
changeLogFileTTL	Change log data is written to disk on the interval specified by this parameter regardless of how much change data is buffered in memory. Default is 5 minutes.
hitLogFileTTL	Hit log data is written to disk on the interval specified by this parameter regardless of how much hit log data is buffered in memory. Default is 5 minutes.

Note: The TTL values identified here are reset each time the change or hit log is written to disk. So if the change log is written because of file size at 3 minutes, the TTL counter is reset to 0 on that event and the hit log is not written again until either 5 minutes has elapsed or 1MB of data is collected, whichever comes first.

Managing the Compile Queues

All responses cached by the WebAccelerator are compiled. These compiled responses are the objects that are cached by the Accelerators.

Compilation involves placing responses on one of two compile queues:

- a queue for normal responses
- a queue for compiling responses that use ESI for content assembly

Once on a compile queue, responses are parsed by threads dedicated to this task.

Use these pvsystem.conf parameters to control the maximum number of responses allowed on a compile queue and to manage the number of threads used to parse these responses.

Parameter	Description
maxParserThreads	Number of threads used to parse responses found in the normal compile queue. Default is 1.
maxParserTasks	Maximum number of responses allowed in the normal compile queue. Default is 1000.
maxEsiParserThreads	Number of threads used to parse responses found in the ESI compile queue. Default is 1.

Parameter	Description
maxEsiParserTasks	Maximum number of responses allowed in the ESI compile queue at any given time. Default is 1000. This number should be set to be 2 times the number of front-end connections allowed for the WebAccelerator.

ESI and content assembly is described in detail in the *Policy Management Guide*. The process that the WebAccelerator uses to compile and cache responses is also described in that manual.

Tuning Tip

The WebAccelerator ships with default values for the compile queues that work well for the recommended hardware. Do not change these values unless your monitoring suggests that some tuning is needed (see "Monitoring the Compile Queue" on page 63 for more information). Even then, make only small changes to these parameters to see if they help your overall Accelerator performance. Be aware that adding threads and tasks to the compile queues can actually hurt overall Accelerator performance.

Managing the Assembly Queue

The process of executing a compiled response in order to respond to an HTTP request is called assembly. When an Accelerator receives an HTTP request that it can service from its cache, it places that request on an assembly queue. Special threads are used to run the compiled response and any related ESI compiled responses in order to assemble the content required to respond to the request.

Use these pvsystem.conf parameters to control content assembly:

Parameter	Description
maxAssembleThreads	Number of threads used to assemble compiled responses. Default is 1.
maxAssembleTasks	Maximum number of requests allowed in the assembly queue. Default is 1000. This number should be set to be 2 times the number of front-end connections allowed for the WebAccelerator.
maxNumInclude	Maximum number of esi:include statements the Accelerator will process before giving up. If this limit is reached, the Accelerator returns HTTP status 404 (Page not found) to the requesting client. Default is 50.

ESI and content assembly is described in detail in the *Policy Management Guide*. The process that the WebAccelerator uses to respond to HTTP requests is also described in that manual.

Tuning Tip

The WebAccelerator ships with default values for the assembly queues that work well for the recommended hardware. Do not change these values unless your monitoring suggests that some tuning is needed (see "Monitoring the Assembly Queue" on page 64 for more information). Even then, make only small changes to these parameters to see if they help your overall Accelerator performance. Be aware that adding threads and tasks to the assembly queues can actually hurt overall Accelerator performance.

Managing System TTL Parameters

Every compiled response cached by the WebAccelerator has a Time-To-Live (TTL) value set for it. This value identifies how much time is allowed to elapse before the WebAccelerator expires the compiled response and proxies to your origin servers for fresh content.

For the most part, compiled response TTLs are set using caching policies. TTLs can also be adjusted using various lifetime mechanisms available in the HTTP and ESI protocols. However, these values cannot be set to values that exceed system limits controlled using `pvsystem.conf` parameters.

Use these `pvsystem.conf` parameters to control the system limits for compiled response TTLs:

Parameter	Description
`staticMinTTL`	The system-wide minimum value that can be set for TTLs for static content like images. Default is `0` seconds.
`staticMaxTTL`	The system-wide maximum value that can be set for TTLs. Default is `86400` seconds (24 hours).
`staticLastModFactor`	Provides a system-wide default value for the HTTP last mod factor. This value is used in an equation that determines TTL values based on information found in HTTP headers. Note that this default value can be overridden using caching policies.
`dynamicMinTTL`	The system-wide minimum value that can be set for TTLs for dynamic page content. Default is `2` seconds.

Content lifetime and TTL values are described in detail in the *Policy Management Guide*.

Managing Socket Tunnels

Socket tunnels are a mechanism by which you can identify traffic that the Accelerator should pass on to an identified host and port. These tunnels allow you to configure your Accelerators to handle traffic such as SSL or FTP sessions that a cache can not or should not manage.

You create socket tunnels by adding one or more `socketTunnel` parameters to `pvsystem.conf`. The format of this parameter is:
`<socketTunnel listenPort="port" remoteHost="host:port" />`

where:

- *`port`* is the value for `listenPort`, is the port on the Accelerator that receives the traffic you want tunneled
- *`host`*`:`*`port`* identifies the hostname and port to which you want this traffic tunneled

For example:
`<socketTunnel listenPort="444" remoteHost="secure1.somesite.com:443" />`

Managing Cookie Encryption

WebAccelerators are capable of encrypting cookies that they set on a client. When the cookie is presented back to the WebAccelerator, it is decrypted and the WebAccelerator uses it normally. Further, if the WebAccelerator must proxy the request to your origin servers, the cookie is decrypted before that proxy is returned.

By using encrypted cookies, you ensure the information contained in the cookie cannot be examined by the client. For example, this can prevent malicious users from gaining knowledge on how your site works by examining the contents of your cookies.

Use these `pvsystem.conf` parameters to manage cookie encryption:

Parameter	Description
`encryptCookieNames`	If set to `true`, then cookie names encrypted.
`encryptCookieValues`	If set to `true`, then cookie values encrypted.

Parameter	Description
encryptCookieVerifyIP	If set to true, then the IP of the client presenting the cookie is examined before the cookie is decrypted. Use of this feature slows down the WebAccelerator to a bit, but it does ensure that a cookie is decrypted only if it is presented by the client to which the cookie was originally set.
encryptCookieMatching	Only cookies whose name match the provided regular expression are encrypted. Note that, the start of line (^) and end of line ($) expressions are not assumed. If you want to encrypt all cookies that begin with "myDomain", use: ^myDomain.*$

Managing Load Balancing

The WebAccelerator is capable of performing load balancing for the connections that it receives for your site. Especially useful is the WebAccelerator's ability to maintain session state by ensuring that all requests for a specific client are routed to the same server.

For more information on how to identify the origin hosts that the WebAccelerator should use for load balancing, see the *Policy Management Guide*.

Use these pvsystem.conf parameters to tune the WebAccelerator's load balancing capabilities:

Parameter	Description
defaultRoutingType	Defines the type of routing to use when Default Load Balancing is selected in the Connection Mapping pages. Values may be either CLIENT_IP_HASH or ROUND_ROBIN. Unless requested to do so by Swan Labs Customer Service personnel, leave this value set to CLIENT_IP_HASH.
useCookieConnPersistence	Use a cookie to improve the guarantee that a client's connection always goes to the same origin server. Default value is true. If persistent connections are not important to you, set this to false.
persistentCookieName	If useCookieConnPersistence is true, then use the name identified on this parameter for the cookie name. Default is pv_ows_id. This parameter has no meaning if useCookieConnPersistence is false.

Parameter	Description
encryptPersistentCookie	If set to true, the cookie set to ensure persistent connections is encrypted. Default is true. This parameter has no meaning if useCookieConnPersistence is false.
useInMemoryTableConnPersistence	Use an in-memory table based on the client's IP to get clients back to the same origin server. This is useful for clients that do not support cookies. Note that if the WebAccelerator is stopped for any reason, the persistence of any client managed by the WebAccelerator is not guaranteed. Default value is false.

Managing hds_prune

hds_prune is a shell script that is responsible for clearing old and unneeded compiled responses out of your on-disk cache.

This script works by periodically checking to see how full your on-disk cache is. You specify the minimum and maximum amounts of free space allowed. If the amount of free space available in the on-disk cache is less than or equal to the minimum amount you specified, the script prunes your cache. The script removes enough data from your on-disk cache to satisfy the maximum amount you specified. That is, when the script is done, the amount of free space in your on-disk cache partition is at least as big as the maximum you set.

This script is automatically configured and started for you by the WebAccelerator's installation and configuration utilities. However, if you do not want to use the default values, you can use these command line arguments:

Argument	Definition
-d	Specifies how long the script sleeps before checking the current amount of free space available in the on-disk cache partition. Default is 300 seconds (5 minutes).
-s	Specifies the smallest amount of free space allowed in the on-disk cache partition. If hds_prune finds that the on-disk cache partition has a free space value that is less than or equal to this value, then it prunes your on-disk cache. Values are expressed as a percentage of free space. The default is to start pruning when there is less than 20% of the disk free.
-e	Specifies the amount of free space that must be available in the partition when hds_prune is finished pruning your on-disk cache. Values are expressed as a percentage of free space. The default is to stop pruning when there is at least 40% of the disk free.

Argument	Definition
-c	Identifies the location of the on-disk cache. Default is /opt/pivia/hds.

Setting hds_prune Values

To change hds_prune values:

1. Log into the WebAccelerator machine as root.
2. Edit /etc/init.d/pivia
3. Locate and modify the variables DAC_CACHE_FREE_START and DAC_CACHE_FREE_END if you want to change the -s or -e options.

   Otherwise, locate the variable PROG_HDS_PRUNE_OPTIONS and change the command line arguments presented there to the values that you want. Note that you should at least provide the -c, -s, and -e options.
4. Close and save the file.
5. Restart the WebAccelerator:
   /etc/init.d/pivia restart

Managing Standby Database Replication

A standby Management Console is installed on a machine with an WebAccelerator, and can be configured using the pvsystem.conf configuration file on that machine. The main task of a standby Management Console is to replicate the database of the primary Management Console. This ensures that when you want to switch over from the primary Management Console to the standby Management Console, the standby Management Console has a reasonably current version of the database. This allows you to smoothly switch over to the standby Management Console even if there was a hardware failure on the primary Management Console machine and the database is no longer accessible.

The standby Management Console replicates the database at intervals. The default interval is 4 hours, meaning the standby Management Console replicates the database from the primary Management Console every 4 hours. This default should work for most WebAccelerator installations.

You can change the interval to optimize it for your site. The smaller the interval, the more current the database is in the event that you must switch over to the standby Management Console. However, the database is large and replicating it more often uses more system resources and bandwidth. Increasing the interval so the database is replicated less often frees up system resources but means the database might be more out-of-date at the time the primary Management Console fails and you need to switch to the standby Management Console.

To change the interval, the value is set in the `pvsystem.conf` file. Specify the value for the interval in minutes:

1. Log in as root to the local machine on which the standby Management Console is running.
2. Edit `pvsystem.conf` to change the immonDBSyncPeriod parameter. The default setting is `240` for 240 minutes or 4 hours.
3. Restart your standby Management Console using:
   `/etc/init.d/pivia restart`

Changing globalfragment.xml

On the Management Console machine, you can find the file as:
`/opt/pivia/dac/policies/conf/globalfragment.xml`

To edit the file and change the options:

1. Log in as root to the local machine on which the Management Console is running.
2. Edit `globalfragment.xml` and save it.
3. Log out as root.
4. Force the changed file to be republished to all the WebAccelerators:
   a. Log in to the Admin Tool. See the *Policy Management Guide* for instructions on using the Admin Tool.
   b. Go to the Applications screen and click on the Edit link for any existing application.
   c. Click the Save button. This causes all global configuration settings for all applications, not just the selected one, to be saved and republished to all WebAccelerators.

Backup: Whenever you change your `globalfragment.xml` file, create a backup copy of it on another machine or on media like a floppy disk or CD. If you ever need to restore this Management Console, or if this machine crashes and you need to recreate the system on another machine, you must have a backup of this file to use.

Managing Object Types

Every response the WebAccelerator receives from your origin servers is classified by object type. This classification can be more accurate than deriving a type based on the

request. The WebAccelerator looks at the response headers and classifies the response based on the first information it finds, in this order:

1. the file extension from the filename field in the Content-Disposition header
2. the file extension from the extension field in the Content-Disposition header
3. the Content-Type header in the response, unless it is an ambiguous MIME type
4. the extension of the path in the request

For example, if the extension in the filename field in the Content-Disposition header is empty, the WebAccelerator looks at the file extension in the extension field of the header. If that has an extension, the WebAccelerator attempts to match it to an object type in the `globalfragment.xml` file. If there is no match, the WebAccelerator assigns an object type of `other` and uses the settings for `other`. The WebAccelerator only looks at the information in the Content-Type header if there is no extension in the filename or extension fields of the Content-Disposition header.

There are a set of predefined object types in the `globalfragment.xml` file that shipped with your WebAccelerator. You can modify the options for these types, or add new types of your own.

The options you specify for each object type are:

`type` — is a short name for the type, that can be used to identify the object type and is displayed in the X-PvInfo header for each response. This option is required.

`group` — is an arbitrary group name, also short, which is displayed in the X-PvInfo header for the response. This allows you to organize object types into groups. This option is required.

`category` — is an arbitrary category name that allows you to create a superset of groups. A value for this option is required. You might want to set a value for category that helps you differentiate between the predefined object types and the custom types you create.

`displayName` — is a longer, more descriptive name for the object type. This option is required.

`ext` — are the values for extension that define this object type. When the WebAccelerator finds a file extension in the filename or extension field in the Content-Disposition header of the response, it attempts to match that to one of the values you specify here. If there is a match, it classifies the response as this object type.

Specify as a single value or as a comma-separated list:

```
ext="jpg, jpeg"
```

This option is required.

`mimeType` are the values for MIME type that define this object type. If the WebAccelerator does not find an extension in the filename or extension fields of the Content-Disposition header, it looks in the Content-Type header of the response to attempt to match that to one of the MIME types you specify here. If there is a match, it classifies the response as this object type.

Specify as a single MIME type or as a comma-separated list of MIME types:

```
mimeType="application/excel, application/msexcel,
application/ms-excel"
```

`compressToClient` specifies in which cases to gzip the response. This option is required. The values you can specify are:

- `none`, specifies never to compress the response
- `pivia`, specifies to compress the response only if the client is another WebAccelerator
- `policyControlled`, specifies to use the compression setting of the assembly policy in effect for this response

Setting this option to `none` or `pivia` overrides any compression settings in the assembly policy for the node to which the response matched.

`transformFile` specifies the name of the rewrite script to run against the response. This option is optional and is only used for very unusual cases, because it overrides any rewrite settings in the assembly policy for the node to which the response matched. Set this option only when you want a particular rewrite script to be run against responses of this content type no matter what policies are set.

For most cases, you use the Admin Tool to create a node and define the matching policy so that any response with this content type matches to it. Then create an assembly policy for this node that specifies the rewrite script you want to run.

Use caution when you use an object type definition to control compression (set to `none` or `pivia`) or run rewrite scripts:

- an object type definition applies across the entire WebAccelerator, regardless of application or policy set
- the object type setting overrides any setting in all assembly policies

Only use object type for compression or rewriting if you want to ensure your setting is used for any response matching that object type across your entire system, and you do not want an assembly policy to ever affect this setting.

To see which object type a response was classified as, you can look in the X-PvInfo header in the response, for a string that begins with `OT/` and this displays the `type`. For more information, see the Response Header appendix in the *Policy Management Guide*.

Here is a sample object type, as it appears in the `globalfragment.xml` file:

```
<objType
      type=”mspowerpoint”
      group=”documents”
      category=”common”
      displayName=”Microsoft Powerpoint”
      ext=”ppt”
      mimeType=”
            application/powerpoint,
            application/mspowerpoint,
            application/ms-powerpoint,
            application/x-powerpoint,
            application/x-mspowerpoint,
            application/vnd.powerpoint,
            application/vnd.mspowerpoint,
            application/vnd.ms-powerpoint”
      compressToClient=”pivia”
/>
```

Managing URL Normalization

Some systems use different URLs to access the same content, sometimes by randomizing the URL. To better identify content, the WebAccelerator analyses the contents of a response and creates an object ID based on that specific content. This enables the WebAccelerator to recognize content independent of the URL. The object ID is inserted into the response that the WebAccelerator returns to the client.

The WebAccelerator can use this object ID to create a normalized URL. The normalized URL can be sent in a redirect to the browser client or WebAccelerator Remote that sent the request. The browser or WebAccelerator Remote can use the normalized URL to search its own cache in case it has a copy of the content that it could not recognize based on the request URL. If the content is found in the cache of the WebAccelerator Remote or browser, it does not have to be sent from the WebAccelerator, reducing bandwidth usage and speeding up the response time for the end user.

You can control whether the WebAccelerator uses redirects, and for what types of content. The `contentBasedIdentity` section of the `globalfragment.xml` file contains the settings for managing URL normalization. The default settings that ship with the WebAccelerator specify that normalization should occur when the WebAccelerator is responding to a WebAccelerator Remote, but not to a client browser. The default setting also specifies that it should only occur for responses that were classified in the

documents group, which consists of Microsoft Word, Excel, and Powerpoint objects and PDF files, and are 20KB or larger in size:

```
<contentBasedIdentity
      enableNormalization="true"
      enableNormalizationToBrowsers="false"
      types=""
      groups="documents"
      sizeThresholdKB="20"
      basePath="pv_obj_cache"
      normalizationMethod="redirect"
      requireAuth="false"
      authMethod="cookie"
      addDefaultExt="true"
/>
```

Also by default, the security feature (authorization and authentication) is disabled and the virtual base path, where the normalized objects should appear to come from, is `/pv_obj_cache`. Some of the options currently support only one value, and cannot be changed.

The options you can change are:

`enableNormalization`

can be `true` or `false`. `true` enables normalization for this WebAccelerator system. `false` disables normalization.

`enableNormalizationToBrowsers`

can be `true` or `false`. `true` enables normalization to browser clients if `enableNormalization` is also `true`. `false` disables normalization to browser clients. Before setting this to `true`, read "Redirecting to Browsers" on page 31.

`types` specifies the object types for which normalization can occur, in addition to the object types that are part of any groups specified in `groups`. See "Managing Object Types" on page 26.

Specify the values in a comma-separated list:

```
types="jpeg, pdf, text"
```

`groups` specifies the object groups for which normalization can occur, in addition to the object types specified in `types`. See "Managing Object Types" on page 26.

Specify the values in a comma-separated list:

```
groups="documents, images"
```

`sizeThresholdKB` specifies the minimum size in kilobytes the object must be before it can be normalized.

`basePath`	specifies the virtual path underneath your website where normalized objects appear to come from. You might need to change this value to work with portal gateways or to appear to be better integrated with the application.
`requireAuth`	can be `true` or `false`. `true` enables authorization and authentication. The object ID is combined with an Accelerator-generated user identifier and encrypted before being used on the redirect. The user and requested document must match before the document can be retrieved using the redirect. `false` disables this feature.

Redirecting to Browsers

If you plan to set `enableNormalizationToBrowsers` to true, enabling redirects to client browsers, there are some restrictions and security considerations you should understand:

- if your website contains framesets imbedded using JavaScript, it is possible that when you are redirecting to a browser, the redirect could fail. This is not common for documents, if that is the only object group you specify for redirects, but it could happen.
- if bookmarks are being set at the browser, only the original URL should be bookmarked. If the final, normalized URL is bookmarked, the bookmark is not valid.
- if you enable redirects to browsers and you normally restrict access to some or all of your documents, you should enable the security feature by setting `requireAuth` to `true`. This prevents other users from finding and using the normalized URL to access content they normally would not be able to access.

Selectively Disabling Content-Based Identity

You can enable content-based identity and normalization for your WebAccelerator system, and then disable it for particular nodes in the Request Type Hierarchy. Any request or response that matches to a node with content-based identity disabled is not normalized for redirects and no content-based cache routines are performed.

To disable content-based identity for a node, go to the Policy Editor and select the node. Go to the Assembly screen. In the Advanced Assembly text box, enter this string:

```
disableContentBasedIdentity=true
```

By default, `disableContentBasedIdentity` is set to false, meaning that this setting does not override any other content-based identity system-wide options. The setting

for `disableContentBasedIdentity` can never enable content-based identity. It can only disable it when content-based identity is turned on for your system. Content-based identity is enabled by setting `enableNormalization` to true in your `globalfragment.xml` file.

Chapter 4

Startup and Shutdown

Startup and shutdown are controlled by scripts placed in this location:
`/etc/init.d/pivia`

To start the F5 WebAccelerator software on the current machine:
`/etc/init.d/pivia start`

To stop the F5 WebAccelerator software on the current machine:
`/etc/init.d/pivia stop`

To restart:
`/etc/init.d/pivia restart`

Runlevels

All WebAccelerator processes are started when the machine boots into runlevels 3, 4, and 5.

Verifying Execution Status

For the most part, you should monitor the activities of your WebAccelerator installation, including whether critical processes are running, using your SNMP-based network monitoring software. For more information, see Chapter 7, Monitoring with SNMP.

However, you can manually check whether WebAccelerator processes are running using the Watchdog client script. This script shows you the status of every WebAccelerator process on the local machine.

To run Watchdog client:

1. Log in as root to the local machine whose WebAccelerator processes you want to check.
2. Run the command:
   `/opt/pivia/dac/rc/watchdog_client`

The script shows you each of the WebAccelerator processes that is current running on this local machine.

To see the status of every WebAccelerator process regardless of whether it is currently running, enter `T`.

To quit the Watchdog client script, enter `Q`.

Management Console Processes

The Watchdog client script shows you the status of these Management Console processes:

Check	Description
`ccm_pri`	Indicates whether the central communications manager is running. This process is responsible for coordinating communication between all of the processes that comprise your WebAccelerator installation, both local and remote.
`ii`	Indicates whether the intelligence interface is running. The intelligence interface is used to publish caching policies from your Management Console to your WebAccelerators.
`tomcat`	Indicates whether Tomcat (the WebAccelerator's application server) is running.
`log_collector`	Indicates whether the log collector is running. See "Processing Change Log Files" on page 38 for more information on the log collector.

WebAccelerator Processes

The Watchdog client script shows you the status of these WebAccelerator processes:

Check	Description
`log_pusher`	Indicates whether the log pusher is running. See "Transferring Change Log Files" on page 38 for more information on the log pusher.
`pvac`	Indicates whether the WebAccelerator software is running.
`hds_prune`	Indicates whether the `hds_prune` script is running. This script is responsible for cleaning out old and unused data from your on-disk cache. For more information, see "Managing hds_prune" on page 24.

Chapter 5
Log Mover

The Log Mover transfers log files from Accelerators on their own machines to the Management Console. It is not used if an Accelerator and Management Console are on the same machine or if the Accelerator is a WebAccelerator Remote. Ignore this chapter if:

- you are using a WebAccelerator installation with just one machine, or
- except for the Accelerator on your Management Console machine, all your Accelerators are WebAccelerator Remotes

Every WebAccelerator creates two kinds of log files:

- change logs, which contain the data that is displayed in the WebAccelerator performance monitor. See the *Policy Management Guide* for information on accessing the performance monitor.
- hit logs, which contain the information that is normally found in web server log files. Many sites perform some kind of an analysis on this data. You can tailor the information that appears in these log files using the WebAccelerator Admin Tool. See the *Policy Management Guide* for more information.

The rate at which an WebAccelerator creates log files is a function of how much traffic the WebAccelerator is experiencing and thresholds set by several `pvsystem.conf` parameters. For information on managing these parameters, see "Managing Log File Creation" on page 18.

The WebAccelerator must move the change logs to the machine running the Management Console so that they can be viewed using the performance monitor.

Note: Clean out your WebAccelerator hit logs on a regular basis. By default, the WebAccelerator does not rotate logs. You can specify that your log files be rotated by using the log rotation facility built into Linux. See the *Getting Started Guide* for more information.

Transferring Change Log Files

Each WebAccelerator in your installation runs a part of the Log Mover called the log pusher. The log pusher is responsible for transferring change log files to your Management Console, and also performs some other functions. The log pusher does these tasks:

1. Periodically the log pusher checks for any Accelerator log files it needs to transfer, at intervals set by the `pvsystem.conf <wakeup_interval>` parameter. By default, this interval is 30 seconds. See "Configuring the Log Mover" on page 40 for information on how to change this interval.
2. If the pusher finds log files to transfer, it moves them to the directory `/opt/pivia/log/push` on the Accelerator.
3. The log files are pushed to the log collector running on the Management Console using an HTTP or HTTPS connection. The host and port to which the log files are pushed is defined in `pvsystem.conf` in the `<collector>` section. If a `<secure_port>` parameter is defined in that section, then HTTPS is used. Otherwise, HTTP is used. HTTP is used by default. See "Configuring the Log Mover" on page 40 for details on how to configuring to use HTTPS.
4. After a log file is pushed to the collector, that log file is moved to `/opt/pivia/log/archive` on the Accelerator.
5. When the log collector finishes processing the log files it receives, it notifies the pusher of this event. Upon receipt of this notification, the pusher deletes the log file from the Accelerator's archive directory.

Each WebAccelerator also has a directory called `/opt/pivia/log/bad_files`. This directory is used to store log files that are corrupted. If you ever see a log file placed in this directory, contact Swan Labs Customer Confidence group.

Processing Change Log Files

Your Management Console runs a part of the Log Mover called the log collector. The log collector is responsible for accepting log files from the log pushers, processing them, and archiving them.

As the Log Mover receives the change log files, it places them in: `/opt/pivia/log/collect`

Change logs contain information that is displayed in the WebAccelerator's performance monitor. When the log collector receives a change log from an WebAccelerator, it handles the log in this way:

1. While the log file is being transmitted, it is placed on the Management Console in: `/opt/pivia/log/put/change`
2. Once the log file has been completely transferred to the Management Console, it is placed on the Management Console in: `/opt/pivia/log/collect/change`
3. The log collector loads the contents of the log file into the database. This can take several minutes.
4. The log file is archived to a location on the Management Console under: `/opt/pivia/log/archive/change`

   These archived files have a filename that includes the time and date stamp when the log was created.
5. Once the log collector has finished processing the change log, the log collector signals this event to the WebAccelerator that generated the change log. The WebAccelerator then deletes the change log from its archive directory.

Managing the Log Mover

Generally, you do not need to configure the Log Mover, but it does require ongoing management because the logs can contain a large amount of data. Be sure to do these important tasks:

1. After the log collector has finished processing a log file, it is your responsibility to make sure the log file is moved off the Management Console for whatever archival or data analysis is needed by your site.

   On the Management Console, frequently clear out the gzipped files stored in: `/opt/pivia/log/collect/complete/archive`

   Either delete, or backup and then delete, these files. Once your change logs have been loaded into your database and you have retrieved your hit logs for analysis, it is unlikely that you ever need these files again.
2. For both the Management Console and your WebAccelerators, use SNMP to monitor the free space in the directory where you are placing your logs. See Chapter 7, Monitoring with SNMP for more information. If this directory is filling up on any of the machines in your installation, examine the machine to see if:
   - the log pusher is successfully moving logs to the log collector running on the Management Console
   - the log collector on the Management Console is successfully processing the logs

Configuring the Log Mover

Default configuration of the Log Mover is performed automatically when you install the WebAccelerator. However, by default the Log Mover transfers files using encryption (SSL). If your WebAccelerator installation is very busy, this might create an unacceptable load on your Accelerators and Management Console. In this case, you might want to configure the Log Mover to use unencrypted transfers if security is not a problem.

If you are transferring your log files over a local area network, or if your site's security policy is such that it is acceptable to transfer log data in the clear, follow these steps to turn off encrypted transfers:

1. Log on to your Management Console machine.
2. cd to `/opt/pivia/dac/conf`
3. Edit `pvsystem.conf` and find this section of the file:

```
<logMover>
 <pusher>
 ...
 </pusher>
 <collector>
 ...
 </collector>
</logMover>
```

   In the `<collector>` section, uncomment the `<port>` parameter and comment out the `<secure_port>` parameter. That is, change this:

```
<collector>
 <!-- <port>12003</port> -->
 <secure_port>12004</secure_port>
 ...
</collector>
```

   to:

```
<collector>
 <port>12003</port>
 <!-- <secure_port>12004</secure_port> -->
 ...
</collector>
```

4. Close and save this file.
5. Edit `pvsystem.conf.global` and make the exact same change as you made in step 3. .

   Note: While you are in this file, make sure the port number identified here is identical to the port identified in step 3.

6. Run these commands in this order:

```
# /opt/pivia/dac/bin/confmgr -A DISTRIBUTE
# /etc/init.d/pivia stop_log_collector
# /etc/init.d/pivia start_log_collector
# /opt/pivia/dac/bin/confmgr -a -A RESTART_ACCELERATOR
```

Your Log Mover now transfers log files without using SSL.

Chapter 6

Back Up and Recovery

The F5 WebAccelerator provides a backup and restore utility, which:

- backs up and restores the Accelerator configurations you created
- backs up and restores the WebAccelerator's database
- backs up and restores configuration files needed by the WebAccelerator

The F5 WebAccelerator also allows you to install a secondary Management Console that runs in warm standby mode, to make it easier and faster to recover if the machine running the primary Management Console crashes. There are several steps you need to follow to transfer control to this standby Management Console. This chapter describe these topics in detail.

Backing Up the WebAccelerator

You should perform back ups of your WebAccelerator on a regular basis, regardless of whether you are running a standby Management Console. When you perform a backup, you must identify:

- the parts of the WebAccelerator that you want backed up
- the directory where you want the backup placed

The Backup Utility

You perform backups using the `/opt/pivia/dac/bin/backup` utility. This backs up your Management Console. When the backup is completed, it places either one or two files in the directory that you specify. The files that it creates are:

- `pivia_conf_data-<timestamp>.tar.gz`

  This is an archive containing Accelerator configurations created by the Admin Tool. This archive also contains the `.ssh` directory for the root account and the `pvssl.pem` file. Admin Tool relies on the contents of the `.ssh` directory to function. The `pvssl.pem` file contains the certificate used by the communications system.

- `pivia_database_data-<timestamp>.tar.gz`

  This is an archive containing all your database data. This includes your organization and user accounts, your policies, and any invalidation objects that might exist in the system at the time of the backup.

The time stamp placed on each file is used by the restore program to identify what file you want to restore from.

The `backup.sh` utility offers these command line arguments:

Option	Description
`-l`	Directory where you want the backup placed.
`-d`	Backup just the database
`-c`	Backup just the Admin Tool and other configuration files.
`-a`	Backup everything. Note that if you not specify `-d`, `-c`, or this option, then this option is used.

Note that you do not have to shutdown or otherwise suspend operations in order to perform your backup.

Manual File Backups

Not all WebAccelerator system files are backed up by the `backup.sh` utility. You also need to back up any changes made to transforms and configuration files. The transforms are procedures used by the Rewrite Engine to manipulate responses. If you or other users have customized or created their own procedures, you must back up the transforms file. If your users are creating their own rewrite procedures, make sure they are backing up the appropriate files and that you know where the backups are located. You also need to back up the global fragments configuration file and the WebAccelerator configuration files.

If the machine running the primary Management Console crashes, and you want to switch to the standby Management Console, you cannot access the transforms file or global fragments configuration file if they are located only on the failed Management Console machine. To back them up, you can manually copy the files to a different machine or onto media.

An WebAccelerator configuration file is found on each WebAccelerator machine. Unless every WebAccelerator is using an identical configuration file, it is useful to back up this file in case one of the WebAccelerator machines crashes. The file is needed on the Management Console machine because that machine includes an WebAccelerator.

The files you need to back up are:

- on the Management Console machine, the global fragments file:
  `/opt/pivia/dac/policies/conf/globalfragment.xml`

  and the transforms file (back up the zip file you find in this directory):
  `/opt/pivia/dac/transforms`
- on each WebAccelerator machine, the configuration file:
  `/opt/pivia/dac/conf/pvsystem.conf`

Restore Utility

You restore your WebAccelerator from one of your backups by using the `restore` utility found in `/opt/pivia/dac/bin/`. When you perform a restore, you must identify:

- the type of restore:
  - only the database
  - only the configuration files
  - everything
- the directory where you placed your backup archives

- the time stamp that appears on the archives from which you want to perform the restore

The time stamp that you specify is used as part of the filename for the backup archive you are using.

The `restore` utility offers these command line arguments:

Option	Description
`-l`	Directory where the backup archives are located.
`-d`	Restore just the database.
`-c`	Restore just the Admin Tool and other configuration files.
`-a`	Restore everything. Note that if you not specify -d, -c, or this option, then this option is used.

`-t`	The time stamp used for the archive that you want to use for the restore. This should be provided in the same format as it appears in the archive file name. For example, if the archive filename is:
	`pivia_database_data-6182002_17_57_11.tar.gz`
	then the value you provide for this option is:
	`6182002_17_57_11`

You do not have to shutdown the Management Console or any of the WebAccelerators. However, while the restore is running, your WebAccelerator is placed in proxy mode. While in this mode, all HTTP requests received by the WebAccelerator are proxied to your origin servers.

Once the restore is complete, the WebAccelerator is automatically taken out of proxy mode and normal operations are resumed.

Restoring your WebAccelerator

The procedure that you use to restore your WebAccelerator from a backup differs depending on what you want to restore:

- to restore just your WebAccelerator configuration files, see "Restoring the Configuration Files"
- to restore your database, see "Restoring the Database" on page 47. Note that this procedure results in everything being restored.

Restoring the Configuration Files

To restore all of your configuration files including the configuration database, follow these steps:

1. Log into the Management Console.
2. Locate the configuration backup file you want use for the restore.
3. Note the time stamp on the configuration backup file that you want to use. For example, if you want to restore your configuration from:
   `/backups/pivia_conf_data-7122002_16_21_43.tar.gz`

   then the timestamp you want to use is:
   `7122002_16_21_43`
4. Issue the command:
   `/opt/pivia/dac/bin/restore -l /backups -c -t 7122002_16_21_43`
5. Copy the files you backed up manually ("Manual File Backups" on page 45) back into their original locations.
6. If you have a single machine configuration, with a Management Console and Accelerator on a single machine, restart your WebAccelerator using:
   ```
   # /etc/init.d/pivia restart
   ```
   If you have a multi-machine configuration, with multiple Accelerators, redistribute your Accelerator configurations and then restart the Accelerators and your Management Console. On the Management Console, issue these commands:
   ```
   # /etc/init.d/pivia restart
   # /opt/pivia/dac/bin/confmgr -A DISTRIBUTE
   # /opt/pivia/dac/bin/confmgr -A RESTART_ACCELERATOR
   ```

Restoring the Database

You should never need to restore your database unless you have experienced some form of hardware failure that has corrupted your database. If this occurs, you must reinstall your Management Console and then perform a full restore:

1. If necessary, stop your Management Console:
   `/etc/init.d/pivia stop`
2. Uninstall the Management Console:
   `/opt/pivia/uninstall`

   Note that entering yes for each of the prompts causes any hit and change logs currently in existence on your Management Console to be deleted. You may want to enter No for that prompt.
3. Install the Management Console as described in the installation guide. Allow the Management Console to start at the end of the installation.
4. Locate the configuration backup files you want to use for the restore.

5. Note the time stamp on the configuration backup files that you want to use. For example, if you want to restore your configuration from:
   `/backups/pivia_conf_data-7122002_16_21_43.tar.gz`
   `/backup/pivia_database_data-7122002_16_21_43.tar.gz`
   then the timestamp you want to use is:
   `7122002_16_21_43`
6. Issue this command:
   `/opt/pivia/dac/bin/restore -l -a -t 7122002_16_21_43`
7. Copy the transforms zip file and global fragments configuration file that you backed up manually into the correct locations on the Management Console machine:
   `/opt/pivia/dac/transforms`
   `/opt/pivia/dac/policies/conf/globalfragment.xml`

Your Management Console is now in the same state as it was in when you ran the backup from which you performed the restore.

Switching to Your Standby Management Console

You can switch operations over from your primary Management Console to the standby Management Console if you are having problems with the primary Management Console or if there is a hardware or network failure on the primary Management Console machine. You must have previously installed the standby Management Console. While the primary Management Console was operating, the standby Management Console was replicating its database so that it has its own copy. The replication occurs at intervals determined by the value set in the `pvsystem.conf` file. The default value for this replication is 4 hours.

It can be useful to have a separate backup of certain files, such as the policy sets, the transforms zip file, and the WebAccelerator configuration file, and the global fragments configuration file. In the Admin Tool, from the Policies screen, you can export the policy sets and transforms, which creates a single file for each. Then you can back up those files to a different machine. For information on exporting, see the "Managing Policies" chapter in the *Policy Management Guide*. For information on backing up the files, see "Manual File Backups" on page 45.

The failover to your standby Management Console is not automatic. You must complete these steps to get your system running with the standby Management Console:

1. You must stop any Management Console processes that are still running on the primary Management Console before you can switch to the standby Management

Console. If the machine is up, log onto the machine as root and run the `stop` script:
`/etc/init.d/pivia stop`

If there are severe hardware or network problems that prevent you from running the script, removing the machine from the network prevents the primary Management Console from interfering with the standby Management Console. Disconnect the network cable from the machine.

2. The network administrator must update the DNS server with the IP address of the standby Management Console. It needs to replace the address of the previous Management Console.

   If a static host is configured for the primary Management Console, the network administrator must change that also.

3. Log in as root to the machine on which the standby Management Console is running.

4. Copy the backup of the transforms file into the directory `/opt/pivia/dac/transforms`. This backup was described in "Manual File Backups" on page 45. This ensures the new primary Management Console has any custom changes to the rewrite procedures.

5. Copy the most current backup of the global fragment configuration file, `globalfragment.xml`, that was backed up from the primary Management Console machine, into the `/opt/pivia/dac/policies/conf/` directory on the new Management Console machine.

6. Next, copy the most current backup of the WebAccelerator configuration file, `pvsystem.conf`, that was backed up from the primary Management Console machine, into the `/opt/pivia/dac/conf/` directory on the new Management Console machine.

7. Run the shell script:
   `/etc/init.d/pivia set_pim`

   This script tells the standby Management Console that it is now the primary Management Console. It stops replicating the database and begins operating as the primary Management Console.

   When the Management Console processes on the primary Management Console are no longer accessible, WebAccelerator processes on other machines automatically attempt to switch over to the standby Management Console. Now that the standby Management Console is running as primary, the processes begin connecting and working with it.

8. You must ensure the WebAccelerators are synchronized with the new standby Management Console. The standby Management Console is as current as the last database replication it performed, so it is not as current as the WebAccelerators.

To synchronize the WebAccelerators, you must clear their caches, each cache on each WebAccelerator machine:

a. Log into the WebAccelerator machine as root.

b. Run the shell script:
`/etc/init.d/pivia clear_cache`

This script stops the WebAccelerator, clears the cache, and restarts the WebAccelerator. This causes the WebAccelerator to refresh everything from the standby Management Console, synchronizing it with the Management Console.

Note: If the cache (`/opt/pivia/hds`) is large, 25G or more, the script can take some time to complete, up to half an hour.

c. Repeat these steps on every machine that is running an WebAccelerator.

Converting a Primary Management Console to Standby

If you had a problem on your primary Management Console and completed the process of changing your standby Management Console into a primary Management Console, you might now have no standby Management Console. If you diagnosed and repaired the problems with your original primary Management Console or its machine, you can now make that Management Console your standby:

1. Log in as root to the machine with the Management Console that you want to make your standby Management Console. This Management Console should not be running currently or it would interfere with the working primary Management Console.
2. Run this shell script:
`/etc/init.d/pivia set_sim`

This starts the Management Console in standby mode, replicating the database from the primary Management Console.

Switching Over With No Failure

You can switch over from a running primary Management Console to a standby Management Console. There might be several reasons for this:

- you want to perform maintenance on the primary Management Console machine and need to shut the machine down or temporarily remove it from the network
- you want to upgrade or replace the machine the primary Management Console is running on

- you had a failover, and fixed all the problems on the original Management Console machine, and are running it as the standby. You now want to make it the primary Management Console again.

If you need to shut down the primary Management Console machine for some reason, minimize disruption to your WebAccelerator system by planning to switch over to the standby Management Console as soon as possible after it has completed a database replication This means the database on the standby Management Console is current as possible.

To avoid confusion as we step through the process of switching from primary to standby and back again to primary, we name the machines Fred and Ginger. For these examples, Fred is the machine currently running your primary Management Console, and Ginger is the machine running the standby Management Console. Follow this general process:

1. Begin by switching over to the standby Management Console that is running on Ginger.
2. Shut down Fred, the machine that had been running the primary Management Console and do any needed tasks on Fred (maintenance, upgrades, replacements).
3. If you replaced Fred with a new machine, install a standby Management Console on the new Fred. See the *Getting Started Guide* for information on installing a standby Management Console.
4. Start the Management Console on Fred as the standby Management Console.
5. Let Fred run as the standby Management Console long enough to have replicated the database at least once. As soon as possible after the database has been replicated, begin converting Fred to the primary Management Console.
6. Switch over to make Fred the primary Management Console, and change Ginger back to a standby Management Console.

The actual steps for switching a working primary Management Console to a standby are:

1. Log in as root on Fred, the primary Management Console machine.
2. Copy the transforms file and configuration files to Ginger from Fred. The transforms are stored as a zip archive. The files are stored in:
   ```
   /opt/pivia/dac/transforms
   /opt/pivia/dac/conf/pvsystem.conf
   /opt/pivia/dac/policies/conf/globalfragment.xml
   ```
   Copy them into the directories with the same names on Ginger. This ensures the new primary Management Console on Ginger has any custom changes to the rewrite procedures and any other customizations that were made on Fred.

3. Update the DNS server so that the Management Console IP address which currently points to Fred's IP address now points to Ginger's IP address.
4. On Fred, convert the primary Management Console to a standby Management Console by running:
   `/etc/init.d/pivia set_sim`

   You always need to stop or change the primary Management Console before you start a new Management Console.
5. Log in to Ginger as root.
6. On Ginger, convert the standby Management Console to a primary Management Console by running:
   `/etc/init.d/pivia set_pim`
7. Synchronize the WebAccelerators with the new primary Management Console on Ginger by clearing the cache on each WebAccelerator machine:
   a. Log into the WebAccelerator machine as root.
   b. Run the shell script:
      `/etc/init.d/pivia clear_cache`
   c. Repeat these steps on every machine that is running an WebAccelerator.

At this point, Ginger is running the primary Management Console for your system and the WebAccelerators are running with this Management Console. You can safely bring down Fred for any maintenance or changes. Stop the standby Management Console on Fred by logging in as root and using:
`/etc/init.d/pivia stop`

When you are done with any work on Fred, restart the standby Management Console using:
`/etc/init.d/pivia start`

Later, you can switch the Management Console on Fred back to primary by repeating Step 1 through Step 7.

Chapter 7

Monitoring with SNMP

The WebAccelerator's operations can be monitored using the Simple Network Management Protocol (SNMP). This includes process activities, memory usage, disk usage, and any critical errors that might arise. This chapter identifies the MIBs that you use to monitor the WebAccelerator and its environment, and the objects in those MIBs that Swan Labs recommends you monitor.

This chapter assumes that you are already familiar with SNMP and that you already have a network management system (NMS) in place for your site's infrastructure. Due to the wide range of NMS products on the market today, this guide cannot describe how to integrate the MIBs into your particular NMS. For information on that, see the documentation that came with your NMS.

All the WebAccelerator software is SNMP version 2c compliant.

MIB Overview

There are several MIBs you use to monitor the WebAccelerator:

MIB	Description
`/opt/pivia/dac/mib/pivia.mib`	Identifies the objects used to monitor the various WebAccelerator processes. This same MIB is used regardless of whether you are monitoring processes at the Management Console or the WebAccelerators
`ucd-snmp`	Identifies the objects used to monitor the Linux operating environments. You can obtain this MIB by downloading and installing the NET-SNMP (also known as the UCD-SNMP) distribution. See "Enabling SNMP" on page 54 for more information
`if`	Identifies objects used to monitor network interfaces. You can obtain this MIB by downloading and installing the NET-SNMP (also known as the UCD-SNMP) distribution. See "Enabling SNMP" on page 54 for more information.

Enabling SNMP

Before using SNMP, you must install an SNMP distribution and run the snmpd daemon that comes with the distribution. Swan Labs recommends the UCD-SNMP distribution, also known as the NET-SNMP distribution. If you do not already have an SNMP distribution, you can obtain both information and downloadable packages for the Linux platform here:
http://www.net-snmp.org

Beyond installing SNMP on each of the platforms comprising your WebAccelerator installation, you must also tell each of your WebAccelerator processes to enable monitoring.

Enabling and Disabling Monitoring

SNMP is turned on by default in the WebAccelerator. However, you can turn SNMP on and off for the Management Console (or for the entire WebAccelerator in the case of a single-machine installation) by following these steps:

1. Log in as root to the machine that hosts your Management Console.
2. Edit `/opt/pivia/dac/conf/pvsystem.conf`

3. Find the `enableMonitor` parameter and change it to `true` if you want SNMP enabled, and set it to `false` if you want it disabled.
4. If you are enabling SNMP, you can optionally find the `monitorCommunity` parameter and change its value to whatever your site requires. By default this value is set to `Public`.
5. Restart the Management Console (see Chapter 4, Startup and Shutdown for more information) or the entire WebAccelerator.

Enabling And Disabling Monitoring for WebAccelerators

If you have a multi-machine installation, your Accelerators are separate from your Management Console and you can enable or disable SNMP just for your Accelerators.

SNMP is turned on by default in the WebAccelerator, for both the Management Console and any Accelerators. However, if it has been turned off, you can turn SNMP back on for your WebAccelerators by following these steps:

1. Log in as root to the Management Console machine.
2. Optionally edit:
   `/opt/pivia/dac/conf/fragments/monitorEnable.xml`
   and set the `monitorCommunity` parameter to the value required by your site.
3. Toggle the SNMP monitor flag to `true` in your WebAccelerator's configuration database:
   ```
   cd /opt/pivia/dac/bin
   ./confmgr -a -U /opt/pivia/dac/conf/fragments/monitorEnable.xml
   ```
4. Distribute the change to your Accelerators:
   ```
   ./confmgr -a -A DISTRIBUTE
   ```
5. Restart your Accelerators:
   ```
   ./confmgr -a -A RESTART_ACCELERATOR
   ```

To disable SNMP for your WebAccelerators:

1. Log in as root to the Management Console machine.
2. Toggle the SNMP monitor flag to `true` in your WebAccelerator's configuration database:
   ```
   cd /opt/pivia/dac/bin
   ./confmgr -a -U /opt/pivia/dac/conf/fragments/monitorDisable.xml
   ```
3. Distribute the change to your Accelerators:
   ```
   ./confmgr -a -A DISTRIBUTE
   ```
4. Restart your Accelerators:
   ```
   ./confmgr -a -A RESTART_ACCELERATOR
   ```

SNMP Ports

Every process in the WebAccelerator uses a different port for SNMP monitoring. This table identifies these processes, the ports that they use for SNMP monitoring, and what you should be monitoring for each specific process:

Process	SNMP Port	Monitor
Management Console communications manager	12400	Watch the various communications queues as described in "Monitoring the Communications System" on page 67.
Administration Server	12402	Watch the various communications queues as described in "Monitoring the Communications System" on page 67.
Intelligence Interface	12403	Watch the database as described in "Monitoring the Database" on page 59. Monitor invalidation objects as described in "Monitoring Invalidation Objects" on page 66. Watch the various communications queues as described in "Monitoring the Communications System" on page 67.
Acceleration Server communications manager (both primary and secondary)	12406	Watch the various communications queues as described in "Monitoring the Communications System" on page 67.
Acceleration Server	12407	Monitor connection throughput ("Monitoring Connection Throughput" on page 60) and the various compile and assembly queues ("Monitoring the Compile Queue" on page 63, "Monitoring the ESI Compile Queue" on page 63, and "Monitoring the Assembly Queue" on page 64). Watch the various communications queues as described in "Monitoring the Communications System" on page 67.
Log Mover (pusher)	12408	Monitor the Log Mover at the WebAccelerator as described in "Monitoring the Log Pusher" on page 65.
Log Mover (collector)	12409	Monitor the Log Mover at the Management Console as described in "Monitoring the Log Collector" on page 59.

Suggested SNMP Objects

The MIBs described in this chapter offer more information than you need to monitor. This section highlights the MIB objects that we recommend you monitor when running the WebAccelerator in a production environment. Note that the names begin with Pivia, which was the company that created the WebAccelerator product originally.

This table summarizes the objects we recommend you monitor:

SNMP Object	Description
Pivia::dbStatus Pivia::dbFreespace Pivia::dbLogfileStatus Pivia::dbControlfileStatus Pivia::dbJobStatus	Used to monitor the status and health of the database. For more information, see "Monitoring the Database" on page 59.
Pivia::numReqRejected Pivia::numPendingReq	Used to monitor connection throughput on an acceleration server. For more information, see "Monitoring Connection Throughput" on page 60.
Pivia::imcHitCount Pivia::hdsHitCount Pivia::lruLength Pivia::lruItemBulk Pivia::lruPops	Used to monitor the size and usage of the on-disk and in-memory caches. For more information, see "Monitoring the Cache" on page 61.
Pivia::sizeCompileQueue	Used to monitor the size of the Accelerator's compile queue. For more information, see "Monitoring the Compile Queue" on page 63.
Pivia::sizeESICompileQueue	Used to monitor the size of the Accelerator's ESI compile queue. For more information, see "Monitoring the ESI Compile Queue" on page 63.
Pivia::sizeAssembleQueue	Used to monitor the size of the Accelerator's assembly queue. For more information, see "Monitoring the Assembly Queue" on page 64.
Pivia::invHashTable	Used to monitor the number of invalidation objects known to the WebAccelerator. For more information, see "Monitoring Invalidation Objects" on page 66.

SNMP Object	Description
Pivia::msgQueueDepth Pivia::postQueueDepth Pivia::numDupRecv Pivia::numExpired	Used to monitor the size and health of the WebAccelerator's communications channels. For more information, see "Monitoring the Communications System" on page 67.
Pivia::numFilesQueue	Used to monitor the number of log files (both change and hit) that an Accelerator has queued for transfer. For more information, see "Monitoring the Log Pusher" on page 65.
Pivia::numFilesInPutDirectory Pivia::numIncompleteHitLogs	Used to monitor the log collector. For more information, see "Monitoring the Log Collector" on page 59.
if::ifOutOctets ucd-snmp::memAvailReal ucd-snmp::memAvailSwap ucd-snmp::laLoadInt ucd-snmp::dskAvail ucd-snmp::dskPercent ucd-snmp::prErrorFlag	Used to monitor the status and health of the Linux operating environments. For more information, see "Operating System Objects" on page 69.

Management Console Objects

Monitoring the Management Console involves watching:

- the database
- the log collector
- process communications
- the number of invalidation objects known to exist in the Management Console

Monitoring the Database

Monitoring the database involves ensuring that it is up, that it has adequate space, and that all database jobs and files have a normal status. Use these SNMP objects:

Object	Description
Pivia::dbStatus	Identifies the current state of the database. A value of 1 indicates that it is up, a value of 2 indicates that it is down. If your Management Console is otherwise running and the dbStatus is reporting 2, then contact Swan Labs Customer Confidence group.
Pivia::dbFreespace	Lists all database tablespaces, its datafiles, and the percentage of freespace available to each datafile.If dbFreeSpace is identifying any datafiles whose freespace is under 10%, contact Swan Labs Customer Confidence group.
Pivia::dbLogfileStatus	Provides a list of all the redo log files and their status. A status of 1 indicates normal or in use status. Status 2 indicates the file is invalid. Status 3 indicates the file is stale or deleted. If any of these files are reporting a status of 2 or 3, contact Swan Labs Customer Confidence group.
Pivia::dbControlfileStatus	Provides a list of all the control files and their status. A status of 1 indicates normal status. Status 2 indicates the file is invalid. If status 2 is reported for any of the control files, contact Swan Labs Customer Confidence group.
Pivia::dbJobStatus	Provides a list of all scheduled database jobs and their status. A status of 1 indicates normal status. Status 2 indicates the job has failed or is broken. If any scheduled jobs are reporting status 2, contact Swan Labs Customer Confidence group.

Monitoring the Log Collector

When monitoring the log collector, which was described in "Processing Change Log Files" on page 38, ensure the log files are moving out of the put directory. There should never be more than one or two log files in the put directory at any given time. However, if the log collector is unable to keep up with the amount of data it is receiving, log files begin to stack up in the put directory.

When monitoring the log collector, check that the log files are moving out of the `/opt/pivia/log/collect/put` directory. Ideally, there should never be more than one or two log files in this directory at any given time. However, if the log collector is unable to keep up with the amount of data that it is receiving, then log files stack up.

You can monitor the number of logs stored in the put directory using the Pivia::numFilesInPutDirectory SNMP object. If the log collector is chronically falling

behind, contact Swan Labs Customer Confidence group for help in spreading this load across multiple collectors.

WebAccelerator Objects

Monitoring WebAccelerators involves watching:

- connection throughput
- the size and state of the cache
- the size and state of the compile queues
- the size and state of the assembly queue
- the log pusher
- process communications (see "Monitoring the Communications System" on page 67 for more information)
- the number of invalidation objects known to exist in the Management Console. See "Monitoring Invalidation Objects" on page 66 for this discussion.

Monitoring Connection Throughput

There are two SNMP objects to watch for monitoring an Accelerator's connection load:

- Pivia::numReqRejected
- Pivia::numPendingReq

Pivia::numReqRejected identifies the number of connection requests rejected by the WebAccelerator because the Accelerator has reached the maximum number of connections it can service. If you see a high number of rejected requests reported by every Accelerator in your installation, consider adding more Accelerators to your installation. If you see this problem reported for only a few Accelerators, examine your traffic load balancing to see if you can more evenly spread requests across all Accelerators.

Pivia::numPendingReq identifies the number of requests that have been accepted by the Accelerator but are not currently being processed. A high number of pending requests indicates that your Accelerator is not keeping up with the traffic that it is being asked to process. This can be caused by:

- disk access performance, if you are using NFS to access your on-disk cache (hds) and your NFS server is too slow to keep up with the Accelerator's disk reads.

- large numbers of assembly events not caused by ESI includes, caused by parameter substitution policies, parameter value randomizers, and ESI operations that do not use ESI include statements. Any request for an object that uses ESI includes is given to a separate thread pool for processing.

If you see many pending requests and you can not improve your system throughput by tuning NFS performance or by decreasing the number of assembly events, add more Accelerators to your installation to improve your overall site response time.

Monitoring the Cache

Monitoring the cache involves watching both the in-memory and on-disk cache to see how effectively they are being used. Use these SNMP objects to monitor your cache:

- Pivia::imcHitCount
- Pivia::hdsHitCount
- Pivia::lruLength
- Pivia::lruItemBulk
- Pivia::lruPops

Hit Counts

Pivia::imcHitCount identifies the number of cache hits counted against the in-memory cache. Similarly, Pivia::hdsHitCount identifies the number of cache hits counted against the on-disk cache. Expect these numbers to fluctuate over time as the WebAccelerator expires content and is forced to proxy for fresh content. Also, cache invalidation events can cause these numbers to be lower than normal for your site.

Serious conditions to monitor for hit counts are:

- If both counts are zero, no content is being serviced from cache.

  Assuming normal traffic loads against your site, this is usually caused by broken caching policies. This condition can also be caused by file permissions set for the hds such that the Accelerator can not write to that disk location. Make sure the effective UID and GID that the Accelerator runs as (`Pivia.Pivia` by default) has write access to `/opt/pivia/hds`.
- If the Pivia::hdsHitCount is zero and the Pivia::imcHitCount is non-zero, this represents an internal error condition. Contact Swan Labs Customer Confidence group.

In-Memory Cache Size

Pivia::lruLength, Pivia::lruItemBulk, and Pivia::lruPops are all related to the size of the in-memory cache. You limit how large your in-memory cache can be by using the `pvsystem.conf imcMaxFootprint` parameter. The acceleration software continuously puts new objects into the in-memory cache until it either has no more unique objects to cache there, or it reaches the size limit set by `imcMaxFootprint`. If the acceleration software hits the maximum footprint limit, it removes, or pops, cached objects out of the in-memory cache. The objects removed are the ones that have not been accessed for the longest amount of time.

Every time the acceleration software pops an object off the in-memory cache, it potentially has to visit the on-disk cache to service future requests for that object. Obtaining data from disk is much slower than obtaining it from memory. If you are seeing a large number of pops as reported by Pivia::lruPops, increase the size of your in-memory cache (if local system resources allow it) to improve performance. For information on increasing your in-memory cache footprint, contact Swan Labs Customer Confidence group.

If you can not increase the size of your in-memory cache footprint, you might still be able to reduce the number of pops by reducing the number of unique objects that the WebAccelerator is caching. You do this through content variation policies. Examine your site to see if there are any legacy query parameters or query parameter values that do not affect content. If so, identify these through the content variation policies. Examine your current content variation policies to see if they have identified any parameters, such as cookies or user agent values, that do actually affect content. If so, eliminate them from your policy set. For more information on content variation policies, see the *Policy Management Guide*.

Pivia::lruItemBulk represents the current footprint size of the in-memory cache. It should never be larger than the value set using the `pvsystem.conf imcMaxFootprint` parameter. If this value does grow larger than `imcMaxFootprint`, contact Swan Labs Customer Confidence group.

Pivia::lruLength represents the number of objects stored in your in-memory cache. Assuming that you are not exceeding the memory available to the in-memory cache, you should see this value fluctuate as objects are expired from the cache due to TTLs or invalidation objects. If you perform a reasonably large cache invalidation and this number does not drop, begin analyzing your communications system to ensure information is moving from the Management Console to the Accelerators appropriately.

Monitoring the Compile Queue

Each response that is compiled is first placed on the compile queue. You can monitor the number of objects on the compile queue using the Pivia::sizeCompileQueue SNMP object.

Compilation is a very efficient process. You should expect the compile queue to be small. In fact, most sites normally see a compile queue size of 0 or 1.

If your compile queue is consistently large (greater than 5), this indicates your Accelerator is not keeping up with its workload. Try reducing the size of the compile queue by changing the number of threads assigned to the compile queue to 2 (by default, only 1 thread is used). You do this using the `pvsystem.conf maxParserThreads` parameter. See "Managing the Compile Queues" on page 19 for more information.

If you increase `maxParserThreads` and your compile queue still does not decrease in size, consider adding additional Accelerators to your installation.

Note that a sudden spike in the size of the compile queue can indicate a problem with the code that generates your site. The compile queue is affected by the size of the pages that must be compiled. If a site responds to a request with an erroneously large page, the compile queue grows as it attempts to handle the larger pages. Therefore, if you experience unexpected spikes in the compile queue, examine your site's code to see if it is building pages in an appropriate manner.

Note: The maximum number of responses that can be in the compile queue is defined by the `pvsystem.conf maxParserTasks` parameter. By default, this parameter is set to 1000. If your compile queue is pegged at this limit, the Accelerator is failing to cache some number of responses. The result can be a greater than anticipated load on your origin servers. In this situation, taking steps to reduce the size of the queue also reduces the load on your origin servers.

Monitoring the ESI Compile Queue

When an Accelerator proxies a request to your origin servers and receives a response that uses the `surrogate-control` header, it assumes that response uses ESI markup. In this situation, the response is placed on the ESI compile queue for compilation into a compiled response. See the previous section, "Monitoring the Compile Queue", for more information on compile queues.

You can monitor the number of objects on the ESI compile queue using the Pivia::sizeESICompileQueue SNMP object. The size of this queue differs from site to site depending on the size of the templates and fragments that you are compiling. The

number of fragments (that is, the number of ESI includes) you are processing also affects the size of this queue.

To reduce the size of your ESI compile queue:

1. Examine your site's code to see if it is generating recursive includes. This represents an error situation that should be corrected.
2. Examine your site's code to see if you can reduce the size or number of fragments you are processing.
3. Try increasing the number of threads used to process the ESI compile queue to 2 (by default, only 1 thread is used). You do this using the `pvsystem.conf maxEsiParserThreads` parameter. See "Managing the Compile Queues" on page 19 for more information.
4. Add additional Accelerators to your installation.

As with your compile queue, a sudden spike in the size of the ESI compile queue can indicate a problem with the code that generates your site. Therefore, if you experience unexpected spikes in the ESI compile queue, examine your site's code to see if it is building pages in an appropriate manner.

Note: The maximum number of responses that can be in the ESI compile queue is defined by the `pvsystem.conf maxESIParserTasks` parameter. By default, this parameter is set to 1000. If your ESI compile queue is pegged at this limit, the Accelerator is failing to cache some number of responses. The result can be a greater than anticipated load on your origin servers. In this situation, taking steps to reduce the size of the queue also reduces the load on your origin servers.

Monitoring the Assembly Queue

You can monitor the size of the assembly queue using the Pivia::sizeAssembleQueue SNMP object.

Assembly is a very efficient process. For sites that are not using ESI you should expect the assembly queue to be small. In fact, most sites normally see a queue size of 0 or 1.

Sites that use ESI can see their assembly queue grow large, depending on how complex their ESI instructions are. If your assembly queue grows too large, your site's users perceive a slow-down in your site's responsiveness. For this reason, it is a good idea to keep your assembly queue as small as possible. You can gauge how small the assembly queue should be by monitoring your site's response time. If your site seems to be responding too slowly and your assembly queue is persistently large, take steps to reduce the size of the queue.

To reduce the size of your assembly queue:

1. Examine your site's code to see if it is generating recursive ESI includes. This represents an error situation that should be corrected.
2. Examine your site's code to see if you can reduce the size or number of ESI fragments that you are processing.
3. Try increasing the number of threads used to process the assembly queue to 2 (by default, only 1 thread is used). You do this using the `pvsystem.conf maxAssembleThreads` parameter. See "Managing the Assembly Queue" on page 20 for more information.
4. Add additional Accelerators to your installation.

Note: The maximum number of requests that can be in the assembly queue is defined by the `pvsystem.conf maxAssembleTasks` parameter. By default, this parameter is set to 1000. If your assembly queue is pegged at this limit, your clients are receiving HTTP service not responding errors. In this situation, you must take steps to reduce the size of your assembly queue.

Monitoring the Log Pusher

When monitoring the log pusher, which was described in "Transferring Change Log Files" on page 38, watch for these conditions:

- log files not being sent to the log collector running on the Management Console

  Network outages and firewall issues can prevent your log files from being transferred to the Management Console. Also, if the log collector running on the Management Console is very busy, that creates a large number of unsent log files on your WebAccelerator.

  In either case, monitor the number of log files that need to be sent to your Management Console using the Pivia::numFilesQueue SNMP object. The value that is reported by this object during normal operations differs from site to site, but in general it should be less than 20. If you see this number growing larger, examine the network connectivity and the load on your Management Console to see what the problem might be.

- log files not being deleted from the archive directory on the WebAccelerator

  Whenever the log collector on the Management Console has finished processing a log file, it sends a message to the originating WebAccelerator and tells the log pusher on that machine to delete the corresponding log file from its archive directory. This deletion might not occur if the log pusher is unable to perform the

transfer to the log collector, or if the log collector cannot finish processing the log file.

To ensure that log files are being deleted from your WebAccelerators, monitor the available disk space on your servers. If the partition that contains your log files is filling up, investigate to ensure the Log Mover is working correctly. You can use either ucd-snmp::dskAvail or ucd-snmp::dskPercent SNMP objects to monitor your disk space.

Note: If the log partition on your WebAccelerators is growing critically short of space during the busiest parts of the day for your site, but the Log Mover catches up during your off-peak hours, consider writing logs to a larger disk partition. These log files are written to a directory under `/opt/pivia/log`, which is a symbolic link to the logging partition that you identified during Accelerator installation. To reset this link, shut down the Accelerator, reset the symbolic link to the new location, and then copy the contents of the old log to the new partition before restarting the Accelerator.

Monitoring Invalidation Objects

Monitoring invalidation objects involves ensuring the same number of invalidation objects is known to each system in your WebAccelerator installation. By watching these numbers, you can ensure that invalidation objects are propagating through the WebAccelerator appropriately.

Note: Different sites rely on cache invalidation to a greater or lesser extent. Sites that are using manual invalidation as an occasional mechanism to clear portions of the cache probably do not need to monitor their invalidation objects as closely as sites that are making heavy use of invalidation triggers or ESI cache invalidation.

You monitor the number of invalidations using the Pivia::invHashTable object. This object provides a table of hashes that represents all the invalidation requests in the system at the moment that each time bucket is captured. The table has one row and 10 columns. All but the last (rightmost) column represents a 10-second bucket. The rightmost column represents the fraction of a bucket when you requested the table. For example, if you requested the table at 10:50:43, then the last column represents a 3-second bucket.

Each system in your WebAccelerator installation should show the same hash value for some number of columns (time buckets), starting from the left. Depending on how quickly invalidation objects propagate through your system, the rightmost columns might not show the same hash values system-wide. Pivia expects that the first 5 to 7 columns are identical system-wide but this is dependent on local conditions such as network latency, the number of Accelerators in the installation, and the number of invalidation objects that are being created for your system.

If every column in this table shows a different hash value than the value reported for other systems in your installation, the creation and propagation of invalidation objects is probably broken in some way. In particular, examine your network and firewall configurations to make sure everything is functioning correctly.

Note: A failure to propagate invalidation objects can point to problems in the communications system. See "Monitoring the Communications System" on page 67 for more information.

Monitoring the Communications System

Every Pivia process running in your WebAccelerator communicates using the communications managers. It is critical that these inter-process communications are working correctly. Any failure here can mean Accelerators do not receive caching policies when they are published on the Management Console. A failure in the inter-process communications can also mean that invalidation objects do not arrive at the Accelerators. A misconfigured communications system can cause hit and change log files to build up in the archive directory on your Accelerators.

The communications system is described in "Communication Managers" on page 4.

Monitoring the Communications Channel

When monitoring the communications channel for a Pivia process, watch for:

- a message queue that is always increasing

  This indicates messages are not leaving the process. The message queue depth can be monitored using the Pivia::msgQueueDepth SNMP object.

- a retry queue depth that is more than 10 or 20 messages in size

  This can indicate a failure to receive acknowledgements. The retry queue depth can be monitored using the Pivia::postQueueDepth SNMP object.

- the number of duplicate messages received by a process is more than 10 or 12

This can indicate a failure to send acknowledgements. The number of duplicate messages can be monitored using the Pivia::numDupRecv SNMP object.

- whether there are any expired messages noted

  This indicates a very high network latency, or of system clocks being out of sync. The number of expired messages that have been processed can be monitored using the Pivia::numExpired SNMP object.

Note: The normal size of these queues differs from installation to installation. Some queues, especially the message queue, can grow larger than is indicated here if your site matches any of these criteria:
- there is high network latency between systems in your installation
- you have a large (greater than 2) number of clusters or a large (greater than 8) number of Accelerators in your installation
- you make heavy use of invalidation objects

Under these circumstances, some experience with your installation is required before you can be certain when the messaging system is not operating correctly.

Troubleshooting the Communications System

For the most part, failures in the communications system are usually caused by:

- a process was unable to obtain the port that is defined for it in `pvsystem.conf`. This almost always happens because the process was not shut down properly in the past. In any case, use the `netstat`(8) command to see what process already has the port. Note that the process logs warnings or errors in: `/opt/pivia/proc_log/comm_svr`

  if it cannot obtain the port it needs for the communications system.

- a process was unable to connect to its upstream (parent) process. This usually happens when the upstream process is on a remote host. Possible reasons for the failure are:
  - the upstream process is not running. In this case, starting it should correct the problem.
  - the upstream process is not using the expected port. In this case, you must correct `pvsystem.conf` on either the upstream or downstream systems.
  - network misconfigurations. Make sure the two systems can ping each other. Make sure the hostnames identified in `pvsystem.conf` are configured in DNS and that they resolve to the correct IP addresses.
  - firewall misconfigurations. Make sure that your firewall is open for TCP/IP traffic, both incoming and outgoing, for all relevant hosts and ports.

You see complaints in `/opt/pivia/proc_log/comm_svr` if a process is not able to start up and correctly connect to its upstream communications manager.

- SSL certificate issues. By default, the communications system uses certificate-based encrypted traffic (SSL v3). If the certificates in use are corrupted or expired, or not yet valid in certain pathological cases, then communications can not be established. Examine `/opt/pivia/proc_log/comm_srv` for any indication of the processes having a problem with a certificate.

  If you suspect a corrupted or invalid certificate, you can check the validity of the certificate in use by doing this on both the upstream and downstream systems:
  `openssl verify /opt/pivia/dac/ssl/pvssl.pem`

  If the last line of output is not:
  `OK`

  there is a problem with the certificate. Note that Error 18 (self signed certificate) is reported for all default WebAccelerator installations. This is considered an acceptable error and `openssl` still reports OK in this situation.

- Time is not synchronized. The communications system is very sensitive to time synchronization issues. For this reason, the WebAccelerator uses NTP to keep all your system clocks in sync. However, under some circumstances your clocks might be too far out of sync for NTP to be able to correct the differential The limit is 1000 seconds. This limit can be exceeded if there is a hardware clock failure on a host. This limit can also be exceeded for fresh installations where the host's clock has not yet been set to a time that is within 1000 seconds of the time set for the Management Console.

  In any case, always check the time set for the hosts in your WebAccelerator installation whenever you see communication problems. If they are out of sync, make sure that NTP is running on each host in question. See if NTP is reporting any error conditions by looking in `/var/log/messages` on Linux.

Operating System Objects

In addition to watching the various WebAccelerator processes, you should also monitor the hosts on which those processes are running. This involves watching CPU, memory, and disk utilization to ensure you are not overloading your systems.

Pivia recommends you use the ucd-snmp MIB for this purpose. Again, you can obtain this MIB and the necessary supporting software from this URL:
http://www.net-snmp.org

Within the ucd-snmp MIB, Pivia recommends you monitor these objects:

Object	Description
if::ifOutOctets	Identifies the amount of data transmitted out of the network interface. If this value stops growing, there is either a problem with your WebAccelerator processes (especially on the Accelerators), or there is a problem with your network in general.
ucd-snmp::dskAvail	Identifies the available space on disk. For your Accelerators, your available disk space can become too low because (1) your on-disk cache is filling up its partition, or (2) your log files are filling up their partition. If your on-disk cache is growing too large for its partition, this can mean that you are caching more objects than you planned disk space for. In this case, increase the size of your partition for your on-disk cache. However, it is also possible that your on-disk cache is not being pruned correctly. If it appears that your HDS partition is not being pruned (that is, objects are not every being deleted from disk), check to make sure that the `hds_prune` script is operating correctly. See "HDS Prune Log File" on page 15 for more information. If the partition where you are putting your log files is growing small, this means that your log files are not being moved to the Management Console in a timely fashion. Make sure the Log Mover is running and that the Accelerator is able to connect to the Management Console using HTTP or HTTPS (depending on how you have your Log Mover configured). Also look in the Log Mover activity log files for any clues as to the problem. See "Log Collector Log File" on page 14 and "Log Pusher Log File" on page 15 for more information. On the Management Console, available disk space can run short because (1) your database files are filling up its partition, or (2) your log files are filling up their partition. If the database files partition is running short on space, check to make sure you are not storing large amounts of data there other than what is being generated for the database files. If your log file partition is filling up, this means that you are failing to delete log files from this partition. The Log Mover never deletes log files it has transferred to the Management Console. It is your responsibility to make sure your log files are moved off the Management Console for whatever archival or data analysis is required by your site.
ucd-snmp::dskPercent	Identifies the amount of space used on disk as a percentage of the total size of the disk. This is another way of identifying the same problems described for ucd-snmp::dskAvail, above.
ucd-snmp::laLoadInt	Identifies CPU load. If you see the CPU load on your Accelerators consistently near the 70 the 80 percent mark, consider adding additional Accelerators to your installation.

Object	Description
ucd-snmp::memAvailReal	Amount of unused memory available on the host. It is especially important to make sure that Accelerators are not swapping because this slows them down. If you see your available memory approaching 0, consider reducing the size of your in-memory cache. Note that for Linux systems, available real memory is almost always identified as 0. For this reason, it is better to monitor the amount of available swap space (see the next object) to see if Linux systems are swapping.
ucd-snmp::memAvailSwap	Amount of unused swap space available on the host.
ucd-snmp::prErrorFlag	Identifies if a process is reporting an error. Use this object to make sure that the various WebAccelerator processes are operating without problems. If any process on the machines in your WebAccelerator installation are reporting an a prErrorFlag value other than 0, investigate that process on that machine to see if there is a problem that requires your attention.

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