hp e-commerce/ xml director server appliance sa8250

user guide

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1 Introduction

Introduction to the SA8250

The HP e-Commerce/XML Director Server Appliance SA8250 provides the flexibility to classify and load balance Extensible Markup Language (XML) traffic according to content and distribute it according to user-defined parameters. The SA8250 makes it easy to use the most appropriate resources at the datacenter to handle incoming requests.

The SA8250 is positioned in the network in front of the web, application, or business-to-business (B2B) XML servers, where it senses and parses XML messages or transaction data. It routes client data to the most appropriate server, based on rules that have been pre-configured for each web server. The most common application is a B2B environment where the client will often be another server or application.

The SA8250 also provides reliable URL- and port-based load balancing, failover, and policy-based management to your e-Commerce site, web site, or Intranet. The SA8250 adds the ability to look into the data beyond the URL, and is the best load balancing solution available for the reasons shown in this table.

Feature	Description
Reliability	The SA8250 provides 7 x 24 uptime through failover systems and the inherent robustness of leading network protocols.
Fault Resistance	The SA8250-managed configurations offer many features and capabilities that improve the availability and reliability of server-based services.
Policy-based Management	The SA8250 allows system administrators to implement classes of service, assign priority levels, and set target response times.
Intelligent Content Routing	The SA8250 takes application-aware routing to a new level with the ability to segment Internet content according to the requested URL and embedded XML data.
Error Recovery	Application intelligence allows the SA8250 to understand and correct transport-related application errors transparently to the end user.
Secure Sockets Layer Acceleration	The SA8250 can offload encrypted web traffic (HTTPS) providing a significant performance improvement over web server based Secure Sockets Layer (SSL) processing.

SA8250 Features

Assumptions

This document assumes that you are a network administrator and that you have at least a basic understanding of the following:

- XML usage and syntax
- Networking concepts and terminology
- Network topologies
- Networks and IP routing

Benefits of the SA8250

This table lists the benefits of the SA8250.

Benefit	Description
Distribute XML traffic among multiple servers according to content	The SA8250 analyzes and intelligently distributes XML traffic. The SA8250 categorizes XML traffic by content according to user-crafted rules, and then distributes it among multiple servers, thus allowing network resources to be used in a manner consistent with your corporate goals.
Substantial performance boost and reliability for e-Commerce	The SA8250 increases the speed, scalability, and reliability of multi-server e-Business sites. It regains the speed lost by servers processing secure transactions by delivering faster SSL processing. It integrates SSL processing with XML traffic management technology, eliminating errors and improving Quality of Service (QoS). This unique capability ensures that customers working with sensitive information or business-to-business transactions online receive timely responses, do not see error messages, and are confident that delivery of their information is kept private.
SSL acceleration	Some e-Commerce sites suffer dramatic performance degradation as secure transactions increase. Using patent-pending technology to perform cryptographic processing offloaded from the server, the SA8250 can support up to 1200 SSL connections per second. The SA8250 enables e-Commerce sites to transact secure business and deliver sensitive information quickly, and confidentially. It performs all key management and encryption. The result is a tremendous performance boost for heavily trafficked e-Commerce sites.
Substantial economic benefits	The SA8250 improves customer satisfaction by improving the response time for secure transactions. This means that e-Commerce sites can now enjoy the benefits provided by having secure transactions participate in layer 7 intelligent traffic management. This creates substantial economic savings for e-Commerce sites through improved customer satisfaction, lower cost of ownership, and reduced server provisioning requirements.

Benefits

Benefit	Description
SSL acceleration and intelligent traffic management benefits	Performance degrades dramatically as more customers access a site in SSL mode, frustrating the very customers who are attempting to make a purchase. The SA8250 is essential to providing high performance and superior levels of service when building reliable, scalable, and secure e-Commerce sites.
	Off-loading SSL handling from e-Commerce servers improves overall site performance and customer response time
	Accelerated SSL processing eliminates over-provisioning capacity
	Lower processing demands on the server creates greater capacity for your e-Commerce site
	Drop-in installation avoids impacting your mission critical e-Commerce servers
	Response-time based prioritized service for secure transactions
	Improved responsiveness, reliability, and QoS for secure transactions means delivering the highest levels of support for paying customers
	Ensures that e-Commerce merchants are always open for business by preventing “Server Too Busy” and “File Not Found” errors, even for secure transactions
Patent pending intelligent XML content routing for secure transactions	The SA8250 implements intelligent traffic management for secure transactions, dramatically improving an e-Commerce site’s responsiveness, reliability, and QoS. While typical traffic management devices make decisions based only on information at Layer 4 in the network stack, the SA8250 is the only XML appliance that combines Layer 4 through 7 (application/content) awareness to speed up response times and eliminate error messages for secure transactions. It keeps e-Commerce sites open for business, even during back-end transaction problems or content glitches.

Benefits (continued)

Benefit	Description
Intelligent session recovery for secure transactions	The SA8250 provides Intelligent Session Recovery technology for secure transactions. By monitoring content within the response sent back by the server, Intelligent Session Recovery detects HTTP 400, 500, or 600 series errors, transparently rolls back the session, and redirects the transaction to another server until the request is fulfilled.
Response-time base prioritized service for secure transactions	The SA8250 enables system administrators to implement varying classes of service, assign priority levels, and set target response times for secure transactions. The SA8250 continually measures the response times of each class of service group and assigns incoming requests to the server that can fulfill those requests within the predefined response time. If the response time exceeds the predefined threshold, requests designated as high priority receive preference over those of lower priority. The SA8250 offers predictable performance for high-priority secure requests.

Benefits (continued)

Specifications

This table lists the specifications for the SA8250.

Specification	Description
Servers supported	Any Web server (Apache, Microsoft, Netscape, etc.)
	Most operating systems, including UNIX*, Solaris*, Windows NT*, BSD*/BSDI*, AIX*, etc.
	Any server hardware (SUN, HP, IBM, Compaq, SGI, etc.)
	No practical limit on number of servers
System administration	Command line interface (CLI)
	Web-based graphical user interface (GUI)
	SNMP monitoring (MIB II and Private MIB)
	Dynamic configuration through password-protected serial console, telnet, SSH v1, and SSH v2
Performance	Rated up to 1200 HTTPS connections/sec, 2500 RICH (Layer 7) HTTP connections/sec, 6600 HOT (Layer 4) connections/sec, 95 Mb/sec
	Layer 7 traffic management
	Patent-pending technology offloads all cryptographic processing from server
Dimensions	Mounting: Standard 19-inch rack mount
	Height: 3.5 inches (8.9 cm)
	Width: 17 inches (43.2 cm)
	Depth: 20.16 inches (51.21 cm)
Weight	24 pounds (10.89 kg)

Specifications

Specification	Description
Interface connections	Dual 10/100 Ethernet
	TTY Serial - console
	Failover port
Transparent operation	Supports single or multiple Virtual IP (VIP) addresses per domain
Priority classes	Application/protocol types supported: HTTP, HTTPS, FTP, NNTP, or any TCP port
Patent pending XML and intelligent content routing	Content: URL, file types such as `*.GIF`, file paths such as `\ads\`, and file names such as `index.html`
	Transactions: Transaction types such as `*.CGI`
	XML patterns: Defined by RICH (Layer 7) and XML expressions, in the form: `*/order.asp & //From[id="acme"]`
Intelligent session recovery	Automatically resubmits requests
	Traps 400, 500, and 600 series errors for HTTP and HTTPS
Response-time based priority for secure and non-secure transactions	Sets and enacts target response times
	Directs data based on class priority and target response times
	Real-time performance monitoring
	Automatic server weighting and tuning
	Server-state aware ("sticky") based on source IP, SSL session ID, or HTTP cookie
System fault tolerance and failover	Single site, single or multiple connections
	Automatic detection of status change and health of servers
	Intelligent Resource Verification (IRV)

Specifications (continued)

Specification	Description
Security features supported	RSA, RC2, RC4, DES, Triple DES, IDEA, Blowfish, MD5, SHA
	SSL v2 and v3 for transaction security
	SSH for secure Command Line Interface (up to 168 bit)
	IP filtering
	Serial port logon

Specifications (continued)

Typographic Conventions

The following typographic conventions are used throughout this manual.

***NOTE:** This is an example of a note.*

NOTES clarify a point, emphasize vital information, or describe options, alternatives, or shortcuts. Except for tables, notes are always found in the left margin.

***CAUTION:** This is an example of a caution.*

CAUTIONS are designed to prevent possible mistakes that could result in injury or equipment damage. Except for tables, cautions are always found in the left margin.

NUMBERED LISTS indicate step-by-step procedures that you must follow in numeric order, even if only one step is listed:

1. This is the first step.
2. This is the second step.
3. This is the third step, etc.

BULLETED LISTS indicate options or features available to you:

- A feature or option
- Another feature or option, etc.

ITALICS are used for emphasis or to indicate onscreen controls:

4. To edit the configuration settings, press the *Configure* tab.

COMMANDS are shown in the following ways:

- Any command or command response text that appears on the terminal is presented in the `courier` font.
- Any text that you need to type at the command line appears in **`bold courier`**, for example:

  `HP SA8250/config/policygroup#`**`create gold`**

- Angled brackets (< >) designate where you enter variable parameters
- Straight brackets ([ ]) show parameter choices, separated by vertical bars
- Braces ({ }) show optional commands and parameters

- Vertical Bars (|) separate the choices of input parameters within straight brackets. You can choose only one of the set of choices separated by vertical bars. Do not include the vertical bar in the command.

2 Theory of Operations

General Operating Principles

This chapter discusses the general operating principles of the HP e-Commerce/XML Director Server Appliance SA8250. For details about the complete SA8250 command set, see Chapter 5. For information about completing specific tasks, see Chapter 6.

XML Operations

The SA8250 provides a powerful means of using eXtensible Markup Language (XML) technology to facilitate B2B transactions. In addition to its XML capability, the SA8250 provides Layer 4 (HOT) services, Layer 7 (RICH) services, and Secure Sockets Layer (SSL) acceleration.

The SA8250 accepts user-created rules regarding the content of information transmitted in XML documents, and uses the rules to route the information to the appropriate data center resources.

Before you can configure the SA8250, you must first obtain the following information:

- Which of the several common formats or varieties of XML will be used in the client application
- Which elements, attributes, or data in the anticipated XML traffic represent the significant markers by which value is determined

You control the XML functionality using the XML Server Tab of Policy Manager screen in the Graphical User Interface (GUI, Chapter 4), or the Command Line Interface (CLI, Chapter 5), as demonstrated in this chapter. The SA8250 manages XML traffic using the "XML expression," a definition of one or more patterns that describe specific conditions to be compared with incoming XML data. Patterns are assigned only to servers identified by their IP address and port. When a match between a pattern and the incoming data occurs, the SA8250 routes that data to the desired server for fulfillment.

XML Expression Syntax

This table lists the valid XML expression syntax for the SA8250. These are described in more detail on the following pages.

Expression	Syntax
XML Expression	PathExpression
PathExpression	Path | PathExpression BooleanOperator PathExpression | '(' PathExpression ')'
Path	('/' | '//') Element + Filter ?
Filter	'[' FilterExpression ']'
FilterExpression	(Element | Attribute | Function Call) (ComparisonOperator Value)? | '(' FilterExpression ')' | FilterExpression BooleanOperator FilterExpression
Value	Literal | Number
Number	Integer | Decimal
ComparisonOperator	'>' | '<' | '=' | '!=' | '>=' | '<='
BooleanOperator	'and' | 'or'
FunctionCall	FunctionName '(' (Argument (',' Argument)*)? ')'
FunctionName	'starts-with' | 'contains' | 'translate'
Attribute	'@' (AttributeName | '*')
Element	ElementName | '*'

XML Expression Syntax

XML Data Model

For standard SA8250 operations, XML data consists of three hierarchical components or nodes:

- Elements (data types)
- Attributes (subcategories of a data type or element)
- Text (specific data such as names, addresses, and quantities)

NOTE: *We indented XML commands for ease of reading in this document. However, the leading spaces or tabs are not significant.*

The relevant content of an XML document is defined within these three components. This example shows a block of incoming XML text as received by the SA8250:

```
<employee>
  <name lastName="Smith" firstName="John"
    initial="K"/>
  <id eid=”12345678” jobClass=”System
    Engineer”/>
  <benefits status=”active”>
    <medicalCarrier>MedCo</medicalCarrier>
  </benefits>
  <grade title=”manager”>5</grade>
  <address>
     <street>13280 Evening Creek Dr</street>
     <city>San Diego</city>
     <state>California</state>
     <zip>92128</zip>
  </address>
</employee>
```

Where:

- `employee`, `name`, `id`, `benefits`, `grade`, `address`, `street`, `city`, `state`, and `zip` are **elements** of the XML document.
- `lastName`, `firstName`, and `initial` are **attributes** of the `name` element.
- `eid` and `jobClass` are **attributes** of the `id` element.
- `13280 Evening Creek Dr`, `San Diego`, `California`, and `92128` are **text** components of the `street`, `city`, `state`, and `zip` elements, respectively.

XML expressions configured in the SA8250 are matched against items as shown above and routed for fulfillment according to server assignments.

Commands and Operators

The SA8250 uses an XML Path Language (XPath) subset.

NOTE: *For a detailed description of XML commands, see Chapter 5.*

XML patterns are created in the CLI or GUI using a set of commands, operators, and comparison operators with XML elements, attributes, and text components. Patterns take the form of a "path," similar to the "expressions" used in configuring the SA8250 for HTTP parsing as described later in this chapter.

A path consists of a sequence of one or more XML elements separated by single or double slashes (/ or //). The first element is also preceded by single or double slashes. These slashes are step operators and are used to select elements relative to the context node, as described in this table.

Operator	Name	Description
/	child operator	Selects all immediate children of the context node
//	descendant operator	Selects elements anywhere under the context node

XML Step Operators

The comparison operators are described in this table.

Operator	Name	Description
=	Equal	Returns true if any values of the nodes specified in the pattern equals to a given value
!=	Not equal	Returns true if at least one value of the nodes specified in the patterns does not equal to a given value
<	Less than	Returns true if at least one value of the nodes specified in the patterns is less than the specified value
<=	Less than or equal to	Returns true if at least one value of the nodes specified in the patterns is less than or equal to the specified value
>	Greater than	Returns true if at least one value of the nodes specified in the patterns is greater than the specified value
>=	Greater than or equal to	Returns true if at least one value of the nodes specified in the patterns is greater than or equal to the specified value

XML Comparison Operators

Each element together with the operator selects a set of nodes in the XML data tree relative to a context node. This set of nodes must match the name of the element specified in a step. Every path starts with the root node as the first context node. Nodes selected in a step form the set of context nodes for the following step.

You can specify an element as "*", which selects any element relative to the context node. You can also specify an optional filter at the end of a path to further refine XML data stream parsing.

Using the "employee" from the earlier XML data example, an XML pattern on the SA8250 might look like this:

```
* & //address[zip > 90000]
```

where:

- `*` is a Layer 7 (RICH) wildcard expression
- `//address[zip > 90000]` is an XML expression

For more information on XML patterns, see "XML Pattern Creation" later in this chapter.

Because the server is configured for any zip codes greater than 90000, and John K. Smith's zip code is 92128, the SA8250 directs his employee data to that server.

You can specify an attribute as @AttributeName, or @* to select any attribute relative to the context node.

Filters are identified by a FilterExpression enclosed within square brackets, [ ]. They define a pattern within a pattern following this general structure:

```
( ('/' | '///') Element )?  [ FilterExpression ]
```

Filter expressions are applied to every element returned by the preceding path pattern. They return a Boolean TRUE if the server is a valid choice, or FALSE if that server will not be used.

An element or attribute by itself inside a filter expression specifies an existence test. For example:

```
//a[b or @c]
```

The operative component of a FilterExpression is a comparison expression or any FunctionCall expression that returns a string value, which compares either an element or an attribute against a specified value. An element in a FilterExpression refers to the child element of the context node, while an attribute refers to the attribute of the context node.

Comparison expression syntax:

```
(Element | Attribute | FunctionCall)
  ComparisonOperator Value
```

FunctionCall expression syntax:

```
FunctionName '(' (Argument (',' Argument)*)? ')'
```

For more information on Function Calls, see "Function Calls" later in this chapter.

You can combine comparison expressions and the FunctionCall expression with Boolean operators and parentheses to create complex filter expressions, as shown in this table.

Sample Pattern	Description
//employee[grade=5]	Matches if an `employee` element with a child element `grade` value equal to 5
//name[@lastName= "Smith"]	Matches if a `name` element with an attribute `lastName=Smith`
//employee[grade=5] and //grade[@title= "manager"]	Matches if an `employee` element with a child element `grade` value equal to 5 and a child element with an attribute `title="manager"`

Comparison Expression Samples

Boolean Operators

Boolean operators are logical operators between expressions. These operators are used in the PathExpression and the FilterExpression:

- <PathExpression> BooleanOperator <PathExpression>
- <FilterExpression> BooleanOperator <FilterExpression>

This table shows two Boolean operators.

Operator	Name	Description
and	Logical AND operator	Performs a logical AND operation
or	Logical OR operator	Performs a logical OR operation

Boolean Operators

This table shows examples of Boolean operators.

Sample Pattern	Description
//benefits[@status and medicalCarrier]	Matches if there is a *benefits* element, a *status* attribute, **and** a *medicalCarrier* child element. *status* and *medicalCarrier* are associated with the *benefits* element.
//benefits[@status or medicalCarrier]	Matches if there is a *benefits* element, a *status* attribute, **or** a *medicalCarrier* child element. *status* and *medicalCarrier* are associated with the *benefits* element.
//benefits or //grade	Matches if there is a *benefits* **or** *grade* element

Boolean Expression Samples

Function Calls

A FunctionCall expression is evaluated by using the FunctionName to identify a supported function, evaluating each of the arguments if needed, and calling the function passing the required arguments. It is an error if the number of arguments is wrong or if an argument is not of the required type. The result of the FunctionCall expression is the result returned by the function. A FunctionCall can only be specified within a FilterExpression.

This table describes the three supported string functions.

Function	Description
starts-with(value, substring)	The *starts-with* function test whether the string value of *value* starts the specified substring. *value* can be either an element, attribute, or function call that returns a string value. *substring* must be a literal value enclosed in single or double quotes. A Boolean value of TRUE or FALSE is returned.
contains(value, substring)	The *contains* function tests whether *value* contains the specified *substring*. *value* can be either an element, attribute, or function call that returns a string value. *substring* must be a literal value enclosed in single or double quotes. A Boolean value of TRUE or FALSE is returned.
translate(value, fromString, toString)	The *translate* function replaces characters in the *value* string if they appear in the *fromString* with the corresponding characters in the *toString*. If a character appears in *fromString* but not in the corresponding position in *toString*, the character will be dropped from the *value* string. The result string is returned. *value* can be either an element, attribute, or function call that returns a string value. Both *fromString* and *toString* have to be a literal value enclosed in single or double quotes.

Function Calls

This table shows function call samples.

Sample Pattern	Description
//employee/name[starts-with(@lastName,"S")]	Matches if there is an *employee* element with a *name* child element that has a *lastName* attribute value starting with "S"
//id[contains(@eid, "456")]	Matches if there is an *id* element with the value of an *eid* attribute containing "456"
//id[contains(translate (@jobClass,'abcdefghijklmnopqrstuvwxyz', 'ABCDEFGHIJKLMNOPQRSTUVWXYZ'), 'SYSTEM ENGINEER')]	Matches if there is an *id* element with the value of a *jobClass* attribute containing "System Engineer." All characters in the *jobClass* attribute are converted to uppercase before being passed to the *contains* function.

Function Call Samples

Values

Values are used to specify the right operand of a comparison expression, and can be either a literal (such as a string) or a number. A literal has to be enclosed either in single or double quotes. If the literal string contains a single quote, double quotes should be used to enclose the string. If the literal string contains double quotes, single quotes should be used to enclose the string. Character references (both decimal and hexadecimal format) and predefined entities as described in the XML specification can be used within the literal string.

The string value of the left operand is obtained for literal equality comparisons. If an element is specified for the left operand, only elements without a child element should be used. Although the upper level elements are not supported, this generally is not a problem, since in most cases only the lowest level element contains text values.

A number can be either a decimal number or an integer. Numbers should not be enclosed in quotes. If a number is enclosed in quotes, it is treated as a literal. A number can be signed by proceeding it with a '+' or '-' sign. A decimal number must contain only one decimal point with at least one digit.

A numeric comparison is either an equality comparison with a numeric right operand or a non-equality comparison. Both the value of the left and right operands, if needed, are converted to numeric values before a numeric comparison is made. If the value cannot be converted to a number, the comparison returns false.

XML Pattern Creation

XML-related commands are issued at the `/xmlpattern` level of the CLI, below the server port level. For example:

```
…/server/10.1.1.1/port/80/xmlpattern#
create */order.asp & doc=3 & //From[id="Acme"]
```

NOTE: Case is significant for text elements like "Acme." Incoming text using "acme" (all lowercase) does not match, unless you use the translate() function to convert text case.

where:

- `*/order.asp` is the Layer 7 (RICH) expression
- `doc=3` is the third document in a multipart or URL encoded message. For more information, see "Document Number Specification" later in this chapter.
- `//From[id="Acme"]` is the XML expression.

It is imperative that XML commands be written as shown above, with spaces on either side of all ampersands (&) used to separate the RICH expression, document number (if used), and XML expression (if used). Failure to do so results in an error.

Once created, XML patterns receive index numbers and are stored in a list. You can display this list by typing the `info` command:

```
…/server/10.1.1.1/port/80/xmlpattern#info
```

This results in a list of expressions by their index number.

XML commands can also be entered and managed using the Policy Manager screen of the Graphical User Interface. For more information, see Chapter 4.

For more information on XML commands, see Chapter 5.

XML Pattern Matching

Please refer to this example XML command throughout this discussion:

```
create */order.asp & doc=3 & //From[id="Acme"]
```

The SA8250 attempts to find XML pattern matches in the following sequence:

1. RICH expression matches. If the RICH expression (`*/order.asp`) does not match, the document number and XML expression are ignored.
2. Optional document number matches. `doc=3` instructs the SA8250 to use the third document for matching against the XML expression. If the third document is missing, or is not an XML document, the data is treated as a non-XML document and directed to the first matching RICH expression server.

   For more information on the document number, see "Document Number Specification" later in this chapter.
3. Optional XML expression matches. If **both** the RICH and XML expressions match, the SA8250 directs the client data to the server matching the XML expression (`//From[id="Acme"]`).
4. If only the RICH expression matches, or the XML expression is missing, the SA8250 either directs the client data to a default server, or returns an HTTP error 503, "No Servers Available" message to the client. This depends upon the SA8250's configuration.

   For information on how to configure a default server, see Chapter 4.

   For more information on RICH expressions, see "RICH expressions in XML patterns" later in this chapter.

If any server in a service has undefined XML expressions, that server will be used for any XML data sent to that service, regardless of content. To prevent this, ensure that you define XML expressions on all servers within a service.

NOTE: *We recommend using the same document number in all XML patterns with the same RICH expression for a service. If you specify different document numbers for each XML pattern of the same RICH expression, it could cause degraded performance, because a different XML document has to be parsed for each XML pattern to be matched.*

MIME Content Type Support

Multipurpose Internet Mail Extension (MIME) values in the "Content-Type" HTTP header are recognized by the SA8250 and handled accordingly. This is primarily to support multipart and URL encoded messages which can contain multiple documents in the message body. The "Content-Type" header has the following format:

```
Content-Type:  <media type>/<media subtype>
  [ ; <parameter> ] *
```

The media type and subtype, the **charset** parameter, and the **boundary** parameter are recognized. The **boundary** parameter is only used for multipart messages.

The charset Parameter

The optional **charset** parameter in the "Content-Type" header is used to identify the character set used for the XML document. If encoding is also specified in the prolog of the XML document, the **charset** parameter in the "Content-Type" header is used instead. Any unrecognizable charset or encoding causes the SA8250 to treat the document as non-XML. Valid character sets include:

- UTF-8
- UTF-16
- US-ASCII
- ISO-8859-1

Media Type and Subtype

This table lists the recognized media type and subtypes. The media types listed are the currently defined types registered with the IANA (Internet Assigned Number Authority). The SA8250 cannot recognize all possible media subtypes, because many of them are proprietary.

Media Type	Media Subtype	How it is processed by the SA8250
text	xml	Treated as XML
	other subtypes	Check if XML
multipart	voice-message	Treated as non-XML
	encrypted	Treated as non-XML
	other subtypes	Extract individual part and classify
application	xml	Treated as XML
	x-www-form-urlencoded	Extract individual field value, check if XML
	pkcs7-mime/x-pkcs7-mime	Treated as non-XML
	other subtypes	Check if XML
message	rfc822	Parse initial rfc822 header and classify
	partial	Treated as non-XML
	other subtypes	Check if XML
any other media type	any subtypes	Treated as non-XML

Media Types and Subtypes

Media type recognition allows the XML engine to determine the format of the message and the type of content being embedded. If a media subtype is “xml,” the document is treated as an XML document without further examination. If a media type indicates explicitly non-XML, such as audio, video, or image, the document is treated as non-XML.

URL Encoded MIME Processing

Messages with a “application/x-www-form-urlencoded” media type are URL encoded messages in a special format that contains a set of field names and values, with the values encoded. This shows how the body of an URL encoded message is formatted:

```
<field name>=<encoded value>[ & <field name>=
  <encoded value>] *
```

Each encoded value is potentially an XML document, and is referred to as a document in the context of document selection. Each encoded value is extracted from the message body and decoded before being checked for XML data and matched against the XML expressions. There can be multiple fields, and thus multiple potential XML documents, in a URL encoded message. The first XML document is used for pattern matching, unless a document number is specified, as described in “Document Number Specification” later in this chapter.

Multipart MIME Processing

Multipart messages contain multiple body parts. Each body part is preceded with a boundary string specified in the boundary parameter in the “Content-Type” header. The body of each body part can be optionally preceded with its own MIME headers. Each body part contains a separate document and is extracted individually before any XML parsing is made. If the boundary parameter is missing for a multipart message, the message will be treated as a non-XML, because there is no way to interpret the body of the message. This is an example of a simple 2-part multipart message:

```
POST /Order.asp HTTP/1.0
Content-Type: multipart/mixed;
  boundary = “Body Part Boundary”
Content-Length: 2048

--Body Part Boundary
Content-Type: text/xml

Content of Document 1
--Body Part Boundary
Content-Type: image/jpeg

Content of Document 2
--Body Part Boundary--
```

Multipart messages can also be nested:

```
POST /Order.asp HTTP/1.0
Content-Type: multipart/mixed;
  boundary = “Body Part Boundary”
Content-Length: 2048

--Body Part Boundary
Content-Type: multipart/related;
  boundary = “Nested Body Part Boundary”

--Nested Body Part Boundary
Content-Type: text/xml

Content of Document A
--Nested Body Part Boundary
Content-Type: text/xml

Content of Document B
--Nested Body Part Boundary--
--Body Part Boundary
Content-Type: text/xml

Content of Document C
--Body Part Boundary--
```

The first body part that contains an XML document is used for pattern matching, unless a specific document number is specified.

Document Number Specification

NOTE: *To maximize performance, the document number of all XML patterns with the same RICH expression should be consistent on all servers.*

Since both URL encoded and multipart messages can contain multiple XML documents, the document number specifes which document is used for matching against a specific XML expression. An incorrect match results if the wrong XML document is specified. An example is shown in the “XML Pattern Matching” earlier in this chapter.

Documents are counted as they are encountered sequentially in the message body. If they are nested in a multipart message body, as shown above, the innermost document is counted first. The document number is used only for multipart and URL encoded messages, and is ignored otherwise. If the document number is not specified, the first XML document will be used for the pattern matching.

Valid document numbers are integers from 1 to 99.

Content Transfer Encoding Support

NOTE: *The Content-Transfer-Encoding header is not an HTTP header, and can only be specified in a MIME header (in the header of an embedded body part).*

Message bodies can be encoded so that they do not cause any problem for some of the protocol transfer gateways, especially when sending binary data. Even though HTTP is able to handle binary data, many applications still encode certain types of the messages. This is especially true if the encoding is being done at an application layer that is unaware of the transport protocol being used.

There are basically two common transfer encoding schemes: quoted-printable, and base64. Quoted-printable encodes non-printable ASCII and non-ASCII characters into the corresponding hexadecimal representation, while base64 uses a 64-character set to encode the data.

Both the quoted-printable and base64 values in the "Content-transfer-encoding" header are recognized. The encoded document is decoded according the encoding scheme, before any XML document test and pattern matching are made. The original message is not modified with respect to content-transfer-encoding.

Signed-Only S/MIME Support

S/MIME messages can be either encrypted or signed-only messages.

For encrypted messages, the format can be either `multipart/encrypted`, or `application/pkcs7-mime` with enveloped-data or encrypted-data. Encrypted messages are not supported, and are treated as non-XML.

For signed-only messages, 2 formats can be used: `multipart/signed` or `application/pkcs7-mime` with signed-data. The `multipart/signed` format is supported, because the signed data content looks like a normal Multipart MIME body part. The `application/pkcs7-mime` format is not supported, and messages in this format are treated as non-XML.

XML “Well formed” errors

If the SA8250 detects punctuation or syntax errors in an incoming XML data stream, it can be configured to send an error message to the sending client (the default setting), or to direct the client data to servers matching the RICH expression, effectively ignoring the incoming XML data.

XML default special case

If a server is configured as the default in the SA8250, and none of the XML expressions match the incoming data stream, the SA8250 directs the client to the default server, provided the RICH expression matches. This feature specifes which server handles the transactions if there are no matches for the XML expressions.

If the SA8250 is not programmed with a default server, and if none of the XML expressions match the incoming data, the SA8250 returns HTTP error 503, “No Servers Available” to the client.

If the RICH expression does not match, the XML expression is ignored and the SA8250 returns HTTP error 503, “No Servers Available” to the client.

To set the default server using the Graphical User Interface (GUI), see Chapter 4.

To set the default server using the Command Line Interface (CLI), see Chapter 5.

Services

Services are the virtual resources that the SA8250 provides to network clients. Services are defined by their Virtual Internet Protocol (VIP) address and virtual port number. The SA8250 load balances network client requests for a service by receiving requests from the user and directing them for fulfillment to the most appropriate resource in the provider's server farm. Services are defined and created within Policy Groups (see "Prioritization and Policy Groups" later in this chapter) and are managed using the following commands:

NOTE: *The sample commands used in this chapter are meant as examples only.*

```
config policygroup <name> service create <name>
  vip <ipaddr> port <number> {type [TCP | UDP |
  RICH_HTTP]} {sticky [disable| src-ip |
  cookie]} {sticky-timeout <seconds>} {backups
  [enable | disable]} {response <milli-sec>}
  {priority <level>} {balancing [load | robin]}
  {server-timeout <seconds>}
config policygroup <name> service delete [<name>
  | -all ]
config policygroup <name> service <name>
  {enable} | {disable} | {balancing [robin |
  load]} | {sticky [disable | src-ip | cookie]}
  | {sticky-timeout <seconds>} {backups [enable
  | disable]} | {response <milli-sec>} |
  {dup-syn <micro-sec>} | {priority <level>} |
  {server-timeout <seconds>}
```

Layer 4 (HOT) Services

HOT services provide the fastest brokered performance and are available on the SA8250. HOT services are defined in full by their Virtual IP address (VIP) and port number.

In HOT or "Brokered" mode, the SA8250 performs Network Address Translation (NAT) on all packets passing through the connection. NAT changes the destination IP address and port of incoming packets to those of the selected fulfillment server. The source IP address is modified to be that of the SA8250.

Fulfillment servers can be addressable by IP address, and thus can be on either local or wide area networks.

By default, in HOT mode the fulfillment server sees all connections as coming from the SA8250 rather than from the client's address. In some environments, it may be preferable to have the fulfillment server see the requests as they were coming directly from the client. Source Address Preservation (SAP) on the SA8250 allows this to happen. For more details, see Source Address Preservation later in this chapter.

Layer 7 (RICH) Services

The SA8250 allows more flexible service fulfillment for RICH (Real-time Intelligent Content Handling) services. The service type "RICH_HTTP" is available on the SA8250 and enables it to make fulfillment decisions based on the URL content of each client HTTP request. RICH services also include advanced error detection, and automatic resubmission of HTTP requests under most error conditions.

As with HOT services above, fulfillment servers can be addressable by IP address, and thus can be on either local or wide area networks.

XML services are configured as RICH services.

Out-of-Path Return (OPR)

NOTE: *OPR is not applicable to Layer 7 services.*

Ordinarily, the SA8250 processes all traffic in both directions between clients and the server farm. Viewing the server return traffic helps the SA8250 accurately determine server response times and handle HTTP errors. Often, the volume of data sent from the server to the client is much larger than the traffic from client to server. In such situations, you can use OPR mode to increase performance. You enable OPR by typing this command:

```
config policygroup <name> service <name> server
  <name> port <port> mode opr
```

Each server for which OPR is enabled must have its loopback interface configured to identify itself as the VIP of the brokered service. This allows the server to respond directly to the client. The server's loopback interface, or an equivalent interface that will not respond to Address Resolution Protocol (ARP) requests, must be configured before setting up the SA8250 for OPR. For more information, see Appendix D.

FTP Limitations

This table lists those limitations of FTP on the SA8250.

Mode	Active FTP	Passive FTP
HOT	No	Yes
HOT with SAP	Yes	Yes (see below)
OPR	No	No

FTP Limitations

HOT with SAP does not change the server's IP address during Passive FTP because the server is making the connection directly to the client, using its real IP address. If the server's IP address is not a "real" IP address, this mode will not work.

Sticky Options

Some services operate best if all requests from a specific client during a single session are directed to the same fulfillment server. For example, if the server maintains a local database of client activity or context (shopping cart, registration info, navigation history, etc.), it is important that subsequent client requests go to the server with these database records. The SA8250's “sticky” options allow this to occur.

Sticky is available in the two modes shown in this table.

Mode	Description
Source IP address (“src-ip”)	Requests from a given IP address are directed to a single server.
Cookie	The requesting browser is given a cookie, which subsequently identifies it as a unique requestor to be directed to a single server. This method uniquely identifies the client even if the request passes through a proxy server. RICH service is required.

Sticky Modes

Sticky source IP for SSL uses the SSL session ID for stickiness instead of the source IP of the client.

Both HTTP and HTTPS services can be RICH. However, incoming RICH SSL connections will always be decrypted and sent on to the fulfillment servers in clear text. Sticky cookie must be used when the clients need to remain stuck to the same server between HTTPS and HTTP.

There is no sticky cookie requirement for HTTPS traffic.

Each brokered service can be configured with sticky cookie, sticky IP, or no sticky option enabled. When a sticky option is configured, all client requests (identified according to the enabled sticky mode) during a session are routed to the same fulfillment server. When the sticky option is disabled, the SA8250 determines the best fulfillment server for each client request and directs them accordingly.

Sticky Persistence

For source-ip based sticky, the relationship between the client IP address and the fulfillment server remains in effect for the entire time the SA8250 is online or until the sticky timeout value expires. In the event of failover, the sticky relationship is lost. Cookie sticky remains in effect while the browser is running or until the sticky timeout value expires. Since the browser maintains the cookie, cookie sticky is maintained in the event of failover. The system clocks on both SA8250s must be synchronized for failover handling to work. You do this by enabling Network Time Protocol (NTP) using the Boot Monitor. The administrator can control the length of time a server is forced to handle serial requests from a single client using the sticky timeout value.

Sticky-timeout

NOTE: *All cookie sticky RICH services will be stuck to the same server for the duration of the sticky timeout value.*

The SA8250 treats the timeout differently for cookie versus source-ip sticky. With source-ip sticky, the timeout is reset with every connection from the client (so that the timeout is effectively an "idle time"). With cookie sticky, the timeout starts with the first connection from the client to the server, and never gets reset. When the cookie expires, even if actively being used, the next connection will be load balanced to a new server.

We recommend that you set the cookie sticky timeout value to at least 1.5 times the maximum amount of time a user will expect to be stuck to a server. If you are uncertain of the exact setting, we recommend using 43200 seconds (12 hours) as the default.

SSL and Sticky

SSL (Secure Sockets Layer, or HTTPS) enabled services can also be made sticky by specifying “sticky cookie” or “sticky src-ip” on the CLI. For SSL services, sticky cookie behaves exactly as it does for ordinary HTTP services. Source IP sticky uses the SSL session ID to maintain server context. The server relationship will not survive failover. As with sticky cookie, use of the session ID uniquely identifies the client even if the request passes through a proxy server.

Server-timeout

A server timeout, which causes a change in servers, can appear as a cookie sticky state change. The recommended value for server timeout is at least 1.5 times the maximum server response time.

We recommend that you use 120 seconds as the default.

Grouping Services

NOTE: RICH is required for sticky service grouping.

The SA8250's sticky capabilities can ensure that all service requests from the same user are routed to the same server. Enabling sticky cookie on multiple services ensures that requests from the same client will be routed to the same fulfillment server for the duration of the sticky relationship. Of course the server must be able to fulfill all service requests to have a true one-to-one client-server relationship.

SSL Acceleration

The SA8250 is a powerful addition to any web site desiring high security levels. It was specifically created to manage secure traffic going to and from critical applications. It handles SSL traffic into and out of the customer's environment, as well as providing load balancing, fault management, and error recovery.

The SA8250 includes cryptographic software features and hardware-based acceleration. It provides up to 1200 SSL (HTTPS) connections per second, far exceeding the performance of even the most powerful web servers on the market today.

The SA8250 allows users to off load SSL processing from their back end servers, and at the same time achieve full-featured traffic management. In a SA8250 environment, all encrypted traffic—required by e-Commerce applications—is handled at the SA8250. The interaction between the SA8250 and the servers is done in the clear, allowing load balancing and session management.

SSL processing is enabled by assigning an RSA private key (a public encryption key algorithm invented in 1977) and an X.509 certificate to a Layer 7 service. The SA8250 Command Line Interface (CLI) creates or imports keys and certificates when you define a service. Once the key and certificate are in place, secure HTTP (HTTPS) requests are decrypted and passed on to the web server. The SA8250's dual NIC and packet filtering capabilities can be used to isolate the web servers from the Internet, further preventing unauthorized access.

SSL Fundamentals

SSL involves an interchange of keys used both to authenticate the parties and to provide information to securely encrypt confidential data. The keys distributed in this medium are “one way,” or asymmetric. That is, they can only be used to encrypt confidential data, and only the “owner” of the public key can decrypt the data once it is encrypted using the public key information. SSL assures the three benefits shown in this table.

Benefit	Description
Authenticity	Verifies the identities of the two parties
Privacy	None other than the transacting parties can access the information being exchanged.
Integrity	The message cannot be altered in transit between the two parties by a third party without the alteration being detected.

SSL Benefits

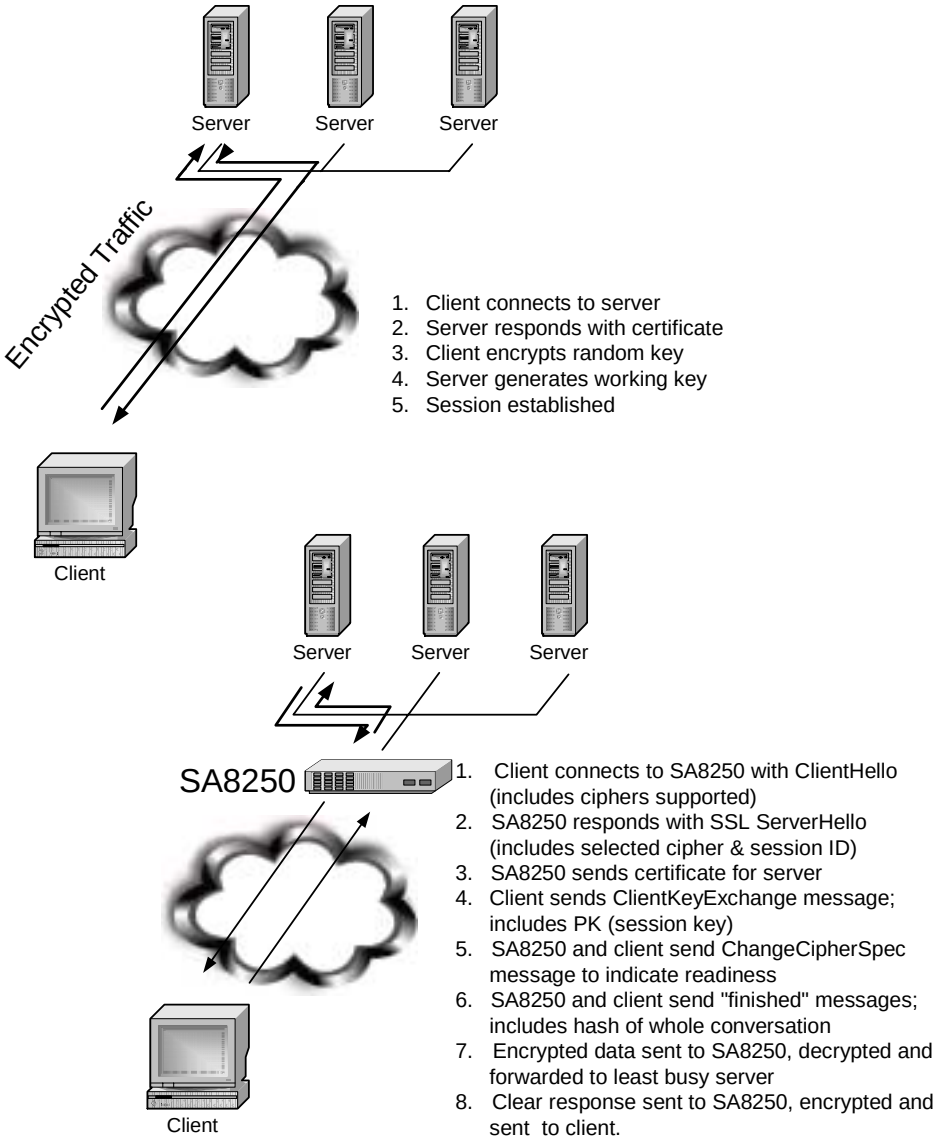
To establish a secure session with a server, the client sends a “hello” message to which the server responds with its certificate and an encryption methodology. The client then responds with an encrypted random challenge, which is used to establish the session keys. This method allows two parties to quickly establish each others’ identities and establish a secure connection.

Several encryption methods are employed. Common ones are DES, 3DES, RC2, and RC4. Key size can be varied to determine the level of security desired. A longer key is more secure.

The SA8250 supports all common keys and ciphers, as well as the following encryption methods: DES, DES3, and RC2 & RC4. The SA8250 includes a licensed version of the RSA code embedded in the security module as well. The device's session management software has been certified by prominent security agencies and meets all standards for SSL traffic.

The SA8250 handles all the handshaking, key establishment, and bulk encryption for SSL transactions. Essentially, the SA8250 is a full-featured, SSL-enabled web server. Traditionally, these functions are performed either at the server level, by web servers generally providing SSL functionality by way of standalone software components, or by embedded encryption software.

The SA8250 places encryption processing on the network side, thus eliminating the need for processing on the servers. The servers never see any of the SSL connection dialogue or the encrypted data. This removes a substantial processing load from the servers allowing improved response times and greater availability of system resources.



Basic SSL Operations

Application Message Traffic Management

The SA8250 was developed to perform load balancing in SSL environments. The SA8250 allows users to load balance based on application content (Layer 7, or RICH mode), as well as server address and port (Layer 4, or HOT mode). SSL management is handled independently of RICH mode processing. That is, once a session is established and the message is decrypted, it is passed to the SA8250's RICH processing component. This allows even SSL traffic to take full advantage of the features of the device, including error recovery and session rollback.

The SA8250 allows non-encrypted traffic to be processed independently of SSL traffic. The advantage of this is that it permits load balancing (in either HOT or RICH mode) configuration on a per virtual IP address, thus allowing you to isolate the impact of the SSL processing. Many users tune their sites for maximum performance by assigning HOT load balancing to all traffic except SSL.

One of other advantages of the SA8250 is its ability to recognize SSL session IDs. This permits "sticky" (or persistent) sessions to be established on a given server.

HTTPS Redirect

If desired, you can specify a page to return to the client if a successful session cannot be negotiated because the client does not support the required cipher suite. The SA8250 accomplishes this by sending an HTTP 302 "redirect" message back to the client in the case of a cipher negotiation failure. For example: The server supports 128-bit encryption, but the client's software is only capable of 40-bit encryption.

The CLI parameter `redirectpage=<URL>` sets which page the client is redirected to.

where <URL> is the fully qualified location of the page. For example: `redirectpage=http://www.companyname.com/error.html`.

The default configuration file setting is: `redirectpage=none`.

Fulfillment of each virtual service is load balanced across a number of real servers depending on the load balancing algorithm chosen. Servers capable of fulfilling requests for a service are identified and managed with the following commands:

```
config policygroup <name> service <name> server
create <name> port <port>

config policygroup <name> service <name> server
delete <name> port <port>
```

If you make an error while creating the policygroup, you must delete it and create a new policygroup.

Client Authentication

By default, the SA8250 does not authenticate client identities; however you can configure services to request client certificates for the purpose of verifying identities. When you enable this feature, the SA8250 verifies that client certificates are signed by a known Certificate Authority (CA).

Issued client certificates are expected to be in use for their entire validity period. The CA periodically issues a signed data structure, called a Certificate Revocation List (CRL), containing the serial numbers of all expired certificates. You can configure the SA8250 to obtain and use a CRL using LDAP, HTTP, or FTP protocols. The SA8250 first verifies a client certificate against the installed CA certificate, and then looks up its serial number in the installed CRL. If the serial number exists in the CRL, the SA8250 returns a message to the client indicating that the client's certificate was revoked, and the client connection is terminated.

HTTP Header Option Fields

The SA8250 can make the IP address of a requesting client available to a fulfillment server by constructing a custom HTTP header option, with the client's IP as the value:

```
HP_SOURCE_IP:<client-IP>
```

SSL-related HTTP header option fields are only used by the SA8250 with any SSL service. The HP_CIPHER_USED header option is used whenever HP_SOURCE_IP is used, to provide the name of the SSL-cipher negotiated between the SA8250 and the client:

```
HP_CIPHER_USED:<ssl-cipher>
```

These two header fields are used only by the SA8250 when client authentication is in use:

```
HP_CLIENT_CERTIFICATE:<client-certificate>
HP_SESSION_ID: <SSL-session-ID>
```

Because a client certificate contains information useful for client/user authorization, the SA8250 inserts the client certificate in the request header before sending the request to the server. The server can then extract the certificate from the request header and use it for authorization or other purposes.

The client certificate is inserted in the request header only once per session. Requests following the initial request will be sent to the server with only the SSL-session-id in the header. The SSL-session-id is unique for each session and allows the server to work with multiple sessions. The client certificate is inserted in the request header with a new SSL-session-id only when the client certificate has been re-negotiated between the SA8250 and the client:

- **New Session/Initial Request:** The SA8250 sends both the HP_CLIENT_CERTIFICATE and HP_SESSION_ID header options.
- **Existing Session/Subsequent Requests:** The SA8250 sends only the HP_SESSION_ID header option.

The use of header option fields is an efficient way of supplying information to the server about the client. To ease the use of this important feature, the SA8250 allows customization of all the above header option field names. For more information, see Chapter 5.

Load Balancing Across Multiple Servers

Balancing Algorithms

The SA8250 provides a choice of load balancing algorithms. Services can be separately configured to load balance using a round-robin or a response time algorithm. In most networks, the best performance results from use of the response time algorithm. Under this algorithm, the SA8250 measures the response time of each request to each server in the server farm. It then balances requests to the service among the servers, sending more requests to the fastest servers and fewer to the slower ones, thus optimizing the average response time.

In cases where OPR is used in unpredictable WAN environments, response time metrics may be obscured by WAN latency variance. In these situations, round-robin load balancing can provide equal distribution of client requests to each fulfillment server.

The balancing algorithm is specified with this command:

```
config policygroup <name> service <name>
  balancing [robin | load]
```

Response-time Metrics

For both balancing algorithms, servers can be assigned target response times. These values indicate the desired average response time for requests for specified services to be fulfilled, and instructs the SA8250 to use alternate resources for fulfillment if the average response time exceeds target response time. Target response time is controlled with this command:

```
config policygroup <name> service <name>
  response <mil-seconds>
```

If the servers do not meet the specified response time threshold, backup servers, if available and enabled, are activated. In addition, the servers providing lower priority services are throttled if the response time is still not being met (if `throttle` is enabled in the policygroup). Both mechanisms are available for both of the load-balancing algorithms.

Primary and Backup Servers

Each server is identified as either a Primary or Backup for a given service. Primary servers are always considered first for request fulfillment. By default, Backup servers are considered for use only if a primary server goes down, though they can optionally be configured for use to maintain target response times. A server's type is established with this command:

```
config policygroup <name> service <name> server
  <name> port <port> type [primary | backup]
```

Backup servers are enabled to maintain target response times with this command:

```
config policygroup <name> service <name> backups
  [enable | disable]
```

Server Configuration Options

Source Address Preservation

By default, brokered service requests arriving at a fulfillment server appear to the server as requests originating from the SA8250. Consequently, server log files record the SA8250 as the source of these requests. When Source Address Preservation (SAP) is enabled however, the SA8250 preserves the original source addresses of requests delivered to the server farm. If you use the log files from your server farm to gather information based on client source addresses, use Source Address Preservation. SAP is controlled with this command:

```
config policygroup <name> service <name> server
  <name> port <port> mode sap
```

NOTE: *For the SA8250 to operate in SAP mode, the default gateway for each SAP-enabled server must be set to the SA8250's physical IP address, not the VIP.*

SAP cannot be used in WAN or multiple router LAN environments. To use SAP, each server must be configured so that its default gateway is set to the physical IP address of the SA8250, thus there can be no routers between the SA8250 and the fulfillment servers.

Limitations of SAP mode operation:

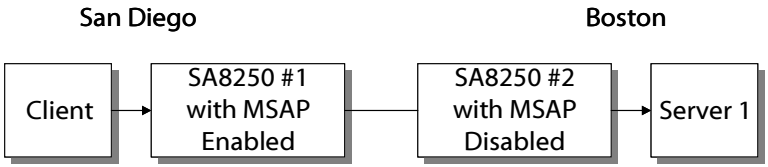
- The client machine cannot be on the same subnet as the SA8250.
- The SA8250 and server must be on the same subnet.

When SAP is enabled, serial cable failover is the only failover option — routing failover is not available.

Multi-hop Source Address Preservation

It is possible in sophisticated network topologies to require requests to pass through two SA8250s. In such configurations, the SA8250 *topologically closest to the clients* must be configured with the Multi-hop Source Address Preservation (MSAP) feature enabled.

MSAP allows requests to pass through two cascaded SA8250s in different geographical areas. Enabling MSAP ensures that the actual IP addresses of requesting clients, rather than the virtual IP address of the SA8250 that delivered the request, are recorded in the server logs. This is similar to SAP (described in the preceding section), however this feature allows SA8250s to be geographically-dispersed:



MSAP on a Geographically-Dispersed Network

NOTE: *MSAP must be disabled (the default).*

In the figure above, a client in San Diego sends a request to a fulfillment server in Boston. MSAP is enabled on SA8250 Broker 1, and Server 1's default route is set to SA8250 Broker 2. The SA8250 Broker 2 doesn't need SAP enabled for this service, since SAP is automatically used on MSAP requests from SA8250 Broker 1. In this configuration, the San Diego client's IP address will be preserved in the Boston fulfillment servers' logs. To enable MSAP, type this command:

```
config policygroup <name> service <name> server
  <name> port <port> msap enable
```

RICH expressions in XML patterns

Layer 7 RICH_HTTP service configurations use rich expressions to assign particular classes of URLs to particular servers for fulfillment. RICH expressions are used, for example, to distinguish content requested by clients performing online transactions, from content typically requested by casual browsers. In this way, users performing online transactions are given higher priority access to server resources (and better response times) than other users.

Each server listed for fulfillment of a RICH_HTTP service can be configured to serve any number of specific rich expressions. This is a list of applicable expressions:

- File type expressions, such as `*.gif`, or `*/index.html`
- Path expressions, such as `/home/*`, or `/home/images/*`, or `/home/images/a*`.
- Unique file expressions, such as `/index.html`
- Wildcard expression, such as `*`.
- Negation expressions, such as `!*.gif` or `!*/index.html`

RICH and XML expressions are managed with these commands:

```
config policygroup <name> service <name> server
  <name> port <port> xmlpattern create
  <xmlpattern>
config policygroup <name> service <name> server
  <name> port <port> xmlpattern delete
  <xmlpattern>
config policygroup <name> service <name> server
  <name> port <port> xmlpattern info
```

For more details on these commands, see Chapter 5.

Order of RICH expressions

When using expressions in Layer 7 (RICH) operations, the order of expressions is significant only when the not (!) operator is used.

Expressions are described in this table.

Expression	Yields
!*.gif	All non-GIF files
***.jpg**	All JPG files
!/home/*	No matches

Order of Expressions

Three rules for expressions:

- The “*” and “!” are allowed in RICH expressions, but they can only exist at the beginning or end of the expression.
- A positive RICH expression is required after a negative RICH expression, otherwise the negative expression has no effect.
- Negative RICH expressions can be used alone, but not in XML patterns.

Routing with Dual Interfaces

Because the SA8250 has two network interfaces, it can act as a router in some contexts. This means that it can route between two subnets. To do this, you must designate the SA8250 as the default gateway for your fulfillment servers. Routes to the inside subnet are not advertised to the outside router, but host routes are advertised to the VIPs. Packets destined for defined VIPs are always routed through the SA8250 to the server-side subnet. Other packets are forwarded through the SA8250 only when the security mode is set to OPEN or when set to CUSTOM and IP Forwarding is turned on. The SA8250's routing capabilities vary depending on which routing and failover methods are used. For more details about these variations and their relationships to routing and failover configurations, see Appendix C.

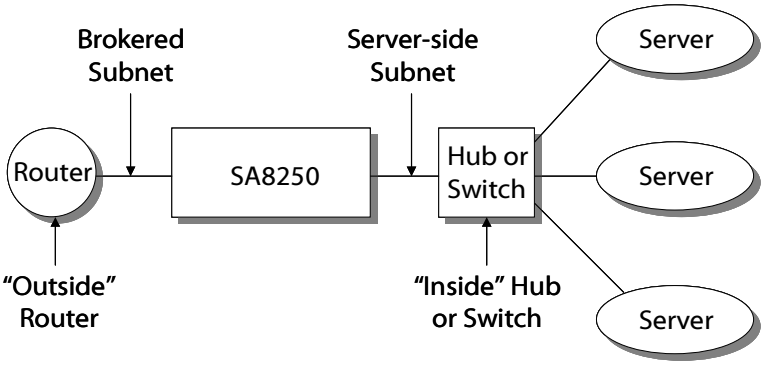
NOTE: *The SA8250 cannot route multiple subnets on one interface.*

This table lists terms that are pertinent to SA8250 routing.

Term	Description
Brokered subnet	The SA8250 interface attached to the side of the physical network on which client requests arrive.
Server-side subnet	The SA8250 interface attached to the side of the physical network that includes the fulfillment servers.
"Outside" device	The router or switch one hop from the SA8250 on the brokered subnet
"Inside" device	The router or switch one hop from the SA8250 on the server-side subnet

Routing Terms

This figure shows an example of the SA8250 routing topology.



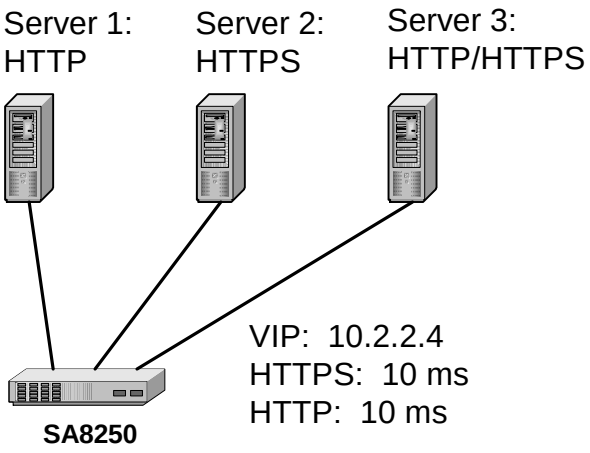
SA8250 Routing Topology

Prioritization and Policy Groups

Policy groups are containers used to organize services. Service prioritization uses policy group information to make decisions about which services should get more or less server resources. Although the assignment of services to policy groups can be arbitrarily determined by the operator, effective use requires that each policy group contain services related by their shared use of server resources. Services and servers are assigned to Policy Groups at their time of creation. This is a list of policy group management commands:

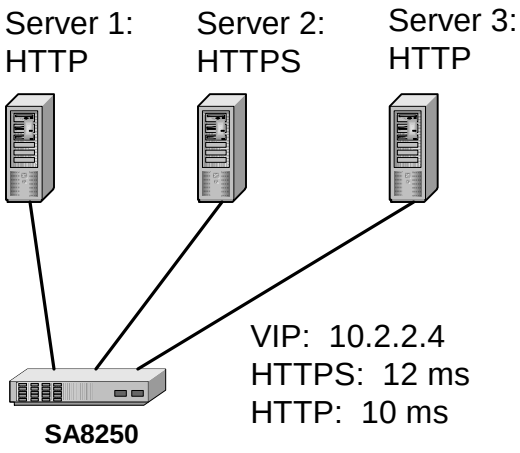
```
config policygroup create <name>

config policygroup delete <name>

config policygroup <name> throttle [enable |
  disable]
```

The policy group framework allows the prioritization of categories of client requests. Each service defined in a policy group is assigned a priority within that group and a target response time. When the average response time of a service exceeds its target response time, that service is allocated, on the basis of its priority, a greater share of common server resources to attempt to bring response time back within the target range (this assumes that the throttling option is enabled for the policy group).



Target Response Time Satisfied

For example, the services HTTP and HTTPS are both assigned to a single policy group. HTTPS is designated the highest priority service, and HTTP the second priority. The SA8250 monitors the response time of each service, and if necessary re-prioritizes server resources of subordinate services to keep the response time for the highest priority service within the specified range. The figure above shows a policy group with services sharing a defined VIP, two services, and their associated target response times. When the average response time of HTTPS is less than or equal to 10ms, Server 1 fulfills HTTP requests, Server 2 fulfills HTTPS requests, and Server 3 fulfills both HTTP and HTTPS requests. The figure on the next page illustrates server utilization after HTTPS response time exceeds 10 ms.



Target Response Time Exceeded

Upon noticing a break in the target response time threshold, the SA8250 scans the policy group's active service and server pools for shared resources. In this example, both the HTTP and HTTPS services use Server 3. To provide the greatest server resources for the highest priority service, shared resources are eliminated from subordinate service pools (although each service will always have at least one point of fulfillment). For example, in the figure above, new HTTP connections are no longer sent to Server 3 in an effort to guarantee the target response time for HTTPS. Server 3 will again serve HTTP when target response times are met.

Routing Method for VIP Addresses

After setting up a service, you must configure the SA8250 to route the VIP address to the Internet. There are two possibilities:

- In single SA8250 installations, “Standalone” mode is preferred as it allows the VIP to be ARP-accessible from the router.
- If there are multiple address spaces (such as a SA8250 on the 10.x.x.x network and a VIP on the 209.x.x.x), then a routing protocol might be the best method to advertise the VIP. When configuring routing on the SA8250, always match the router's configuration. The SA8250 can be programmed to use RIP v1, RIP v2, or OSPF.

  For example (standalone mode):

```
HP SA8250#config route
HP SA8250/config/route#info
Route configuration:
----------------------------
Broker role: standalone
RIP Info:
    Active:no
    Version:2

OSPF Info:
                  Active: no
                    Area: backbone
          Hello interval: 10
    Router dead interval: 40
     Authentication type: simple
      Authentication key: <your key>
```

Error Detection

The SA8250 is capable of recognizing and reacting to server error conditions, detecting non-responsive (comatose) servers, and directing traffic to alternate resources until the server is back in operation. The SA8250 can also capture many HTTP errors before they reach the client, and redirect the request to an alternate server.

Server Status Detection

The SA8250 uses multiple means to monitor the status of the fulfillment servers. The Intelligent Resource Verification (IRV) module periodically pings the servers to verify that they are alive. The SA8250 also monitors a "dup-syn" interval to calculate packet loss rate.

Intelligent Resource Verification

When the IRV module pings a server and receives no response, it tries to connect to each port on which the suspect server is configured to listen. If the SA8250 itself does not receive a response from a given port, then that server/port combination is declared dead. If the server maintains network connectivity and responds positively to IRV pings, but its ports stop responding, then the dup-syn interval threshold (described below) is used to decide if the server is declared dead.

Dup-syn Interval

The SA8250 dynamically calculates the threshold for the acceptable number of dropped packets within a given interval. If at any time in this interval the number of dropped packets exceeds this threshold, the server is considered dead. After the specified time value has expired the lost packet (or dup-syn) count is divided by two and the time interval starts again. In this way, some history information is kept between time intervals.

The dup-syn interval for this threshold is established with the `dup-syn` CLI command, and ranges in value from 1000 to 2,147,483,647 microseconds. The default time interval value is 500,000 microseconds (one half second), which is appropriate for most environments. By lowering or raising this value, you render the SA8250 respectively less or more sensitive to dropped packets, and less or more likely to declare a server dead. The volume of network traffic must be taken into account when setting the dup-syn interval. Higher volumes of traffic require a shorter dup-syn interval to avoid mistakenly declaring a server dead due to network congestion.

The `dup-syn` command uses the following syntax:

```
config policygroup <name> service <name> dup-syn
  <micro-seconds>
```

HTTP Error Detection

The SA8250 offers HTTP error detection for RICH services. When HTTP error detection is enabled, the SA8250 scans the headers of server responses for errors. If an HTTP error is found, the original request is rerouted to another server for fulfillment, transparently to the client. This process continues until a server responds without an error, or all applicable servers have been tried. Conversely, if HTTP error detection is disabled, the error is returned directly to the client. HTTP error detection for errors 401-405 and 500-503 (as defined in the HTTP specification) is configured with this command:

```
config policygroup <name> service <name> server
  <name> port <port> http [enable | disable]
```

The SA8250 extends standard HTTP error handling by allowing the server to return a special 606 error code. Detection and handling of 606 errors is configured separately. In this way, standard errors may be passed to the client while 606 errors are handled transparently by the system. If 606 error handling is enabled, the SA8250 scans for an HTTP 606 response code. If the response code is found and another server is available to handle the request, it is sent automatically. This process continues until a server responds without an error, or until all applicable servers have been tried.

The HTTP header for 606 handling is of the form: “HTTP/1.0 606 Error.” Users can generate this response through a variety of methods including CGI and nph scripts. Consult your web server documentation for information about generating custom error messages.

```
config policygroup <name> service <name> server
  <name> port <port> 606 [enable | disable]
```

Serial Cable Failover

The SA8250 offers two failover methods:

- Router Failover (including OSPF, RIPv1 and RIPv2), *and*
- Serial Cable Failover

NOTE: *DHCP is not available when serial cable failover is enabled.*

When serial cable failover is configured, the Primary and Backup SA8250s communicate heartbeat, configuration, and status information using the included null modem serial cable. The Backup SA8250 assumes control from the Primary when any of the following occur:

- The Backup SA8250 does not detect the Primary SA8250's heartbeat within the timeout period (the default is 3 seconds).
- The Primary SA8250's Ethernet interface becomes inactive. For example, if the Ethernet cable is disconnected.
- The Primary SA8250 experiences an internal software error.

NOTE: *You can log on to the Backup SA8250, but the full command set is not available.*

Both the Primary and Backup SA8250s need to know their own identity and the "Online Identity" by address and name to satisfy internal communication parameters. The SA8250s' own names and the shared online identity are automatically entered into their host files during failover configuration. If Dual NIC is enabled, the identities for both the Outside (network-side) and Inside (server-side) NICs are shared.

For information on failover method dependencies, see Appendix C.

Serial Cable Failover Configuration

NOTE: *Before configuring serial cable failover, both the primary and backup SA8250s must be configured with the* `setup` *command. For more information, see Chapter 3.*

The following procedures are used to configure the Primary and Secondary SA8250s for serial cable failover operation.

Configure the Primary SA8250

1. Connect the two SA8250s using their failover ports using the provided null modem serial cable.
2. Reboot the SA8250 that will be the Primary and press a key at the prompt to enter the Boot Monitor.
3. At the prompt, type this command:

```
monitor>failover
```

NOTE: *The Online IP Address is the address used by the SA8250 that is currently accepting connections — this can be either the Primary or the Backup SA8250 (though it is typically the Primary). The Online IP Address is the address by which you can access the Online SA8250 using telnet for administration.*

4. For single NIC operation, follow the prompts as shown:

```
Set failover method (None, Serial, Route)
  [ ] ---> serial
Checking for failover unit...
  Failover unit not detected or may not be
  configured.
Is this machine Primary or Backup? [Primary]--->
Enter the Network's Online IP Address
  --->10.6.3.200
Enter Network's Online Hostname ---> netonline
Serial failover successfully configured
```

If Dual NIC operation is enabled, failover configuration looks like this example:

```
monitor>failover
Set failover method (disabled, serial, route)
[disabled] --->serial
Disabling DHCP to allow serial failover.
Checking for failover unit...
  Failover unit not detected or may not be
  configured.
Is this machine Primary or Backup? [Primary]--->
Enter the Network side Online IP Address
  [10.6.3.200] --->
Enter the Server side Online IP Address
  [10.6.4.200] --->
Enter the Network side Online hostname
  [netonline] --->
Enter the Server side Online hostname --->
  servonline
Serial failover successfully configured
```

5. Save the Primary configuration.

```
monitor>save
List of currently saved configuration files(s).
You may save over an existing configuration file
or enter a new name.
File name
----------
active.cfg
backup.cfg
cris.cfg

'active.cfg' is the last booted configuration.
Enter configuration file name (- to cancel):
  [active.cfg] --->
Configuration has been saved.
```

6. Boot the SA8250.

```
monitor>boot
Do you really want to continue boot? [y]
  ---> <Enter>
Boot which configuration? [active.cfg]
  ---> <Enter>
Please stand by, the system is being booted.
  .... Done
Login>
```

Configure the Backup SA8250

1. Reboot the SA8250 that will be the Secondary and press a key at the prompt to enter the Boot Monitor.
2. At the prompt, type this command:

```
monitor>failover
```

3. Follow these prompts:

```
Specify failover method (disabled, serial,
  route) [ ] --->s
Checking for failover unit...
Failover unit detected
-------------------------
Version : 2.3
Type    : PRIMARY
State   : ONLINE
Name    : online13
IP      : 13.1.1.20
Mac     : 0:1:c9:ed:a6:fb
```

NOTE: Use the same Online IP Address and name for the Backup SA8250 as the Primary (these appear by default).

```
Is this machine Primary or Backup? [Backup]
  ---> <Enter>
Enter Online IP Address [13.1.1.20] ---> <Enter>
Enter Online Name [online13] ---> <Enter>
Serial failover successfully configured
monitor>
```

4. Save the Backup configuration.

```
monitor>save
List of currently saved configuration file(s).
You may save over an existing configuration file
  or enter a new name.
File name
----------
active.cfg
backup.cfg
cris.cfg

'active.cfg' is the last booted configuration.
Enter configuration file name (- to cancel):
  [active.cfg] --->
Configuration has been saved.
```

5. Boot the SA8250.

```
monitor>boot
 ... current configuration ...
 ... list of saved configuration files ...
Boot configuration file name? [active.cfg]
  ---> <Enter>
Do you really want to boot 'active.cfg'? [y]
  ---> <Enter>
Please stand by, the system is being booted.
```

Replicating the Configuration

The active configuration is replicated upon changes to the Backup SA8250 from the Primary. For most configurations, faults are detected within 3 seconds, and the Backup is fully online within 25 seconds. The latter interval increases as the number of services increases.

Status Information

You can display information about the SA8250s' function and failover status either via the Command Line Interface or the GUI. Below are the commands to display status information followed by a list of status messages and their explanations.

1. Log in to the SA8250.
2. At the CLI prompt, type this command:

```
HP SA8250>info
```

The status appears on the last line of the info command's output. A description of the status message is shown in this table.

Failover Status Message	Description
The broker is ONLINE, and serial failover is NONE (disabled).	One of the SA8250s is configured for either "none" or "route" failover.
The broker is PRIMARY and ONLINE, the remote's serial failover is NONE (disabled).	One of the SA8250s is configured for either "none" or "route" failover.
The broker is PRIMARY and ONLINE, the remote's state is READY.	Normal Serial Failover Operation
The broker is BACKUP and READY, and the remote's state is ONLINE.	
The broker is PRIMARY and NIC_FAILED, and the remote's state is ONLINE.	Ethernet cable disconnected, or cable, NIC, or HUB port failure
The broker is BACKUP and ONLINE, and the remote's state is NIC_FAILED.	
The broker is PRIMARY and ONLINE, the connection to the remote has TIMED OUT.	The serial cable connecting the SA8250s is disconnected
The broker is BACKUP and IP_IN_USE_ERROR, the connection to the remote has TIMED OUT.	

Status Message Descriptions

NOTE: *The notation, PRIMARY/BACKUP indicates that either "PRIMARY" or "BACKUP" will be displayed.*

The Failover Status messages in this table are not specific to the Primary or Backup SA8250s.

Failover Status Message	Description
The broker is PRIMARY/ BACKUP and WAITING_FOR_SYNC	One of the SA8250s has been restarted. This status persists while the configuration files are loaded from the online SA8250. The time this state persists depends on the number of VIPs and services configured.
The broker is PRIMARY/ BACKUP and CONFIGURATION_ ERROR	Both SA8250s are configured as Primary or as Backup. Neither SA8250 will come online until this condition is corrected
The broker is PRIMARY/ BACKUP and DNS_FAILED	The online IP address is missing from both the local host file and the DNS server.
The broker is PRIMARY/ BACKUP and CORE_APP_FAILED.	Indeterminate error. Use an earlier working configuration. If the condition persists, contact Customer Support for assistance.
The broker is PRIMARY/ BACKUP and RICH_APP_FAILED.	

Additional Status Message Descriptions

Notes

3 Boot Monitor

Using the Boot Monitor

CAUTION: *After configuring the SA8250 with the Boot Monitor, you must enable Autoboot with the* `autoboot` *command or the SA8250 will not operate.*

The HP e-Commerce/XML Director Server Appliance SA8250's Boot Monitor configures boot options and manage boot configuration files. Typically, you will use the Boot Monitor only during the initial configuration or after major reconfigurations, if the latter becomes necessary. You can manage day-to-day operations using the Graphical User Interface (GUI, Chapter 4) or the Command Line Interface (CLI, Chapter 5).

General categories of tasks performed by the Boot Monitor:

- Configure and display boot options, including the configuration file
- Manage the boot configuration file system
- Configure and change IP parameters

System Requirements

You can use any terminal or workstation with a terminal emulator to run Boot Monitor, provided the terminal has the following features:

- 9600 bits per second, 8 data bits, 1 stop bit no parity, no flow control (**9600-8-N-1**)
- A terminal emulation program, such as HyperTerminal*
- Cable and connector to match the male DTE connector (DB-9)

Accessing the Boot Monitor

You can access the Boot Monitor in either of the two ways described below.

Interrupting the Bootup Sequence

1. Interrupt the SA8250's bootup sequence by pressing a key at the following prompt:

   ```
   Press any key to stop autoboot.
   ```

   In a few seconds the following prompt displays, confirming that the Boot Monitor is running:

   ```
   monitor>
   ```

Using the Run Time CLI

1. Type this command at the prompt:

   ```
   HP SA8250#config sys autoboot disable
   ```

2. Type this command at the prompt:

   ```
   HP SA8250#reboot
   ```

   The `monitor>` prompt displays, confirming that the Boot Monitor is running.

Boot Monitor Commands

This section lists and describes all Boot Monitor commands available on the SA8250.

autoboot

Enables or disables the Autoboot function. If Autoboot is enabled (the default), the SA8250 prompts you to press a key during restart to enter the Boot Monitor command line interface. If you ignore the prompt, restart finishes with the SA8250 in normal operating mode. If Autoboot is disabled, the restart sequence ends by displaying the Boot Monitor interface.

Example:

```
monitor>autoboot
Enable Autoboot? (yes,no) [yes] --->
```

boot

Boots the device with a specific configuration. Variations on the use of the reboot command are shown in this section.

Reboot with No Configuration Changes

NOTE: The first boot after a `factory_reset` *command or a new installation will prompt you for the root password.*

1. Type the **`boot`** command.

   The Boot Monitor displays the current configuration and prompts you for confirmation:

```
Current active configuration
----------------------------
Product:                HP SA8250
Version:                2.7
Patch Level:            0.0
Build:                  12
Current time:           Tue Sep 12 17:02:05 2000
Hostname:               CSLab7k
-------------
Network side NIC:
  IP Address:           10.6.3.21
  Netmask:              255.255.255.0
  MAC address:          0:a0:c9:ed:6c:cc
-------------
Service side NIC:
  IP Address            10.6.5.21
  Netmask:              255.255.255.0
  MAC address:          0:d0:b7:6:c1:85
-------------
```

```
Default Gateway:        10.6.3.1
Domain:                 None
Primary name server:    None
DHCP:                   Disabled
Failover mode:          Disabled
Network NIC setup:      Auto
Server NIC setup:       Auto
NTP:                    Disabled
Autoboot:               Disabled
Static Routes:          None
RICH_Biased:            Enabled
Do you really want to boot active.cfg? [y] --->
```

2. To boot to the normal operational prompt, type **y**.
3. To return to the `monitor>` prompt, type **n**.

Reboot with Configuration Changes

When you use the **`boot`** command after changing the SA8250's configuration, you are presented with a number of options. With these you can use the changed configuration, revert to the last saved configuration, or choose among a list of previously saved configurations. Procedures for choosing among these options are organized within three groups described in this section.

1. Type the **`boot`** command.
2. The Boot Monitor displays the changed configuration information and prompts you to save the new configuration:

```
Current active configuration
----------------------------
Product:                HP SA8250
Version:                2.7
Patch Level:            0.0
Build:                  12
Current time:           Tue Sep 12 17:02:05 2000
Hostname:               CSLab7k
-------------
Network side NIC:
  IP Address:           10.6.3.21
  Netmask:              255.255.255.0
  MAC address:          0:a0:c9:ed:6c:cc
-------------
```

```
Service side NIC:
  IP Address            10.6.5.21
  Netmask:              255.255.255.0
  MAC address:          0:d0:b7:6:c1:85
-------------
Default Gateway:        10.6.3.1
Domain:                 None
Primary name server:    None
DHCP:                   Disabled
Failover mode:          Disabled
Network NIC setup:      Auto
Server NIC setup:       Auto
NTP:                    Disabled
Autoboot:               Disabled
Static Routes:          None
RICH_Biased:            Enabled
The configuration has changed, save it? [y] --->
```

First Options:

1. If you accept the default, **y**, the system saves the configuration as either `active.cfg` or the last loaded filename.

   ```
   Configuration file name? [active.cfg] --->
   ```

NOTE: *This list includes* `backup.cfg`*, a backup of the most recently booted configuration. This file is automatically created when you change the configuration and* **save**.

2. You can either accept the default, `active.cfg`, or enter a new filename. The system then saves the file and presents a list of all saved files.

   ```
   Select a boot configuration from the following
     files.
   active.cfg
   backup.cfg
   Boot configuration file name? [active.cfg] --->
   ```

3. You can accept the default, `active.cfg`, or select another previously saved configuration. No matter which file you select, the configuration file you are about to boot is displayed to ensure that the last file displayed is the configuration that is booted.

4. If you accept the default, **y**, the system boots to the normal operational prompt, if you type **n**, it returns to the `monitor>` prompt.

Second Options:

1. If you choose not to save the modified file, the system displays a warning that it is reverting to the previously booted configuration:

   ```
   Warning: The current configuration has NOT been
   saved and will not be booted. Reverting to last
   saved active.cfg.
   ```

2. If there are no additional saved configurations then the system prompts you to confirm that want to boot the last saved configuration, which will always be `active.cfg`.

   ```
   Do you really want to boot active.cfg? [y] --->
   ```

3. If you accept the default, **y**, the system boots to the normal operational prompt. If you type **n**, it returns to the `monitor>` prompt.

Third Options:

1. If there are any previously saved configurations on the system, you are offered a choice of configuration files to boot from.

   ```
   Select a boot configuration from the following
     files.
   active.cfg
   backup.cfg
   Boot configuration file name? [active.cfg] --->
   ```

2. You can accept the default, `active.cfg`, or select another previously saved configuration. If you select `active.cfg`, the configuration is not redisplayed. If you select a file other than `active.cfg`, the file's contents are displayed to ensure that the last file displayed is the configuration that is booted.

3. If you accept the default, **y**, the system boots to the normal operational prompt. If you type **n**, it returns to the `monitor>` prompt.

delete Deletes the specified configuration file.

Example:

```
monitor>delete
Select a configuration to delete from the
  following files.
Note: You cannot delete the active
  configuration file active.cfg.
File name
--------------
active.cfg
backup.cfg
cris.cfg

'active.cfg' is the last booted configuration.
Enter the configuration filename to delete:
  --->broker1.cfg
broker1.cfg successfully deleted.
```

dhcp Enables or disables the SA8250's use of DHCP. When DHCP is enabled, the SA8250 receives its configuration parameters from the DHCP server at startup. When DHCP is disabled (the default setting), the SA8250 ignores the DHCP server, and so it must be manually configured at restart. Respond to the prompt with **y** to enable, or **n** to disable.

Example:

```
monitor> dhcp
Enable DHCP (yes, no)? [no] --->
```

dir Displays the list of saved boot configuration files.

dns Sets the domain and (optionally) nameserver(s). The system prompts you for the required information.

Example:

```
monitor> dns
Would you like to configure DNS (yes, no)?
  [no] --->
monitor>dns
Would you like to configure DNS (yes, no)?
  [no] --->yes
Enter Domain name (‘-’ to cancel)
  --->mydomain.com
Enter the IP Address of the Primary name server
  (‘-’ to cancel) --->10.6.3.5
Specify additional name server
  ( <return> to end ) --->10.6.3.10
Specify additional name server
  ( <return> to end ) --->
```

dual Sets single or dual NIC operation.

Example:

```
monitor>dual
Enable dual NIC operation (yes, no) [no] --->
```

factory_reset

Resets the SA8250 to its factory defaults, as listed in this table.

NOTE: *The first boot after a* `factory_reset` *command or a new installation will prompt you for the root password. Also, the* `factory_reset` *command does not delete saved configuration files.*

Parameter	Setting
All added user accounts	Deleted
Policy groups, services, and servers	Deleted
Route parameters	Deleted
CLI parameters	Deleted
IP address	Deleted
Default route	Deleted
Hostname	Deleted
Domain	Deleted
Name servers	Deleted
DHCP	Disabled
Dual NIC	Disabled
Failover mode	Disabled
Autoboot	Disabled
Autoboot timeout	5 seconds
Added hosts in the host file	Deleted
New root password on next boot	Forced
Rich bias	Enabled
Static routes	Deleted

Factory Defaults

failover Sets the SA8250's failover method. Three failover options are available:

- **disabled:** no failover method will be used
- **serial**: serial cable failover will be used
- **route**: router failover will be used

Example:

```
monitor>failover
Specify failover method (disabled, serial,
  route): [disabled] --->serial
Checking for failover unit...
  Failover unit not detected or may not be
  configured.
Is this machine Primary or Backup?
  [Primary] --->
Enter the Network side Online IP Address
  --->10.6.3.200
Enter the Server side Online Address
  --->10.6.5.200
Enter the Network side Online hostname
  --->net-onlinehost
Enter the Server side Online hostname
  --->serv-onlinehost
Serial failover successfully configured
```

gateway Specifies the default gateway.

Example:

```
monitor>gateway
Enter default gateway: --->10.6.3.1
```

help Lists all Boot Monitor commands, or optionally displays syntax for a specified command.

Example:

```
gateway        Set default gateway
interface      Configure network interface card
```

host Sets the SA8250's host name.

Example:

```
monitor>host
Enter the hostname you would like to assign to
  the Network NIC: --->CSLab7k
```

info Displays the current boot configuration.

interface Configures Ethernet port parameters (replaces the **nic** command). Compatibility with some older switches, hubs, or routers, may require that you manually specify the Ethernet speed and duplex mode of the SA8250's network interface card.

Single NIC configuration example:

```
monitor>interface
Auto configure the network NIC speed and duplex
  (yes,no)? [yes] --->no
1 - 100BaseTx
2 - 10BaseTx
Select Media Type (1 or 2): [1] --->2
Use Full Duplex? [n] --->n
```

Dual NIC configuration example:

```
monitor>interface
Auto configure the Network side NIC speed and
  duplex (yes,no)? [yes] --->
Auto configure the Server side NIC speed and
  duplex (yes,no)? [yes] --->
```

ip Sets the SA8250's IP address.

Example:

```
monitor>ip
Enter the IP address for the Network side NIC
  [10.6.3.21] --->
Enter the IP address for the Server side NIC
  [10.6.5.21] --->
```

load Loads a previously saved configuration file into memory.

Example:

```
monitor>load
Select a configuration file to load from the
  following files.
File name
--------------
active.cfg
backup.cfg
cris.cfg

'active.cfg' is the last booted configuration.
Enter the configuration filename to load
  (- to cancel): [active.cfg] --->
Configuration loaded: active.cfg
```

netmask Sets the netmask.

Example:

```
monitor>netmask
Enter Netmask for Network side NIC
  [255.255.255.0] --->
Enter Netmask for Service side NIC
  [255.255.255.0] --->
```

rich-bias Optimizes RICH_HTTP service performance. If your RICH_HTTP service responses consist mostly of files greater than 8K, the enabled (default) setting of `rich_bias` will optimize performance. If your site is experiencing performance problems and the RICH_HTTP service responses are less than 8K, you should disable `rich_bias`.

This command has no effect on SSL terminated connections.

Example:

```
monitor>rich_bias
Unit is currently 'RICH_Biased', change it
  (yes, no) [no] --->yes
RICH_Biased (enable, disable) [enable]
  --->disable
```

save Saves the current configuration. Changes made during the current Boot Monitor session are lost unless you use the `save` command.

Example:

```
monitor>save
List of currently saved configuration file(s).
You may save over an existing configuration file
  or enter a new name.
File name
-------------
active.cfg
bckup.cfg
cris.cfg

'active.cfg' is the last booted configuration.
Enter configuration file name (- to cancel):
  [active.cfg] --->-Configuration save canceled!
```

settime Set the SA8250's system date and time. If you select NTP, you will be prompted for the IP address of the NTP server(s) you want to use. If you set the date manually, you will be prompted for the date in 24-hour format.

Example, with NTP:

```
monitor>settime
Use NTP? [enable] --->
Enter IP address of NTP server or <return> to
  end:  --->209.218.240.1
Enter IP address of NTP server or <return> to
  end:  --->209.218.240.238
Enter IP address of NTP server or <return> to
  end:  --->
```

Example 1, without NTP (manual setting)

NOTE: Example 1 is for setting the time using Greenwich Mean Time (GMT). For example, the GMT-14 timezone is GMT minus 14 hours.

```
monitor>settime
Use NTP? [disable] --->

Select TIMEZONEs to list (GMT, US, Other or q to
  quit: [GMT] --->GMT
```

```
Select a TIMEZONE from the 'GMT' list.

1) GMT-14     2) GMT-13     3) GMT-12
4) GMT-11     5) GMT-10     6) GMT-9
7) GMT-8      8) GMT-7      9) GMT-6
10)GMT-5      11)GMT-4      12)GMT-3
13)GMT-2      14)GMT-1      15)GMT
16)GMT+1      17)GMT+2      18)GMT+3
19)GMT+4      20)GMT+5      21)GMT+6
22)GMT+7      23)GMT+8      24)GMT+9
25)GMT+10     26)GMT+11     27)GMT+12

Select a number between 1 and 27
  (q to quit)--->2

Selected TIMEZONE 'GMT-13'
The current time is now: Fri Sep 29 05:38:38
  GMT-13 2000

Enter the year (YYYY): [2000] --->
Enter the month (MM): [09] --->
Enter the day (DD): [29] --->
Enter the hour (HH): [05] --->
Enter the minute (MM): [38] --->
Enter the seconds (SS): [38] --->
Fri Sep 29 05:38:38 GMT-13 2000
```

Example 2, without NTP (manual setting):

NOTE: *Example 2 is for setting the time using United States time (US).*

```
monitor>settime
Use NTP?  [disable] --->

Select TIMEZONEs to list (GMT, US, Other or q to
  quit: [GMT] --->US

Select a TIMEZONE from the 'US' list.

1) Alaska       2) Aleutian       3) Arizona
4) Central      5) Eastern        6) Hawaii
7) Indiana-East 8) Indiana-Starke 9) Michigan
10)Mountain    11)Pacific       12)Somoa

Select a number between 1 and 12
 (q to quit): [11}--->5
```

```
Selected TIMEZONE 'Eastern'
The current time is now: Sat Oct 28 23:59:42
  2000
Enter the year (YYYY): [2000]--->
Enter the month(MM): [10]--->
Enter the day (DD): [28]--->29
Enter the hour (HH): [23]--->01
Enter the minute (MM): [59]-->57
Enter the seconds (SS): [39]--->
Sun Oct 29 01:57:39 EDT 2000
```

Example 3, without NTP (manual setting):

NOTE: *Example 3 is for setting the time using any timezone OTHER THAN GMT or US.*

```
monitor>settime
Use NTP?  [disable] --->

Select TIMEZONEs to list (GMT, US, Other or q to
  quit: [GMT] --->O

Select a TIMEZONE from the 'Other' list.

1) Bangkok        2) Belfast      3) Belgrade
4) Berlin         5) Brussels     6) Copenhagen
7) Hongkong       8) Israel       9) Japan
10)London         11)Madrid       12)Manila
13)Paris          14)Poland       15)Portugal
16)Prague         17)Rome         18)Singapore
19)Stockholm      20)Turkey       21)Warsaw
22)Zulu           23)Zurich

Select a number between 1 and 23 (q to quit):
  [10]--->22

Selected TIMEZONE 'Zulu'
The current time is now: Wed Jan 10 10:32:22 UTC
  2001
Enter the year (YYYY): [2001]--->
Enter the month(MM): [01]--->
Enter the day (DD): [10]--->
Enter the hour (HH): [10]--->
Enter the minute (MM): [32]-->
Enter the seconds (SS): [22]--->
Wed Jan 10 10:32:22 UTC 2001
```

setup Starts the SA8250's setup procedure. The system displays prompts for all inputs necessary to initialize it.

Example:

```
monitor>setup
Enable dual NIC operation(yes,no)? [no] ---> yes
Autoconfigure the Network side NIC speed and
  duplex? (yes,no)? [yes] --->
Autoconfigure the Server side NIC speed and
  duplex? (yes,no)? [yes] --->
  DHCP is disabled for dual NIC operation.
Enter the hostname you would like to assign to
  the Network NIC: --->CSLab7k
Enter the IP address for the Network side NIC
  --->10.6.3.21
Enter the IP address for the Server side NIC
  --->10.6.5.21
Enter the Netmask for the Network side NIC
  --->255.255.255.0
Enter the Netmask for the Server side NIC
  --->[255.255.255.0] --->255.255.255.0
Enter default gateway: --->10.6.3.1
Would you like to configure DNS (yes, no)? [no]
  --->DNS not configured.
Specify failover method (disabled, serial,
  route): [disabled] --->
Set Autoboot? (yes,no) [no] --->
```

static_routes Deletes and adds any number of static IP routes. Shows the current static IP routes (if any) when the function is entered. You are prompted for the destination and gateway IP addresses. The `info` command will show any static IP routes that are known to the Boot Monitor, and `factory_reset` will remove all static IP routes as part of its cleanup.

Example:

```
monitor>static_routes

Static Route information.

Enter Static route (1) dest IP(- to del, q to
  quit): --->10.7.16.5
Enter Static route (1) gate IP(- to del, q to
  quit): --->10.8.15.40
Enter Static route (2) dest IP(- to del, q to
  quit): --->10.7.18.50
Enter Static route (2) gate IP(- to del, q to
  quit): --->10.8.15.40
Enter Static route (3) dest IP(- to del, q to
  quit): --->q
{2} Static Route(s).
```

version Displays the software version information.

Example:

```
monitor>version
Product:                HP SA8250
Version:                2.8
Patch Level:            0.1
Build:                  8
```

Notes

4 Graphical User Interface

Before You Begin

NOTE: *Some functions and features, such as expressions, are not available in the GUI.*

The HP e-Commerce/XML Director Server Appliance SA8250 has features and functions that are controlled through either the browser-based Graphical User Interface (GUI), as discussed in this chapter, or the Command Line Interface (CLI), as discussed in chapter 5.

In order to use the inside IP or inside online IP for administration, the client must be on the same subnet as the inside interface, or must have an alternate path back through the outside interface.

To type all XML commands and configurations, see the Policy Manager screen, later in this chapter.

Logon Screen

To access the various GUI services available to you on the SA8250, you must first log on to the system as described in this section.

Logging on to the GUI

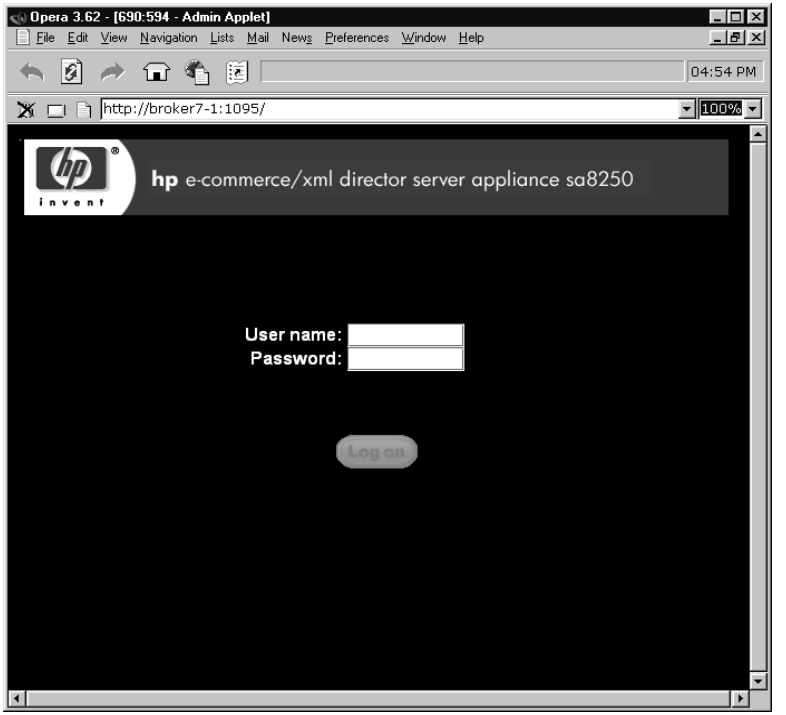
NOTE: *If Internet Explorer* 5.01 is your browser, you must add a trailing slash (/) to the URL, as shown in step (2). Also, the default GUI port (1095) can be changed. For details, see "GUI Tab" later in this chapter.*

1. Launch your browser.
2. In your browser's *Address* or *Location* field, type the SA8250's address and specify port 1095. For example:

   `http://system_name:1095/`

   where *system_name* is the actual name or IP address of your SA8250.
3. Press Enter.

   The Logon screen displays.



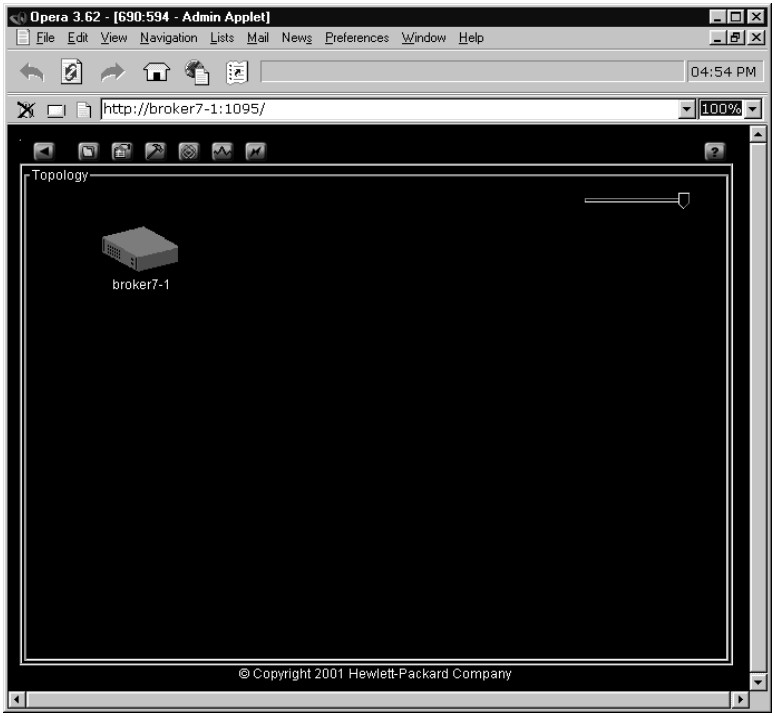
Logon Screen

NOTE: *The factory default for both the user name and password is* **`admin`** *(lowercase required). To change them, see "Users Tab" later in this chapter.*

4. In the space provided, type your User name.
5. In the space provided, type your Password.
6. Click *Logon*.

   The Topology screen displays, as shown on the next page. The number of server icons varies, depending upon your network configuration.

Topology Screen



Topology Screen

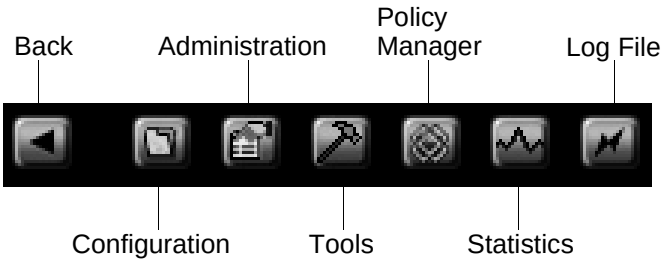
Using the Topology Screen

Purposes of the Topology Screen

- Displays a graphical representation of the current topological relationships between the SA8250 and network servers. The SA8250's status and Serial Cable failover, if configured, are also reflected here.
- Serves as a gateway to the Administration and Policy Manager screens, and the Configuration and Tools screens.

Topology Screen Toolbar

Located at the top left of the window, the toolbar's buttons are described below.



Topology Screen Toolbar

- *Back* returns you to the previous screen. From the Topology screen, this will log you off the system and return you to the logon screen.
- *Configuration* displays the Configuration Screen
- *Administration* displays the Administration Screen
- *Tools* displays the Tools Screen
- *Policy Manager* displays the Policy Manager Screen
- *Statistics* displays the Statistics Screen
- *Log File* displays the SA8250's log file.

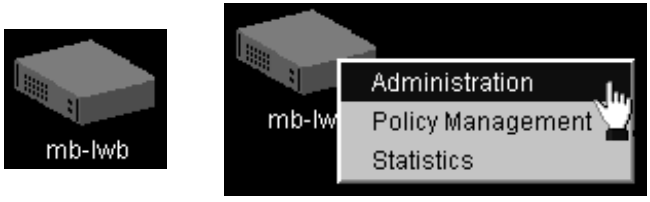
Online Help

Located at the top right of the window, the *Help* button is shown below. Click *Help* to display the online help file.

Online Help Button

Topology Screen Elements

This figure shows how the SA8250 is represented onscreen by a horizontal "rack unit" icon.



SA8250 Icon

- Right-clicking on the SA8250 icon displays a popup menu that can take you to other screens.
- Double-clicking the SA8250 icon takes you to the Policy Management screen by default, but this can be changed in the Administration screen later in this chapter.

This figure shows how servers are represented onscreen by vertical "tower case" icons.

Server Icon

- Right-clicking on a server icon displays a popup menu that can take you to other screens.
- Double-clicking the server icon takes you to the Statistics screen by default, but this can be changed in the Administration screen later in this chapter.

Window Controls

To resize the Topology screen elements, click and drag the slider control located in the upper right hand corner of the screen.

Slider Control

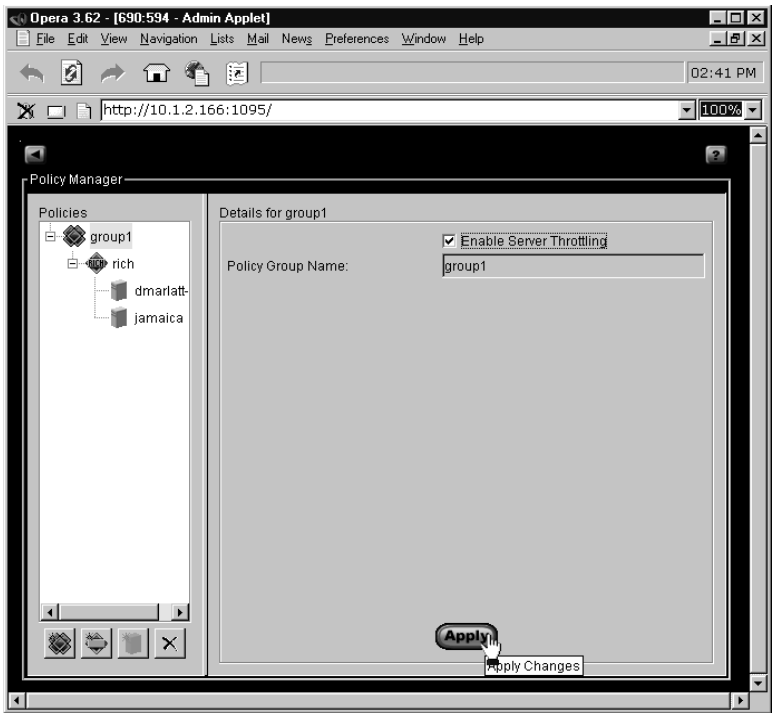
- Moving the slider control to the far right, as shown in the figure above, for the largest display.
- Moving the slider control to the far left results in the smallest display.
- You can also resize the Topology screen elements by right-clicking on the background of the screen and making your selection from the popup menu.

Background Zoom and Refresh Control

- *Zoom In* enlarges the display and is the equivalent of moving the slider control to the right.
- *Zoom Out* reduces the display and is the equivalent of moving the slider control to the left.
- *Refresh Display* updates the Topology screen.

Policy Manager Screen

When you double-click a SA8250 icon in the Topology screen (or right-click and select *Policy Management*), the Policy Manager screen displays.



Policy Manager Screen

The Policy Manager consists of a series of screens with multiple tabs that includes the controls used in the implementation of Policies. The discrete items created, altered, and deleted in the course of Policy management are listed below:

- Policy Groups
- Services
- Servers

Policy Manager Controls and Displays

The Policy Manager screen contains two main regions:

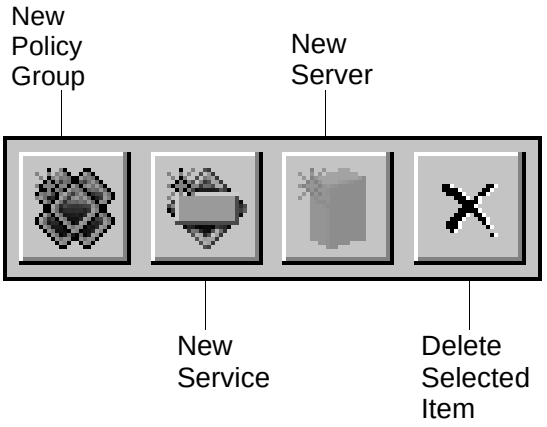
- Policies, on the left side of the Policy Manager screen
- Details, on the right side of the Policy Manager screen

You can adjust the relative sizes of the Policies and Details displays by clicking and dragging the vertical line between the panels. The Policies display includes existing Policy Groups, Services, and Servers, reflecting the previously mentioned hierarchy. The Details display includes controls and status displays relating to the item selected in the Policies display, and changes according to the type (Policy Group, Service, or Server) of the item selected. If a Service or Server is selected, then the Details screen contains two tabs, each containing related controls.

The three types of items form a hierarchy: policy groups contain Services. Services in turn contain Servers. A lower hierarchy item cannot be created unless its immediately superior type exists, that is, a policy group must exist before you can create a Service, and a Service must exist before you can create a Server.

Policy Manager Toolbar

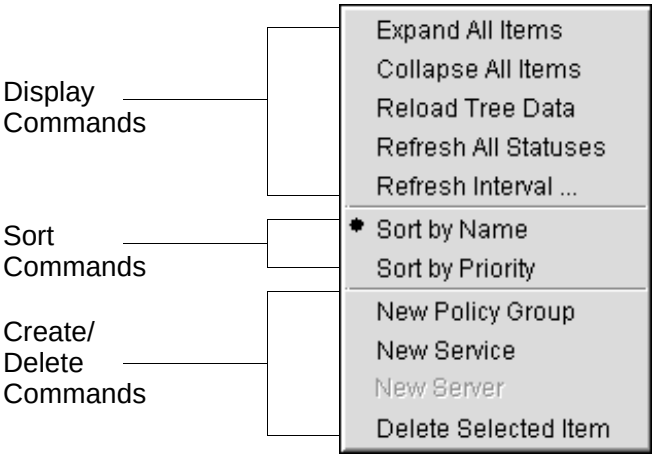
The Policy Manager toolbar contains three buttons for creating Policy Groups, Services and Servers, and one button to delete the currently selected item, regardless of its type. The toolbar's buttons are enabled or disabled (dimmed) according to the type of item selected in the Policies display.



Policy Manager Toolbar

Policy Manager's Pop-up Menu

You can display the Policy Manager's pop-up menu by right-clicking in the Policies display.



Policy Manager's Pop-up Menu

Policy Groups

Services are virtual resources provided to a client. However, Services can exist only in the context of *Policy Groups*. Policy Groups are regarded as containers used to organize Services. Therefore, before Services can be defined, Policy Groups must be created to contain them.

The Policy Manager's Policy Group Details screen provides two functions:

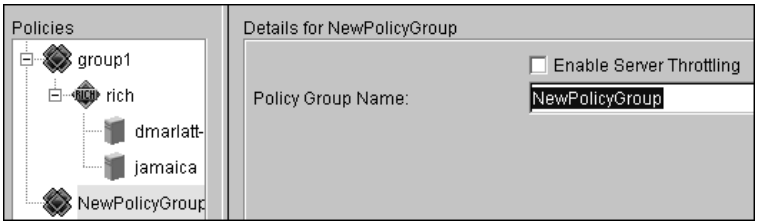
- Naming of newly created Policy Groups
- Enabling or disabling of the selected Policy Group's throttling function

Creating Policy Groups

You can create Policy Groups in either of two ways:

1. In the left of the Policy Manager toolbar, click *New Policy Group, or*
2. Right-click to display the menu, then select the *New Policy Group* command.

   A new Policy Group icon and the Detail screen displays in the Policies.



Adding a New Policy Group

3. In the *Policy Group Name* field, type a name for the new Policy Group. Policy Group names must adhere to the following conventions:

- From 1 to 25 characters in length
- Any alphanumeric character
- Other eligible characters include hyphens ("-"), periods ("."), and underscores ("_")
- Spaces must **not** be used.

NOTE: *The names of existing Policy Groups cannot be changed.*

Within these restrictions, the naming of Policy Groups is at your discretion, though convenient naming schemes might include serial names ("Group1," "Group2," etc.), or names that reflect a Policy Group's content, such as "e-CommerceGrp" or "HTTP_Group."

4. To accept the specified name, click *Apply.* The new Policy Group's new name displays in the Policies display.

   When the new Policy Group name displays, *New Service* becomes available. This reflects the fact that Services cannot be created unless at least one Policy Group already exists.

Throttling

When throttling is enabled, requests to eligible servers in lower-priority services are stopped until response times of higher priority services are met, or all eligible servers have been throttled. An *eligible* server is one that is shared by both higher and lower priority services. Throttling affects all services within a Policy Group.

To enable or disable throttling for the selected Policy Group, follow these steps:

1. Select the *Enable Server Throttling* check box.
2. Click *Apply.*

Deleting Policy Groups

To delete a Policy Group, follow these steps:

1. In the Policies display, click to select the name of the Policy Group to be deleted.
2. In the Policy Manager toolbar, click *Delete* (**X**), or right-click to display the menu and click the *Delete Selected Item* command.

Services

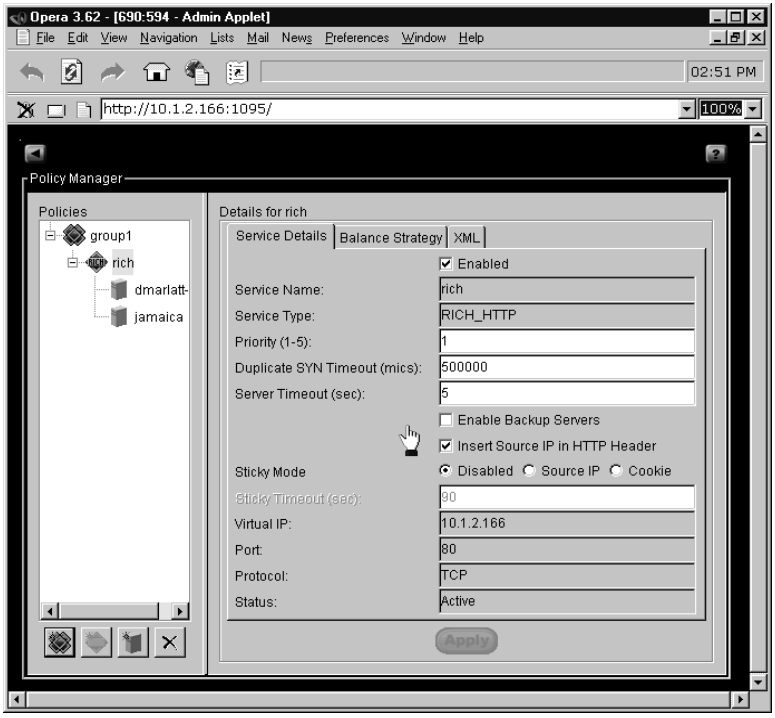
Once a Policy Group exists, you can create Services.

Creating Services

To create a Service, follow these steps:

1. In the Policies display, click to select a Policy Group.
2. In the Policy Manager toolbar, click *New Service*, or right-click in the Policies display and select *New Service* from the pop-up menu.

   The *Service Details* tab displays in the Details for the service.



Service Details Tab

NOTE: *All fields in steps (3) through (6) become read-only after the service is created.*

3. In the *Service Name* field, type a name for the service.
4. From the *Service Type* pull-down menu, click the desired Service type. The choices are HOT TCP (the default), or RICH_HTTP.
5. From the *Virtual IP* pull-down menu, click the desired Virtual IP (VIP) address. If there are no VIPs in the menu, or if the desired one is absent, type it in.

NOTE: *The VIP/port combination* ***must*** *be unique.*

6. In the *Port* field, type a port number. This is the listening port for incoming connections, and you can select port numbers between 1 and 65535.
7. When you have finished filling in the fields in the *Service Details* tab, click *Apply.*

   The Policies display now reflects the name of the new Service below the name of the Policy Group from which it was created.

Additional Service Tab Controls and Displays

This table lists items that can be changed after the Service has been created.

Control or Display	Description
Enabled	Select this check box to activate the selected Service. Clear the check box to disable the Service.
Priority	Services within a single Policy Group can be prioritized. The SA8250 assures more server resources to Services with high priority numbers than to those with lower numbers. The Priority setting is an integer from 1 (highest priority) to 5 (lowest priority), and the default is 1.
Duplicate SYN Timeout	This value is the time interval (in microseconds) after which the fulfillment server is declared dead if the dynamically calculated number of duplicate SYNs (lost packets) to that server is detected. You can specify a value from 1000 to 2,147,483,647, and the default is 500,000.
Server Timeout (RICH Only)	This value is the time interval (in seconds) during which a server must respond before it is declared dead. If the server fails to respond before the end of timeout interval, the outstanding request is passed to another server. This value is only available for RICH_HTTP services.
Enable Backup Servers	This check box enables or disables servers designated as type "Backup" to come on line if necessary to assure target response times. For more details about servers, see “Servers” later in this chapter.
Insert Source IP in HTTP Header (RICH only)	This check box specifies whether or not the Source IP address is embedded within the HTTP header information.

Additional Service Tab Controls and Displays

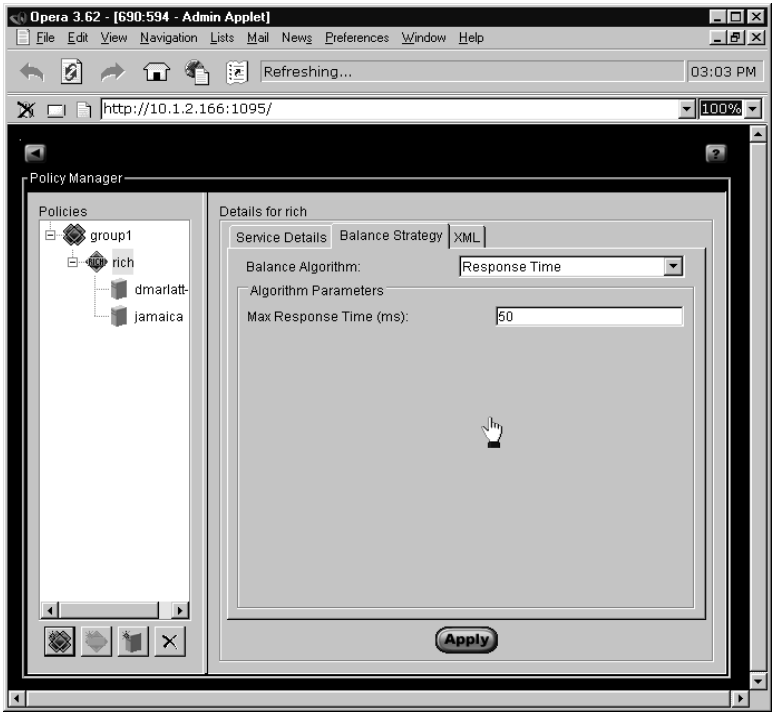
Control or Display	Description
Sticky Mode	The SA8250 is configured to maintain a session's state so that serial requests from a single client are allocated to the same server. This is called a "sticky" port. This setting may be disabled, based on Source IP, or based on a Cookie: **Source IP**: Source IP sticky mode uses the client's source IP address to identify a series of requests to be directed to a single server. **Note**: If using SSL services, the SSL session ID maintains a sticky relationship when Source IP sticky is selected. **Cookie**: In cases where requests come through a proxy server, all requests display to originate from that server's IP address, thus IP address is of no use in identifying individual requestors. Cookie sticky mode provides an active method of identifying requestors in such situations. When Cookie sticky mode is enabled, a cookie is given to requesting browsers. Subsequent requests from clients who have received cookies contain identifying information allowing the SA8250 to direct them to a single server. Cookie mode is available only for RICH_HTTP.
Sticky Timeout	The current software version for the SA8250 treats the timeout differently for cookie versus Source IP sticky. With Source IP sticky, the timeout is reset with every connection from the client (so that the timeout is effectively an "idle time"). With cookie sticky, the timeout starts with the first connection from the client to the server, and never gets reset. When the cookie expires, even if actively being used, the next connection will be load balanced to a new server. Workaround: We recommend that you set the cookie sticky timeout value to at least 1.5 times the maximum amount of time a user will expect to be stuck to a server. The default is 90 seconds.
Protocol	This read-only field displays the protocol of the Service (TCP).
Status	This read-only field displays the status of the selected Service ("Active" or "Inactive").

Additional Service Tab Controls and Displays (continued)

Balance Strategy

HOT Services are assigned server resources according to either of two Balance Algorithms.

1. Click the Balance Strategy tab of the Service Details screen to display the *Balance Algorithm* controls.



Service Balance Strategy Tab

Two Balance Algorithms are available:

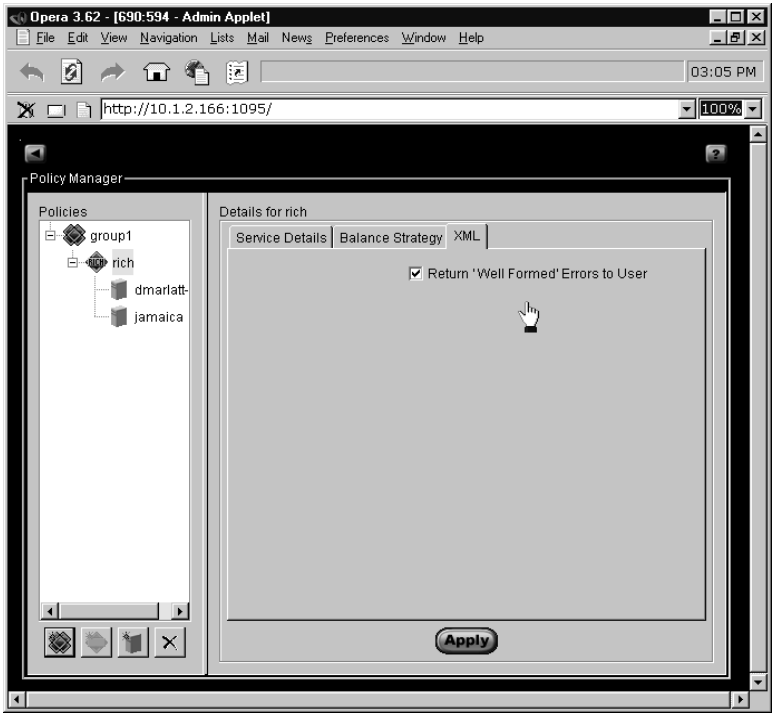
- **Response Time:** Requests for a Service using the Response Time algorithm are forwarded to the server that can fulfill them within the shortest time.
- **Round Robin:** Requests for a Service using the Round Robin algorithm are distributed evenly among the available servers.

2. From the pull-down menu, click to select the desired *Balance Algorithm* for the Service selected in the Policies display. If you select Response Time, type a value (in milliseconds) in the *Max response time (ms)* field.

XML Service Tab

This screen controls how the SA8250 reacts to incorrect syntax or punctuation errors it detects in the incoming client data.

1. Click the XML tab of the Service Details screen.



XML Services Tab

2. To enable the client error messages (HTTP 403, “POST data was not well formed”), check the *Return “Well Formed” Errors to User* checkbox. This is the default setting.
3. To disable this feature, uncheck the *Return “Well Formed” Errors to User* checkbox. When disabled, no HTTP error messages are sent, but the SA8250 directs the data to servers that match the RICH expression, effectively ignoring the XML expression.
4. Click *Apply.*

Deleting Services

To delete a Service:

1. In the Tree, click select the name of the Service to delete.
2. In the Policy Manager toolbar, click *Delete*, or right-click to display the menu and click the *Delete Selected Item* command.

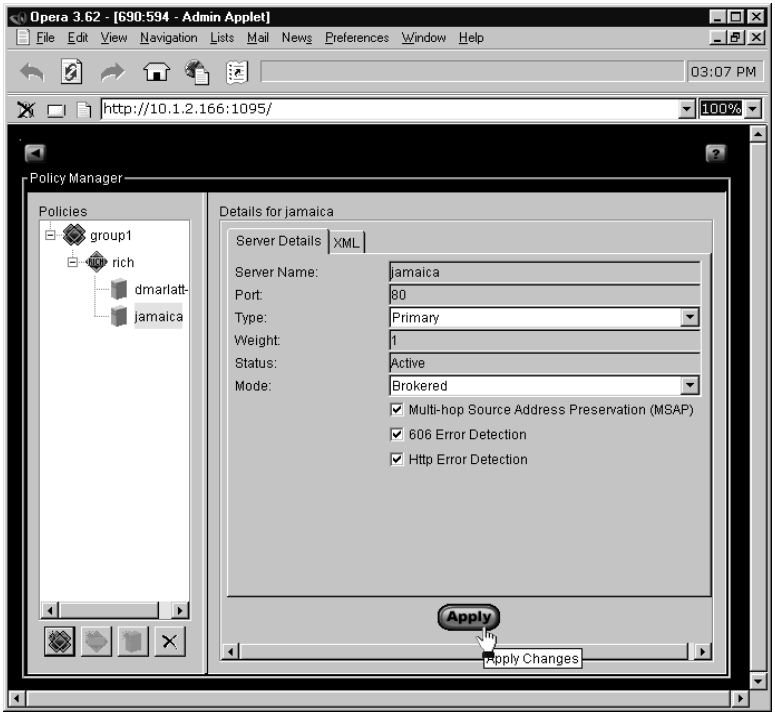
Servers

After you create Services, you must designate, or "create" Servers to fulfill client requests for Services. As Services must exist within Policy Groups, a Server (for example, a fulfillment host) must be mapped to a Service.

To create Servers, follow these steps:

1. In the Policies tree, click an existing Service.
2. In the Policy Manager toolbar, click *Create Server*, or right-click in the Policies display and click *New Server* from the pop-up menu.

   The *Server Details* tab displays in the Details screen:



The Policy Manager's Server Detail Screen

3. In the *Server Name* field, type an IP address or server name known to the SA8250 via DNS or static host table. This value cannot be changed after the server is created.
4. If appropriate, edit the *Port* field. The default value is the port number of the Service under which this Server displays in the Tree. This value cannot be changed after the server is created.

5. From the drop down menu, click to select the desired *Type*:

   - **Primary:** Primary servers are immediately available to accept client requests forwarded from the SA8250.
   - **Backup**: Backup servers are sent requests under only two circumstances: First, when the primary servers are unable to meet the configured target response times a backup server may be used if and only if "backups" is enabled for this service. Second, backup servers are given requests when a primary server is unavailable. As primary servers become inactive, backup servers are brought into service to handle requests.
   - **Disabled:** Renders the server unavailable to accept client requests.

NOTE: *OPR cannot be used in conjunction with Services of type RICH_HTTP.*

6. From the drop down menu, click to select the desired *Mode*. This command enables or disables Source Address Preservation (SAP) on the named server. When Out-of-Path Return (OPR) is enabled, the user-designated server port is ignored and the configured service server port is used. By default, SAP is enabled (and cannot be disabled) when OPR is in effect.

   For more details about SAP and OPR, see Chapter 2.

7. Check the appropriate RICH control checkboxes:

- **Multi-hop Source Address Preservation:** It is possible in sophisticated network topologies to require that requests pass through two cascaded SA8250s. In such configurations, the SA8250 topologically closest to the clients must be configured with the MSAP feature enabled. In most configurations, the default setting (MSAP disabled) must be used.
- **606 Error Detection:** "606" is a user-defined error code, that is, you can specify an application level error as a "606 error" so it is detectable by the SA8250. When 606 Error Detection is enabled, requests that generate a 606 error are rerouted, transparently to the client, to the next available server. When disabled, the error is sent back to the requesting client.
- **HTTP Error Detection:** When HTTP Error Detection is enabled, requests that generate HTTP errors 401-405 and 500-503 are rerouted, transparently to the client, to the next available server. When disabled, these errors are sent back to the requesting client.

XML Server Tab

This screen defines the RICH and XML expressions that the SA8250 will look for in the incoming client data.

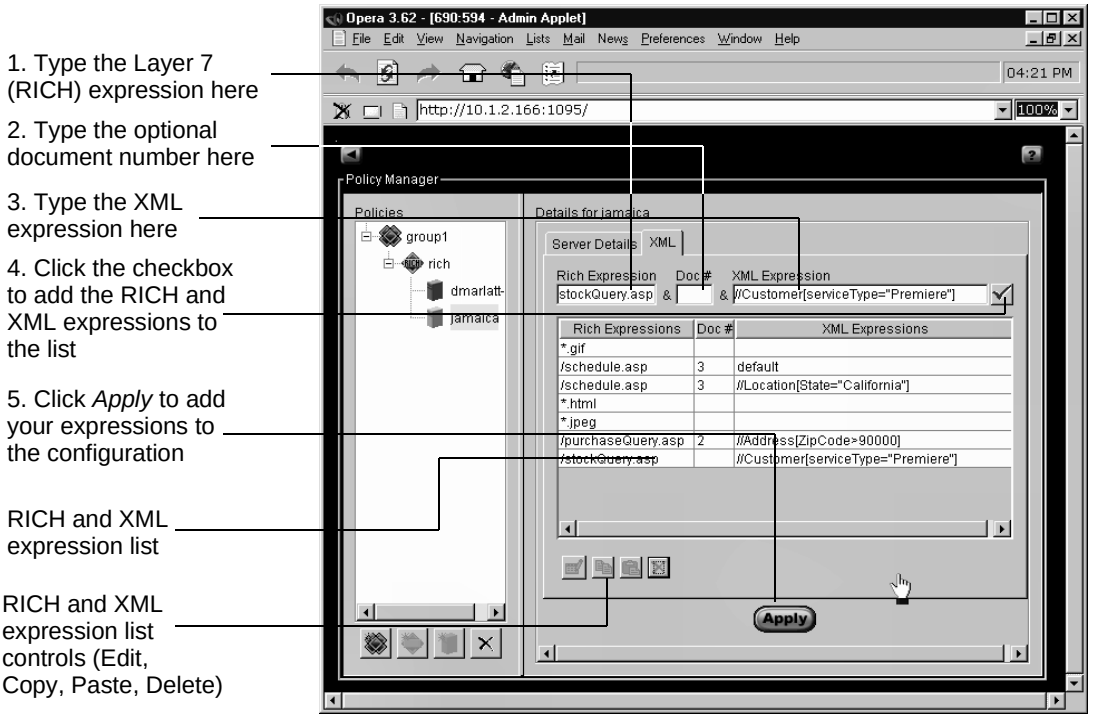
For more details on XML expressions, see Chapter 2.

Programming RICH and XML expressions

To program the RICH and XML expressions, follow these steps:

1. From the Server Details screen, click the XML tab.

   This figure shows the XML Server Tab display.



XML Server Tab

NOTE: *If the* RICH Expression *field is blank, XML expressions will be ignored. If desired, you can type an asterisk (*) as a wildcard in the* RICH Expression *field to accept all RICH expressions Also, you cannot use the vertical bar* (|) *or the carat* (^) *in XML expressions.*

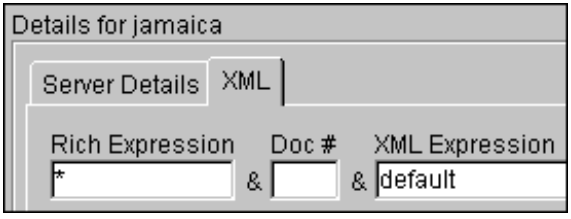
2. In the *RICH Expression* field, type a valid RICH expression.
3. (Optional) In the *Doc #* field, type a valid document number if using multipart or URL-encoded messages. The entry **must** be an integer, and the valid range is from 1 to 99. If a document is not specified, the SA8250 starts with the first XML document in the message.
4. In the *XML Expression* field, type a valid XML expression.
5. To the right of the *XML Expression* field, click the checkbox.

   Your RICH and XML expressions are added to the list.
6. Repeat steps (2) through (5) above as needed.
7. When you have finished adding expressions to the list, add the expressions to the SA8250's configuration by clicking *Apply.*

For more XML expression examples, see Chapter 6.

XML Default Special Case

We recommend programming the SA8250 with one of your servers set to the default special case.



Typing the XML Default Special Case

The advantage of this is that if no XML expressions match, the client is directed to the server you chose as the default server.

If no default servers exist, and no RICH or XML expressions match, the client will receive a "Server not found" error from the SA8250.

XML Syntax Checking

The SA8250 includes a syntax checker to ensure that XML expressions you type are understood by the system. If your syntax is incorrect, as in the case of a missing double quote (“) or an incorrect document number, an error message is displayed.

GUI XML Syntax Error Window

The error message will tell you the location of the first error. In the figure above, a closing double quote was missing in the second character position of an XML expression.

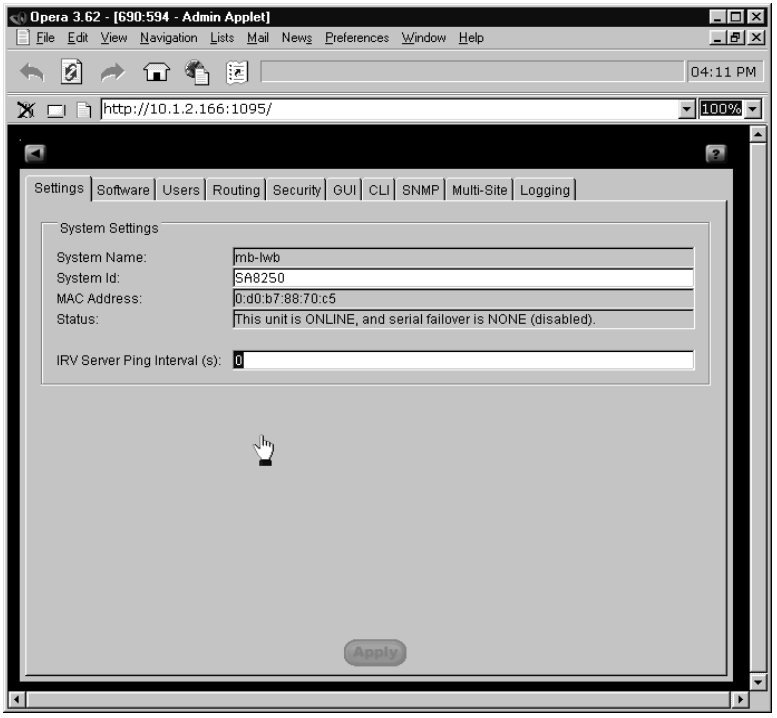
Deleting Servers

To delete a Server:

1. In the Tree, click the name of the Server to delete.
2. In the Policy Manager toolbar, click *Delete*, or right-click to display the menu and click *Delete Selected Item*.

Administration Screen

The Administration Screen is a set of ten tabs containing the functions used to manage the SA8250. Each tab includes controls and displays related to a specific category of administration tasks.



Administration Screen — Settings Tab

Settings Tab

The Settings tab includes controls used to set the following:

- **System ID:** Edit this field to set the unit identifier. The SA8250s are shipped with the unit serial number in this field. You can use this control to change the identifier if your site requires alternate asset tracking information. The new ID can be an alphanumeric value from 1 to 64 characters. To change this value, type the desired identifier, and then click *Apply.*

- **Server Verification Interval:** Edit this field to change the interval in seconds at which servers are "pinged" to verify they are available and able to handle traffic requests. For more details, see Chapter 5. The valid range for this field is 0 to 99999. A value of 0 disables IRV.

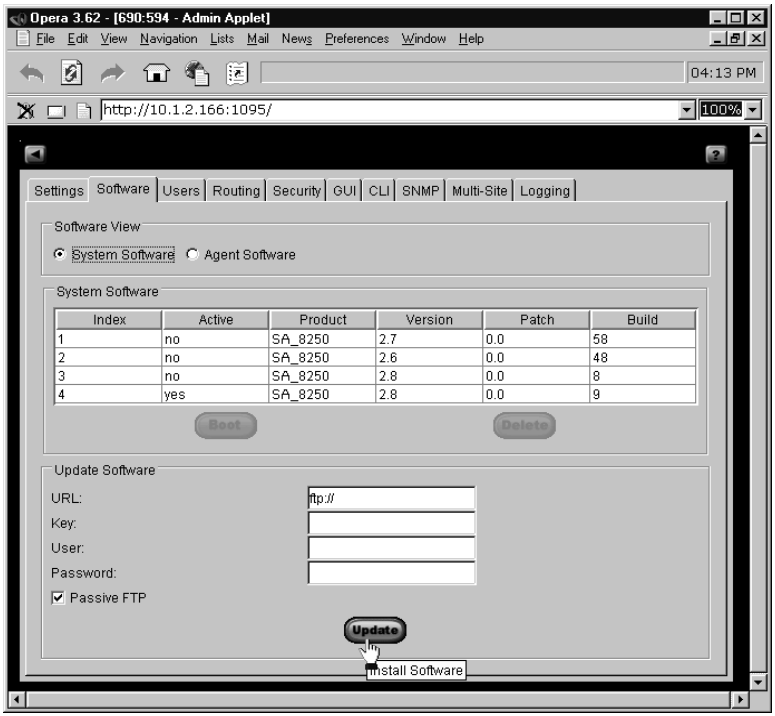
  In addition to the above controls, the Settings tab also contains the following read-only displays:

- **System Name:** Displays the name given the SA8250 in its initial configuration.
- **MAC Address:** Displays the SA8250's Media Access Control address.
- **Status:** The Status field displays information about the SA8250's function and failover status. For more details about status messages, see Chapter 2.

Software Tab

The Software tab contains controls and displays allowing you to perform the following tasks:

- Specify image category as either System software or Agent Software. Agent software lists software components other than the SA8250 system image that may be installed on the unit, such as the HP Multi-Site Traffic Director Server Appliance SA9200 agent.
- View the list of currently installed system software images (the SA8250 can have up to five system images installed).
- View the list of currently installed agent software images (the SA8250 can have up to four agents installed in addition to those accompanying each system software image).
- Specify which of the installed software images is to be active.
- Install or update software images.
- Delete software images.
- Enable or disable Passive FTP.
- FTP or TFTP new Multi-Site Agents to the SA8250.



Administration Screen — Software Tab (System Software View)

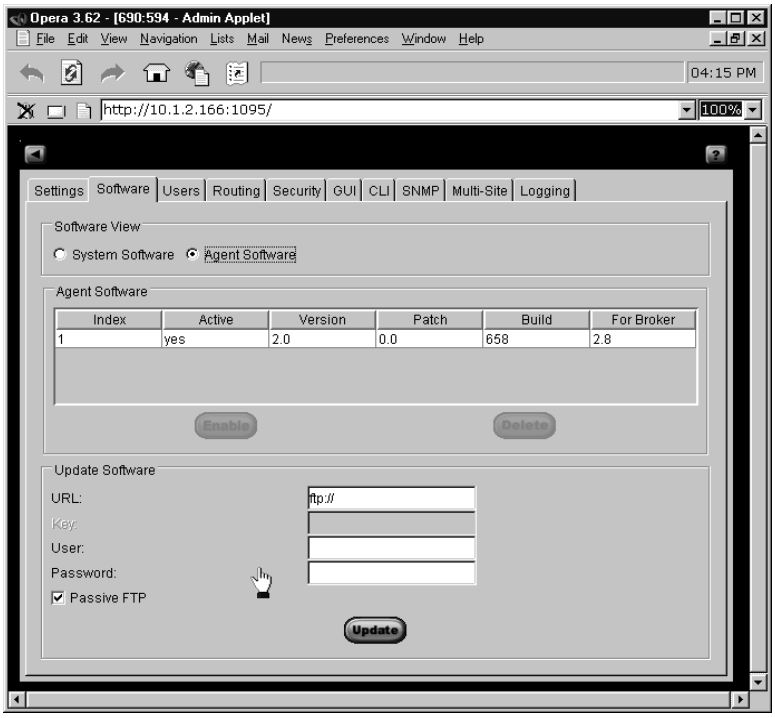
System Software

The SA8250 provides sufficient local storage for five software images (though at any time, only one image is active and executing.) The "System Software" area of the Software tab displays the list of currently installed system images, including the following details for each:

- Image index number
- "Active" status (yes/no)
- Product name
- Product version number
- Patch number
- Build number

Agent Software

The SA8250 can interface with other HP Server Appliances by using Agent Software images. The SA8250 provides sufficient local storage for at least five Agent software images (though at any time, only one image is enabled). To display the "Agent Software" area of the *Software* tab, click *Agent Software*, which displays the list of currently installed Multi-Site Director Agent images:



Software Tab in Agent Software View

Details displayed for each Agent include:

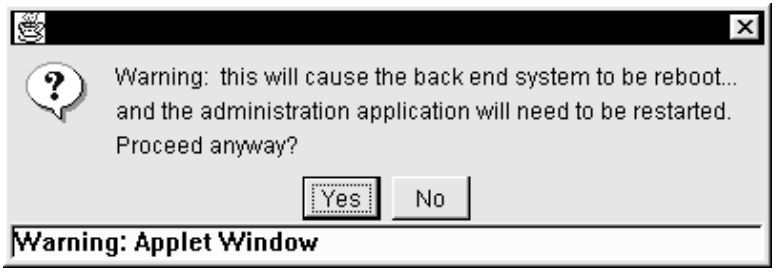
- Image index number
- "Active" status (yes/no)
- Product version number
- Patch number
- Build number
- Compatible Multi-Site Traffic Director version number

Specifying the Active System Software Image

To change the active system image:

1. Click *System Software*.
2. In the *System Software* box, click the image you want to activate.
3. Click *Boot*.

   The SA8250 warns you that it will reboot.

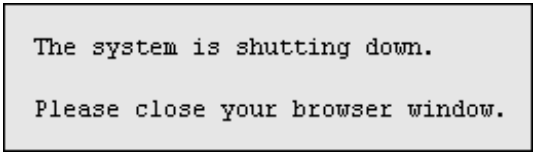


Boot Warning Window

NOTE: *You can also perform a soft reboot of the SA8250 by selecting the currently active software image and clicking* Boot.

4. Click *Yes*.

   As the SA8250 reboots, it prompts you to close your browser window.

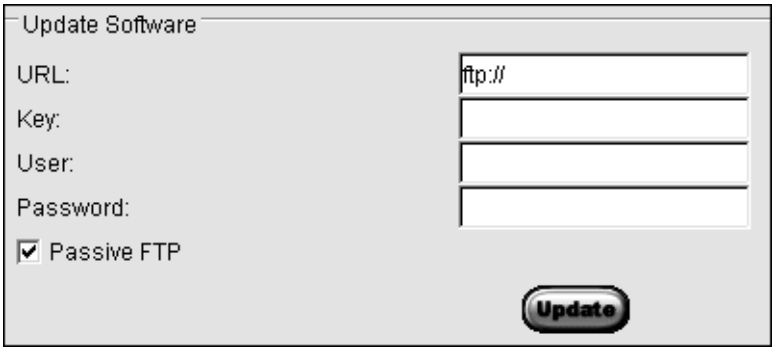


Reboot Screen

5. You must close all browser windows to ensure your browser uses the newly activated Administration Application.
6. Wait three to five minutes for the SA8250 to finish rebooting, and then run the administration application.
7. Go to the Software tab of the Administration screen and verify that the "Active" column of the selected image displays **yes**.

Installing Software Images

You can download and install new system and agent software images for the SA8250 using the controls in the Update Software box at the bottom of the Software tab.



Downloading a System Software Update

NOTE: *A key is not required to obtain Agent Software.*

1. To download the new image, contact HP Customer Support or your System Administrator to obtain the *URL*, *Key*, *User*, and *Password* information.

   For more details about software installation and updates, see Chapter 8.

Deleting Software Images

To delete a software image from the list of installed images:

1. In the *Software View* box, click the software type to be deleted.
2. In the *Installed Software* box, click the image to be deleted.
3. Click *Delete*. The SA8250 prompts you to confirm that you want to delete the selected image.

Delete Image Confirmation (System View)

4. Click *Yes*.

   If you selected Agent Software, you are prompted to confirm the deletion.

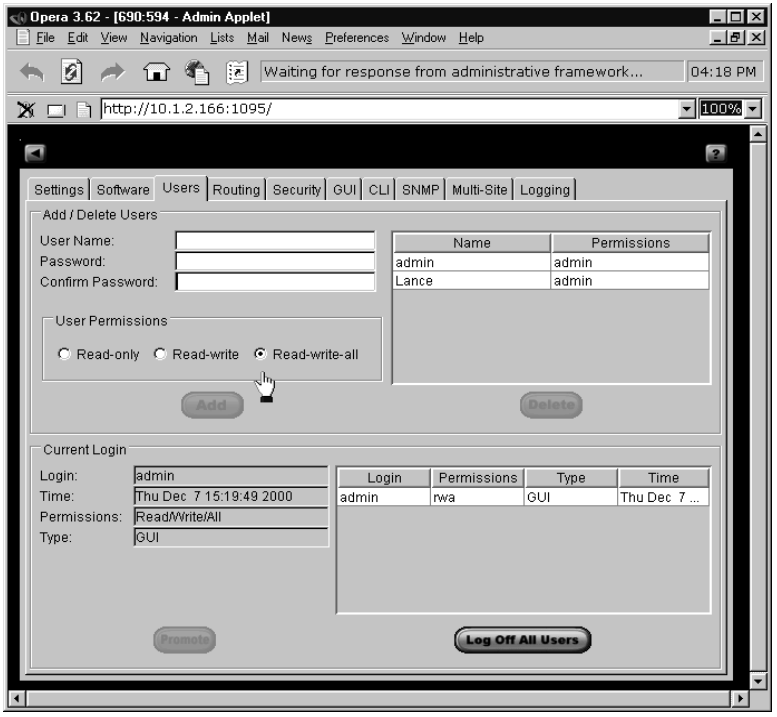
Delete Image Confirmation (Agent View)

5. Click *Yes*.

Users Tab

The Users tab contains controls and displays allowing you to perform the following tasks:

- Add users
- Modify user permissions and passwords
- Delete users
- View the user names and permissions of all authorized users
- View the user names and permissions of all users currently logged on
- Promote your permissions level
- Log off all other users currently logged on



Administration Screen — Users Tab

List of All Users

The Add/Delete Users box contains a list of all users allowed to log on to the SA8250.

Adding Users

To add a user:

1. In the *User Name* field, type the new user's User Name.
2. In the *Password* field, type the new user's password.
3. In the *Confirm Password* field, re-enter the password.
4. In the User Permissions box, select the appropriate permission level: *Read-only*, *Read-write*, *Read-write-all*. Users with Read-write-all permissions can add, modify, and delete other user logon entries.
5. Click *Add*.
6. Verify that the new user's name and permission level displays in the "All User" list.

Editing User Profiles

To modify existing users' permissions and passwords:

1. In the All Users List at the upper right sector of the tab, click the user you want to modify.
2. If you are changing the password, type the new password in the *Password* field, and then retype it in the *Confirm Password* field.
3. Click *Change*.
4. If you are changing the user's permissions, click the appropriate button in the User Permissions box.
5. Click *Change*.

Deleting Users

To delete a user:

1. In the User List, click the user you want to delete.
2. Below the list, click *Delete*.
3. Verify that the deleted user's name no longer displays in the list.

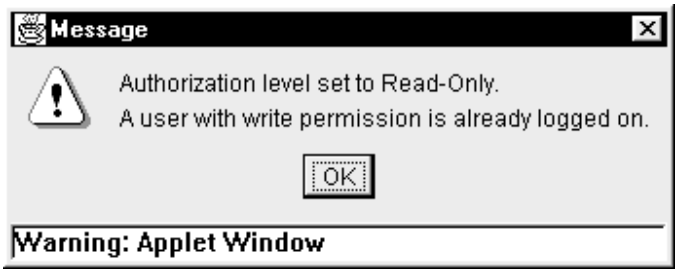
Current User's Information

The left-hand side of the "Current Logon" box at the bottom of the Users tab displays the name and permissions of the user currently logged on to this session. The log on time and date also display in this area of the tab.

Demotion and Promotion of Your Permissions

NOTE: *Use* Promote *with care. If you promote your permissions, be aware that conflicts may arise among multiple users who have Read-Write-All permission. For example, administrative changes you make may be overwritten by another user.*

If a user with Read-Write or Read-Write-All permission logs on while another user with Read-Write or Read-Write-All permission is logged on, the SA8250 "demotes" the later user's permissions to Read-only. The system informs the demoted user of their status.



Demoted Notification

The demoted Read-Write-All user can restore his or her original permission level by clicking *Promote in* the User tab. This button is located in the Current Logon box at the tab's lower left.

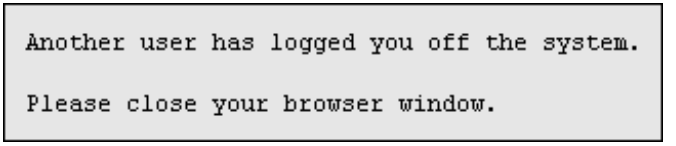
List of Logged-On Users

The right hand side of the "Current Logon" box at the bottom of the Users tab displays a list of all currently logged on users, their log on times, their permissions, and their log on method (either the Command Line Interface or the GUI).

Logoff All Other Users

NOTE: *Use* Logoff All Users *with care, as it can leave the system in an ambiguous state. For example, if a user is in the process of performing a* Restore *operation, and another user logs them off before the* Restore *completes, the system is left in an unknown state.*

Users with Read-Write-All permission can click *Logoff All Users* at the Users tab's lower right to end the sessions of all other users currently logged on. This logs off all other administrative users from the SA8250. Users logged on using the GUI who are logged off in this manner will see this message in their browser window.

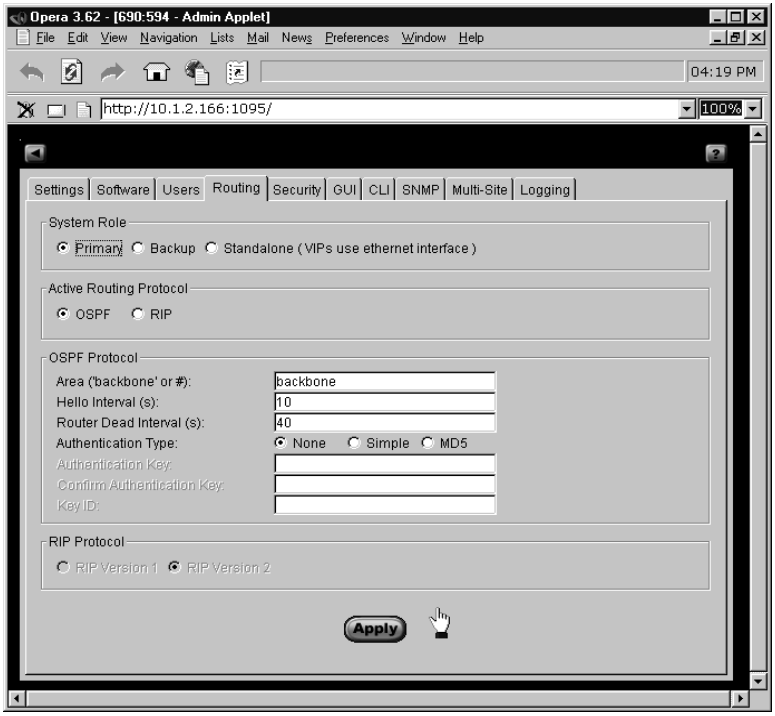


Logoff by Another User

Routing Tab

The Administration screen's Routing tab manages the following:

- System Role
- Active Routing Protocol
- OSPF Protocol
- RIP Protocol



The Administration Screen's Routing Tab

System Role

The choice of System Role (or simply "role") depends in part on your network's topology and on the number of SA8250s installed. A single SA8250's role must be "Standalone." If two SA8250s are employed, and you intend to use serial cable failover you must designate both SA8250s as "standalone." If two SA8250s are employed, and you intend to use Router Failover, one must be designated as the "Primary" and the other as the "Backup." In such cases, the primary SA8250 accepts all client requests and routes them according to its configuration while the backup SA8250 monitors the primary and comes online if the primary fails.

The system roles are defined in this table.

Failover Method	System Role for SA8250 #1	System Role for SA8250 #2
N/A (Single-SA8250 Installation)	Standalone	N/A
Router Failover	Primary	Backup
Serial Cable Failover	Standalone	Standalone
Disabled	Standalone	Standalone

System Roles

To select the SA8250's System Role:

1. In the System Role box, click the appropriate button.

Active Routing Protocol

The SA8250 needs to know what your network's active routing protocol is (either OSPF or RIP).

1. In the Active Routing Protocol box, click the appropriate radio button.

RIP Protocol

If your network's active routing protocol is RIP, click the appropriate button in the RIP Protocol box to specify the applicable RIP version.

OSPF Protocol

NOTE: *Unless the* `config route protocol` *command is set to* `ospf`*, OSPF protocol is not active. For more information, see Chapter 5.*

The Router tab's OSPF Protocol box specifies the following values:

- *OSPF Area:* This value must be set to the same OSPF area as the ingress router to which the SA8250 is talking. This can be the keywords "backbone" or "Default," an integer, or dotted decimal format (xxx.xxx.xxx.xxx). The integer range is from 0 to 2,147,483,647, and the default is **Default**.
- *Hello Interval:* The number of seconds between hello packets sent on this interface. This value must match the hello interval of the ingress router. The valid range is from 1 to 65,535, and the default is **10**.

NOTE: *The Router Dead value must be at least four times the Hello interval.*

- *Router Dead Interval:* The number of seconds the SA8250's OSPF neighbors should wait before assuming this OSPF SA8250 is down. This value must match the router dead interval of the ingress router. The valid range is from 1 to 2,147,483,647, and the default is **40**.

  Authentication type and key are security mechanisms to guarantee that routing information is exchanged only with trusted routers. The type and key together comprise the "authentication scheme." An OSPF Area can have only one OSPF Authentication scheme.

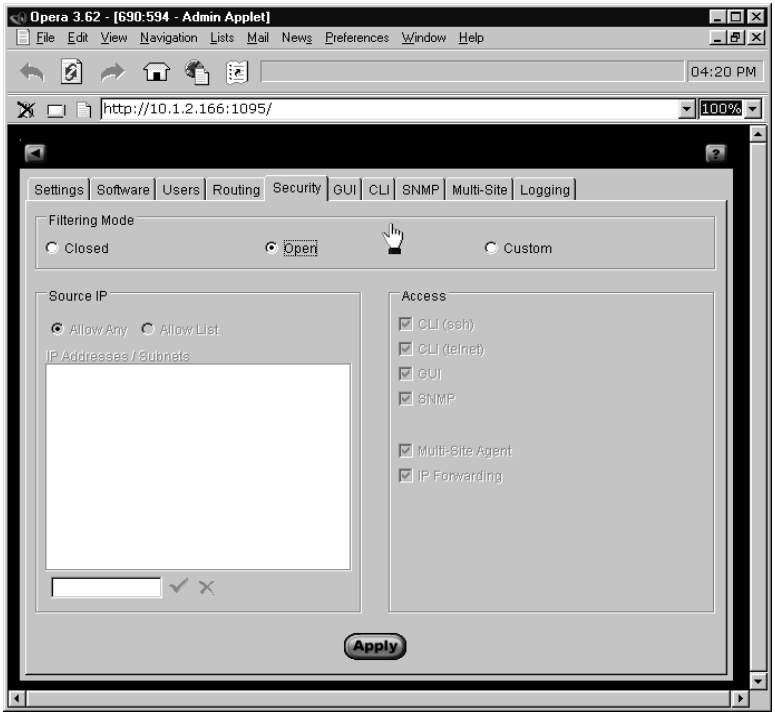
NOTE: *Both sides of the OSPF connection must use the same authentication type and key and key ID if applicable.*

- *Authentication Type:* Specifies the type of OSPF authentication. To disable OSPF authentication, click *None*. To enable Simple password authentication, click *Simple* and then proceed to the *Authentication Key* field. To enable MD5 authentication, click *MD5*, then enter an authentication key and key id.
- *Authentication Key:* A user-specified string (excluding double quotes and spaces) used as an authentication password. The authentication key is from 1 to 8 characters for Simple authentication, and 1 to 16 characters for MD5 authentication.
- *Confirm Authentication Key:* Re-enter the Authentication Key to verify it to the SA8250.
- *Key ID:* MD5 key id, an integer from 1 to 255. MD5 authentication provides a stronger level of security for OSPF users.

Security Tab

The security screen implements IP Packet Forwarding (IPFW) security policies. Three modes are available:

- *Closed* mode disables all remote administration capabilities.
- *Open* mode enables all remote administration capabilities, SA9200 agent traffic, and IP Forwarding.
- *Custom* mode specifies filtering of traffic based on traffic port and source IP address.



The Administration Screen's Security Tab

Source IP Filtering

The Security Tab's Source IP dialog box filters administration access by source IP address. This dialog box contains a pair of buttons and combo box. To allow any IP address to perform administrative tasks, click *Allow Any*. To filter by source IP, click *Allow List* and type the IP addresses and/or subnets allowed administrative access into the IP Addresses/Subnets list. Subnets are specified in "slash" notation (such as 209.218.0.0/16). Click the check icon to add the contents of the text field into the list. You can delete an item from the list by clicking the item to delete and clicking the "**X**" icon.

Access Options

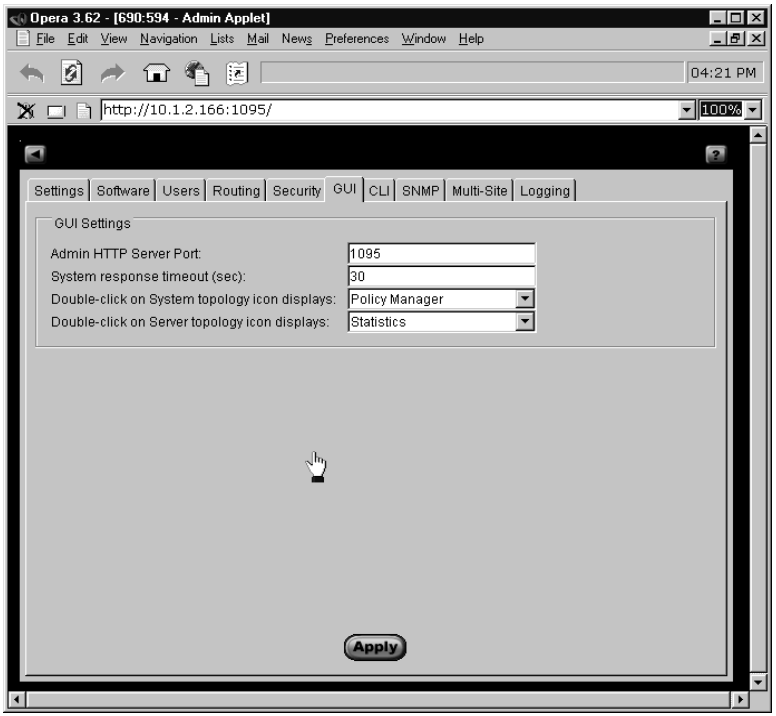
When the Custom security mode is enabled, you can choose among the access options in the Access security box. To enable an option, select the corresponding check box and verify that a check mark displays. To disable, click again to clear the check mark. Available options are listed below:

- CLI (SSH) Enable "Secure Shell," that is, secure access to the unit's Command Line Interface. Secure Shell operates like an ordinary telnet session, but adds encryption.
- CLI (telnet) Enable standard unencrypted telnet access to the unit's Command Line Interface.
- GUI Enable administration using the unit's Graphical User Interface.
- SNMP Enable administration of the unit using SNMP (Simple Network Management Protocol).
- Multi-Site Traffic Director Server Appliance SA9200 Agent. Permit or deny traffic to the SA9200 port.
- IP Forwarding. Permit or deny traffic to specific servers. IP forwarding allows administrative access to servers at their real IP addresses via the SA8250. For more details, see Chapter 2.

GUI Tab

The GUI tab configures the following aspects of the SA8250's Graphical User Interface (GUI):

- Server port on which the GUI is accessible from the browser
- Response Timeout Value
- Choice of result from double-clicking the SA8250 icon in the Topology Screen
- Choice of result from double-clicking the Server icon in the Topology Screen



The Administration Screen's GUI Tab

NOTE: *After changing this setting your browser disconnects. You must restart your browser and connect it to the new port to resume using the administration application.*

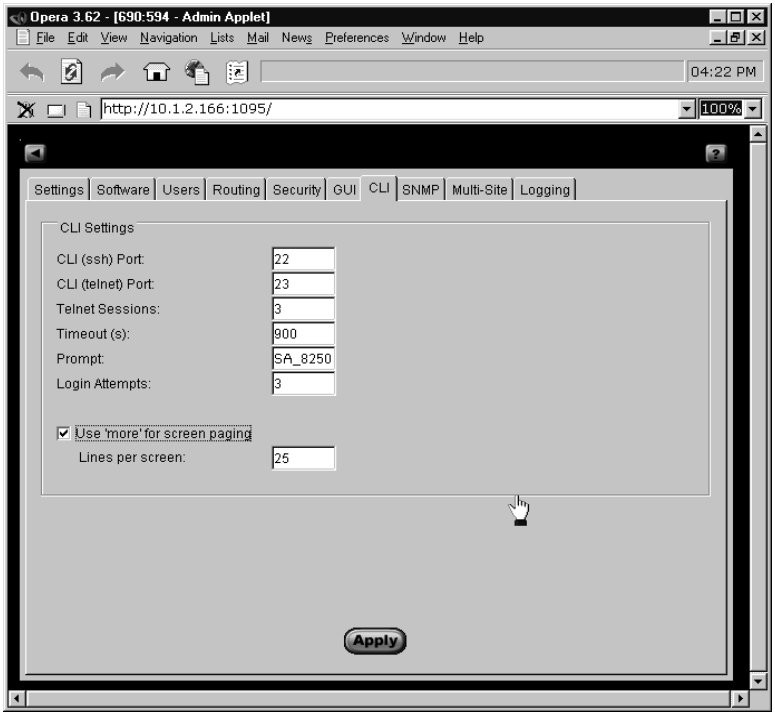
- Admin HTTP Server Port: Edit this field to designate the port on which the SA8250's GUI application listens. To change this value, type the desired port number and click *Apply.* Valid ports are any unused ports between 1 and 65535. The default is port **1095**.

- The Broker Response timeout (sec): This field specifies, in seconds, the time the GUI will wait for a response from the SA8250 before timing out. This value must be an integer between 0 and 120. A value of 0 disables timeout. The default value is **30**.
- The Double-click Broker topology icon displays: The drop down menu specifies the destination within the GUI after double-clicking a SA8250 icon in the topology screen.
- The Double-click Server topology icon displays: The drop down menu specifies the destination within the GUI after double-clicking a Server icon in the topology screen.

CLI Tab

The CLI tab configures the following aspects of the SA8250's Command Line Interface:

- SSH Port
- Telnet Port
- Telnet Sessions
- Timeout
- Prompt
- Login Attempts
- Enable "more" for screen paging
- Lines per screen



The Administration Screen's CLI Tab

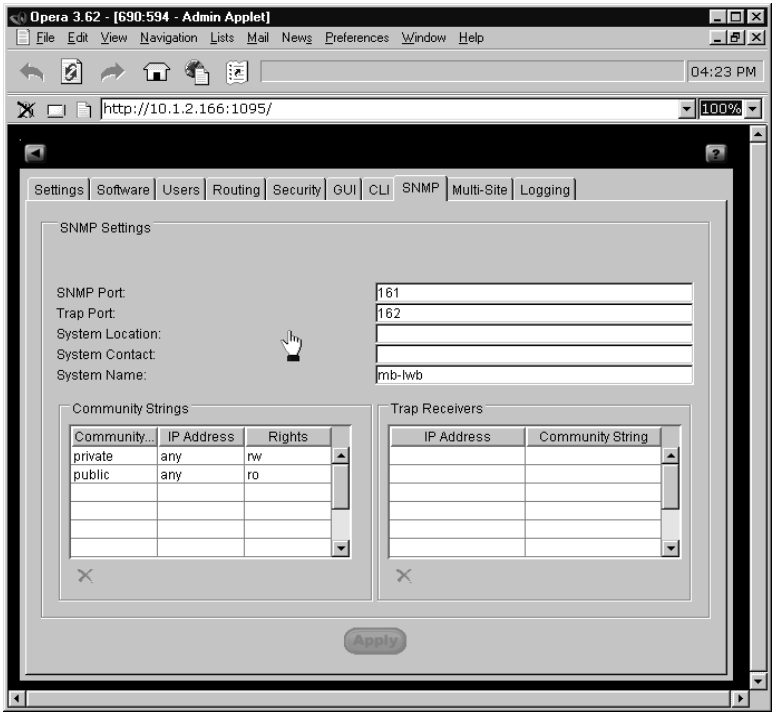
- The CLI (SSH) Port field specifies the secure telnet port on which the CLI runs. Valid ports are port **22** (the default) or any unused port between 1024 and 65535.

- The CLI (telnet) Port field specifies the standard (unencrypted) telnet port on which the CLI runs. Valid ports are port **23** (the default) or any port between 1024 and 65535.
- The Telnet Sessions field specifies the maximum number of concurrent inbound remote CLI logon sessions allowed. This value must be an integer between 1 and 8. The default is **3**.
- Use the Timeout field to set or change the idle timeout period before automatic logoff for CLI sessions. This feature is disabled by setting the timeout value to "0." This timeout period is expressed in seconds (0, or 30 to 65535). The default is **900** seconds (15 minutes).
- Use the Prompt field to set or change the root level prompt. The default prompt is an abbreviation of the product's name, for example: "HP SA8250."
- The Login Attempts field specifies the maximum allowable number of failed login attempts before closing the connection. The valid range is from 1 to 30.
- Use 'more' for screen paging. When this box is not checked, the CLI outputs a continuous scrolling display. When the box is checked, the CLI scrolls one page at time.
- When more is selected, the Lines per screen field becomes available. Use this field to specify the number of lines more displays at a time.

1. Click *Apply.*

SNMP Tab

The SNMP tab includes controls for the SA8250's Simple Network Management Protocol (SNMP) agent.



Administration Screen's SNMP Tab

SNMP Agent

The SNMP agent allows network management applications to monitor and retrieve the SA8250's status and statistics via SNMP.

NOTE: *Ensure that the SA8250's IP Filtering security mechanism allows IP access to SNMP, otherwise SNMP requests will not pass through the filter.*

The SNMP Agent Start check box enables or disables the SA8250's SNMP agent. The default is **Enabled**.

- Use the SNMP Port: field to specify the port on which the SA8250 receives SNMP requests. Allowable port numbers are **161** (the default) or any unused ports 5020 through 65535.
- Use the Trap Port: field to specify the port on which the SA8250 sends SNMP traps. Allowable port numbers are **162** (the default) or any unused ports 5020 through 65535.

- System Location: corresponds to the MIB variable sysLocation in MIB-II. System Location (sysLocation) is the physical location of this SA8250. By default, sysLocation is NULL.
- System Contact: corresponds to the MIB variable sysContact in MIB-II. System Contact (sysContact) is the name of the administrator of this SA8250. By default, sysContact is NULL.
- System Name: corresponds to the MIB variable sysName in MIB-II. System Name (sysName) is the name of this SA8250. By default, sysName is the hostname of the SA8250.

The Community Strings box contains community strings accepted by the SA8250 on incoming SNMP requests. Up to ten community strings can be configured for use by the SA8250. Each community string can have read-only (ro) or read-write (rw) privilege, and can be configured for use by a specific IP address or all IP addresses. When the value "any" is used for <ip address>, the community string can be used by all IP addresses.

For example, the string:

```
community=test ip=209.218.240.5 rights=ro
```

creates the community string test with read-only privilege. SNMP read-only requests using community string test are accepted only from IP address 209.218.240.5.

By default, the following community strings are defined:

```
public ro "any"
private rw "any"
```

The Trap Receivers box contains the IP addresses to which the SA8250 will send traps. The SA8250 SNMP can send trap notifications to up to ten configured trap receivers. Each IP address configured as a trap receiver is associated with a community string, which is included in traps sent to that IP address.

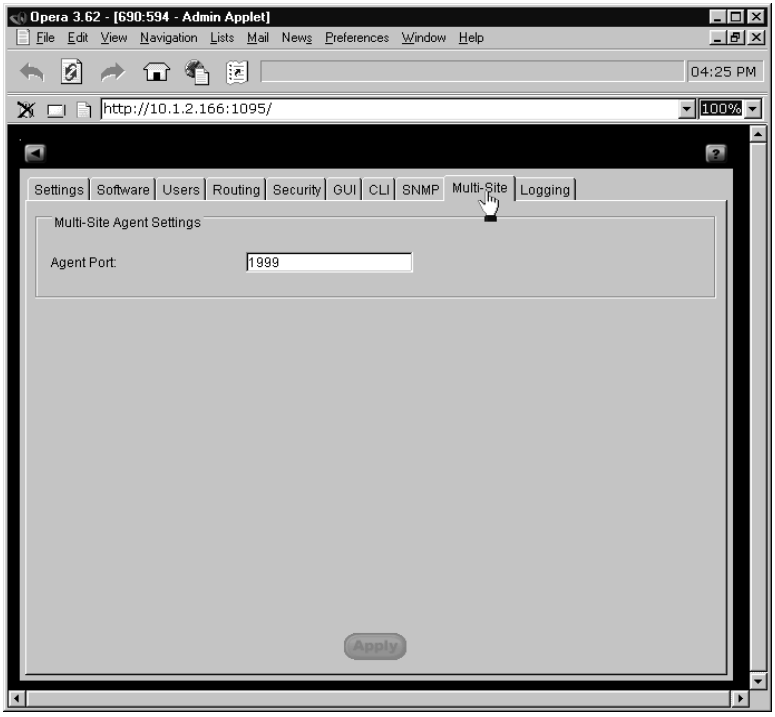
For example, the string:

```
ip=209.218.240.5 community=NOC1
```

causes traps to be sent to IP address 209.218.240.5, and causes the SA8250 SNMP agent to put the community string, NOC1 in the trap sent to that address.

Multi-Site Tab

This tab contains controls for setting the port that communicates with the HP Multi-Site Traffic Director Server Appliance SA9200.



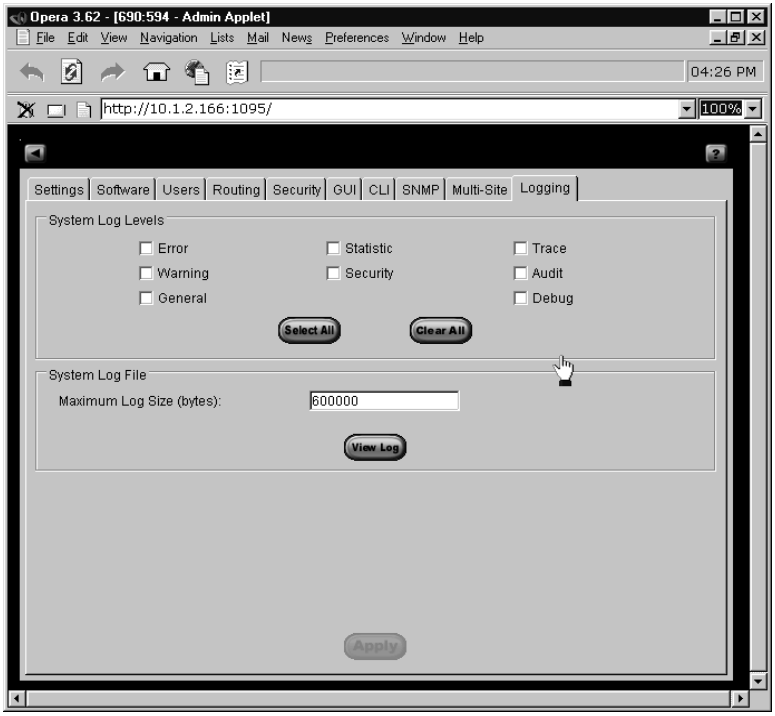
Administration Screen Multi-Site Tab

To specify the Multi-Site Agent's port:

1. In the *Agent Port* field, type that port number. Valid range is from 1 to 65535, and **1999** is the default. We recommend using ports 1024 and higher.
2. Click *Apply.*

Logging Tab

The Logging tab specifies (or filters) the kinds of information written to the SA8250's log file. This file records operational events for troubleshooting information. You can enable or disable the logging of specific types of information, and specify the log file size.



Administration Screen's Logging Tab

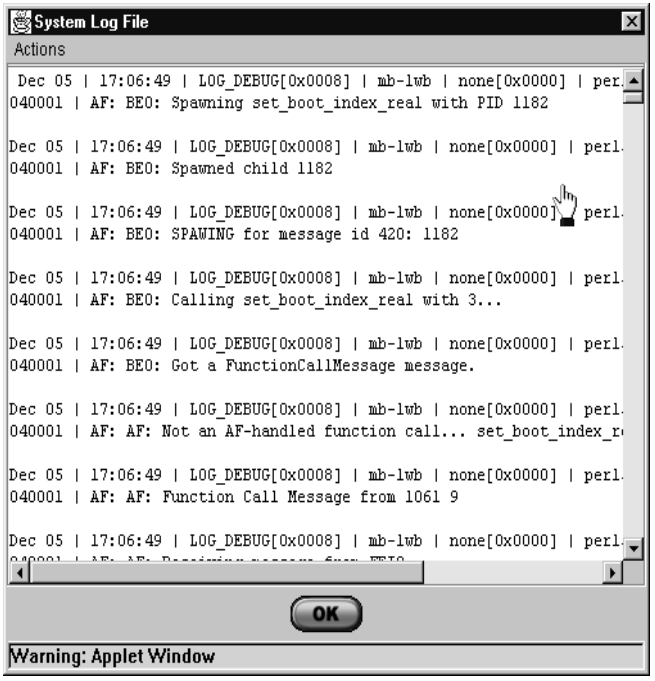
Specifying System Log Parameters

1. In the System Log Levels box, select the check boxes for those types of system information you want the log file to reflect. To record all available information types, click *Select All*.
2. In the System Log File box, type the size of the log file. Valid range is from 1,024 to 600,000 bytes, and **600,000** is the default.
3. Click *Apply.*

Viewing the Log File

1. To view the log file, click *View Log*.

   The System Log File displays.



The Logging Tab's File Contents Window

The File Contents window's Actions menu contains two items:

- *Filter*
- *Mail To...*

The Log File Filter dialog box filters the view of the log displayed in the File Contents window.

Log File Filter Window

1. Select or clear the appropriate check boxes to specify the types or categories of messages you want to display.
2. Click *Apply*, or *Cancel* to abort.

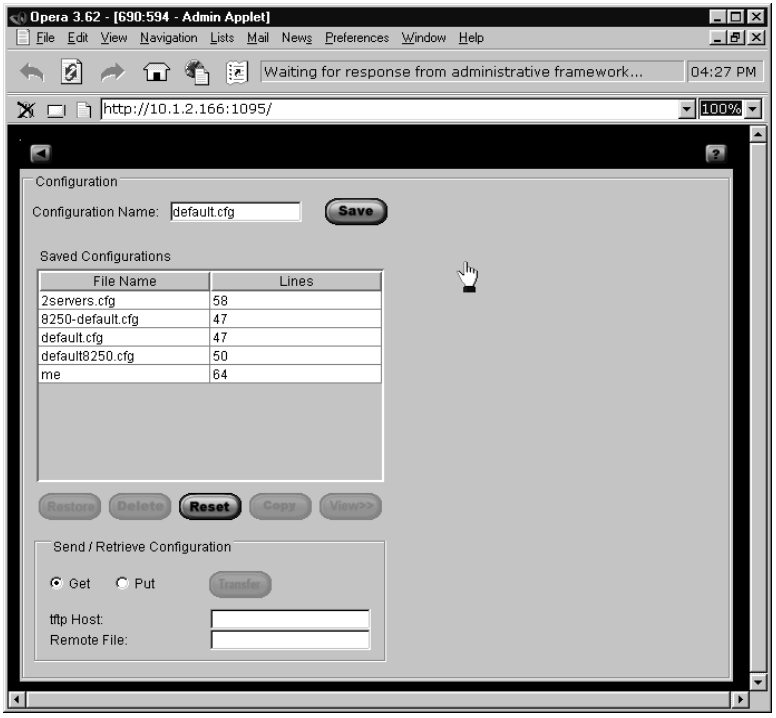
Use the Mail Log File dialog box to email the contents of the log file.

Log Mail To Window

1. In the *Enter Email Address* field, type the email address to which you want to send the log file.
2. In the *Enter Mail Host* field, type the name or IP address of your network's outgoing mail (SMTP) server.
3. Click *OK*, or *Cancel* to abort.

Configuration Screen

The Configuration screen saves, restores, sends, and receives SA8250 configuration information in individual ASCII files. You can save configuration files on the SA8250 and send them to a remote TFTP server or retrieve them. The Configuration screen also has a provision for restoring the factory default configuration.



Configuration Screen

Saving Configuration Files

To save the SA8250's current configuration to a file:

1. In the *Configuration Name* field, type a filename.

   Valid characters include letters, digits, (-), (_), and (.). File names cannot begin with the (.) character.

2. Click *Save*.

3. Verify that the new file's name displays in the Saved Configurations list.

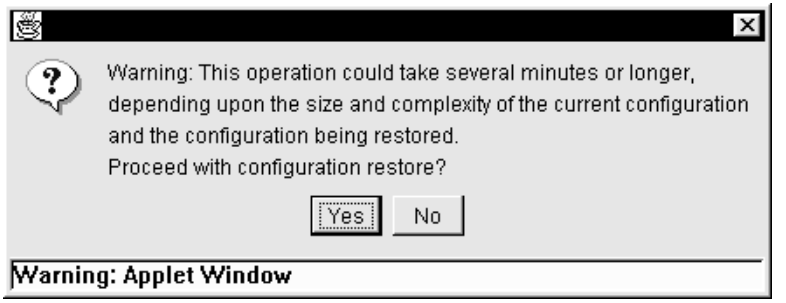
Restoring Configuration Files

To restore a configuration file:

1. In the Saved Configurations list, click the name of the file you wish to restore.
2. Click *Restore*.

   The system prompts you to confirm the operation.

NOTE: *Username commands are not valid in configuration files. The* save config *and* restore config *operations do not include username data. Use the Administration Screen's Users Tab to specify users.*



Restore Confirmation Window

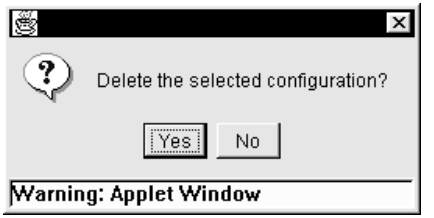
3. To finish the restore operation, click *Yes,* or *No* to abort.

Deleting Configuration Files

To delete a configuration file:

1. In the Saved Configurations list, click the name of the file you want to delete.
2. Click *Delete*.

   The system prompts you to confirm the operation.



Delete Confirmation Window

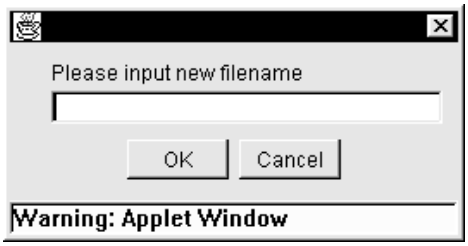
3. To delete the file, click *Yes,* or *No* to abort.

Copying Configuration Files

To copy an existing configuration file under a new name:

1. In the Saved Configurations list, click the name of the file you wish to copy.
2. Click *Copy.*

   The system prompts you for a file name.



Copy New Filename Window

   Valid characters are letters, digits, (-), (_), and (.). File names cannot begin with the (.) character.

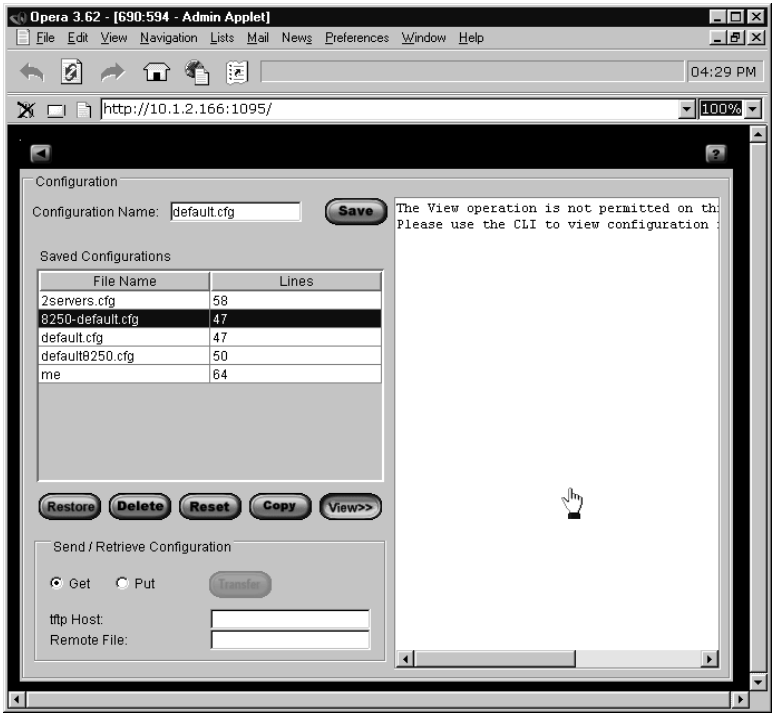
3. To complete the operation, click *OK*, or *Cancel* to abort.

Viewing Configuration Files

To prevent certificates and keys from being displayed or transmitted as plain text across the network, the View Configuration File function has been disabled.

1. In the Saved Configurations list, click the name of the file whose contents you want to view.
2. Click *View>>*. The right hand panel of the Configuration screen displays this message:

```
The View operation is not permitted on this
device for security reasons.  Please use the CLI
to view configuration files.
```



Viewing a Configuration File (Disabled)

Resetting the Factory Configuration

This command resets the SA8250 to its original factory configuration. Reset deletes all policy groups, services, and servers.

Original factory settings are listed in this table.

Type	Parameter	Default Setting
Route	Role	Standalone
	Protocol	None
	OSPF-area	Backbone
	Hello interval	10 seconds
	Dead interval	40 seconds
	RIP version	2.0
Static routes	static_route	None
RICH Bias	rich_bias	Enabled
HTTPS Redirect	Redirect	None
CLI	CLI SSH-port	22
	CLI port	23
	Prompt	Product name
	Maximum telnet sessions	3
	Scrolling	Disabled
	Idle timeout	900 seconds
	Maximum login attempts	3
SNMP	sysContact	NULL
	sysName	Host name of the unit
	sysLocation	NULL

Factory Configuration

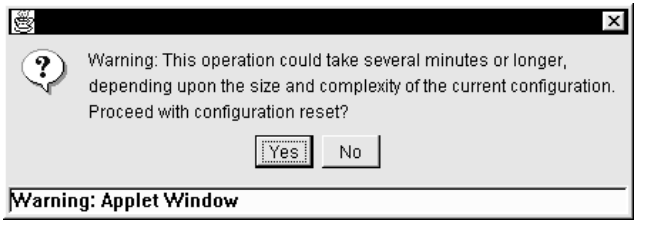
Type	Parameter	Default Setting
GUI	broker-action	0 (Policy Manager)
	server-action	1 (Statistics)
Security	acl	Cleared
	custom access-control	Disabled
	custom forwarding	Disabled
	custom ssh	Enabled
	custom telnet	Disabled
	custom gui	Disabled
	custom snmp	Disabled
	security mode	Closed

Factory Configuration (continued)

To restore the factory default configuration:

1. Click *Reset*.

   The system prompts you to confirm the operation.



Reset Confirmation Window

2. To confirm the operation, click *Yes*, or *No* to abort.

Sending and Retrieving Configuration Files

By default, configuration files are saved on the SA8250 itself. You can also send them to and retrieve them from remote TFTP servers.

To send a configuration file to a remote TFTP server:

1. In the Saved Configurations list, click the name of the file you want to send.
2. In the Send/Receive Configuration box, click *Put*.
3. In the *tftp Host* field, type the name of the host where you will send the file.
4. **Optional**: In the *Remote Directory* field, type the directory of the remote host where you want to save the file.
5. Click *Transfer.*

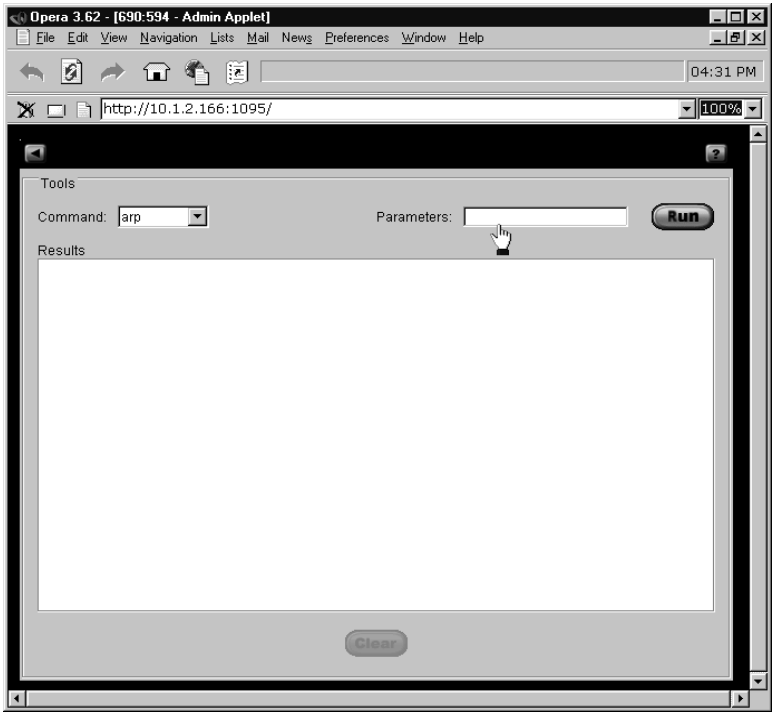
To retrieve a configuration file from a remote TFTP server:

1. In the Send/Receive Configuration box, click *Get*.
2. In the *tftp Host* field, type the name of the host where you will retrieve the file.
3. In the *Remote File* field, type the name of the file you want to retrieve.
4. Click *Transfer.*

Tools Screen

The SA8250's Tools screen provides the following network diagnostic tools for your convenience:

- ARP
- Ether
- Ping
- Netstat
- Nslookup
- Reboot
- Trace
- Traceroute



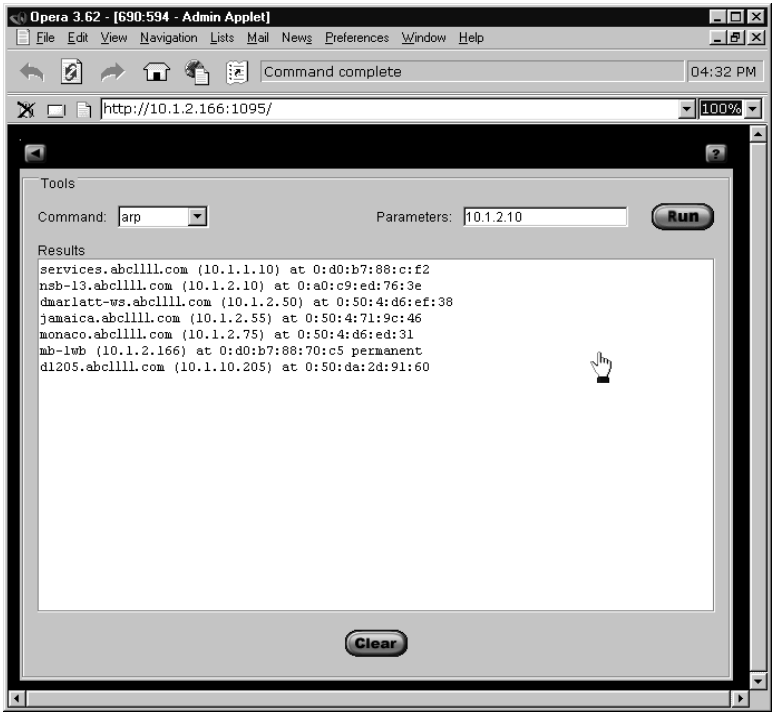
Tools Screen (defaults to ARP)

ARP

Displays the SA8250's Address Resolution Protocol (ARP) table. To use the command:

1. From the *Command* menu, click **arp**.
2. Click *Run*.

   After a few seconds, the ARP information displays in the Results window.



ARP Results

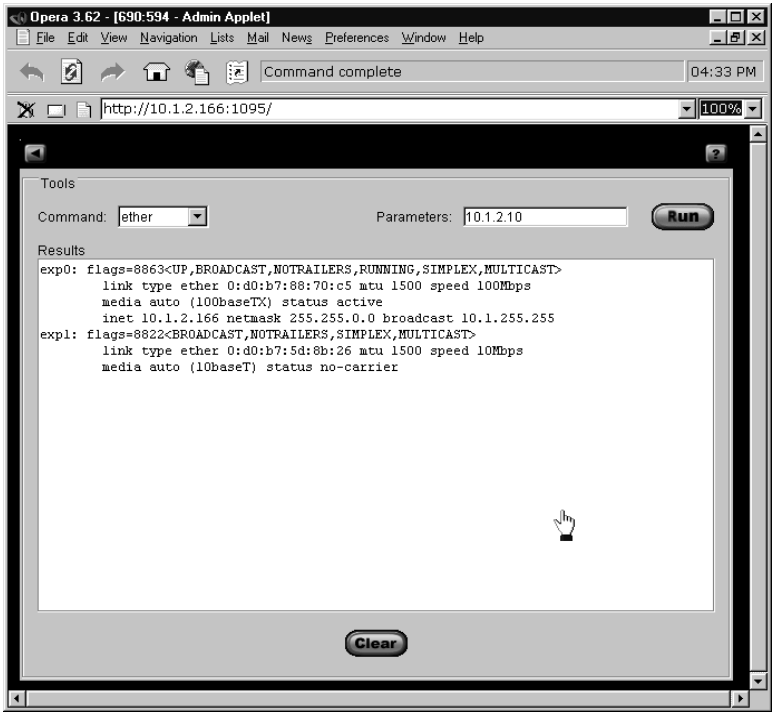
3. To clear the Results window, click *Clear.*

Ether

Displays the Ethernet interface values. To use the command:

1. From the *Command* menu, click **ether**.
2. Click *Run*.

   The Ethernet interface information displays in the Results window.



Ether Results

3. To clear the Results window, click *Clear.*

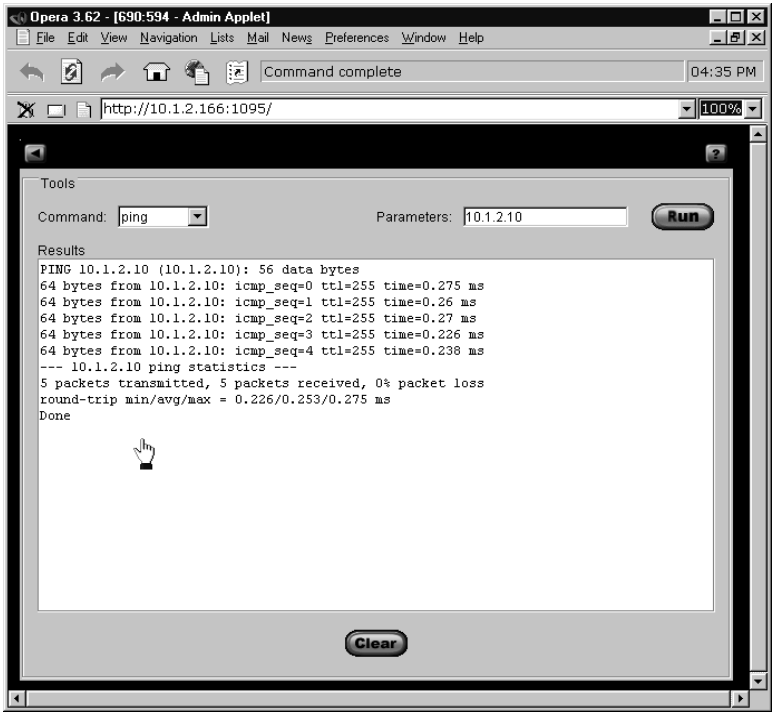
Ping

Ping tests the network connection to another networking device by sending five ICMP packets from the SA8250 to the target device, which if it receives them, sends a reply. When the SA8250 receives the reply, it displays a message reflecting the response time from the target device. If the SA8250 receives no reply, it displays a message indicating that the target device is not responding.

To "ping" a network device:

1. From the *Command* menu, click **ping**.
2. In the *Parameters* field, type the host name or IP address of the target device.
3. Click *Run*.

   After a few seconds, the Ping information displays in the Results window.



Ping Results

4. To clear the Results window, click *Clear.*

Netstat

Displays the SA8250's routing tables. To use the command:

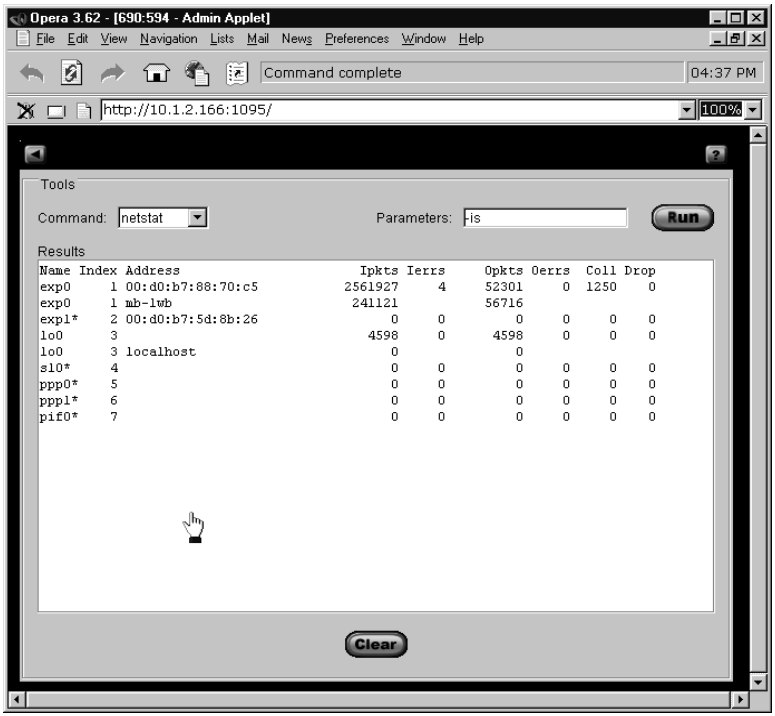
1. From the *Command* menu, click **netstat**.
2. (Optional) In the *Parameter* field, type any parameter from the options/variables in this table.

Parameter	Description
-I <interface>	Can be exp0 or exp1 for dual-homed device
-i	Displays the interface configuration information
-is	Displays the interface statistics
-n	Do not use DNS to resolve IP addresses
-p <protocol>	Where `protocol` can be either **ip**, **icmp**, **igmp**, **tcp**, or **udp**
-r	Displays the forwarding table
-rs	Displays the forwarding table statistics
-s	Displays the protocol statistics
none	Displays the active network connections

Netstat Command Parameters

3. Click *Run*.

   After a few seconds, the routing tables display in the Results window, as shown on the next page.



Netstat -is Results

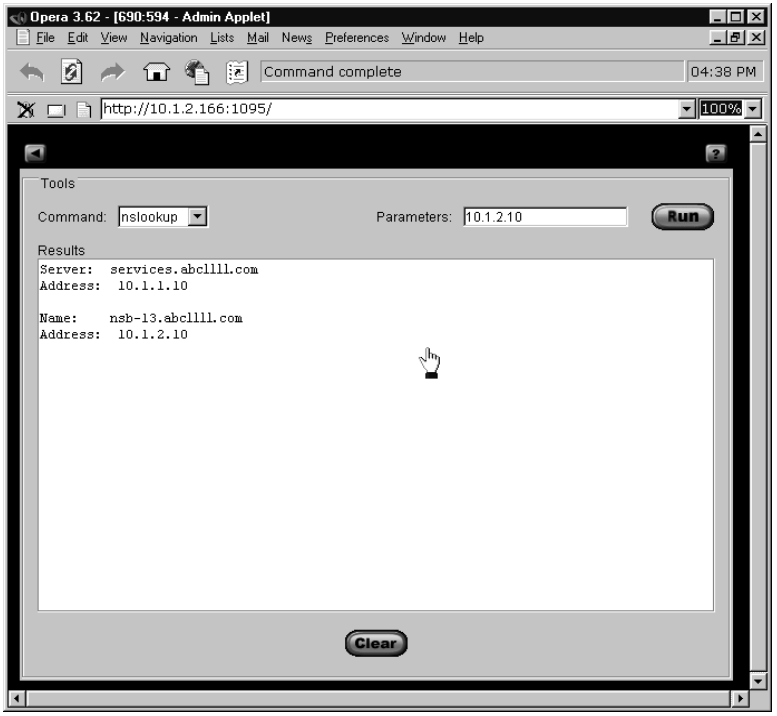
4. To clear the Results window, click *Clear.*

Nslookup

Identifies the IP address of a given host, or the host name of a given IP address. You can use this tool to determine whether the SA8250 can resolve a host name or address, or to get the IP address of a machine of which you know only the host name. To use the command:

1. From the *Command* menu, click **nslookup**.
2. In the *Parameters* field, type the host name or IP address of the target device.
3. Click *Run*.

   After a few seconds, the nslookup information displays in the Results window.

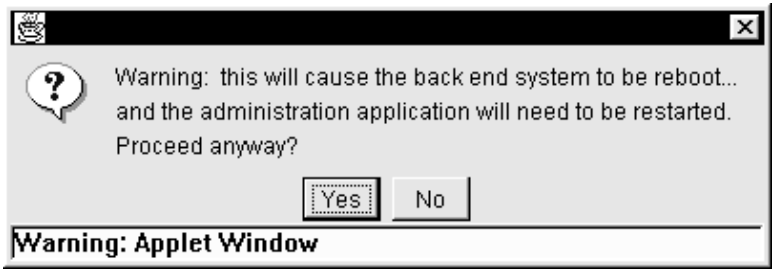


Nslookup Results

4. To clear the Results window, click *Clear.*

Reboot

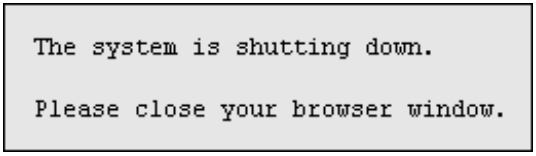
The Reboot command reboots the SA8250. This command requires no parameters, and when executed prompts for confirmation.



Reboot Confirmation

1. To reboot click *Yes*, or *No* to abort.

   As the SA8250 reboots, it prompts you to close your browser window.



Reboot Notification

2. Close all browser windows to ensure that your browser uses the newly activated administration application.
3. Wait a few minutes (typically three to five) for the SA8250 to finish rebooting before running the administration application.

Trace

The `trace` command captures traffic on a network that matches the given expression. The `trace` output can be helpful for troubleshooting network problems.

NOTE: *By default,* `trace` *will automatically exit after 60 seconds. If the GUI is configured for a shorter timeout, the* `trace` *information may be lost. For more details, see "GUI Tab" in this chapter.*

Syntax:

```
trace [-aefnNpqStvxX] [-c <count>]
[-i <interface>] [-s <snaplen>] [-T <type>]
-F <file> [-P] -w <file> -H <tftp-host>
-D <tftp-path>
```

Switches enclosed in brackets [] are optional. The -w, -F, -H, and -D switches are required. A complete listing of the switches for the `trace` command is found in the table on the next page.

Example:

This command TFTPs `my.filter` from `dhcp8/var/tftpboot/my.filter` to the SA8250, captures five packets (using the expressions in the `my.filter` file), and then writes the packet information to the `fred.dump` file. Because of the -P switch, the filter file is not deleted.

```
trace -c 5 -w fred.dump -F my.filter -H dhcp8
-D /var/tftpboot -P
```

If the -P switch is **not** used, the filter file is deleted.

Switch	Description
-a	Attempt to use the DNS to convert address to names
-c <count>	Exit after receiving <count> packets
-D <tftp-path>	The TFTP path directory information. Required parameter.
-e	Print the link-level header on each dump line
-f	Print "foreign" Internet addresses numerically, rather than symbolically
-F <file>	The filter expression file. If this file does not exist on the SA8250, it is TFTPed from the TFTP host (see the **-D** and **-H** options). Required parameter.
-H <tftp-host>	The TFTP host information. Required parameter.
-i <interface>	Specify an interface to capture packets from (exp0 or exp1 for dual-homed devices)
-n	Don't convert addresses to names
-N	Don't print domain name qualification of host names
-p	Change the interface to promiscuous mode (every packet is captured)
-P	Preserves the filter expression file on the SA8250 for future use, so that it is not TFTPed after the first use.
-q	Output less protocol information
-s <snaplen>	Capture `<snaplen>` (snapshot length) bytes of data from each packet rather than the default of 76 bytes
-S	Output absolute rather than relative TCP sequence numbers
-t	Don't output a timestamp on each dump line
-tt	Output an unformatted timestamp on each dump line

Switches for the Trace Command

Switch	Description
-T <type>	Force packets selected by <expression> to be interpreted as the specified <type>
-v	Slightly more verbose output
-vv	Even more verbose output
-w <file>	The `trace` output file. Required parameter.
-x	Output each packet in hex
-X	Output each packet in hex and ASCII

Switches for the Trace Command (continued)

The table on the next page lists the <expression> primitives for the filter expression file (-F <file>).

- If the filter expression file is empty, all packets on the net will be captured.
- The <expression> primitives can be combined using parentheses and '!' or 'not', '&&' or 'and', and '||' or 'or'.

Expression	Evaluation
dst host <host>	True if the IP destination field of the packet is <host>
src host <host>	True if the IP source field of the packet is <host>
host <host>	True if either the IP source or destination field of the packet is <host>
ether dst <ehost>	True if the ethernet destination address is <ehost>
ether src <ehost>	True if the ethernet source address is <ehost>
ether host <ehost>	True if either the ethernet source or destination address is <ehost>
gateway <host>	True if the packet used <host> as a gateway
dst net <net>	True if the IP destination address of the packet has a network number of <net>
src net <net>	True if the IP source address of the packet has a network number of <net>
net <net>	True if the IP source or destination address of the packet has a network number of <net>
net <net> mask <mask>	True if the IP address matches <net> with the specific netmask
net <net>/<len>	True if the IP address matches <net> a netmask <len> bits wide
dst port <port>	True if the packet is IP/TCP and has a destination port value of <port>
src port <port>	True if the packet has a source port value of <port>
port <port>	True if either the source port value or destination port has a value of <port>
ip proto <protocol>	True if the packet is an ip packet of protocol type <protocol>, where <protocol> can be "ICMP" or "TCP"
ether broadcast	True if the packet is an ethernet broadcast packet
ip broadcast	True if the packet is an IP broadcast packet

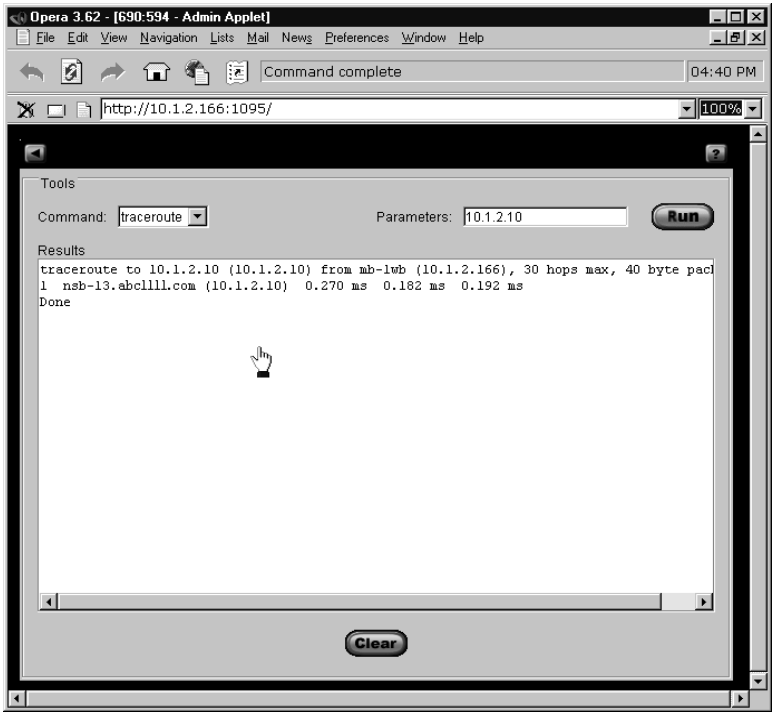
Filter Expression File Primitives

Traceroute

The Traceroute command displays the route that packets travel to the specified network device. To trace the route from the SA8250 to another device:

1. From the *Command* menu, click **traceroute**.
2. In the *Parameters* field, type the host name or IP address of the target device.
3. Click *Run*.

   After a few seconds, the Traceroute information displays in the Results window.



Traceroute Results

4. To clear the Results window, click *Clear.*

Statistics Screen

The SA8250 provides a screen where you can view four different statistical categories, in a variety of graphical display formats, at the levels of Device, Service, and Server. Statistical data series are defined in the main Screen, and subsequently displayed in a separate window.

The four statistical categories for SA8250s are listed below:

- Average Connections per Second
- CPU Utilization
- Open Connections
- The SA8250's Uptime

For services and servers, the available statistics are listed below:

- Average Response Time (ms)
- Average Connections per Second
- Open Connections
- Service or Server Uptime

NOTE: *Statistics for open connections in RICH mode are not available.*

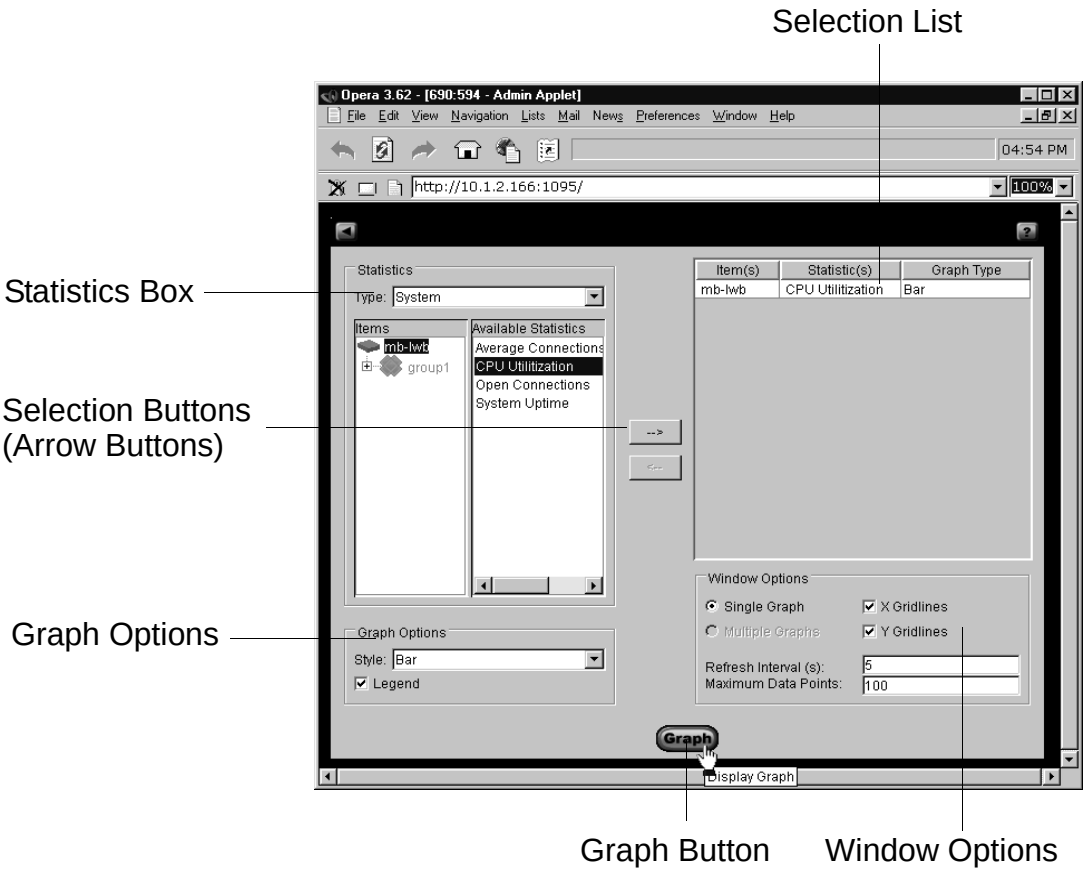
To display the Statistics screen:

1. In the Topology screen's toolbar, click the Statistics icon.

Statistics Screen Controls

The Statistics Screen, on the next page, is divided into the four sections or functional areas below:

- Statistics Box
- Graph Options
- Selection List
- Window Options
- Selection buttons (the arrows between the Statistics Box and the Selection List). These are for selecting statistical categories to be displayed.
- *Graph* button to launch the graph display window.



Statistics Screen

Statistics Box

The Statistics box contains controls for you to select the statistics you want to view graphically, as well as the graph format in which you want those statistics displayed.

- *Type:* This pull-down list specifies the type of statistics that are available: System, Server, or Service.
- *Items:* Select the specific System, Services, or Servers whose statistics you wish to view. You can select multiple like items from this list.

NOTE: *Statistics for open connections in RICH mode are not available.*

- *Available Statistics:* In this graphical display, you can specify which of the available statistics you want to view. These include Average Response Time, Average Connections per Second, CPU Utilization, Open Connections, and Uptime. The available statistics will depend on your selection from the *Type* pull-down list. You can select multiple items in this list.

Graph Options

The Graph Options box contains two controls:

- *Style:* This drop down list specifies the style of the graph used to display the selected statistics for this data series. Available styles are Plot, Scatter Plot, Bar, Stacking Bar, Area, and Stacking Area. The style selected in this list applies to each statistical category at the time it is selected with the right arrow button as described above.
- *Legend:* After the Legend check box is selected, a legend displays at the bottom of the Graph window for this data series. This legend identifies each selected statistical category by color and symbol as it displays on the graph. When disabled, the legend does not display and the graph display expands to fill the legend area. It is enabled by default.

To define a statistical data series, follow these steps:

1. Click the type of item whose statistics you want to display (System, Server, Service).
2. Click the specific item(s).
3. Click the desired statistic.
4. Click the graph type (Plot, Scatter Plot, Bar, etc.).
5. Click the right arrow selection button to the right of the Statistics box.
6. Verify that your selections display in the Selection list (to the right of the Statistics box).
7. Repeat steps (1) through (6) above to graph more statistics, if needed.

Selection List

The Selection List reflects the item (System, Server, Service), statistical category, and graph type of each defined data series. These display in the List's three columns, described below:

- **Items:** The specific System, Server, or Service selected in the Statistics box's Items list.
- **Statistics:** The statistical category selected in the Statistics box's Available Statistics list.
- **Graph Type:** The graph type name selected in the Graph Options' Style drop down menu.

Window Options

The Window Options box includes these controls:

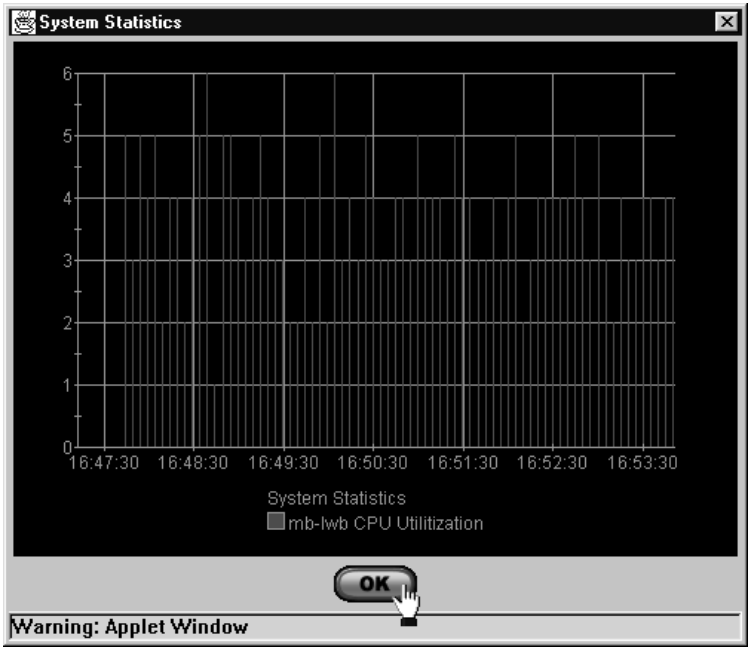
- **Single Graph:** Displays all data series in a single composite graph.
- **Multiple Graphs:** Displays each data series in its own graph.
- **X Gridlines:** Displays the graph's vertical grid lines (the default is enabled).
- **Y Gridlines:** Displays the graph's horizontal grid lines (the default is enabled).
- **Refresh Interval(s):** The refresh or update rate of the graph in seconds (the default is five seconds).
- **Maximum Data Points:** The number of data points displayed in the graph. After the maximum number of data points is displayed, new data points are added to the right of the graph and the oldest data point is displaced off the left side of the graph. The graph can display between 1 and 1000 data points, and the default is **100**.

NOTE: *Statistics gathering generates network overhead, and increasing the refresh rate (that is, lowering the* Refresh Intervals *value) increases that overhead.*

Graphing Statistics

NOTE: The graph parameters, including the Legend checkbox, can be changed on the fly, but the results will not be displayed in the graph window (in the figure at right) until you stop and restart the graph process from the Statistics Screen.

1. After you've entered the desired parameters into the Statistics Screen, display the graph (or graphs, if you've defined multiple data series and have enabled *Multiple Graphs*) by clicking *Graph* at the bottom of the Statistics Screen.



Graph Window with Bar Display

The meaning of the graph depends upon the items and statistics that you have selected. For example, the graph above shows a bar display of CPU Utilization for one system (SA8250) only.

Although the image is grey scaled in this text, each plot displays in a unique color identified at the bottom of the graph.

You can use this information to compare performance of multiple servers in relation to a service and adjust the Max Response Time for the servers if needed.

Notes

5 Command Line Interface

CLI Introduction

The HP e-Commerce/XML Director Server Appliance SA8250 can be fully configured using the Command Line Interface (CLI). The CLI is accessible by using either the Telnet or the serial port. Commands exist in a logical hierarchy.

Secure Shell Support

The SA8250 provides secure shell (SSH) versions 1 and 2 support.

To use the secure shell:

1. Launch your SSH client and connect to the SA8250's IP address.
2. Log on to the secure shell using **`admin`** for both the user ID and password. You can use the `change_password` command, discussed in this chapter, to change the CLI password.

NOTE: *The secure shell is available only when administering the SA8250 over your network.*

Online Help

The SA8250 provides online CLI command help in six forms:

1. Type `help` to describe help features.
2. Type `help commands` to display the list of commands you can enter at the current prompt.
3. Type `help ttychars` to display a list of special terminal editing characters.
4. Type `help <command>` for a description of a specific command or, if relevant, a list of sub-commands you can enter from within `<command>`.
5. Type `?` to display a path list of commands and parameters available from the current prompt or `<command>` forward.
6. Typing `?` or `help` as one of a command's parameters, that is, `<command> ?`, displays help regarding the parameters available for `<command>`.

Pipes

Any command's output can be "piped" using the '|' symbol with "grep" or "more."

- Redirecting a command to `more` pages that command's output regardless of the `config cli more` setting.
- Redirecting a command to `grep` displays only the command output's lines that contain the word specified after `grep` to be displayed.

  ```
  HP SA8250#info | grep SNMP
  ```

  The above command filters the output of the info command using `grep` such that only lines containing "SNMP" are displayed.
- Pipes to `grep` can be cascaded.

  ```
  HP SA8250/config/policygroup/test/service#
  info | grep Primary | grep serv1.com
  ```

  The above command displays only lines containing "Primary" AND "serv1.com."
- The output of a command can be redirected to both `grep` and `more`, but the pipe to `more` must be the last pipe present.

  ```
  HP SA8250/config/policygroup/test/service#
  info | grep Primary | grep serv1.com | more
  ```

Syntax

CLI examples in this chapter use the syntax found in this table.

Syntax	Description
Angled brackets (< >)	Designates where you enter variable parameters
Straight brackets ([ ])	Choices of parameters appear between straight brackets, separated by vertical bars.
Braces ({ })	Optional commands or parameters appear between braces.
Boldface	Commands that you enter after the CLI prompt appear in **boldface** type. The prompt appears in normal typeface to distinguish it from the command text.
Vertical bar (|)	Separates choices of input parameters within straight brackets. You can choose only one of the set of choices separated by vertical bars (do not include the vertical bar in the command).

CLI Command Syntax

Categorical List of CLI Commands

This section lists the SA8250's CLI commands by functional category. For more complete details regarding CLI commands, see "Run-Time CLI Command Reference" later in this chapter.

Global System Commands

```
?
!, !!
Tab key
arp
back, ..
box, top, toplevel
exit, logout, quit
ether
force-rwa
halt
help
history
info
list
logout, exit, quit
netstat {options}
nslookup
ping
quit, exit, logout
reboot
remove
reset
top, box, toplevel
toplevel, box, top
trace
traceroute
who
```

Admin Commands

```
config admin info
config admin port
```

File Management Commands

```
cat
copy
dir
get
put
remove
restore
restore-verbose
save
```

CLI Commands

```
config
config cli delete <username>
config cli info
config cli login-attempts <tries>
config cli more [enable | disable]
config cli port <port>
config cli prompt <prompt>
config cli screenlines <nlines>
config cli ssh-port <sshport>
config cli telnet-sessions <nsessions>
config cli timeout <nseconds>
config cli username <name> password <password>
  level <ro | rw | rwa>
config cli users
```

IRV Commands

```
config irv
config irv info
config irv <ping-interval>
```

GUI Commands

```
config gui broker-action <action>
config gui info
config gui response-timeout <seconds>
config gui server-action <action>
```

Routing Commands

```
config route ospf-area [backbone | <area>]
config route ospf-hello <nseconds>
config route ospf-dead <nseconds>
config route ospf-authtype [none | simple
  ospf-authkey <simple key> | md5 [ospf-authkey
  md5 <key> keyid <id>]
config route protocol [rip | ospf | none]
config route rip-version <version>
config route role [standalone | primary |
  backup]
```

Policy Group Commands

```
config policygroup create <name>
config policygroup delete <name> | -all
config policygroup <name> service <name>
  header-names [certificate <headername> |
  cipher-used <headername> | source-ip
  <headername> | ssl-id <headername>]
config policygroup <name> throttle [enable |
  disable]
```

Service Commands

```
config policygroup <name> service create
  <name> vip <ipaddr> port <port> {type
  [TCP | UDP | RICH_HTTP]} {sticky [disable|
  src-ip | cookie]} {sticky-timeout <seconds>}
  {backups [enable | disable]} {response
  <milli-sec>} {priority <level>} {balancing
  [load | robin]} {server-timeout <seconds>}
config policygroup <name> service delete
  [<name> | -all ]
config policygroup <name> service <name>
  {enable} {disable} {balancing [robin | load]}
  {sticky [disable | src-ip | cookie]}
  {sticky-timeout <nseconds>} {backups [enable |
  disable]} {response <milliseconds>} {dup-syn
  <microseconds>} {priority <level>}
  {server-timeout <seconds>}
config policygroup <name> service <name> header
config policygroup <name> service <name> header-
  names [certificate <name> | cipher-used <name>
  | source-ip <name> | ssl-id <name>]
config policygroup <name> service <name>
  xml-well-formed (enabled | disabled)
```

Server Commands

```
config policygroup <name> service <name> server
  create <name> port <port> {type [primary |
  backup | disabled]} {mode [brokered | sap |
  opr]} {msap [enable | disable]}{606 [enable |
  disable]} {http [enable | disable]}
config policygroup <name> service <name>
  server delete <name> port <port> | -all
config policygroup <name> service <name> server
  <name> port <port> {mode [brokered | sap |
  opr]} {type [primary | backup]{msap [enable |
  disable]}{606 [enable | disable]} {http
  [enable | disable] {xmlpattern create
  <xmlpattern> | xmlpattern delete <xmlpattern |
  index> | xmlpattern info}
```

System Commands

```
config sys
config sys autoboot [enable | disable]
config sys hosts info
config sys hosts delete <ipaddress>
config sys hosts add <ipaddress> alias
  <hostname1> {alias2 <hostname2> alias3
  <hostname3> alias4 <hostname4> alias5
  <hostname5> alias6 <hostname6>}
config sys id <identifier>
config sys info
config sys msd
config sys msd info
config sys msd port <port>
config sys software
config sys software boot <index>
config sys software delete <index>
config sys software info
config sys software install <url> {key <license
  key>} {user <user name>} {password
  <password>} passive <enable | disable>}
config sys software ms-software info <index>
config sys software ms-software enable <index>
config sys software ms-software delete <index>
config sys software ms-software install
```

Security Commands

```
config sys security custom
config sys security custom access-control
  [enable | disable]
config sys security custom acl add ip
  <xxx.xxx.xxx.xxx>
config sys security custom acl add netmask
  <xxx.xxx.xxx.xxx/xx>
config sys security custom acl delete ip
  <xxx.xxx.xxx.xxx>
config sys security custom acl delete netmask
  <xxx.xxx.xxx.xxx/xx>
config sys security custom acl info
config sys security custom forwarding [enable |
  disable]
config sys security custom gui [enable |
  disable]
config sys security custom info
config sys security custom ms-agent [enable |
  disable]
config sys security custom snmp [enable |
  disable]
config sys security custom ssh [enable |
  disable]
config sys security custom telnet [enable |
  disable]
config sys security info
config sys security mode <open | closed |
  custom>
```

SNMP Commands

```
config sys snmp community info
config sys snmp community create <community
  string> ip [<ip address | any>] rights
  [ro | rw]
config sys snmp community delete <string> ip
  [<ip address> | any]
config sys snmp info
config sys snmp port <#>
config sys snmp sysContact <string>
config sys snmp sysLocation <string>
config sys snmp sysName <string>
config sys snmp trap <port>
config sys snmp trap create <ip address>
  community <community string>
config sys snmp trap delete <ip address>
  community <community string>
config sys snmp trap info
config sys snmp trap port <port>
```

SSL Commands

```
config policygroup <name> service <name> key
  certificate [create | delete | import | export
  | info]
config policygroup <name> service <name> key
  client-ca [delete | export | import | info]
config policygroup <name> service <name> key
  client-ca header-certificate [disable |
  enable]
config policygroup <name> service <name> key
  client-ca revocation [delete | import | info |
  mode <disable | enable> | refresh <interval |
  now> | url <url> {user <username> password
  <password> | <none>}]
config policygroup <name> service <name> key
  redirect [<url> | default | none]
config policygroup <name> service <name> key
  signrequest [create | delete | export | info]
config policygroup <name> service <name> key
  suite [ all | high | medium | low | export |
  <custom> ] <ciphersuite>
config ssl info
config ssl redirect [<url> | none]
config ssl suite [ all | high | medium | low |
  export | <custom> ]
config ssl cache [enable|disable]
config ssl dn [ name <name> | email <email> |
  locality <local> | state <state> | country
  <country> | organization <org> | unit <unit> ]
```

Logging Commands

```
config logging info
config logging sys
config logging output
config logging sys info
config logging sys enable
config logging sys disable
config logging output info
config logging output logsize
config logging output viewlog
config logging output maillog
```

Show Commands

```
show admin info
show cli info
show gui info
show irv info
show msd info
show policygroup info
show policygroup <name> info
show policygroup <name> service info
show policygroup <name> service <name> info
show policygroup <name> service <name> key info
show policygroup <name> service <name> key
  certificate info
show policygroup <name> service <name> key
  client-ca info
show policygroup <name> service <name> key
  client-ca revocation info
show policygroup <name> service <name> key
  signrequest info
show policygroup <name> service <name> server
  info
show policygroup <name> service <name> server
  <name> info
show policygroup <name> service <name> server
  <name> port info
show policygroup <name> service <name> server
  <name> port <port> info
show policygroup <name> service <name> server
  <name> port <port> xmlpattern
show route info
show ssl info
show stats info
show stats service <vip> vport <port>
show stats service <vip> vport <port> server
  <ipaddr> port <port> info
show sys date
show sys info
show sys snmp info
show sys software info
show sys software ms-software info
```

Run-Time CLI Command Reference

Global System Commands

This table includes descriptive examples of the Global System commands.

Command	Description
?	Displays the help command tree
!	Enter ! followed by an index number from the history list to execute the indexed command. ! <n> where n is the index number of the command you want to execute
!!	Repeats the last command
Tab key	View the commands available for the current prompt level, and can be used to complete a command. For example, typing "con<TAB>" will create the word "config."
arp	Displays the SA8250's Address Resolution Protocol (ARP) table
back, ..	Brings you up one level in the CLI command tree
box, top, toplevel	Brings you back to the beginning (root level) of the CLI branch command tree
exit, logout, quit	Exit the CLI
ether	Display the Ethernet interface values

Global System Commands

Command	Description
force-rwa	If a user with Read-Write-All authorization logs on when another user with the same authorization is already logged on, the SA8250 "demotes" the new user's permission to Read-only. The **`force-rwa`** command restores a demoted user's permission to Read-Write-All. This command is available only to users with "rwa" authorization. **Note:** The use of **`force-rwa`** potentially allows conflicts among users of equivalent authorization. `force-rwa {-cleanup}` where `-cleanup` automatically logs off all other users
halt	Halts the SA8250.
help	Displays help for the CLI commands
history	Displays the command history. Type "`!`" or "`h`" to recall a command number from the history list.
info	Displays configuration information, including the status of the xml-well-formed setting, for the current prompt level
list	Displays XML patterns by index number
logout, exit, quit	Exit the CLI

Global System Commands (continued)

Command	Description
netstat	Displays the SA8250's routing tables. Global options for the `netstat` command include: • -I <interface> Can be exp0 or exp1 for dual-homed device • -n Do not try to use DNS to resolve IP addresses • -p <protocol> Where <protocol can be either "ip", "icmp", "igmp", "tcp", or "udp" Forms of the `netstat` command include: • No switches dislays active network connections • -r displays the device's forwarding table • -rs displays the device's forwarding table statistics • -s displays protocol statistics • -i displays interface configuration information • -is displays interface statistics
nslookup	Performs an nslookup of the specified IP address or hostname `nslookup <ipaddr | hostname>` where: • `ipaddr` is the IP address • `hostname` is the name of the host
ping	Tests the network connection to another networking device. The command sends an ICMP packet from the SA8250 to the target device, which (if it receives the packet), sends a ping reply. After the SA8250 receives the reply, it displays a message indicating that the specified IP address is alive. If the SA8250 receives no reply, it displays a message indicating that the target device is not responding. `ping <ipaddress | hostname>` where: • `ipaddress` is the IP address of the other networking device • `hostname` is the host name of the other networking device

Global System Commands (continued)

Command	Description
quit, exit, logout	Exit the CLI
reboot	Reboots the SA8250
reset	Resets the SA8250 to its original factory configuration. Only parameters set within the CLI are affected. Networking parameters controlled through the Boot monitor are not affected by the reset command. **Note 1**: Reset causes all policy groups, services, and servers to be deleted. **Note 2**: This operation disables all remote administration access. Use the `config sys security` command to enable remote access. **CLI Factory Settings:** • Telnet port is set to 23. • Prompt is reset to product name. • Maximum telnet sessions is set to 3. • Scrolling is disabled. • Idle timeout is set to 90 seconds. • Maximum login attempts is set to 3. • Unit ID is set to the factory value. • IRV is disabled. • SSH port is set to 22. • Screenlines is set to 25. **GUI Settings:** • Response timeout is set to 30 seconds. • Broker-action is set to 0 (Policy Manager). • Server-action is set to 1 (Statistics) **Multi-site Settings:** • MSD port is set to 1999.

Global System Commands (continued)

Command	Description
reset (continued)	**Route Factory Settings:** • Role is set to ‘standalone.’ • Protocol is set to ‘none’ • OSPF-area is set to ‘backbone.’ • Hello interval is set to 10 seconds. • Dead interval is set to 40 seconds. • RIP version is set to 2.0. **Security Settings:** • acl is cleared. • custom access-control is disabled. • custom forwarding is disabled. • custom ssh is enabled. • custom telnet is disabled. • custom gui is disabled. • custom snmp is disabled. • custom ms-agent is disabled. • security mode is set to closed. **SNMP Settings:** • `sysContact` is set to a blank value. • `sysName` is set to the host name of the unit. • `sysLocation` is set to a blank value. • Community private string rights set to RW. • Community public string rights set to RO. • Port is set to 161. • Trap port is set to 162. • All traps are deleted. **SSL Settings:** • Suite is set to ‘default.’ • Cache is set to ‘enable.’ • Suite is set to ‘none.’
top, box, toplevel	Changes the prompt to the system's top or box level

Global System Commands (continued)

Command	Description
trace	Displays TCP packets coming into or out of the SA8250. It can be helpful for troubleshooting network problems. Trace accepts a tcpdump-style expression and several command line options that cause the device to capture packets in the tcpdump binary format; You can TFTP this capture to a remote machine for debugging. Use the CLI File Management command `put` to TFTP the resultant dump file from this device. Any machine with `tcpdump` can decode the binary file into human-readable packet dumps using the "-r" switch. This command will prompt you for the name of an output file and a filter file. Press `<return>` when prompted for a filter file if you do not have one. It is simply a text file containing an arbitrarily long tcpdump-style expression which `trace` can use. `trace <switches> {<expression>}` Available switches: • `-a` Attempt to use the DNS to convert address to names. • `-c <int>` Exit after receiving `<int>` packets (by default, the command automatically exits after 60 seconds. • `-e` Print the link-level header on each dump line. • `-i <interface>` Specify an interface to capture packets from (exp0 or exp1 for dual-homed devices). • `-n` Don't convert addresses to names. • `-N` Don't print domain name qualification of host names. • `-q` Output less protocol information. • `-s <int>` Capture `<int>` bytes of data from each packet rather than the default of 76 bytes. • `-S` Output absolute rather than relative TCP sequence numbers. • `-t` Don't output a timestamp on each dump line. • `-tt` Output an unformatted timestamp on each dump line. • `-v` Slightly more verbose output. • `-vv` Even more verbose output. • `-x` Output each packet in hex. • `-X` Output each packet in hex and ASCII.

Global System Commands (continued)

Command	Description
trace (continued)	The <expression> has the same format as a "tcpdump" expression: If no <expression> is given all packets on the net will be output. <expression> primitives can be combined using parentheses and '!' or 'not', '&&' or 'and', and '||' or 'or.' Here is a list of the <expression> primitives: • dst host <host>: true if the IP destination field of the packet is <host>. • src host <host>: true if the IP source field of the packet is <host>. • host <host>: true if either the IP source or destination field of the packet is <host>. • ether dst <ehost>: true if the ethernet destination address is <ehost>. • ether src <ehost>: true if the ethernet source address is <ehost>. • ether host <ehost>: true if either the ethernet source or destination address is <ehost>. • gateway <host>: true if the packet used <host> as a gateway. • dst net <net>: true if the IP destination address of the packet has a network number of <net>. • src net <net>: true if the IP source address of the packet has a network number of <net>. • net <net>: true if the IP source or destination address of the packet has a network number of <net>. • net <net> mask <mask>: true if the IP address matches <net> with the specific netmask • net <net>/<len>: true if the IP address matches <net> a netmask <len> bits wide. • dst port <port>: true if the packet is ip/tcp or ip/udp and has a destination port value of <port>. • src port <port>: true if the packet has a source port value of <port>. • port <port>: true if either the source port value or destination port has a value of <port>.

Global System Commands (continued)

Command	Description
trace (continued)	• `ip proto <protocol>` : true if the packet is an ip packet of protocol type `<protocol>`, where `<protocol>` is **icmp**, **udp**, or **tcp**. • `ether broadcast` : true if the packet is an ethernet broadcast packet. • `ip broadcast` : true if the packet is an IP broadcast packet
traceroute	Displays the route that packets travel to the network host. `traceroute <ipaddr | hostname>` where: • `hostname` is the name of the network host • `ipaddr` is the network host's IP address
who	Displays the list of currently logged on users, with their permission levels and whether they are logged on using the CLI or GUI `who`

Global System Commands (continued)

Admin Commands

This table describes the SA8250's admin commands, which specify the server port where the Graphical User Interface is accessed and verify the current port.

Command	Description
config admin info	Displays the current Graphical User Interface (GUI) port `config admin info`
config admin port	Sets the Graphical User Interface (GUI) port number. This is the port where the admin GUI listens for connections. The Admin GUI allows the user to configure the unit using a graphical user interface. `config admin port <port>` where `port` is the GUI http port. You can select any available port between 1 and 65535. The default is **1095**.

Admin Commands

File Management Commands

This table describes the File Management commands.

Command	Description
cat	Displays contents of the specified saved configuration file. `cat {filename}` where `filename` is the name of the file to be displayed. If not specified, the file `active.cfg` is displayed.
copy	Copies an existing configuration file to a new file. `copy <source> to <destination>` where `source` is the name of the original file and `destination` is the name of the target file.
dir	Displays a list of saved configuration files `dir`
get	Retrieves a configuration file from a TFTP server. Because the TFTP protocol has no user-logon or validation, sites that support it typically enforce some file access restrictions. Such restrictions are specific to each site and vary widely in scope and methods. `get <tftpurl>` where `tftpurl` is the name of the TFTP server and file to retrieve. Example: **`get tftp://192.168.10.1/default.cfg`**

Command	Description

put	Puts a configuration to the specified remote file or directory. If the remote-directory form is used, the remote host is assumed to be a UNIX* machine. Because the TFTP protocol has no user-logon or validation, sites that support it typically enforce some file access restrictions. Such restrictions are specific to each site and vary widely in scope and methods.
	
	`put <filename> to <tftpurl>`
	
	where:
	• `filename` is the name of the file to send.
	• `tftpurl` is the name of the TFTP server and file name to which you want to send the configuration file
	
	Example:
	
	`put default.cfg to tftp://192.168.10.1/ default.cfg`

remove	Removes a configuration file. `remove <filename>` where `filename` is name of the configuration file to be removed
restore	Restores a CLI configuration from a previously saved file (see **save**). `restore {filename}` where `filename` is the name of the configuration file to be restored (the default file name is `active.cfg`). **Note:** Username commands are not valid in configuration files, that is, save config and restore config operations do not include username data. Type the `config cli username` command to restore usernames.

File Management Commands (continued)

Command	Description
restore-verbose	Same as **restore** but displays every line as it is restored `restore-verbose {filename}` where `filename` is the name of the configuration file to be restored (the default file name is `active.cfg`). **Note:** Username commands are not valid in configuration files, that is, save config and restore config operations do not include username data. Type the `config cli username` command to restore usernames.
save	Saves the current CLI configuration to a file of the specified name. This information is saved in an ASCII file (see also **restore**). `save {filename}` where `filename` is the file name used to store the configuration (the default file name is `active.cfg`). **Note**: Username commands are not valid in configuration files, that is, save config and restore config operations do not include username data. Type the `config cli username` command to restore usernames.

File Management Commands (continued)

CLI Commands

This table describes the Command Line Interface commands.

Command	Description
config	Changes the prompt to the CLI `config` branch. `config`
config cli delete	Deletes the specified user. `config cli delete <username>` **Note**: The default user name, "admin" cannot be deleted.
config cli info	Shows all current CLI settings at this level. `config cli info`
config cli login-attempts	Specifies the maximum allowable number of failed login attempts before closing the connection. `config cli login-attempts <tries>` where `tries` is a number from 1 to 30.
config cli more	Sets scrolling of the output display to one page at a time or to continuous display. `config cli more [enable | disable]` where: • `enable` scrolls one page at a time. • `disable` results in continuous scrolling.

CLI Commands

Command	Description
config cli port	Specifies the telnet port on which the CLI runs. **Note**: If you are logged in using telnet, do not use this command. Doing so will change the port parameters and you will be disconnected. `config cli port <port>` where `port` is a valid port. Valid ports are port **23** (the default) or any port between 1024 and 65535.
config cli prompt	Changes the root level prompt. `config cli prompt <prompt>` where `prompt` is the new prompt name. The default prompt is an abbreviation of the product's name, such as "HP SA8250." The default prompt can be restored by entering "" (two double quotes with no space between them) as the prompt name.
config cli screenlines	Specifies the number of lines in the output display. `config cli screenlines <nlines>` where `nlines` is the number of output lines (8 to 64, the default is **23**).
config cli telnet-sessions	Sets the allowable number of concurrent inbound remote CLI logon sessions. `config cli telnet-sessions <nsessions>` where `nsessions` is the number of allowed sessions (1 to 8, the default is **3**).

CLI Commands (continued)

Command	Description
config cli ssh-port	Sets the Secure Shell (SSH) port number. **Note**: If you are logged in using SSH, do not use this command. Doing so will change the port parameters and you will be disconnected. `config cli ssh-port <port>` where `port` is a valid port. Valid ports are port **22** (the default) or any unused port between 1024 and 65535.
config cli timeout	Sets or changes the idle timeout period before automatic logout for CLI sessions. This feature can be disabled by setting the timeout value to "0." `config cli timeout <nseconds>` where `nseconds` is the timeout period in seconds (0, or 30 to 65535). The default is **900** seconds (15 minutes).
config cli username	Adds or changes the logon entry or password `config cli username <name> password <password> level <ro | rw | rwa>` where: • `name` is the logon name (must be from 4 to 16 characters with no spaces) • `password` is the password (must be from 4 to 16 characters with no spaces) • `level` is the authorization level (`ro` = read only, `rw` = read and write, and `rwa` = read, write all). **Note:** Username commands are not valid in configuration files, that is, save config and restore config operations do not include username data.
config cli users	View the logon and user levels for the different access levels. `config cli users`

CLI Commands (continued)

IRV Commands

This table describes the Intelligent Resource Verification (IRV) commands.

Command	Description
config irv	Changes to the `config/irv` branch `config irv`
config irv info	Displays the current ping interval `config irv info`
config irv ping-interval	Sets the IRV ping interval `config irv <ping-interval>` where `ping-interval` is a the number of seconds from 0 to 99999. To disable IRV, set `ping-interval` to 0.

IRV Commands

GUI Commands

This table describes the SA8250's GUI commands, which are used to configure its Graphical User Interface.

Command	Description
config gui broker-action	Specifies the start screen within the GUI when you double-click a SA8250 icon in the topology screen. `config gui broker-action [0-5]` where `[0-5]` is an integer between 0 and 5 that indicates one of the following destination screens: • 0 = Policy Manager (default) • 1 = Statistics • 2 = Administration • 3 = Tools • 4 = Configuration Maintenance • 5 = Event Log
config gui info	Displays current Graphical User Interface (GUI) configuration information `config gui info`
config gui response-timeout	Specifies the interval in seconds the GUI waits for a response from the SA8250 before it times out. `config gui response-timeout <seconds>` where `<seconds>` is an integer between 0 and 120. A value of 0 disables timeout, and the default value is **30**.

GUI Commands

Command	Description
config gui server-action	Specifies the start screen within the GUI when you double-click a server icon in the topology screen. `config gui server-action [0-5]` where `[0-5]` is an integer between 0 and 5 that indicates one of the following destination screens: • 0 = Policy Manager • 1 = Statistics (default) • 2 = Administration • 3 = Tools • 4 = Configuration Maintenance • 5 = Event Log

GUI Commands (continued)

Routing Commands

The Routing Commands are used both in route and serial failover modes. In serial failover mode, they advertise routes to the VIPs.

NOTE: *Latency exists in the refresh process of normal routing tables. If you configure OSPF routing protocol for a SA8250 on a specific router, VIP destinations may be inconsistent in the routing table. Also, if you change the role from or to Standalone you must specify the protocol on the same line.*

This is critical for VIPs that are not in the same subnet as the SA8250. If you use route failover, you must configure a routing protocol (OSPF or RIP) appropriate to your router.

Use of the first two commands in this section, config route role and config route protocol, must be coordinated. If role is set to "`standalone`," then protocol must be set to "none." If role is set to "`primary`" or "`backup`," then protocol must be set to OSPF or RIP, (such as `config route role standalone protocol none`).

For example:

```
config route role standalone protocol disable
```

or

```
config route role primary protocol ospf
```

Command	Description
config route ospf-area	Changes the OSPF area. **Note:** `ospf-area` must be set to the same OSPF area as the ingress router to which the SA8250 is talking. This can be the keyword, "backbone," or an integer from 0 to 2,147,483,647, or dotted decimal format (xxx.xxx.xxx.xxx). `config route ospf-area [backbone | <area>]` where: • `backbone` sets the OSPF area to backbone (0.0.0.0) • `area` is the OSPF area ID.
config route ospf-hello	Changes the OSPF hello interval. The hello interval is the number of seconds between hello packets sent on this interface. This must match the hello interval of the ingress router. The valid range is 1 to 65535, and the default is **10**. `config route ospf-hello <nseconds>` where `nseconds` is the number of seconds in the hello interval.

Command	Description
config route ospf-dead	Changes the duration of the OSPF router dead interval. The router dead interval is the number of seconds the SA8250's OSPF neighbors should wait before assuming that this OSPF SA8250 is down. This must match the router dead interval of the ingress router. Valid range is from 1 to 2,147,483,647, and the default is **40**. **Note**: This value must be at least four times the hello interval. `config route ospf-dead <nseconds>` where `nseconds` is the number of seconds in the OSPF router dead interval.

Routing Commands (continued)

Command	Description
config route ospf-authtype	Specifies the OSPF authentication mode. Router Authentication type and key are security mechanisms to guarantee that routing information is exchanged only with trusted routers. The type and key together comprise the "authentication scheme." **Note 1:** An OSPF Area can have only one OSPF authentication scheme. Select `none` to specify no OSPF authentication, or `simple` to specify simple password authentication. If you select `simple`, you must provide an authentication key: a string of from one to eight characters (double quotes and spaces excluded). The default is `none`. **Note 2:** Both sides of the OSPF connection must use the same authentication type and key. `config route ospf-authtype [none | simple ospf-authkey <simplekey> | md5 ospf-authkey <md5key> keyid <id>` where: • `none` disables OSPF Authentication • `simple` enables OSPF Authentication (requiring you to provide an authentication key) • `simplekey` is a string of from one to eight characters used as an authentication password. Spaces and double quotes are not permitted. This string must match the SA8250's OSPF neighbors. • `md5key` is a string of from one to sixteen characters. Spaces and double quotes are not permitted. • `id` is an integer between 1 and 255.

Routing Commands (continued)

Command	Description
config route protocol	Specifies the desired routing protocol. `config route protocol [rip | ospf | none]` where: • `rip` enables Routing Information Protocol (RIP) on the SA8250. • `ospf` enables Open Shortest Path First (OSPF) routing protocol on the SA8250. • `none` disables both RIP and OSPF protocols.
config route rip-version	Specifies the RIP version (1 or 2). `config route rip-version [1 | 2]` where `1` or `2` enables RIP version 1 or 2, respectively, and **2** is the default.
config route role	Specifies the SA8250's role as "Standalone," "Primary," or "Backup." The default is Standalone. `config route role [standalone | primary | backup]` where: • `standalone` enables the SA8250's standalone mode • `primary` enables the SA8250's primary mode • `backup` enables the SA8250's backup mode.

Routing Commands (continued)

Policy Group Commands

This table describes the Policy Group commands. Policy Group names must adhere to the following conventions:

- From 1 to 25 characters in length
- Any alphanumeric character
- Other eligible characters include hyphens ("-"), periods ("."), and underscores ("_")
- Spaces must **not** be used.

Within these restrictions, the naming of Policy Groups is at your discretion, though convenient naming schemes might include serial names ("Group1," "Group2," etc.), or names that reflect a Policy Group's content, such as "e-CommerceGrp" or "HTTP_Group."

NOTE: *The names of existing Policy Groups cannot be changed.*

Command	Description
config policygroup create	Creates a new Policy Group. `config policygroup create <policy-name>` where `policy-name` is the name of the Policy Group to be created.
config policygroup delete	Deletes an existing Policy Group. `config policygroup delete [<policy-name> | -all]` where `policy-name` is the name of Policy Group to be deleted. Type "`-all`" to delete all policy groups.

Policy Group Commands

Command	Description
config policygroup throttle	Enables throttling of services to meet specified response times. `config policygroup <policy-name> throttle [enable | disable]` where: • `policy-name` is the name of the policy group • `enable` enables throttling • `disable` disables throttling **Note**: When throttling is activated, requests to eligible servers in lower-priority services are throttled until response times are met or all eligible servers have been throttled. An eligible server is one that is shared by both a higher and lower priority service. Throttling affects all services within the Policy Group.
config policygroup service backups	Enables or disables servers designated as "backup" to come on line if necessary to assure target response times. `config policygroup <policy-name> service <service-name> backups [enable | disable]` where: • `policy-name` is the name of an existing Policy Group • `service-name` is the name of the service • `enable` enables backup server(s) • `disable` disables the backup server(s)
config policygroup service balancing	Changes the load balancing algorithm. The default algorithm is "load." `config policygroup <policy-name> service <service-name> balancing [robin | load]` where: • `policy-name` is the name of an existing Policy Group • `service-name` is the name of the service • `robin` directs the service to use the round-robin load balancing algorithm • `load` directs the service to use the response time load balancing algorithm.

Policy Group Commands (continued)

Command	Description
config policygroup service create	Creates a service. The default type is TCP. `config policygroup <policy-name> service create <service-name> vip <ipaddr> port <port> {type [TCP | UDP | RICH_HTTP]}` **Note 1:** The VIP/port combination must be unique. The service type defaults to TCP unless specified otherwise on the command line. **Note 2:** The `service-name`, `ipaddr`, and `port` cannot be changed once you enter this command. where: • `policy-name` is the name of an existing Policy Group `service-name` is the name of the service you want to create • `ipaddr` is the virtual IP address (xxx.xxx.xxx.xxx) • `port` is the listening port for incoming connections. You can select port numbers between 1 and 65535.
config policygroup service delete	Deletes an existing service. `config policygroup <policy-name> service delete [ <service-name> | -all ]` where: • `policy-name` is the name of the Policy Group that contains the service to be deleted • `service-name` is the service to be deleted • `-all` deletes all services and associated servers
config policygroup service disable	Disables the specified service. `config policygroup <policy-name> service <service-name> disable` where: • `policy-name` is the name of an existing policy group • `service-name` is the name of the service

Policy Group Commands (continued)

Command	Description
config policygroup service dup-syn	Sets the time interval (in microseconds) within which if the dynamically calculated number of duplicate SYNs (lost packets) to a fulfillment server is detected, the server is declared dead. `config policygroup <policy-name> service <service-name> dup-syn <microseconds>` where: • `policy-name` is the name of an existing policy group `service-name` is the name of the service • `microseconds` is the time interval within which to count dropped packets. You can specify a value from 1000 to 2,147,483,647, and the default is **500,000**.
config policygroup service enable	Enables the specified service. `config policygroup <policy-name> service <service-name> enable` where: • `policy-name` is the name of an existing policy group • `service-name` is the name of the service.
config policygroup service header	Enables or disables the HTTP header information. `config policygroup <policy-name> service <service-name> header [enable | disable]` where: • `policy-name` is the name of the policy group • `service-name` is the name of the service • `enable` enables the http header information • `disable` disables the http header information. Note: Enabled for SSL by default.

Policy Group Commands (continued)

Command	Description
config policygroup service header-names	Sets the name used in the HeaderNameField of the HTTP headers inserted when `header` or `header-certificate` are enabled, on a per-service basis. `config policygroup <policy-name> service <service-name> header-names [certificate <headername> | cipher-used <headername> | source-ip <headername> | ssl-id <headername>]` where: • `policy-name` is the name of the policy group • `service-name` is the name of the service • `headername` the name to use in the HTTP header **Note 1**: With `header` enabled, the following is the default HTTP header name: • source-ip: HP_SOURCE_IP **Note 2**: With `header-certificate` enabled, the following are the default HTTP header names: • certificate: HP_CLIENT_CERTIFICATE • cipher-used: HP_CIPHER_USED • ssl-id: HP_SSL_SESSION_ID **Note 3**: With `header-certificate` enabled, and using Internet Explorer* with a non-trusted CA (for example, a broker-generated or Microsoft IIS) server- generated server certificate, the client certificate may not pass through on the first request. Pass-through behaves correctly if the server certificate is obtained from a recognized Certificate Authority such as Verisign*.

Policy Group Commands (continued)

Command	Description
config policygroup service priority	Sets the priority level of the specified service. `config policygroup <policy-name> service <service-name> priority <level>` where: • `policy-name` is the name of an existing Policy Group • `service-name` is the name of the service • `level` is the service priority. You can specify a value from 1 (highest) to 5 (lowest), and **1** is the default.
config policygroup service response	Sets the target response time. `config policygroup <policy-name> service <service-name> response <mil-seconds>` where: • `policy-name` is the name of an existing Policy Group • `service-name` is the name of the service • `mil-seconds` is the number of milliseconds the service should take to respond to a request. This value is ignored unless throttling is activated in the Policy Group. You can specify a value from 0 to 2,147,483,647, and the default is **50**.
config policygroup service server-timeout	Specifies the amount of time a client request waits for the server to respond before trying the next available server. If no server is available, a 503 error ("No server available") message is sent to the requesting client. Server-timeout mode is available only to RICH_HTTP services. `config policygroup <policy-name> service <service-name> server-timeout <seconds>` where: • `policy-name` is the name of an existing Policy Group • `service-name` is the name of the service • `seconds` is the number of seconds to wait for a connection. You can specify a value from 1 to 2,147,483,647, and the default is **5**.

Policy Group Commands (continued)

Command	Description
config policygroup service server create	Creates a new server. **Note:** The server name and port must be unique. `config policygroup <policy-name> service <service-name> server create <server-name>` where: • `policy-name` is the name of an existing Policy Group • `service-name` is the name of the service • `server-name` is any valid server name
config policygroup service server port 606	Enables or disables 606 error detection on the named server. 606 is a user-defined error code. When 606 error detection is enabled, requests that generate 606 errors are rerouted (transparently to the client), to the next available server. When disabled, the error is sent back to the requesting client. `config policygroup <policy-name> service <service-name> server <server-name> port <port> 606 [enable | disable]` where: • `policy-name` is the name of an existing Policy Group • `service-name` is the name of the service • `server-name` is the name of the server • `port` is the server port • `enable` enables 606 error detection • `disable` disables 606 error detection
config policygroup service server delete	Deletes an existing server. `config policygroup <policy-name> service <service-name> server delete <name>` where: • `policy-name` is the name of an existing Policy Group • `service-name` is the name of the service • `name` is the name of the server to be deleted

Policy Group Commands (continued)

Command	Description
config policygroup service server port http	Enables or disables HTTP error detection on the named server. When HTTP error detection is enabled, requests that generate HTTP errors 401-405 and 500-503 are rerouted (transparently to the client), to the next available server. When disabled, these errors are sent back to the requesting client. `config policygroup <policy-name> service <service-name> server <server-name> port <port> http [enable | disable]` where: • `policy-name` is the name of an existing Policy Group • `service-name` is the name of the service • `server-name` is the name of the server • `port` is the server port • `enable` enables HTTP error detection • `disable` disables HTTP error detection
config policygroup service server port mode	Enables or disables Source Address Preservation (SAP) on the named server. When OPR is enabled, the CLI-configured server port is ignored and the configured server service port is used. By default, SAP is enabled (and cannot be disabled) when OPR is enabled. **Note:** OPR requires the use of servers' loopback adapters. For more details, see Appendix D. `config policygroup <policy-name> service <service-name> server <server-name> port <port> mode [brokered | opr | sap]` where: • `policy-name` is the name of an existing Policy Group • `service-name` is the name of the service • `server-name` is the name of the server • `port` is the server port • `brokered` is the default mode, with both SAP and OPR disabled. • `opr` enables Out-of-Path Return • `sap` enables Source Address Preservation

Policy Group Commands (continued)

Command	Description
config policygroup service server port msap	Enables or disables Multi-hop Source Address Preservation (MSAP) on the named server. `config policygroup <policy-name> service <service-name> server <server-name> port <port> msap [enable | disable]` where: • `policygroup-name` is the name of an existing Policy Group • `service-name` is the name of the service • `server-name` is the name of the server • `port` is the server port • `enable` enables MSAP • `disable` disables MSAP
config policygroup service server port type	Specifies the server type of the named server. `config policygroup <policy-name> service <service-name> server <server-name> port <port> type [primary | backup | disable]` where: • `policy-name` is the name of an existing Policy Group • `service-name` is the name of the service • `server-name` is the name of the server • `port` is the server port • `primary` specifies that this server is a primary server • `backup` specifies that this server is a backup server • `disable` disables the server **Note:** A backup server is sent requests only under two circumstances: First, when the primary servers are unable to meet the configured target response times a backup server is used if and only if "backups" is enabled for this service. Second, backup servers are given requests when a primary server is unavailable. As primary servers become inactive, backup servers are brought into service to handle requests.

Policy Group Commands (continued)

Command	Description
config policygroup service server port xmlpattern create	Creates an XML pattern defined by the specified string for the server and port specified in the current path `config policygroup <policy-name> service <service-name> server <server-name> port <port> xmlpattern create <xmlpattern>` where: • `policy-name` is the name of the policy group • `service-name` is the name of the service • `server-name` is the name of the server • `port` is the port number • `xmlpattern` is the complete RICH and XML (or RICH only) specification of the pattern to be created, including elements, attributes, text, operators, and comparison operators *Valid RICH expressions include:* • File type expressions, such as `*.gif`, or `*/index.html` • Path expressions, such as `/home/*`, or `/home/images/*`, or `/home/images/a*` • Unique file expressions, such as `/index.html` • Wildcard expressions, such as `*.` **Note 1:** The above expressions can include the negation operator (!), such as `!*.gif`, or `!*/index.html`, but cannot be used with XML expressions. *Invalid RICH expressions include:* • Text on either side of the asterisk, such as `/index*.gif` • Asterisk on either side of text, such as `*/images/*` • Expressions containing more than one asterisk, such as `/index*.*` • Expressions containing one or more spaces or the dollar sign ($) character • Expressions containing a vertical bar (|) or a carat (^) **Note 2:** There can be only one asterisk in any single expression. An asterisk must be either the entire expression itself, or occur at the beginning or the end of the expression.

Policy Group Commands (continued)

Command	Description
config policygroup service server port xmlpattern create (continued)	An example `xmlpattern_string`: **`create */order.asp & doc=5 & //Amount[Value > 10000]`** **Note 3**: You must include a single space before and after the ampersands (&) used to separate the RICH expression, document number, and XML expression. **Note 4**: If the RICH expression matches, but no match can be found for incoming XML expressions, the SA8250 returns a "Server not found" error message to the client. To avoid this, we recommend that you define one of your servers as the default server if the XML expression does not match. To do this, type this command: **`create * & default`** **Note 5**: If the RICH expression does not match, the XML expression is ignored. **Note 6**: The document number is optional. If used, it specifies the document number within a multipart message or URL-encoded document. In the example above, the SA8250 looks for the fifth document within a multipart message. If the fifth document is not and XML document, or does not exist, the XML expression is ignored, and the data is treated as a non-XML document and directed to the first matched RICH expression server. Valid range is integers 1 to 99. **Note 7**: For more information on XML expressions, see Chapter 2.

Policy Group Commands (continued)

Command	Description
config policygroup service server port xmlpattern delete	Deletes the XML pattern defined by the specified string, or by index number, for the server and port specified in the current path `config policygroup <policy-name> service <service-name> server <server-name> port <port> xmlpattern delete [ <xmlpattern> | <index> ]` where: • `policy-name` is the name of the policy group • `service-name` is the name of the service • `server-name` is the name of the server • `port` is the port number • `xmlpattern` is the complete RICH, document number (if used), and XML (or RICH only) alphanumeric specification of the string to be deleted • `index` is the index number of the pattern to be deleted **Note**: You can determine the index number by typing the `info` command.
config policygroup service server port xmlpattern info	Displays a list of all XML patterns and their index numbers on the SA8250. `config policygroup <policy-name> service <service-name> server <server_name> port <port> xmlpattern info` where: • `policy-name` is the name of the policy group • `service-name` is the name of the service • `server-name` is the name of the server • `port` is the port number

Policy Group Commands (continued)

Command	Description
config policygroup service sticky	The SA8250 can be configured to maintain a session's state so that serial requests from a single client are allocated to the same server. This is called "sticky port" functionality. This command enables or disables the sticky port function. Sticky functionality is enabled in either of two modes. "Src-ip" (source IP address) mode identifies requesting clients by IP address."Cookie" mode entails sending a cookie to requesting browsers which identifies subsequent requests as coming from the same client. **Note:** This mode must be used to enable sticky ports in environments in which requests come to the SA8250 through proxy servers. (All requests coming from a proxy server have that server's address as their apparent Source IP address, rather than the actual address of their origination.) Sticky Cookie mode is available only to RICH_HTTP services. `config policygroup <policy-name> service <service-name> sticky [disable | src-ip | cookie]` where: • `policy-name` is the name of an existing Policy Group • `service-name` is the name of the service • `disable` disables sticky ports • `src-ip` enables Source IP Address sticky mode • `cookie` enables Cookie mode (available only to RICH_HTTP)

Policy Group Commands (continued)

Command	Description
config policygroup service sticky-timeout	When the sticky port function is enabled, the maximum time during which a single server is forced to serve serial requests by a single client is called the "sticky timeout." This command sets the sticky timeout. `config policygroup <policy-name> service <service-name> sticky-timeout <nseconds>` where: • `policy-name` is the name of an existing Policy Group • `service-name` is the name of the service • `nseconds` is the period, in seconds, that a connection is guaranteed to connect to the same server. For each subsequent connection, the timeout countdown is restarted. You can specify a value from 1 to 2,147,483,647, and the default is **90** seconds.
config policygroup service xml-well-formed	Specifies if the SA8250 returns an error to the user or directs the client data to servers with matching RICH expressions when it detects an XML well-formed error on an incoming XML data stream. `config policygroup <policy-name> service <service-name> xml-well-formed [ enabled | disabled ]` where: • `policy-name` is the name of the policy group • `service-name` is the name of the service • `enabled` sends a error message to the sending client if a well-formed XML error is detected (the default) • `disabled` sends no error message to the sending client but directs the client data to servers with matching RICH expressions

Policy Group Commands (continued)

System Commands

This table describes the System commands.

Command	Description
config sys	Changes the prompt to the `config/sys` branch `config sys`
config sys autoboot	Enables or disables the Autoboot function. If Autoboot is enabled, the SA8250 prompts you to press a key during restart to enter the Boot Monitor command line interface. If you ignore the prompt, restart finishes with the SA8250 in normal operating mode. If Autoboot is disabled, the restart sequence ends by displaying the Boot Monitor interface. Autoboot is enabled by default. For more details, see Chapter 3. `config sys autoboot [enable | disable]`
config sys hosts info	Displays the contents of the SA8250's host file `config sys hosts info`
config sys hosts delete	Deletes the specified entry from the host file `config sys hosts delete <ipaddress>`
config sys hosts add	Adds the specified IP address to the host file and associates it with the specified hostnames. Hostnames are separated on the command line by spaces. `config sys hosts add <ipaddress> alias <hostname1> { alias2 <hostname> alias3 <hostname> alias4 <hostname> alias5 <hostname> alias6 <hostname> }`

System Commands

Command	Description
config sys id	Sets the unit identifier. The SA8250 is shipped pre-configured with the unit's serial number in this field. This command can change the identifier if the site requires alternate asset tracking information. `config sys id <identifier>` where `identifier` is an alphanumeric value from 1 to 64 characters.
config sys info	Displays all current system information `config sys info`
config sys msd	Changes the prompt to the config/sys/msd branch `config sys msd`
config sys msd info	Shows the current Multi-Site Agent information `config sys msd info`
config sys msd port	Sets the Multi-Site Agent port `config sys msd port <port>` where `port` is an integer from 1 to 65535, and the default is **1999**. We recommend using available ports 1024 and higher.
config sys software	Changes the prompt to the `config/sys/software` branch `config sys software`
config sys software boot	Select a software image and reboots the system under that image. `config sys software boot <index>` where `index` is a valid index of an installed software image, as displayed with the `show sys software info` command.

System Commands (continued)

Command	Description
config sys software delete	Deletes old versions of SA8250 software from local storage. It can be used to free local storage to install a version update or product upgrade. `config sys software delete <index>` where `index` is a valid index of an installed software image, as displayed using the command, **`show sys software info`**
config sys software install	Downloads and installs SA8250 software updates or upgrades. Software downloads are performed via ftp protocol. Once installed, images are selected for execution by typing the `config sys software boot` command. `config sys software install <url> {key <license key>} {user <user name>} {password <password>} passive [ enable | disable ]` where: • `url` is a valid URL identifying the software image to download. It must be of the form `ftp://<host>/<path_name>`. • `license key` is a valid license key for the software image and SA8250 unit to be installed. `license key` is required only to upgrade from 7140 software to 7170 software; no key is required for updates within a single version (you can obtain a key from HP Customer Support). • `user name` is the user name needed to log in during FTP file transfer • `password` is the password with which to log on during FTP during file transfer • `passive` permits you to enable or disable passive FTP transfers. The default is "`enable`." **Note 1:** IP Forwarding blocks active FTP transfers unless all ports are opened. **Note 2**: If you install the same image as the currently running image, the system will automatically reboot. This is normal.

System Commands (continued)

Command	Description
config sys software ms-software	Specifies the multi-site software level. The parameters are used to show all installed multi-site agents, enable a multi-site agent, delete a multi-site agent, or install a new multi-site agent. `config sys software ms-software [info | enable <index> | delete <index> | install <url> {user <user> password <pass>}]` where: • `index` is the (integer) index of the installed multi-site agent to make active or delete • `url` is the complete TFTP or FTP URL of an install agent • `user` is a valid username • `pass` is a valid password

System Commands (continued)

Security Commands

This table describes the Security commands.

Command	Description
config sys security custom access-control	Determines whether the access control list is enabled or disabled. Access control lists are configured with the commands `acl add` (`ip` or `netmask`) and `acl delete` (`ip` or `netmask`). If an IP or netmask is on the access control list they are allowed to connect with any of the enabled administrative methods. SNMP has further restrictions based on IP, the other methods require user / password authentication. `config sys security custom access-control [enable | disable]` Disabled by default.
config sys security custom acl add ip	Adds an IP address to the access control list. `config sys security acl add ip <xxx.xxx.xxx.xxx>`
config sys security custom acl add netmask	Adds a netmask in dotted decimal notation to the access control list. `config sys security acl add netmask <xxx.xxx.xxx.xxx/xx>`
config sys security custom acl delete ip	Deletes an IP address from the access control list. `config sys security acl delete ip <xxx.xxx.xxx.xxx>`
config sys security custom acl delete netmask	Deletes a netmask in dotted decimal notation from the access control list. `config sys security acl delete netmask <xxx.xxx.xxx.xxx/xx>`
config sys security custom acl info	Displays the current access control list. The access control list is only used if config sys security access-control is enabled

Security Commands

Command	Description
config sys security custom	Switches to custom security settings menu `config sys security custom`
config sys security custom forwarding	Enables or disables IP forwarding. If IP forwarding is enabled, the servers connected to the second interface of the SA8250 are directly accessible by their IP addresses. There is no restriction on direct access to the servers through the SA8250. `config sys security custom forwarding [enable | disable]` Disabled by default.
config sys security custom gui	Enables or disables administration using the GUI. If enabled, administrators can only log on to the GUI and perform administration tasks through a web browser. `config sys security custom gui [enable | disable]` Disabled by default.
config sys security custom info	Displays the current state of the custom configuration. If the mode displayed is "custom," then the displayed configuration is the active one. The default custom configuration is SSH access only.
config sys security custom ms-agent	Enables or disables the multi-site agent. `config sys security custom ms-agent [enable | disable]` Disabled by default.
config sys security custom snmp	Enables or disables administration using SNMP. `config sys security custom snmp [enable | disable]` Disabled by default.

Security Commands (continued)

Command	Description
config sys security custom ssh	Enables or disables administration using Secure Shell (SSH). `config sys security custom ssh [enable | disable]`
config sys security custom telnet	Enables or disables administration using telnet. `config sys security custom telnet [enable | disable]` Disabled by default.
config sys security info	Displays the current state of the security system
config sys security mode	Specifies the security mode. The default mode is "closed." `config sys security mode [ open | closed | custom ]` where `mode` is one of the following: • `open` permits all administration tasks to be performed without restriction from all IP addresses and enables IP forwarding. IP forwarding allows direct access to servers at their real IP addresses. • `closed` allows administration to be performed only from the serial port. • `custom` enables the configuration displayed by `config sys security custom info`. Within `config sys security custom` each SA8250 administration access method can be configured individually.

Security Commands (continued)

SNMP Commands

This table describes the SNMP commands.

Command	Description
config sys snmp community create	Specifies community strings that the SA8250 will accept on incoming SNMP requests. Up to 10 community strings can be created. `config sys snmp community create <string> ip [<ip address>|any] rights [ro|rw]` where: • `<string>` is the name of the community you wish to create • `<ip address>` is the IP address of the host from which you will accept this community string. If `any` is specified, the community string will be accepted on requests from any IP address. • `ro` means the community string has read-only privilege. • `rw` means the community string has read-write privilege. The default community strings are `public any ro` and `private any rw`.
config sys snmp community delete	Deletes a community string that the SA8250 can accept on incoming SNMP requests. `config sys snmp community delete <string> ip [<ip address> | any]` where: • `string` is the name of the community string you want to delete • `ip address` is the IP address of the host from which you will not accept this community string. If `any` is specified, the community string will not be accepted on requests from any IP address.
config sys snmp community info	Displays the community strings the SA8250 is configured to accept. `config sys snmp community info`

Command	Description
config sys snmp info	Displays information about the SNMP port, `sysContact`, `sysName`, and `sysLocation`. `config sys snmp info`
config sys snmp port	Specifies the port where the SA8250 receives SNMP requests. `config sys snmp port <#>` where # is a number between 5020 and 65535 (the default is **161**)
config sys snmp sysContact	Specifies a string for the MIB-II variable sysContact. The default is NULL. `config sys snmp sysContact <string>` where `string` is a string of displayable characters.
config sys snmp sysLocation	Specifies a string for the MIB-II variable sysLocation. The default is NULL. `config sys snmp sysLocation <string>` where `string` is a string of displayable characters.
config sys snmp sysName	Specifies a string for the MIB-II variable `sysName`. The default is the hostname of the SA8250. `config sys snmp sysName <string>` where `string` is a string of displayable characters.

SNMP Commands (continued)

Command	Description
config sys snmp trap create community	Specifies the host to which SA8250 sends SNMP traps. Up to 10 trap receivers can be created. By default the trap receiver list is empty, thus no traps are sent. `config sys snmp trap create <ip address> community <community string>` where: • `ip address` is the IP address of the host to which you wish to send SNMP traps • `community string` is sent with all traps sent to the IP address
config sys snmp trap delete community	Deletes a host from the trap receiver list. `config sys snmp trap delete <ip address> community <community string>` where: • `ip address` is the IP address of the host you want to delete from the trap receiver list • `community string` is an identifier associated with specified access rights
config sys snmp trap info	Displays the trap receiver list.
config sys snmp trap port	Specifies the port to which the SA8250 sends traps. `config sys snmp trap port <port>` where `port` is a number between 5020 and 65535 (the default is **162**)
show sys snmp info	Displays all SNMP information

SNMP Commands (continued)

SSL Commands

This table describes the Secure Transactions (SSL) commands. Commands in this section are only valid for RICH_HTTP services.

Command	Description
config policygroup service key certificate create	Creates a certificate. A private key must be created prior to using this command. You can optionally provide distinguished name (DN) information. If no DN information is provided, the default DN information is used. The default DN information can be viewed or changed by using the `config ssl dn` command. `config policygroup <policy-name> service <service-name> key certificate create {life <life>} {name <name>} {email <email>} {state <state>} {organization <org>} {unit <unit>} {locality <loc>} {country <country>}` where: • `policy-name` is the name of a policy group • `service-name` is the name of a service • `life` is the number of days the certificate remains valid (the default is **30** days) • `name` is the common (server's) name • `email` is the email address, `state` is the name of your state or province • `organization` is the name of your company or organization, `unit` is your organizational section • `locality` is the name of your city or locality For example, creating a certificate that expires in 120 days: `HP SA8250/.../<server> port <port> number>#`**`certificate create life 120`** **Note**: When the procedure is complete, you can type `info` at the prompt to verify the key's creation.

SSL Commands

Command	Description

config policygroup service key certificate delete	Deletes a certificate.
	
	`config policygroup <policy-name> service <service-name> key certificate delete`
	
	where:
	• `policy-name` is the name of a policy group
	• `service-name` is the name of a service
	
	Example:
	`HP SA8250/.../service/<service>/key>#`
	`certificate delete`
	
	Note: When the procedure is complete, you can type `info` at the prompt to verify the certificate's deletion.

config policygroup service key certificate export	Exports a certificate. Certificates can be exported to the console or to a remote machine via ftp. `config policygroup <policy-name> service <service-name> key certificate export [<url>]` where: • `policy-name` is the name of a policy group • `service-name` is the name of a service • `url` is a valid URL identifying where to export the certificate (it must be in the form `ftp://<host>/<path_name>`) **Note**: If no URL is provided, the certificate will be exported to the console.

SSL Commands (continued)

Command	Description
config policygroup service key certificate import	Imports an existing certificate. We recommend you copy the certificate (a block of ASCII text) from a server's console window, then paste it into the SA8250's console window when prompted. To paste in a certificate, type the `import` command and press <**Enter**>. The CLI prompts you to paste in the certificate. When finished, type three periods ("**...**") on a separate line, then press <**Enter**>. `config policygroup <policy-name> service <service-name> key certificate import [<url> {user <username> password <password>}]` where: • `policy-name` is the name of a policy group • `service-name` is the name of a service • `url` is a valid URL identifying the certificate file to download. (It must be in the form `ftp://<host>/<path_name>`) • `user` is the username • `password` is the password **Note:** When the procedure is complete, you can type `info` at the prompt to verify the certificate's transfer to the SA8250.

SSL Commands (continued)

Command	Description
config policygroup service key client-ca	Displays, deletes, exports, or imports a client certificate. `config policygroup <policy-name> service <service-name> key client-ca [delete | export | import | info]` where: • `policy-name` is the name of a policy group • `service-name` is the name of a service • `delete` deletes a client certificate • `export` exports a client certificate • `import` imports a client certificate • `info` displays the client certificate information **Note**: Client certificates are actually loaded in the browser. Certificates from the Certificate Authority (CA) that issued the client certificates are loaded in the SA8250.
config policygroup service key client-ca header-certificate	Adds a PEM-encoded client certificate to the HTTP header of requests sent to the servers. `config policygroup <policy-name> service <service-name> key client-ca header-certificate [disable | enable]` where: • `policy-name` is the name of a policy group • `service-name` is the name of a service • `disable` (the default) disables the client certificate in the HTTP header • `enable` enables the client certificate in the HTTP header **Note**: With `header-certificate` enabled, and using Internet Explorer* with a non-trusted CA (for example, a broker-generated or Microsoft IIS) server- generated server certificate, the client certificate may not pass through on the first request. Pass-through behaves correctly if the server certificate is obtained from a recognized Certificate Authority such as Verisign*.

SSL Commands (continued)

Command	Description
config policygroup service key client-ca revocation delete	Deletes a Certificate Revocation List (CRL). `config policygroup <policy-name> service <service-name> key client-ca revocation delete` where: • `policy-name` is the name of a policy group • `service-name` is the name of a service
config policygroup service key client-ca revocation import	Imports a CRL from a server. `config policygroup <policy-name> service <service-name> key client-ca revocation import` where: • `policy-name` is the name of a policy group • `service-name` is the name of a service For example, you can copy the CRL (a block of ASCII text) from a certificate server's console window, then paste it into the SA8250's console window. To paste in a CRL, type the `import` command and press <**Enter**>. The CLI prompts you to paste in the certificate. When finished, type three periods ("**...**") on a separate line and press <**Enter**>
config policygroup service key client-ca revocation info	Displays detailed information about the CRL. `config policygroup <policy-name> service <service-name> key client-ca revocation info` where: • `policy-name` is the name of a policy group • `service-name` is the name of a service

SSL Commands (continued)

Command	Description
config policygroup service key client-ca revocation mode	Sets the mode to disable or enable. `config policygroup <policy-name> service <service-name> key client-ca revocation mode [ disable | enable ]` where: • `policy-name` is the name of a policy group • `service-name` is the name of a service • `disable` means that client certificates are not checked against the CRL (the default setting) • `enable` means that client certificates are validated against the CRL **Note**: When mode is *disabled*, the presence of a valid CRL is irrelevant, since no client certificate checking will occur. When mode is *enabled*, a missing or invalid CRL will cause the service to become disabled. Changing the mode to *disabled*, or importing a valid CRL, will re-enable the service.
config policygroup service key client-ca revocation refresh	Sets the interval at which the SA8250 will download the CRL from a certificate server. `config policygroup <policy-name> service <service-name> key client-ca revocation refresh <now>` where: • `policy-name` is the name of a policy group • `service-name` is the name of a service • `interval` is an integer representing the number of minutes from 0 to 625600 (1 year) to wait between attempted retrievals of a CRL from a URL specified using the `url` parameter. A value of 0 disables the feature, and a value of 30 will attempt to retrieve the CRL every 30 minutes. • `now` causes the CRL to be downloaded immediately **Note**: This command supports both DER and PEM format revocation lists.

SSL Commands (continued)

Command	Description
config policygroup service key client-ca revocation url	Retrieves the CRL. `config policygroup <policy-name> service <service-name> key client-ca revocation url <url> {user <username> password <password> | none}` where: • `policy-name` is the name of a policy group • `service-name` is the name of a service • `url` is a URL used to retrieve the CRL. The format of the URL is *protocol://server:port/path*. Valid protocols are FTP, HTTP, and LDAP protocols are supported. • `username` is the optional username to access the URL • `password` is the optional password to access the URL • `none` clears the URL Examples of the `url` parameter: • `url ftp://ftp.newhost.com/myrevoke.crl user anonymous` sets the URL path to myrevoke.crl on the host ftp.newhost.com using the FTP protocol with the username of anonymous, and no password. • `url http://www.myhost.com:9800/CertEnroll/server.crl` sets the URL path to CertEnroll/server.crl on the host www.myhost.com using the HTTP protocol on port 9800. • `url ldap://server.com/DC=company,CD=com,CN=cRL password U8#h2k0W` sets the URL to /DC=company, CD=com,CN=cRL on the host server.com using the LDAP protocol with a password of U8#h2k0W. **Note 1:** If refresh is set to a non-zero value, and the URL is invalid (or specifies a non-valid CRL file), a message is entered into the system logs. We recommend that network administrators closely monitor these logs to ensure the SA8250 is receiving CRLs properly. Using the **refresh now** command causes the log message to be printed onscreen. **Note 2:** This command supports both DER and PEM format revocation lists.

SSL Commands (continued)

Command	Description
config policygroup service key create	Creates a private key. `config policygroup <policy-name> service <service-name> key create {[512 | 1024]}` where: • `policy-name` is the name of a policy group • `service-name` is the name of a service • `512` (the default) creates a 512 bit RSA private key • `1024` creates a 1024 bit RSA private key **Note:** When the procedure is complete, you can type `info` at the prompt to verify the key's creation.
config policygroup service key delete	Deletes a private key. **Note 1**: This command deletes the certificate, signing request, and private key associated with the service. `config policygroup <policy-name> service <service-name> key delete` where: • `policy-name` is the name of a policy group • `service-name` is the name of a service **Note 2**: When the procedure is complete, you can type `info` at the prompt to verify the key's deletion.

SSL Commands (continued)

Command	Description
config policygroup service key export	Exports a private key. The private key can be either exported to the console or to a remote machine via ftp. `config policygroup <policy-name> service <service-name> key export [<url>]` where: • `policy-name` is the name of a policy group • `service-name` is the name of a service • `url` is a valid URL identifying where the private key is to be exported (it must be in the form `ftp://<host>/<path_name>`) • `user` is the username • `password` is the password **Note:** If no URL is provided, the private key will be displayed on the console.

SSL Commands (continued)

Command	Description

config policygroup service key import	Imports an existing private key. For example, you can copy the key (a block of ASCII text) from a server's console window, then paste it into the SA8250's console window, or the private key may be copied via ftp. To paste in a key, type the `import` command and press <**Enter**>. The CLI prompts you to paste in the certificate. When finished, type three periods ("**...**") on a separate line, then press <**Enter**>.
	
	`config policygroup <policy-name> service <service-name> key import <url> {user <user name>} {password <password>}`
	
	where:
	• `policy-name` is the name of a policy group
	• `service-name` is the name of a service
	• `url` is a valid URL identifying the private key file to download (it must be in the form, `ftp://<host>/<path_name>`)
	• `user` is the username
	• `password` is the password
	
	For example, importing a private key via FTP:
	
	`Import ftp://remotehost/key.pem user anonymous`
	
	Note: When the procedure is complete, you can type `info` at the prompt to verify the key's transfer to the SA8250.

SSL Commands (continued)

Command	Description
config policygroup service key redirect	Specifies the default URL to return the user if the client does not support the cipher suite. Each service may specify a different URL. `config policygroup <policy-name> service <service-name> key redirect [default | <url> | none]` where: • `policy-name` is the name of a policy group • `service-name` is the name of a service • `default` specifies the redirect value • `url` is a valid URL identifying the redirect page in the form `http://<host>/<path name>` • `none` disables page redirect

SSL Commands (continued)

Command	Description
config policygroup service key signrequest create	Creates a signing request. Signing requests are used to obtain certificates from a Certificate Authority. Once created, the signing request is exported and emailed to the Certificate Authority, who will mail you a certificate for you to import into the SA8250. You can optionally include distinguished name (DN) information in the request. If no DN information is provided, the default DN information is used. The default DN information can be viewed or changed by using the `ssl dn` command. **Note:** You must create a private key prior to creating a signing request. `config policygroup <policy-name> service <service-name> key signrequest create {name <name>} {email <email>} {state <state>} {organization <org>} {unit <unit>} {locality <loc>} {country <country>} {password <password>} {company <company>}` where: • `policy-name` is the name of a policy group • `service-name` is the name of a service • `name` is the common (or server's) name • `email` is the email address • `state` is the name of your state or province • `organization` is the name of your company or organization • `unit` is your organizational section • `locality` is the name of your city or locality • `password` is the challenge password • `company` is a company name For example: `HP SA8250/.../service/<service>/key>#` **`signrequest create`**

SSL Commands (continued)

Command	Description

config policygroup service key signrequest delete	Deletes a signing request.
	
	`config policygroup <policy-name> service <service-name> key signrequest delete`
	
	where:
	• `policy-name` is the name of a policy group
	• `service-name` is the name of a service
	
	For example:
	
	`HP SA8250/.../service/<service>/key>#`
	`signrequest delete`
	
	Note: When the procedure is complete, you can type `info` at the prompt to verify the signing request's deletion.

config policygroup service key signrequest export	Exports a signing request. The request can be exported to the console or to a remote machine via ftp. `config policygroup <policy-name> service <service-name> key signrequest export <url>` where: • `policy-name` is the name of an existing policy group • `service-name` is the name of the service you want to create • `url` is a valid URL identifying where to export the certificate (it must be in the form `ftp://<host>/<path_name>`)

SSL Commands (continued)

Command	Description
config policygroup service key suite	Specifies a cipher suite for each type of service. `config policygroup <policy-name> service <service-name> key suite [ all | high | medium | low | export | <custom> | default ] <ciphersuite>` where: • `policy-name` is the name of an existing policy group • `service-name` is the name of the service you want to create • `ciphersuite` is a string representing the desired cipher suite, for example: RC4-MD5 The `suite` is one of the following: • `all` is all supported ciphers (including `export` ciphers) • `high` is all ciphers with 168-bit encryption (triple-DES) • `medium` is all ciphers with 128-bit and above encryption, including `high` • `low` is all ciphers with 64-bit and above encryption, including `medium` and `high` • `export` is all export ciphers only • `custom` is a user-defined cipher • `default` use the default specified value in the 'config ssl' level
config ssl cache	Enables or disables the SA8250's SSL session reuse capability. Enabling the cache can provide a performance benefit for SSLv2 clients. This option must be disabled if the majority of the traffic uses SSLv3. Users must consult their client browser software to determine the protocol used. `config ssl cache [enable|disable]` where: • `enable` enables the SSL session reuse capability • `disable` disables the SSL session reuse capability

SSL Commands (continued)

Command	Description
config ssl dn	Sets the Distinguished Name (DN) configuration. This information will be incorporated into new certificate or signing requests unless otherwise specified. **Note:** A unique DN should be specified when generating certificates for each private key created or installed on the SA8250. This prevents potential certificate conflicts with cached certificates on the client's browser. As an alternative, the same private key and certificate pair can be used for multiple Layer 7 services. In this case, the user will see the service as coming from the same trusted provider. `config ssl dn {name <name>} {email <email>} {state <state>} {organization <org>} {unit <unit>} {locality <loc>} {country <country>}` where: • `name` is the common (server's) name • `email` is the email address • `state` is the name of your state or province • `organization` is the name of your company or organization • `unit` your organizational section • `locality` is the name of your city or locality
config ssl redirect	Specifies the default URL to return the user if the client does not support the cipher suite. Each service may specify a specific URL (see the `config policygroup service key redirect` command) at the service key level. `config ssl redirect [<url> | none]` where: • `url` is a valid URL identifying the redirect page in the form `http://<host>/<path name>` • `none` (the default) disables page redirect.

SSL Commands (continued)

Command	Description
config ssl suite	Configures the Cipher Suite the client is permitted to negotiate in the SSL handshake phase. The value applies to all SSL-enabled services. `config ssl suite [ all | high | medium | low | export | default | <custom> ]` where: • `all` is all supported ciphers (including `export` ciphers) • `high` is all ciphers with 168-bit encryption (triple-DES) • `medium` is all ciphers with 128-bit and above encryption, including `high` • `low` is all ciphers with 64-bit and above encryption, including `medium` and `high` • `export` is all export ciphers only • `default` is the default cipher • `custom` is a user-defined cipher **Note**: For more information about supported ciphers, see Appendix B.

SSL Commands (continued)

Logging Commands

This table describes the Logging commands.

Command	Description
config logging info	Displays current logging configuration settings.
config logging sys	Displays system-level logging configuration.
config logging output	Log file viewing and configurations.
config logging sys info	Displays the current system logging mask settings and available logging mask.
config logging sys enable	Enables the system logging mask `config logging sys enable <mask>` where `mask` is one of the following: • general • trace • audit • debug • statistic • security • warning • error
config logging sys disable	Disables the system logging mask. `config logging sys disable <mask>` where `mask` is one of the following: • general • trace • audit • debug • statistic • security • warning • error

Logging Commands

Command	Description
config logging output info	Displays the current logging configuration settings
config logging output logsize	Sets the maximum log file size. The range is from 1024 to 60000.
config logging output viewlog	Allows review of the log file. An option filter value can be indicated to remove the logging mask from the log file upon review. `config logging output viewlog <filter>` where `filter` is one of the following: • general general debug and information logging • trace function-level trace logging • audit audit trail logging • debug debug information logging • statistic statistical information logging • security security information logging • warning warning statement logging • error error statement logging

config logging output maillog	Reviews the log file. An SMTP email address is required to send the log file to for review.
	
	`config logging output maillog <address>`
	`mailhost <mailhost>`
	
	where:
	• `address` is a valid SMTP email address to which the log file is sent externally
	• `mailhost` is a valid email server on your network

Logging Commands (continued)

Show Commands

This table describes the Show commands.

Command	Description
show admin info	Displays the port used for communication with the GUI `show admin info`
show cli info	Displays the CLI configuration `show cli info`
show cli users	Displays the list of users `show cli users`
show gui info	Displays the GUI configuration `show gui info`
show irv info	Displays the current IRV ping interval `show irv info`
show msd info	Displays the current multi-site agent information `show msd info`

show policygroup info	To display the configurations of all policy groups:
	`show policygroup info`
	To display the configuration of a specified policy group:
	`show policygroup <policy-name> info`
	where `policy-name` is the name of the policy group whose configuration you want to view

Show Commands

Command	Description

show policygroup service info	To display the configuration for all services in the specified policy group:
	
	`show policygroup <policy-name> service info`
	
	where `policy-name` is the name of the policy group whose service information you want to view
	
	To display the configuration for a specified service:
	
	`show policygroup <policy-name> service <service-name> info`
	
	where:
	• `policy-name` is the name of the policy group
	• `service-name` is the name of the service

show policygroup service info	Displays configuration for a specified service `show policygroup <policy-name> service <service-name> info` where: • `policy-name` is the name of the policy group • `service-name` is the name of the service
show policygroup service key certificate info	Displays SSL certificate information `show policygroup <policy-name> service <service-name> key certificate info` where: • `policy-name` is the name of the policy group • `service-name` is the name of the service

Show Commands (continued)

Command	Description
show policygroup key client-ca info	Displays client-ca information `show policygroup <policy-name> service <service-name> key client-ca info` • `policy-name` is the name of the policy group • `service-name` is the name of the service
show policygroup key sign-request info	Displays signing request information `show policygroup <policy-name> service <service-name> key sign-request info` • `policy-name` is the name of the policy group • `service-name` is the name of the service
show policygroup key client-ca revocation	Displays client-ca revocation information `show policygroup <policy-name> service <service-name> key client-ca revocation info` • `policy-name` is the name of the policy group • `service-name` is the name of the service
show policygroup service key info	Displays SSL private key information `show policygroup <policy-name> service <service-name> key info` where: • `policy-name` is the name of the policy group • `service-name` is the name of the service

Show Commands (continued)

Command	Description

show policygroup service server info	To display the server information for all servers:
	`show policygroup <policy-name> service <service-name> server info`
	where:
	• `policy-name` is the name of the policy group
	• `service-name` is the name of the service
	To display the server information for a specific server:
	`show policygroup <policy-name> service <service-name> server <server-name> info`
	where:
	• `policy-name` is the name of the policy group
	• `service-name` is the name of the service
	• `server-name` is the name of the server

show policygroup service server port info	To display all ports on a configured server:
	`show policygroup <policy-name> service <service-name> server <server-name> port info`
	where:
	• `policy-name` is the name of the policy group
	• `service-name` is the name of the service
	• `server-name` is the name of the server
	To display specific port information on a configured server:
	`show policygroup <policy-name> service <service-name> server <server-name> port <port> info`
	where:
	• `policy-name` is the name of the policy group
	• `service-name` is the name of the service
	• `server-name` is the name of the server
	• `port` is the server port

Show Commands (continued)

Command	Description
show policygroup service server port xmlpattern info	Displays the list of XML expressions for a specified server `show policygroup <policy-name> service <service-name> server <server-name> port <port> xmlpattern info` where: • `policy-name` is the name of the policy group • `service-name` is the name of the service • `server-name` is the name of the server • `port` is the server port
show route info	Displays the SA8250's routing configuration `show route info`
show ssl info	Displays the SSL distinguished name, cipher suite, and cache configuration `show ssl info`
show stats info	Displays the SA8250's statistics `show stats info` **Note**: Statistics for open connections in RICH mode are not available.
show stats service vport	Displays statistics for a specified service `show stats service <vip> vport <vport>` where: • `vip` is the service IP address (Virtual IP) • `vport` is the VIP port

Show Commands (continued)

Command	Description
show stats service vport server port	Displays statistics for a specified server `show stats service <vip> vport <vport> server <ipaddr> port <port>` where: • `vip` is the service IP address (Virtual IP) • `vport` is the VIP port • `ipaddr` is the server IP address • `port` is the server port
show sys date	Displays the system date `show sys date`
show sys info	Displays the following system information: IP address, netmask, broadcast, hostname, default route, name servers, and autoboot status `show sys info` **Note:** If you need to contact Customer Support, you may be asked to provide this information.
show sys snmp info	Displays the current SNMP configuration information `show sys snmp info`
show sys software info	Displays a list of installed software images, their image index, product, version, and build numbers `show sys software info`
show sys software ms-software info	Displays all current installed multi-site software versions `show sys software ms-software info`

Show Commands (continued)

Notes

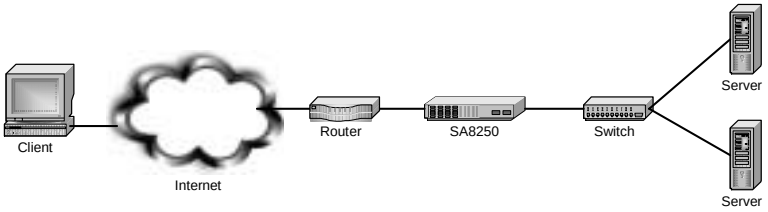
6 Scenarios

SA8250 Scenarios

This chapter contains multiple scenarios that demonstrate the HP e-Commerce/XML Director Server Appliance SA8250's operation using "real world" applications.

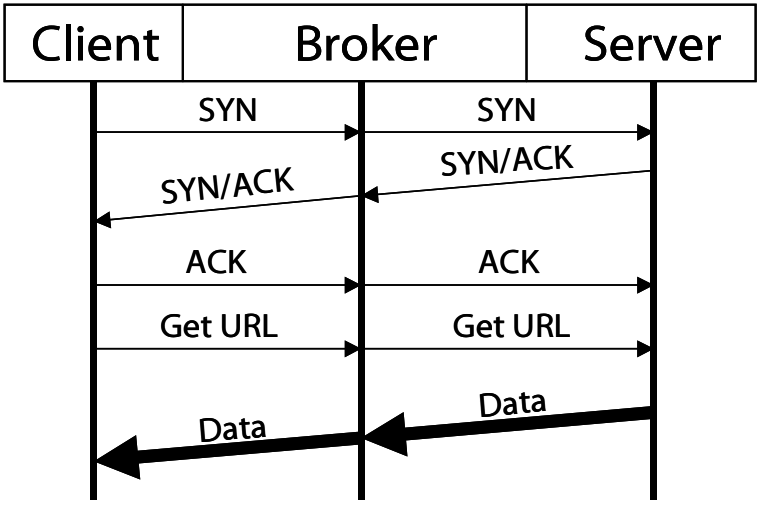
Scenario 1: Load Balancing a Web Site with Two Servers and the SA8250 in Inline Mode

An Internet Service Provider (ISP) wants to set up a load-balanced, two server web site named “Acme Web” with the SA8250 operating in Dual NIC mode. The service is HTTP and the website's address is 30.1.1.201. This diagram shows the network configuration for scenario 1.



Network Configuration for Scenario 1

This diagram shows the data flow for scenario 1.



Data Flow for Scenario 1

In Dual NIC mode, the SA8250 uses two Ethernet ports. One is connected to the router or switch on which client requests arrive, and the other is connected to the server-side subnet. By contrast, Single NIC mode refers to configurations in which the SA8250 communicates with the router or switch and the servers using a single Ethernet port. For more information, see Chapter 2.

Prerequisites for Scenario 1

- Two web servers are configured with replicated content. In this example they are referred to as “serv1.acme.com” and “serv2.acme.com” with IP addresses of 10.6.1.99 and 10.6.1.100, respectively.
- One SA8250 is installed between two distinct subnets. The outside subnet is connected to the router, and the inside subnet is connected to the switch.
- The SA8250 must be physically installed on the network, and its Boot Monitor and routing protocol configurations must be complete. For more information, see the *Getting Started Guide*.

Procedure for Scenario 1

NOTE: *Remember that all commands you need to type at the terminal appear in* **bold** *in this text.*

1. Type these SA8250 initial configuration commands:

```
monitor>setup
Enable dual NIC operation(yes,no)? [no] ---> yes
Autoconfigure the Network side NIC speed and
  duplex? (yes,no)? [yes] --->
Autoconfigure the Server side NIC speed and
  duplex? (yes,no)? [yes] --->
  DHCP is disabled for dual NIC operation.
Enter the hostname you would like to assign to
  the Network NIC: --->tcslab
Enter the IP address for the Network side NIC
  --->10.6.3.21
Enter the IP address for the Server side NIC
  --->10.6.5.21
Enter the Netmask for the Network side NIC
  --->255.255.255.0
Enter the Netmask for the Server side NIC
  --->[255.255.255.0] --->255.255.255.0
Enter default gateway: --->10.6.3.1
Would you like to configure DNS (yes, no)? [no]
  --->DNS not configured.
Specify failover method (disabled, serial,
  route): [disabled] --->
Set Autoboot? (yes,no) [no] --->
```

```
monitor>dns
Would you like to configure DNS (yes,no)?
  [no] --->yes
Enter Domain name ('-' to cancel)
  --->tcslab.acme.com
Enter the IP Address of the Primary name server
  ('-' to cancel)--->10.6.5.11
Specify additional name server ( <return>
  to end ) --->

monitor>save
List of currently saved configuration file(s).
You may save over an existing configuration file
or enter a new name.
File name
-----------
active.cfg
test.cfg
failover
backup.cfg

'active.cfg' is the last booted configuration.
Enter configuration file name (- to cancel):
  [active.cfg] --->

monitor>boot
Current active configuration
------------------------------
Product:              HP SA8250
Version:              2.7
Patch Level:          0.0
Build                 38
Current time:         Thu Oct  5 11:55:49
                      PDT 2000
Hostname:             SA8250
--------------
Network side NIC:
   IP Address:        10.6.2.99
   Netmask:           255.255.255.0
   MAC address:       0:90:27:f6:f6:22
---------------
Server side NIC:
   IP Address:        10.6.4.99
   Netmask:           255.255.255.0
   MAC address:       0:d0:b7:7f:46:34
---------------
```

```
Default Gateway:      10.6.2.1
Domain:               tcslab.acme.com
Primary name server:  10.6.5.11
DHCP:            Disabled
Failover mode:   Disabled
Network NIC speed/duplex:  Auto
Server NIC speed/duplex:   Auto
NTP:             Disabled
Autoboot:        Disabled
Static Routes:   None
RICH Biased:     Enabled

Select a boot configuration from the following
  files.
active.cfg
bobs
failover
backup.cfg
Boot configuration file name? [active.cfg] --->
Do you really want to boot 'active.cfg'? [y]--->
Please stand by, the system is being booted.
..... Done

login: admin
Password:

HP SA8250 command line interface
Copyright (c) 2001 HP Corporation  All Rights
  Reserved.
Please wait ..

HP SA8250#
```

Create a Policy Group

1. To create a policy group, first move the prompt to the CLI's policy group level by typing this command:

   ```
   HP SA8250#config policygroup
   ```

2. To specify the new policy group's name ("gold" in this example), type this command:

   ```
   HP SA8250/config/policygroup#create gold

   Policygroup gold created.
   ```

3. To move the prompt to that level, type the name of the new policy group:

```
HP SA8250/config/policygroup#gold
```

Add HTTP Service and VIP

1. To add HTTP service to policy group gold, type this command:

```
HP SA8250/config/policygroup/gold#
service create http vip 30.1.1.201 port 80
```

   This command creates a new HTTP service on the SA8250 at IP address 30.1.1.201, listening on TCP port 80.

2. To move the prompt to the level of the specific service ("http"), type this command:

```
HP SA8250/config/policygroup/gold#service http
```

Add Servers to the HTTP Service

1. To add server "serv1.acme.com" to the HTTP service, type this command:

```
HP SA8250/config/policygroup/gold/service/http#
server create serv1.acme.com port 80

Server serv1.acme.com port 80 has been created.
```

   This command tells the SA8250 that serv1.acme.com can fulfill requests arriving at 30.1.1.201 on port 80.

2. To add server "serv2.acme.com," type this command:

```
HP SA8250/config/policygroup/gold/service/http#
server create serv2.acme.com port 80

Server serv2.acme.com port 80 has been created.
```

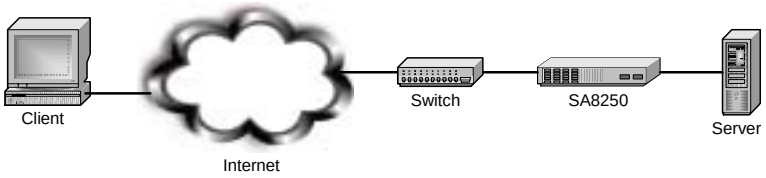
   The SA8250 is now configured for load balancing a Web site with two servers. When HTTP requests arrive at VIP 30.1.1.201 on port 80, the SA8250 balances the fulfillment of those requests across serv1.acme.com and serv2.acme.com.

Scenario 2: Load Balancing Servers with Source Address Preservation

In its default operating mode, the SA8250 alters source and destination packet addresses so that fulfillment servers see only the SA8250's address. However, under some circumstances, administrators may want to preserve incoming clients' addresses in the server log files.

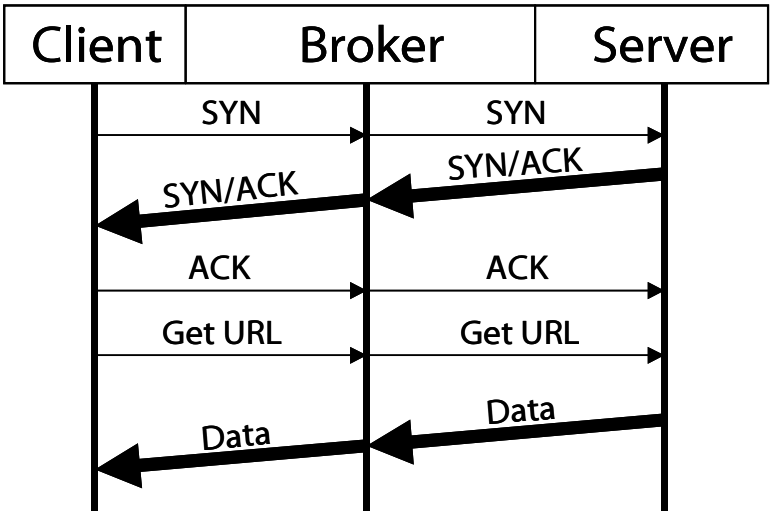
The SA8250's Source Address Preservation (SAP) mode ensures that a client's address remains as the source address of packets forwarded to the server, thus ensuring the maintenance of a record of client addresses in the server logs. This scenario illustrates the steps required to enable Source Address Preservation and configure the SA8250 to broadcast routes.

This diagram shows the network configuration for scenario 2.



Network Configuration for Scenario 2

This diagram shows the data flow for scenario 2.



Data Flow for Scenario 2

Prerequisites for Scenario 2

- At least one Web server
- One client
- One SA8250 must be physically installed on the network, and its Boot Monitor and routing protocol configurations must be complete. For more information, see the *Getting Started Guide*.

Procedure for Scenario 2

Connect to the SA8250

1. Telnet to the SA8250's port 23 and log on as the administrator (**admin**).

   The Command Line prompt displays:

   ```
   HP SA8250#
   ```

Create a Policy Group

1. To create a policy group, first move the prompt to the policy group level by typing this command:

   ```
   HP SA8250#config policygroup
   ```

2. To specify the new policy group's name ("saptest" in this example), type this command:

   ```
   HP SA8250/config/policygroup#create saptest
   Policy group saptest created.
   ```

3. To move the prompt to that level, type the name of the policy group just created:

   ```
   HP SA8250/config/policygroup#saptest
   ```

Add Service and VIP

1. To add the SAP service to policy group saptest, type this command:

   ```
   HP SA8250/config/policygroup/saptest#
   service create sap vip 30.1.1.201 port 80
   ```

   This creates a new service on the SA8250, using the HTTP protocol, at IP address 30.1.1.201, listening on TCP port 80.

2. To move the prompt to the level of the specific service, type this command:

```
HP SA8250/config/policygroup/saptest#service sap
```

Add Servers to the SAP Service

1. To add the server “serv1” to the SAP service, type this command:

```
HP SA8250/config/policygroup/saptest/service/
sap#server create serv1.prime.com port 80
Server serv1.prime.com port 80 has been created.
```

   This tells the SA8250 that serv1.prime.com can fulfill requests arriving at 30.1.1.201 on port 80.

2. Move the prompt again by typing this command:

```
HP SA8250/config/policygroup/saptest/service/
sap#server serv1.prime.com port 80
```

3. To finish, type this command:

```
HP SA8250/config/policygroup/saptest/service/
sap/server/serv1.prime.com/port/80#mode sap
```

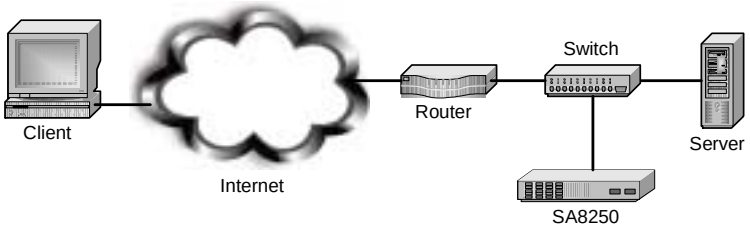
   The **mode sap** command allows clients' addresses to be forwarded to the server in place of the SA8250's address.

Scenario 3: Routing Outbound Data Away from the SA8250 for OPR

You can configure the SA8250 to direct outbound data from the fulfillment servers to bypass the SA8250. Most requests to servers elicit a disproportionate amount of return data. Under some circumstances, it is desirable to avoid routing such volumes of content through the SA8250 as it returns to the client.

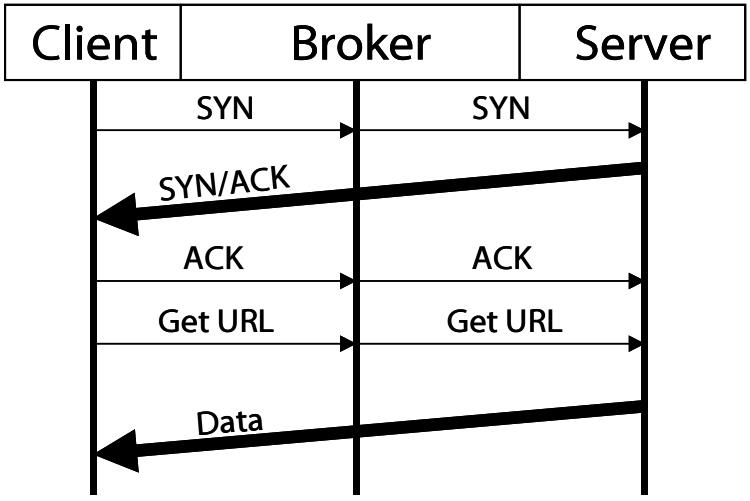
The SA8250's Out of Path Return (OPR) mode removes it from the return path to the client. OPR sends requests to a back-end server and allows the server to respond through its own default gateway—thus bypassing the SA8250 altogether. OPR requires that the server's loopback adapter be installed and configured with the VIP as an alias, and that the server be programmed with a default gateway address other than that of the SA8250.

This diagram shows the network configuration for scenario 3.



Network Configuration for Scenario 3

This diagram shows the data flow for scenario 3.



Data Flow for Scenario 3

Prerequisites for Scenario 3

Equipment

- At least one Web server with an installed loopback adapter (for example, UNIX* or Windows* or NT*)
- One SA8250 physically installed on the network, with its Boot Monitor and routing protocol configurations completed. For more information, see the *Getting Started Guide*.

Procedure for Scenario 3

Connect to the SA8250

1. Telnet to the SA8250's port 23 and log on as the administrator (**admin**).

   The Command Line prompt displays:

   ```
   HP SA8250#
   ```

Create a Policy Group

1. To create a policy group, first move the prompt to the policy group level by typing this command:

   ```
   HP SA8250#config policygroup
   ```

2. To specify the new policy group's name (“oprtest” in this example), type this command:

   ```
   HP SA8250/config/policygroup#create oprtest
   policy group oprtest created.
   ```

3. To move the prompt to that level, type the new policy group's name:

   ```
   HP SA8250/config/policygroup#oprtest
   ```

Add HTTP Service and VIP

1. To add HTTP service to policy group oprtest, type this command:

   ```
   HP SA8250/config/policygroup/oprtest#
   service create OPR vip 30.1.1.201 port 80
   ```

   This command creates a new service on the SA8250, using the HTTP protocol, at IP address 30.1.1.201, listening on TCP port 80.

2. To move the prompt, type this command:

   ```
   HP SA8250/config/policygroup/oprtest#service OPR
   ```

Add Servers to the OPR Service

NOTE: *We recommend that you test the connectivity using Brokered mode before switching to OPR mode. Verify that the VIP is accessible from the client before enabling OPR mode.*

1. To add the server "Serv1.com" to the OPR service, type this command:

   ```
   HP SA8250/config/policygroup/oprtest/service/
   OPR#server create serv1.prime.com port 80
   Server serv1.prime.com port 80 has been created.
   ```

   This command tells the SA8250 that serv1.prime.com can fulfill requests arriving at 30.1.1.201 on port 80.

2. To move the prompt, type this command:

   ```
   HP SA8250/config/policygroup/oprtest/service/
   OPR#serv1.prime.com port 80
   ```

3. Finish by typing this command:

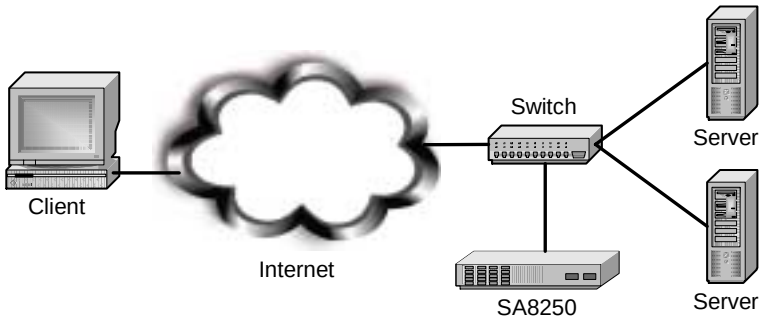
   ```
   HP SA8250/config/policygroup/oprtest/service/
   OPR/serv1.prime.com/port/80#mode opr
   ```

   This command allows client addresses to be forwarded to the server rather than to the SA8250's address.

Scenario 4: Content Routing using RICH only

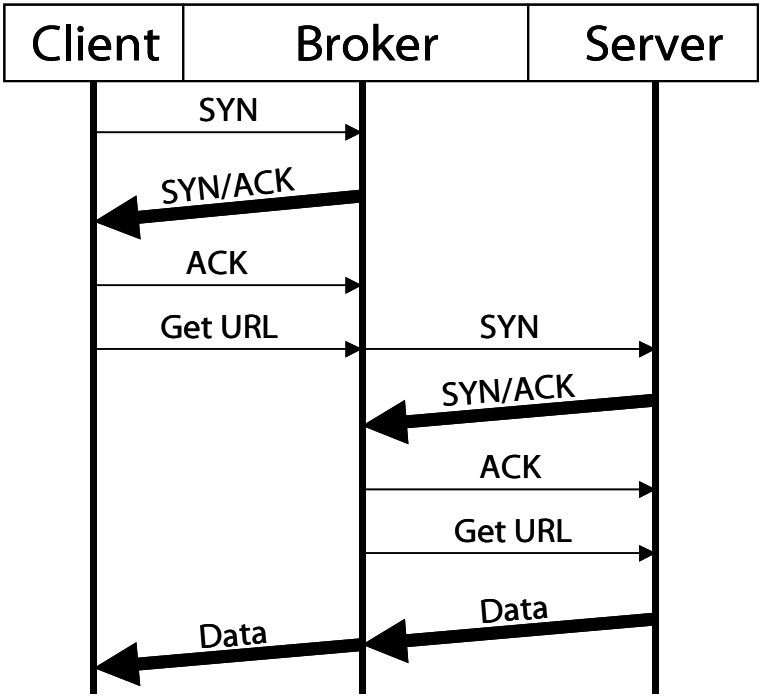
Because the SA8250 can differentiate servers according to their content, it can apportion requests based on the type of content requested. For example, an administrator might choose to run the most processor-intensive processes (such as CGI scripts) on the most powerful servers while placing the less processor-bound files on slower servers. The SA8250 then sends requests for CGI scripts to the faster servers, thus avoiding the slowdowns that would occur if the slow servers were relied upon.

This diagram shows the network configuration for scenario 4.



Network Configuration for Scenario 4

This diagram shows the data flow for scenario 4.



Data Flow for Scenario 4

Prerequisites for Scenario 4

- At least two Web servers
- One for HTML and images
- One for CGI scripts
- One SA8250 physically installed on the network, and its Boot Monitor and routing protocol configurations must be complete. For more information, see the *Getting Started Guide*.

Procedure for Scenario 4

Connect to the SA8250

1. Telnet to the SA8250's port 23 and log on as the administrator (**admin**).

   The Command Line prompt displays:

   ```
   HP SA8250#
   ```

Create a Policy Group

1. To create a policy group, first move the prompt to the policy group level by typing this command:

   ```
   HP SA8250#config policygroup
   ```

2. To specify the new policy group's name ("xml" in this example), type this command:

   ```
   HP SA8250/config/policygroup#create xml
   ```

3. To move the prompt to the new policy group's level, type this command:

   ```
   HP SA8250/config/policygroup#xml
   ```

Add RICH_HTTP Service and VIP

1. To add RICH_HTTP service to policy group xml, type this command:

   ```
   HP SA8250/config/policygroup/xml#
   service create rich vip 30.1.1.201 port 80 type
   RICH_HTTP
   ```

   This creates a new RICH service on the SA8250 using the RICH_HTTP protocol, at IP address 30.1.1.201, listening on TCP port 80.

2. To move the prompt to the service level, type **service rich**:

   ```
   HP SA8250/config/policygroup/xml#service rich
   ```

Add Servers to the RICH Service

1. To add “serv1” to the rich service, type this command:

```
HP SA8250/config/policygroup/xml/service/
rich#server create serv1.prime.com port 80
Server serv1.prime.com port 80 has been created.
```

   This tells the SA8250 that serv1.prime.com can fulfill requests arriving at 30.1.1.201 on port 80.

2. To move the prompt to the server level, type this command:

```
HP SA8250/config/policygroup/xml/service/
rich#server serv1.prime.com port 80
```

Add Expressions to serv1's Configuration

1. Finish the configuration by adding expressions to server Serv1.com to differentiate content by typing these commands:

```
HP SA8250/config/policygroup/xml/service/rich/
server/serv1.prime.com/port/80#xmlpattern create
*.html

HP SA8250/config/policygroup/xml/service/rich/
server/serv1.prime.com/port/80#xmlpattern create
*.jpg

HP SA8250/config/policygroup/xml/service/rich/
server/serv1.prime.com/port/80#xmlpattern create
*.gif
```

2. To verify the setup of serv1.prime.com, type this command at the prompt:

```
HP SA8250/config/policygroup/xml/service/rich/
server/serv1.prime.com/port/80/xmlpattern#info
Policy group:xml
Service:xml
Server Name: serv1.prime.com
Status Port Type    Weight Mode    MSAP 606 HTTP
-----------------------------------------------
Active 80   Primary 1      BROKERED Off Off Off
Index Pattern
 1    *.html
 2    *.jpg
 3    *.gif
```

3. To add “serv2” to the rich service, type these commands:

```
HP SA8250/config/policygroup/xml/service/rich/
server/serv1.prime.com/port/80#back
HP SA8250/config/policygroup/xml/service/rich/
server#create serv2.prime.com port 80
```

4. To move the prompt, type this command:

```
HP SA8250/config/policygroup/xml/service/rich/
server#serv2.prime.com port 80
```

Add an Expression to serv2's Configuration

1. Now add an expression to differentiate serv2's content from that of serv1 by typing this command. In this example, serv2 contains CGI content:

```
HP SA8250/config/policygroup/xml/service/rich/
server/serv2.prime.com/port/80#
xmlpattern create /cgi-bin/*
```

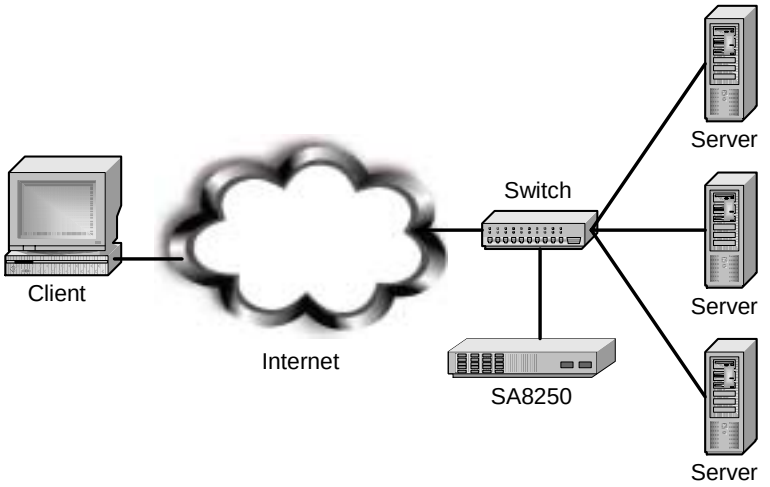
2. To verify the setup of serv2, type this command at the prompt:

```
HP SA8250/config/policygroup/xml/service/rich/
server/serv2.prime.com/port/80/xmlpattern#
info
Policy group:xml
Service:xml
Server Name: serv2.prime.com
Status Port Type    Weight Mode    MSAP 606 HTTP
-----------------------------------------------
Active 80   Primary 1      BROKERED Off On  Off
Index Pattern
1    /cgi-bin/*
```

The SA8250 now directs requests to specific servers according to the content requested. serv2 receives requests entailing CGI scripts (files located in the `/cgi-bin` directory), while all other requests go to serv1.

Scenario 5: Using SSL Acceleration

We now build upon Scenario 4 by adding a Layer 7 service using the SA8250's SSL acceleration capabilities. As discussed earlier, the SA8250 can off load SSL processing from the web server, providing dramatically improved performance. This diagram shows the network configuration for scenario 5.



Network Configuration for Scenario 5

In the conventional secure web server setup, protected data is accessed using the HTTPS (HTTP over SSL) on port 443. In this example we add a new web server, "Serv3," which along with "Serv2" (defined in Scenario 4) hosts this data and accesses it through VIP 30.1.1.201 on port 443. We assume the data is accessed on server port 80 to isolate it from normal HTTP traffic. It is also strongly recommended that secure data be isolated from the rest of the network through the use of the inside NIC interface and the SA8250's security firewall capabilities.

The following processes occur in Scenario 5:

1. The client connects to the SA8250 with ClientHello (includes ciphers supported).
2. The SA8250 responds with SSL Server Hello (includes selected cipher and session ID).
3. The SA8250 sends the certificate for the server
4. The client sends the ClientKeyExchange message, including the PK (session key).

5. The SA8250 and client send ChangeCipherSpec message to indicate readiness.
6. The SA8250 and client send “finished” messages, including whole conversation.
7. Encrypted data is sent to the SA8250, decrypted, and forwarded to the least busy server.
8. A clear response is sent to the SA8250, encrypted, and sent to client.

Procedure for Scenario 5

Using this procedure, you will add an SSL enabled service called “SSL” to the previously defined “xml” policy group.

1. Telnet to the SA8250's port 23 and log on as the administrator (**`admin`**).

   The Command Line prompt displays:

   ```
   HP SA8250#
   ```

2. To move the prompt to the xml policy group, type this command:

   ```
   HP SA8250#config policygroup xml
   ```

3. To add the new service to the xml policy group, type this command:

   ```
   HP SA8250/config/policygroup/xml#
   service create SSL vip 30.1.1.201 port 443 type
   RICH_HTTP
   Service SSL created.
   ```

4. To move the prompt to the service SSL level, type this command:

   ```
   HP SA8250/config/policygroup/xml#
   service SSL
   ```

NOTE: *An existing key may be imported using the* **`key import`** *command.*

5. To create the RSA private key, type this command:

   ```
   HP SA8250/config/policygroup/xml/service/SSL#key
   create 1024
   Finished creating key. Key strength is 1024.
   ```

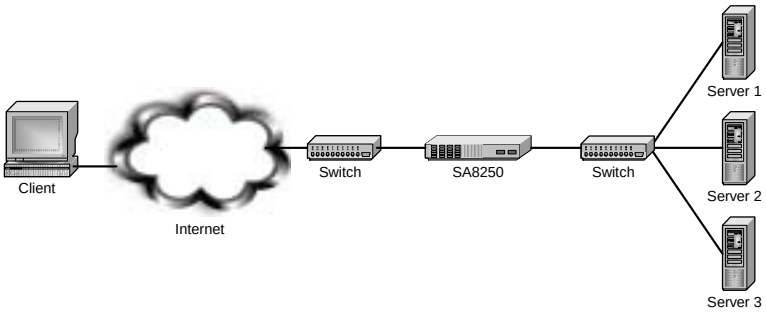
6. To create a certificate, type these commands:

```
HP SA8250/config/policygroup/xml/service/SSL#
key certificate create
Certificate created (Expires in 30 days).
The service is SSL enabled. Define the servers
to start processing.

HP SA8250/config/policygroup/xml/service/SSL#
server create serv2.prime.com port 80
Server serv2.prime.com port 80 has been created.

HP SA8250/config/policygroup/xml/service/SSL#
server create serv3.prime.com port 80
Server serv3.prime.com port 80 has been created.
```

Scenario 6: Content Routing using RICH and XML expressions

In addition to recognizing RICH expressions, the SA8250 has the unique ability to direct traffic to servers based on its recognition of patterns in the incoming XML data.

This diagram shows the network configuration for scenario 6. For ease of reading, the SA8250 is interfaced to only three servers in this scenario, but the principles demonstrated here could be applied to any number of servers.



Network Configuration for Scenario 6

NOTE: *There must be one space before and after the ampersand (&), and the RICH expression must always precede the XML expression.*

The table on the next page shows example XML patterns (in the form of RICH and XML expressions) that would be programmed in the SA8250 for each of the three servers in the figure above. For ease of reading, the RICH and XML expressions are shown separately in the table on the following page, but the actual pattern in the SA8250 would display in this form:

```
create */order.asp & //Amount[Value >= 10000]
```

For more information on XML commands, see Chapter 5.

Using the default special case

For more information on the XML default server setting, see Chapter 2.

Server	RICH Expression	XML Expression
1	*/order.asp	//From[id = “Acme”]
	*/order.asp	//Amount[Value >= 10000]
	*/order.asp	default
2	*/order.asp	//From[id = “Widgets.com”]
	*/order.asp	//Amount[Value < 10000]
	*/order.asp	//Order[@type = “debit card”]
3	*/order.asp	//Amount[Value > 5000 and Value < 10000]
	*/order.asp	//Address[ZipCode > 90000]
	*/order.asp	//From[contains(id, “Your”)]

XML Patterns for Scenario 6

This table shows example SA8250 responses to incoming XML data.

Incoming XML Data	SA8250 Response
company name is Acme	Directed to Server 1
company name is Widgets.com	Directed to Server 2
company name is YourCo.com	Directed to Server 3
purchase amount is $13,280	Directed to Server 1
purchase amount is $7,280	Load-balanced between Servers 2 and 3 because it falls within the *value* range for both servers
purchase amount is $713	Directed to Server 2
order is paid for with a debit card	Directed to Server 2
customer’s zip code is 92128	Directed to Server 3
customer’s zip code is 27513	Directed to Server 1 due to the default* setting
order is paid for with a credit card	Directed to Server 1 due to the default* setting

Example SA8250 Responses to incoming XML traffic

Scenario 7: Using CRLs

The SA8250 can be configured to work with Client Revocation Lists (CRLs). In this scenario, the SA8250 uses a CRL to validate that a client certificate is not expired, meaning that it does not display in the CRL. For more information on CRLs, see Appendix B.

Prerequisites for Scenario 7

NOTE: *Scenario 7 assumes that you have already completed all steps in Scenario 5.*

- A Web server
- A SA8250
- A valid client authentication (CA) certificate
- A public key infrastructure (PKI) server with a CA certificate and the ability to:
  - generate a CRL
  - revoke certificates
  - export the CRL using FTP, HTTP, or LDAP

Procedure for Scenario 7

Using this procedure, you will configure the SA8250 to use a CRL.

NOTE: *The SA8250 cannot use CRLs with more than 10,000 serial numbers.*

1. Telnet to the SA8250 and log on as the administrator (**admin**).

   The Command Line prompt displays:

   ```
   HP SA8250#
   ```

2. To move the prompt to the SSL service in the Richtest policy group, type this command:

   ```
   HP SA8250#config policygroup richtest service
   SSL
   ```

3. To navigate to client-ca, type this command:

   ```
   HP SA8250/config/policygroup/richtest/service/
     SSL#key client-ca
   ```

4. To import the CA certificate from the PKI server, type this command:

   ```
   HP SA8250/config/policygroup/richtest/service/
     SSL/key/client-ca#import
   ```

You will see:

```
Paste in the data, end with ... alone on line.
```

5. Paste in the certificate.

   After aproximately 30 seconds, you will see:

```
-----BEGIN CERTIFICATE-----
MIIDdDCCAt2gAwIBAgIBADANBgkqhkiG9w0BAQQFADCBiTEL
MAkGA1UEBhMCVVMxEzARBgNVBAgTCkNhbGlmb3JuaWExEjAQ
BgNVBAcTCVNhbiBEaWVnbzEOMAwGA1UEChMFSW50ZWwxDTAL
BgNVBAsTBEVOR1IxGjAYBgNVBAMTEUFuZHJlYXMgQVVUSE9S
SVRZMRYwFAYJKoZIhvcNAQkBFgdhQGUuYy5kMB4XDTAwMTAx
NzEwNTI1M1oXDTAxMTAxNzEwNTI1M1owgYkxCzAJBgNVBAYT
AlVTMRMwEQYDVQQIEwpDYWxpZm9ybmlhMRIwEAYDVQQHEwlT
YW4gRGllZ28xDjAMBgNVBAoTBUludGVsMQ0wCwYDVQQLEwRF
TkdSMRowGAYDVQQDExFBbmRyZWFzIEFVVEhPUklUWTEWMBQG
CSqGSIb3DQEJARYHYUBlLmMuZDCBnzANBgkqhkiG9w0BAQEF
AAOBjQAwgYkCgYEAwbizLs+d5+wLBcmTob9kc0uhuPUiMt7x
RzMNu6cNKZjC5hZnM0Gfp063s7HftllVYpbwyNu1UxQBNYfG
27vd95rCNe4XDy34j0HB4LMmmHRVn3HxiypWQZhmBlmSeBJz
kkLV4Y62IoGcypqnfLbEF+VoYdQ8cprHkpFIAPuCkCAwEAAa
OB6TCB5jAdBgNVHQ4EFgQUG+mshG5BnnVLidK97NuMXAi0lk
kwgbYGA1UdIwSBrjCBq4AUG+mshG5BnnVLidK97NuMXAi0
lkmhgY+kgYwwgYkxCzAJBgNVBAYTAlVTMRMwEQYDVQQIEwpD
YWxpZm9ybmlhMRIwEAYDVQQHEwlTYW4gRGllZ28xDjAMBgNV
BAoTBUludGVsMQ0wCwYDVQQLEwRFTkdSMRowGAYDVQQDExFB
bmRyZWFzIEFVVEhPUklUWTEWMBQGCSqGSIb3DQEJARYHYUBl
LmMuZIIBADAMBgNVHRMEBTADAQH/MA0GCSqGSIb3DQEBBA
UAA4GBAFFWGDxGIq5u5XhaLY4gb0j38BEtdj//qX5IXQi
1d+Xqnx+IpHKN3ID2ao44+eLGDFEJZd5vCVkDHFQw6pja1YX
7gaHTPswm/Qk3Tn5Wr97ThfK8JcJjNSzYg8w7NcnnFyq
8a0+Z7kdH9TxlazvF/blRosjGRfVrje8JAI5oZUI
-----END CERTIFICATE-----
...
Client certificate successfully imported
```

6. To move to the revocation level and enable CRLs, type this command:

```
HP SA8250/config/policygroup/richtest/service/
  SSL/key/client-ca#revocation
```

7. To provide the SA8250 with the download address for the CRL, type this command:

   ```
   HP SA8250/config/policygroup/richtest/service/
     SSL/key/client-ca/revocation#url ftp://
     10.1.2.64/Certsrv/myCA.crl user john password
     smith
   ```

   where **john** is your username and **smith** is your password. You will see:

   ```
   URL updated
   ```

8. To verify that the SA8250 can retrieve the CRL from your PKI, type this command:

   ```
   HP SA8250/config/policygroup/richtest/service/
     SSL/key/client-ca/revocation#refresh now
   ```

   This downloads the CRL from your PKI server 10.1.2.64 to the SA8250. You will see:

   ```
   Refresh completed, revocation list was obtained
   from: ftp://10.1.2.64/Certsrv/myCA.crl
   ```

9. To set up the SA8250 to periodically update the CRL, type this command:

   ```
   HP SA8250/config/policygroup/richtest/service/
     SSL/key/client-ca/revocation#refresh 480
   ```

   This sets the CRL update period to 8 hours (480 minutes). You will see:

   ```
   Refresh will begin in 480 minute(s), url: ftp://
   10.1.2.64/Certsrv/myCA.crl
   ```

10. To enable the CRL feature for the SA8250, type this command:

    ```
    HP SA8250/config/policygroup/richtest/service/
      SSL/key/client-ca/revocation#mode enable
    ```

    You will see:

    ```
    Mode changed to enable
    ```

Notes

7 SNMP Support

Using SNMP

The HP e-Commerce/XML Director Server Appliance SA8250 includes a fully compliant, embedded SNMP agent that supports SNMPv1 and SNMPv2c requests. In addition to standard MIB-II, HP private enterprise MIBs provide the following capabilities:

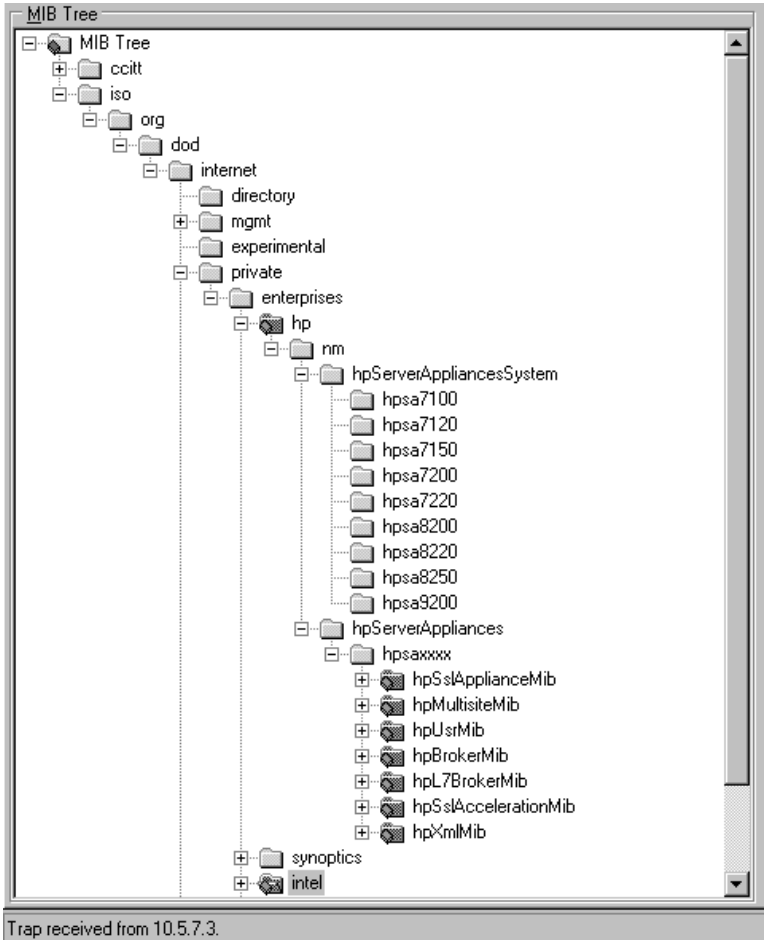
- Monitor the SA8250's health
- Monitor health of a redundant SA8250 and failover readiness
- Monitor the SA8250's load as indicated by CPU utilization, connection count and connections per second
- Monitor status and performance of server farm
- Monitor status and performance of services (VIP, port) presented to clients
- Monitor HTTP server errors and HTTP errors recovered by the SA8250 for clients
- Monitor SSL acceleration performance and capacity

Standards Compliance

The SA8250 SNMP agent is bilingual and can support both SNMPv1 and SNMPv2c requests. HP private enterprise MIB files are compliant with SMIv2 as specified in RFC 1902. The SNMP agent supports Management Information Base-II (MIB-II) as specified in RFC 1213, but allows SET operations only on the SYSTEM and SNMP groups.

MIB Tree

This figure illustrates the HP MIB tree. Please refer to it as needed throughout this chapter.



HP's MIB Tree

All HP enterprise MIBs and MIB objects are defined under the management branch of the `hp` tree. All `sysObjectIds` that identify HP products are defined under the `hpServerAppliancesSystem` branch of the `hp` tree.

Supported MIBs

Management Information Base-II (MIB-II)

HP Enterprise MIBs:

```
hpserver-header.my
hpbroker-mib.my
hpl7-broker-mib.my
hpssl-acceleration-mib.my
hpuser-mib.my
```

Where to find MIB Files

Electronic copies of the HP MIB files used by the SA8250 are shipped with the product on CD-ROM and are available from HP's web site:

```
http://www.hp.com/serverappliances/support/
```

Write access through MIB II SNMP SET is allowed only to the System and SNMP groups. An SNMP SET on all other groups returns a noAccess error for SNMPv2c or a noSuchName error for SNMPv1.

The SA8250 supports the `coldStart`, `linkUp`, `linkDown`, and `authenticationfailure` standard SNMP traps.

hpserver-header.my

`hpserver-header.my` contains objects that define the top-level branches of the HP MIB tree. This MIB file contains the `sysObjectId` definition for the SA8250.

hpbroker-mib.my

`hpbroker-mib.my` defines objects and traps for Layer 4 load balancing. `hpbroker-mib.my` also contains objects and traps related to server availability, the SA8250's CPU utilization, and its operational status. The `hpbroker-mib.my` objects and traps are discussed below.

Server Availability (Ping)

NOTE: *The Intelligent Resource Verification (IRV) CLI command is* `config irv <ping-interval>` *and the default ping-interval is zero. To make the serverPingTable active, ensure that the ping-interval is NOT set to zero.*

The `serverPingTable` can be used to monitor server availability. If a server is responding to periodic ping requests from the SA8250, then its state is marked as `responding`. Otherwise, the server is marked as `notResponding`. Whenever a server's Ping state toggles, the trap `serverPingNormal` or `serverPingAlert` is sent for that server.

Server TCP Connection

The performance of TCP connections between the SA8250 and servers are monitored. This performance data is stored in the `serverTcpTable`. For each configured server mapping used for load balancing a service (VIP, PORT), the following data is maintained in the `serverTcpTable`:

- state, up or down (`serverState`)
- how long this server has been up (`serverUpTime`)
- response time (`serverRspTm`)
- number of established TCP connection instances (`serverConnCnt`)
- TCP connections established per second (`serverCps`)

Trap thresholds are available in the MIB for `serverRspTm`, `serverConnCnt` and `serverCps`. Different threshold settings can be configured for each server TCP connection in `serverTcpTable`.

Trap thresholds for server response time can be configured so that a trap is sent if the response time reaches a specified value. When `serverRspTm` reaches `serverRspTmHiWater`, a `serverRspTmAlert` trap is sent. While in alert, if `serverRspTm` dips to `serverRspTmLoWater`, a `serverRspTmNormal` trap is sent. High- and low- water thresholds provide hysteresis and prevent the spurious generation of traps. If the high-water threshold is set to 0, no traps are sent.

Trap thresholds for server connection count can be configured so that a trap is sent if the connection count reaches a specified value. The `serverConnCntAlert` and `serverConnCntNormal` traps and applicable thresholds work similarly for server response time.

Trap thresholds for server connections can be configured such that if the connection/second rate reaches a given value, a trap is sent. The `serverCpsAlert` and `serverCpsNormal` trap and applicable thresholds work similarly for server response time.

Layer 4 Service (VIP, PORT)

The performance of each configured Layer 4 service (VIP, PORT) presented to clients is monitored. Performance data is stored in the `serviceTcpTable`. This data is computed by aggregating the values in `serverTcpTable` that apply to the (VIP, PORT). That is, all server TCP connections used for load balancing a (VIP, PORT) are aggregated to derive performance data for that (VIP, PORT) in `serviceTcpTable`. Per (VIP, PORT) pair, the following data is available:

- State, up or down (`serviceState`)
- Length of time the service has been up (`serviceUpTime`)
- Response time (`serviceRspTm`)
- Number of established TCP connections (`serviceConnCnt`)
- TCP connections established per second (`serviceCps`)

Trap thresholds are available in the MIB for `serviceRspTm`, `serviceConnCnt` and `serviceCps`. Different threshold settings can be configured for each service in `serviceTcpTable`.

Trap thresholds for service response time can be configured such that if the service response time reaches a specified value, a trap is sent. When `serviceRspTm` reaches `serviceRspTmHiWater`, a `serviceRspTmAlert` trap is sent. While in alert, if `serviceRspTm` dips to `serviceRspTmLoWater`, a `serviceRspTmNormal` trap is sent. High- and low-water thresholds provide hysteresis and prevent spurious trap generation. If the high-water threshold is set to 0, no traps are sent.

Trap thresholds for service connection count can be configured so that a trap is sent if the connection count reaches a value. The traps, `serviceConnCntAlert` and `serviceConnCntNormal` and applicable thresholds work similarly for service response time.

Trap thresholds for service connection can be configured such that if the connection/second rate reaches a value, a trap is sent. The `serviceCpsAlert` and `serviceCpsNormal` trap and applicable thresholds work similarly for service response time.

Broker Connection Count, Connections/Second, and CPU Utilization

`brokerConnCount` is the number of established TCP connections used for load balancing. This number aggregates all `serviceConnCnt` values in the `serviceTcpTable`. `brokerCps` is the number of TCP connections/second established by the Director. `brokerCps` aggregates all `serviceCps` values in the `serviceTcpTable`.

`brokerCpuUtil` returns the current CPU utilization of the Director. Its value can be from 0 to 100%.

Trap thresholds are available in the MIB for `brokerCpuUtil`, `brokerConnCnt`.

Trap thresholds for Director CPU utilization can be configured such that if the Director CPU utilization reaches a value, a trap is sent. When `brokerCpuUtil` reaches `brokerCpuUtilHiWater`, a `brokerCpuUtilAlert` trap is sent. While in alert, if `brokerCpuUtil` dips to `brokerCpuUtilLoWater`, a `brokerCpuUtilNormal` trap is sent. High- and low-water thresholds provide hysteresis and prevent the spurious generation of traps. If the high water threshold is set to 0, no traps are sent.

Trap thresholds for Director connection count can be configured such that if the connection count reaches a value, a trap is sent. The traps, `brokerConnCntAlert` and `brokerConnCntNormal` and applicable thresholds work similarly as described above for Director CPU utilization.

Trap thresholds for Director connection/second can be configured such that if the connection/second rate reaches a value, a trap is sent. The `brokerCpsAlert` and `brokerCpsNormal` traps and applicable thresholds work similarly for the SA8250's CPU utilization.

Director and Redundant Director Operational State

Operational state of the Director can be monitored through `operationState`. Whenever the value of `operationState` changes, the `operationStateChanged` trap is sent. The operational state of the redundant Director in a serial-cable failover configuration is monitored through `redundantBrokerState`. The traps `redundantBrokerUp` and `redundantBrokerDown` are sent to alert the administrator of any changes in the availability of the redundant Director.

hpl7-broker-mib.my

`hpl7-broker-mib.my` defines objects and traps for Layer 7 load balancing. The `hpl7-broker-mib.my` objects and traps are discussed below.

HTTP Monitor Table

A 24-hour history of HTTP performance is maintained in `httpMonTable`. `httpMonTable` is indexed by hours of the day, so `httpMonTable` is indexed from 0 to 23. To get the current http performance numbers, index the table by the current hour. Each entry in the table contains the following information:

```
httpRedirects
httpErrsToClient
http606Redirects
http606ErrsToClient
invalidHttpReq
httpServerErrs
```

Using the Intelligent Session Recovery feature, the Director can be configured such that if a server returns an HTTP error, the Director intercepts the error and resubmits the HTTP request to another server for fulfillment. Each server is tried in sequence until the HTTP request is fulfilled. If the HTTP request is fulfilled, the client sees a successful completion of the request. Otherwise, the client receives a 503 error from the Director.

`httpRedirects` is the number of times during the hour that the Director redirected a request to a server. `httpErrsToClient` is the number of times during the hour that a 503 error is returned to the client because all redirection attempts failed to fulfill an HTTP request. A trap threshold, `httpErrsToClientTh`, is available in the MIB. If `httpErrsToClient` reaches `httpErrsToClientTh` during the current hour, a trap is sent. `httpErrsToClientTh` can be set to any positive number. If `httpErrsToClientTh` is set to 0, no trap is sent. Since the value of `httpErrsToClient` during the hour is accumulative and does not fluctuate, low and high water thresholds are not necessary for hysteresis.

The SA8250 can be configured such that if a server returns an HTTP 606 error, the Director intercepts the error and resubmits the HTTP request to another server for fulfillment. Each server is tried in sequence until the HTTP request is fulfilled. If the HTTP request is fulfilled, the client sees a successful completion of the request. Otherwise, the client receives a 503 error from the Director.

`http606Redirects` is the number of times during the hour that the Director redirected a request to a server. `http606ErrsToClient` is the number of times during the hour that a 503 error is returned to the client because all redirection attempts failed to fulfill an HTTP request. A trap threshold, `http606ErrsToClientTh`, is available in the MIB. If `http606ErrsToClient` reaches `http606ErrsToClientTh` during the current hour, a trap is sent. `http606ErrsToClientTh` can be set to any positive number. If `http606ErrsToClientTh` is set to 0, no trap is sent. Since the value of `http606ErrsToClient` during the hour is accumulative and does not fluctuate, low and high water thresholds are not necessary for hysteresis.

`invalidHttpRequests` returns the number of invalid HTTP requests received by the Director during the hour.

`httpServerErrs` is the number of timeouts, HTTP errors and HTTP 606 errors received from servers during the hour.

hpssl-acceleration-mib.my

`hpssl-acceleration-mib.my` defines objects and traps for Layer 7 load balancing. This MIB is available on the SA8250 only. The `hpssl-acceleration-mib.my` objects and traps are discussed below.

SSL Monitor Table

A 24-hour history of SSL performance is maintained in `sslMonTable`. `sslMonTable` is indexed by hours of the day, so `sslMonTable` is indexed from 0 to 23. To get the current SSL performance numbers, index the table by the current hour. `currentHour` is defined in `hpl7-broker-mib.my`. Each entry in the table contains the following information:

```
sslPeakCpsRate
sslCpsRate
sslConnProcessed
sslTraffic
sslErrs
```

`sslPeakCpsRate` is the peak SSL connection/second rate processed by the SA8250 for the hour. `sslCpsRate` is the connection/second rate for the hour.

`sslConnProcessed` is the number of SSL connections handled by the SA8250 during the hour.

`sslTraffic` indicates whether or not SSL traffic exceeded maximum capacity at least once during the 1-hour period. This object starts with the value "ok" and is changed to "overflow" at the first instance in which SSL traffic exceeds the capacity of the box. The value does not toggle back to "ok." In this way, a 24-hour history of SSL traffic capacity can be retrieved. An `sslTrafficOverflow Alert` trap is sent when the value goes to "overflow" for the current hour.

hpuser-mib.my

The MIB file `hpuser-mib.my` contains definitions for the `operatorLogin` and `operatorLogout` traps.

Trap Summary

This list summarizes the traps generated by the SA8250. For details about a particular trap, please read the description of each MIB above, or read the documentation within the MIB file. Traps are generated by SNMPv2c.

Standard SNMP Traps

```
coldStart
authenticationFailure
linkUp
linkDown
```

hpbroker-mib.my

```
serverPingAlert
serverPingNormal
serverStateChanged
serverRspTmAlert
serverRspTmNormal
serverCpsAlert
serverCpsNormal
serverConnCntAlert
serverConnCntNormal
serviceStateChanged
serviceRspTmAlert
serviceRspTmNormal
serviceCpsAlert
serviceCpsNormal
serviceConnCntAlert
serviceConnCntNormal
brokerCpsAlert
brokerCpsNormal
brokerConnCntAlert
brokerConnCntNormal
brokerCpuUtilAlert
brokerCpuUtilNormal
operationStateChanged
redundantBrokerDown
redundantBrokerUp
```

hpl7-broker-mib.my

```
httpErrsToClientAlert
http606ErrsToClientAlert
```

hpssl-acceleration-mib.my

```
sslTrafficOverflowAlert
```

hpuser-mib.my

```
operatorLogin
operatorLogout
```

Displaying SNMP Parameters

The GUI's Administration SNMP tab displays all SNMP parameters. In the CLI, use the following command to display all SNMP parameters:

```
show sys snmp info
```

The SA8250 has an IP filtering capability accessible through the Administration-Security tab or the config sys security command. Make sure that security is configured so that SNMP request packets are allowed to pass through the IP filter. Security mode must either be OPEN or CUSTOM. If mode is CUSTOM, SNMP access must be enabled. Either of the following two sets of CLI commands configure Security to enable SNMP:

```
config sys security mode open
```

or

```
config sys security mode custom
config sys security custom snmp enable
```

Configuring Community Authentication and Security Parameters

The SA8250 SNMP supports community-based authentication. An unlimited number of community strings can be configured for use by the SA8250. Each community string can have read-only (ro) or read-write (rw) privilege, and can be configured for use by a specific IP address or all IP addresses. When the value **any** is used for `<ip address>`, the community string can be used by all IP addresses.

The following CLI commands are used to display and configure SNMP community strings. These parameters can be configured in the Administration-SNMP tab of the Web-based GUI interface.

```
config sys snmp community info
config sys snmp community create <string> ip <ip
  address> rights [ro|rw]
config sys snmp community delete <string> ip <ip
  address>
```

For example:

```
config sys snmp community create test ip
  209.218.240.5 rights ro
```

This command creates the community string test with read-only privilege. SNMP read-only requests using community string test will be accepted only from IP address 209.218.240.5.

By default the following community strings are defined:

```
public ro any
private rw any
```

Configuring Trap Parameters

Use the following CLI commands to display and configure SNMP trap parameters:

```
config sys snmp trap info
config sys snmp trap port <port>
config sys snmp trap create <ip address>
  community <community>
config sys snmp trap delete <ip address>
  community <community>
```

NOTE: *You can also configure these parameters in the Administration-SNMP tab of the Web-based GUI interface.*

By default, the UDP port used for sending traps is **162**. The trap port can be changed to a number between 5020 and 65535, or left at 162.

The SA8250 SNMP can send trap notifications to an unlimited number of configured trap receivers. Each IP address configured as a trap receiver is associated with a community string included in traps sent to that IP address. For example:

```
config sys snmp trap create 209.218.240.5
  community NOC1
```

sends traps to IP address 209.218.240.5, and causes the SA8250 SNMP agent to include the community string, NOC1 in the trap.

Configuring Other SNMP Parameters

The following CLI commands are used to display and configure general SNMP parameters:

```
config sys snmp info
config sys snmp port <port>
config sys snmp sysContact <string>
config sys snmp sysName <string>
config sys snmp sysLocation <string>
```

NOTE: *You can also configure these parameters in the Administration-SNMP tab of the GUI interface.*

SNMP port is used by the SA8250 SNMP to listen for SNMP requests. By default, the SNMP port is **161**. The SNMP port can be changed to a number between 5020 and 65535.

`sysContact`, `sysName` and `sysLocation` correspond to the MIB variables of the same name in MIB-II. `sysContact` is the name of the administrator of this SA8250. By default, `sysContact` is NULL. `sysName` is the name of the SA8250. By default, `sysName` contains the hostname of the SA8250. `sysLocation` indicates where the SA8250 is physically located. By default, `sysLocation` is NULL.

8 Software Updates

Updating Your System Software

We recommend that you visit `http://www.hp.com/serverappliances/support/` on a routine basis to ensure that your system is running the current software release.

After initial installation and setup, you may be eligible for, or choose to purchase, a software version update. Update procedures are performed using either the Graphical User Interface (GUI, Chapter 4) or the Command Line Interface (CLI, Chapter 5). This chapter describes how to update your system using the CLI.

Multiple Software Images

The SA8250 provides sufficient local storage for at least five software images (though at any time, only one image is active and executing). You can download and install new software images on the SA8250 using the `config sys software install` CLI command.

Software Image Media

Depending on the circumstances, you may receive your software update from a CD-ROM as part of a new software kit, or you can download it from an HP software Web site. In either case, the distribution consists of a single large binary file of approximately 50 MB. The first step in software installation is to place this install image file on an ftp server accessible by the SA8250.

Saving Your Current Configuration

Username commands are not valid in configuration files, that is, `save config` and `restore config` operations do not include username data.

The SA8250 configurations are not, by default, preserved across major software updates. It is however possible to save your existing SA8250 configuration while running your currently installed software, and subsequently restore it to your updated system. You can save your current configuration with the `save` command.

Downloading and Installing the Software

NOTE: *If you install the same image as the currently running image, the system will automatically reboot.*

The process for downloading and installing the software is the same whether the image is a version update or patch. After the install file is on an ftp server, use the GUI or the CLI to download and install it onto the SA8250. Although it is possible to install software while the SA8250 is operating, we recommend that you configure a backup SA8250 before installation to minimize your downtime. If no backup is available, it is best to perform installations at off-peak times.

1. To install the image, type this command:

   ```
   config sys software install
   ```

   If you are installing a software version update, your unit is already licensed to execute the update image.

This is an example of FTP download syntax:

NOTE: *The example shown here is for illustrative purposes only. Actual input is unique to each installation.*

FTP software update (no key required)

```
config sys software install ftp://myftpserver/
  dir1/dir2/install_Pivot.SA8250.2.3.0.0.221
  user myftpuser password myftppw
```

Status information appears as the installation progresses. If the install status information indicates that the installation failed due to an incorrect URL, user name, or password information, verify this data and reenter the command with the appropriate corrections.

Rebooting with the New Image and Verifying Installation

As an added security feature, you must be connected to the serial console throughout this section.

After the image has been downloaded and installed, you can verify it by typing the CLI command, `show sys software info`. For example, after downloading and installing an update, the response to `show sys software info` might look like the example shown in this table.

Index	Product	Version	Patch	Build	Active
1	SA8250	2.8	0.0	38	
2	SA8250	2.6	1.0	40	Yes

Example show sys software info Response

NOTE: *If any errors occurred during installation, the* `show sys software info` *command may display the image as installed, but the downloaded image is* ***not*** *safe to use. Use* `config sys software delete` *to delete the image and repeat the installation before continuing. If the problem persists, contact HP Customer Support.*

The table above indicates that version 2.8 of SA8250 software has been installed and is ready for service.

1. Verify your connection to the serial console.
2. To activate the new image, type this command:

   ```
   config sys software boot 1
   ```

   This causes the SA8250 to reboot under the new image. This command can also be used to restore the previous version of software.

Upgrading Under Serial Cable Failover Configuration

Upgrading software versions on two SA8250s (System A and System B) configured for serial cable failover presents a special case. This procedure ensures minimum downtime during upgrade.

1. At System A's run time CLI, type the `save` command to save its current configuration in a file, such as `beforeupgrade.cfg`.
2. At System A's CLI, type this command:

   ```
   config sys software install ftp://url/path_to_
     install_image user <username> password
     <password>
   ```

   This downloads the new image and installs it on System A.

NOTE: *In this example, System A is the failover Primary and is online. System B is the failover Backup and is offline.*

3. At System B's CLI, type this command:

   ```
   config sys software install ftp://url/path_to_
     install_image user <username> password
     <password>
   ```

   This downloads the new image and installs it on System B.
4. At System B's CLI, type this command:

   ```
   config sys autoboot disable
   ```

   This ensures that System B pauses at the Boot Monitor.
5. Boot System A with the newly installed software image (allow System A to boot and enter the Boot Monitor by pressing a key at the appropriate prompt during the boot sequence before proceeding to the next step). This will force a failover, and System B will come online as Backup.
6. Boot System B with the newly installed software image and proceed immediately to step 7.
7. In the Boot Monitor on System A, type the `boot` command. System A will come online as Primary. Proceed immediately to step 8.
8. At the prompt, type the new root password. This password must consist of 8 to 128 characters.
9. Log on to System A's CLI and restore the previously saved configuration file `<beforeupgrade.cfg>`.
10. In the Boot Monitor on System B, type the `boot` command. System B will remain offline as backup.

11. At the prompt, type the new password. This password must also consist of 8 to 128 characters.
12. If desired, type the following command in System B's CLI to enable autoboot:

```
config sys autoboot enable
```

A Security Configuration

Recommended Security Configuration

This section describes configuration options to enhance the level of protection of your SA8250. For more details, see Chapter 5.

1. If you have not already done so, change the admin password by typing the `config cli username` command.
2. Set security to closed or custom mode typing the `config sys security mode [closed|custom]` command. Closed mode restricts administration to the serial port. By default, the custom mode enables both SSH and the serial port. You can view the current settings of your system typing the `config sys security info` command.

3. With custom mode access, control lists can be used to further enhance administration security by restricting management functionality to either your IP or subnet. Type these commands:

   ```
   config sys security custom access-control
     enabled
   config sys security custom acl add ip <ip
     address>
   ```

   For a subnet entirely under your control, type the following command:

   ```
   config sys security custom acl add netmask <ip
     address>/<mask length>
   ```

4. If you want to use SNMP, reads and traps should be restricted to the specific IP's of logging hosts or administration machines. Type the following commands for this purpose. The system must be in custom mode and SNMP access must be enabled.

   ```
   config sys snmp community delete public ip any
   config sys snmp community delete private ip any
   config sys snmp community create <community
     string> ip <ip address> rights [ro|rw]
   ```

5. Always remember to save your configuration by typing the `save <filename>` command.

B SSL Configuration

Obtaining Keys and Certificates

NOTE: *The SA8250 comes with default keys and certificates for test purposes. However, certificates for production use must be obtained from a recognized Certificate Authority.*

Keys and certificates are necessary for the successful operation of the SA8250 for XML traffic processing. The SA8250 supports certificates in PEM format. There are three ways to obtain them:

- Obtain a certificate from Verisign or another Certificate Authority (CA)
- Import from a server
- Create a new key or certificate on the SA8250

Copying and Pasting Keys and Certificates

Copying and pasting is an integral part of the next several procedures. These are steps required to perform these tasks using HyperTerminal*. If you use another terminal program, consult that product's documentation for the appropriate procedures.

To copy an item (key, certificate signing request, etc.) from HyperTerminal§:

1. Open the HyperTerminal§ window.
2. Click and drag to select the item.
3. After the item is selected, open the **Edit** menu and click **Copy** (or type **<ctrl-c>**).
4. Open the window where you will paste the data, and position the cursor at the appropriate point.
5. In the **Edit** menu, click **Paste** (or type **<ctrl-v>**).

To paste an item (key, certificate signing request, etc.) into HyperTerminal:

1. Display the item in the appropriate application window, then click and drag to select the item.
2. Once the item is selected, click the **Edit** menu and select **Copy** (or type **<ctrl-c>**).
3. Move to the HyperTerminal window, and position the cursor at the appropriate point.
4. Pull down the **Edit** menu, and select **Paste to Host** (or type **<ctrl-v>**).

Obtaining a Certificate from Verisign or another CA

NOTE: Be sure to save your configuration after creating a key. If the configuration is not saved, and a power outage or a `factory_reset` *occurs, the unsaved key will be lost, rendering the certificate invalid. Also, for optimal security, one or more fields must be modified to make the DN unique.*

Use the policy manager `key create` command to create your key and the `key signrequest create` command to create a signing request to be sent to Verisign or another CA for authentication. The CA will return the certificate, but there may be a delay of 1-5 days.

This method is used when certificate authentication is desired. The fields input as part of creating a signing request are called a Distinguished Name (DN).

Procedure

1. To create a key, type the following command:

   ```
   HP SA8250#config policygroup <name> service
     <name> key create [512 | 1024]
   ```

2. To create the signing request, type the following command:

   ```
   HP SA8250#config policygroup <name> service
     <name> key signrequest create <DN
     parameters>
   ```

   Where the optional DN parameters are shown in this table.

Element	Description
life	The number of days that the certificate remains valid. The default is 30 days.
name	The common (server) name
email	Your email address
state	Your state or province
organization	Your company name
unit	Your organizational section
locality	Your town or city

Optional DN Parameters

3. Use the policy manager `key signrequest export` command to paste or ftp the signing request to another system and submit it to the CA.
4. When returned by the CA, import the certificate into the SA8250.

Importing Keys into the SA8250

NOTE: *Do not interrupt the key import process. If you do interrupt the process, delete the key and start again.*

We recommend importing an existing key by copying the key (a block of ASCII text) from a server's console window, then pasting it into the SA8250's console window when prompted.

For more details about copying and pasting, see "Copying and Pasting Keys and Certificates" in this appendix.

To paste in a key:

1. Type the `import` command and press <Enter>.

   The CLI prompts you to paste in the key.

2. When finished, type three periods ("**...**") on a separate line, then press <Enter>.

3. When the procedure is complete, you can type `info` at the prompt to verify the key's transfer to the SA8250.

An alternative method for importing an existing key is to ftp the key:

```
config policygroup <name> service <name> key
  import [<url> {user <user name>} {password
  <password>}]
```

where:

- `url` is a valid URL identifying the private key file to download (it must be in the form, `ftp://<host>/<path_name>`)
- `user name` is the username
- `password` is the password

Importing Certificates into the SA8250

NOTE: *Do not interrupt the import process. If you do interrupt the process, delete the certificate and start again.*

We recommend importing an existing certificate by copying the certificate (a block of ASCII text) from a server's console window, then pasting it into the SA8250's console window when prompted.

For more details about copying and pasting, see "Copying and Pasting Keys and Certificates" in this appendix.

To paste in a certificate:

1. Type the `import` command and press <Enter>.

   The CLI prompts you to paste in the certificate.

2. When finished, type three periods ("**...**") on a separate line, then press <Enter>.

3. When the procedure is complete, you can type `info` at the prompt to verify the certificate's transfer to the SA8250.

An alternative method for importing an existing certificate is to ftp the certificate:

```
config policygroup <name> service <name> key
  certificate import [<url> {user <username>}
  {password <password>}]
```

where:

- `url` is a valid URL identifying the private key file to download (it must be in the form, `ftp://<host>/<path_name>`)
- `user name` is the username
- `password` is the password

Creating a new Key/Certificate on the SA8250

Use the policy manager `key create` and `key create certificate` commands to create new keys and certificates for SA8250 operation. This procedure can be used when there are no existing keys and certificates on the server. The advantage of this method is that it is very fast, but a CA has not signed the certificates. This means that users will have to explicitly accept the certificate the first time they connect to your site.

NOTE: *For optimal security, one or more fields must be modified to make the DN unique.*

The fields input as part of creating a certificate are called a Distinguished Name (DN).

Procedure

1. To create a key, type this command:

   ```
   HP SA8250#config policygroup <name> service
     <name> key create [512 | 1024]
   ```

2. To create a certificate, type this command:

   ```
   HP SA8250#config policygroup <name> service
     <name> key create certificate <DN
     parameters>
   ```

   Where the optional DN parameters are shown in this table.

NOTE: *Alternatively, default DN parameters can be specified using the* `config ssl dn` *command. This allows recurring parameters to be specified once and then reused for multiple certificates.*

Parameter	Description
life	The number of days that the certificate remains valid. The default is 30 days.
name	The common (server) name
email	Email address
state	Your state or province
organization	Your company name
unit	Your organizational section
locality	Your town or city

Optional DN Parameters

Using Global Site Certificates

Overview

The export versions of Internet Explorer and Netscape Communicator initiate an SSL connection to the SSL server to use 40-bit encryption, even though the browser is capable of 128-bit encryption. The server responds to the browser with a digital certificate. If the certificate is not a global site certificate, both the browser and server will continue the SSL handshake and use the 40-bit key to encrypt application data. If the certificate is a global site certificate (GSC), however, the client will terminate the previous SSL handshake and renegotiate the connection to use 128-bit encryption.

A GSC is normally signed by an intermediate certificate authority (CA), just like traditional certificates. The intermediate CA is either Microsoft SGC Root, or Verisign Class 3 CA. These are called chained certificates. When the browser gets the certificate from the server along with the intermediate CA, it will verify the certificate, the intermediate CA, and the root CA to determine the GSC capability. The root CA is normally installed in the browser, but not the intermediate CA. So the SA8250 should be able to send both the certificate and the intermediate CA.

Using the CLI

If the certificate is not a global site certificate, the customer will only need to import the certificate. If it is a global site certificate, the customer has to import both the certificate and the intermediate CA so that the CA is the last in the chain.

Type the `import certificate` command to import a certificate or chained certificates. If the certificate is signed by a CA, paste the CA after the certificate. If the CA is signed by another CA, paste the CA after the signed CA, and so on. Here is an example:

```
HP SA8250/config/policygroup/test/service/test/
key/certificate#import
```

When you type or paste in data, you must end the data entry with three periods (...) alone on a line. This returns you to the command prompt.

NOTE: *There must be no white space before, between, or after certificates, and the "Begin" headers and "End" trailers must all be retained.*

An example of a certificate:

```
-----BEGIN CERTIFICATE-----
MIIFZTCCBM6gAwIBAgIQCTN2wvQH2CK+rgZKcTrNBzANBgkq
hkiG9w0BAQQFADCBujEfMB0GA1UEChMWVmVyaVNpZ24gVHJ1
c3QgTmV0d29yazEXMBUGA1UECxMOVmVyaVNpZ24sIEluYy4x
MzAxBgNVBAsTKlZlcmlTaWduIEludGVybmF0aW9uYWwgU2Vy
:
:
dmVyIENBIC0gQ2xhc3MgMzFJMEcGA1UECxNAd3d3LnZlcmlz
aWduLmNvbS9DUFMgSW5jb3JwLmJ5IFJlZi4gTElBQklMSVRZ
IExURC4oYyk5NyBWZXJpU2lnbjAeFw05OTExMTEwMDAwMDBa
Fw0wMDExMTAyMzU5NTlaMIHHMQswCQYDVQQGEwJVUzETMBEG
-----END CERTIFICATE-----
-----BEGIN CERTIFICATE-----
MIIEMTCCA5qgAwIBAgIQI2yXHivGDQv5dGDe8QjDwzANBgkq
hkiG9w0BAQIFADBfMQswCQYDVQQGEwJVUzEXMBUGA1UEChMO
VmVyaVNpZ24sIEluYy4xNzA1BgNVBAsTLkNsYXNzIDMgUHVi
bGljIFByaW1hcnkgQ2VydGlmaWNhdGlvbiBBdXRob3JpdHkw
HhcNOTcwNDE3MDAwMDAwWhcN
:
:
OTk3IFZlcmlTaWduMA0GCSqGSIb3DQEBAgUAA4GBALiMmMMr
SPVyzWgNGrN0Y7uxWLaYRSLsEY3HTjOLYlohJGyawEK0Rak6
+2fwkb4YH9VIGZNrjcs3S4bmfZv9jHiZ/4PC/NlVBp4xZkZ9
G3hg9FXUbFXIaWJwfE22iQYFm8hDjswMKNXRjM1GUOMxlmaS
ESQeSltLZl5lVR5fN5qu
-----END CERTIFICATE-----
...
Certificate successfully imported
HP SA8250/config/policygroup/test/service/test/
key/certificate#
```

In this example, two certificates are imported: the certificate and then the CA certificate. Together these two certificates will cause a step-up in the encryption to RC4-128 bit RSA. No special command or handling is required to paste these two certificates as long as they are pasted in this order.

Generating a Client CA

NOTE: *To acquire a copy of OpenSSL* for your environment, access the OpenSSL website at http://www.openssl.org.*

This procedure will show you how to generate a client CA using OpenSSL:

1. Create a working directory where all the keys and certificates will be stored.
2. Copy the file `openssl.cnf` from the openSSL source directory.
3. Create a private key by typing this command:

   ```
   openssl genrsa -out key.pem 1024
   ```

4. Create another private key by typing this command:

   ```
   openssl genrsa -out ca_key.pem 1024
   ```

NOTE: *The DN information typed in step 5 must differ from the DN information typed in step 6.*

5. Now generate the client CA by typing this command:

   ```
   openssl req -new -x509 -config openssl.cnf -key
   ca_key.pem -out ca_cert.pem
   ```

6. Generate the client certificate request by typing this command:

   ```
   openssl req -new -config openssl.cnf -key
   key.pem -out csr.pem
   ```

7. Sign the client certificate request by typing this command:

   ```
   openssl X509 -req -CAcreatserial -CAkey
   ca_key.pem -CA ca_cert.pem -in csr.pem -out
   cert.pem
   ```

8. Combine the `key.pem` and `cert.pem` keys into one file by typing this command:

   ```
   cat key.pem cert.pem > all.pem
   ```

9. Convert to p12 format by typing this command:

   ```
   openssl pkcs12 -export -in all.pem -out
   <file>.p12 - name “MY NAME”
   ```

   The output file `<file>.p12` is imported into the browser as a personal certificate.

Generating a CRL

NOTE: *To acquire a copy of OpenSSL for your environment, access the OpenSSL website at http://www.openssl.org.*

This procedure shows how to generate a Certificate Revocation List (CRL) using OpenSSL. The SA8250 cannot use CRLs with more than 10,000 serial numbers.

1. If you have not already done so, create a working directory where all the keys and certificates will be stored.
2. If you have not already done so, copy the file `openssl.cnf` from the openSSL source directory.
3. Create a private key for the SA8250 CA certificate by typing this command:

   ```
   openssl genrsa -out ca_key.pem 1024
   ```

NOTE: *Most of these commands use the openssl.cnf file. Make sure the information presented in this file is accurate and that it reflects the directory structure used. Filenames and directory names are both important for these commands to work properly. For more information on how to use openssl, visit http://www.openssl.org.*

4. Create the CA certificate SA8250 by typing this command:

   ```
   openssl req -new -x509 -config openssl.cnf -key
     key.pem -out ca_cert.pem
   ```

5. Import this file to the SA8250.
6. Create a private key for the signing request by typing this command:

   ```
   openssl genrsa -out clientkey1.pem 1024
   ```

7. Generate a signing request by typing this command:

   ```
   openssl req -new -config openssl.cnf -key
     clientkey1.pem -out clientrequest1.pem
   ```

8. Repeat steps (6) and (7) above for each additional client certificate, incrementing `clientrequest1.pem` by one digit each time.
9. Sign all the requests generated above by typing this command:

   ```
   openssl ca keyfile ca_key.pem -cert ca_cert.pem
     -infiles clientrequest1.pem clientrequest2.pem
     clientrequest3.pem ...
   ```

10. For all client certificates, create a CRL by typing this command:

    ```
    openssl ca -gencrl -out crl.pem
    ```

11. Import this file to the SA8250.

12. Combine the clientkey1.pem and cert.pem files into one file by typing this command:

```
cat clientkey1.pem cert.pem > all.pem
```

13. Convert to p12 format by typing this command:

```
openssl pkcs12 -export -in all.pem
  -out <file>.p12 -name "MY NAME"
```

Revoking a Certificate

1. To revoke a certificate, type this command:

```
openssl ca -revoke clientcertificate.pem
```

2. To generate a new CRL to incorporate the revoked certificate, type this command:

```
openssl ca -gencrl -out crl.pem
```

Using Ciphers with the SA8250

The SA8250 only supports RSA key exchange and authentication. Diffie-Hellman (including Anonymous and Ephemeral) key exchange/authentication and DSS authentication are not supported.

Use the **`set cipher`** command to specify the cipher. The command prompts you for the cipher strength, as shown in this table.

Element	Description
All	All supported ciphers
High	All ciphers using Triple-DES
Medium	All ciphers with 128 bit encryption
Low	All low strength ciphers (no export, single DES)
Export	All export ciphers

Cipher Strength Listing

The default cipher value is **all supported ciphers** (both SSLv2 and SSLv3).

This table provides ciphers supported by the SA8250. Notice that the export version of the software supports only the ciphers marked “E” in the Profile column.

Cipher Name	Proto-col	Key Exchange	Authen-tication	Encryp-tion (key size)	Message Authenti-cation (MAC)	Profile (Hi/ Med/ Low/ Export)
DES-CBC3-SHA	SSLv3	RSA	RSA	3DES(168)	SHA1	H
IDEA-CBC-SHA	SSLv3	RSA	RSA	IDEA(128)	SHA1	M
RC4-SHA	SSLv3	RSA	RSA	RC4(128)	SHA1	M
RC4-MD5	SSLv3	RSA	RSA	RC4(128)	MD5	M
DES-CBC-SHA	SSLv3	RSA	RSA	DES(56)	SHA1	L
DES-CBC3-MD5	SSLv2	RSA	RSA	3DES(168)	MD5	H
IDEA-CBC-MD5	SSLv2	RSA	RSA	IDEA(128)	MD5	M
RC2-CBC-MD5	SSLv2	RSA	RSA	RC2(128)	MD5	M
RC4-MD5	SSLv2	RSA	RSA	RC4(128)	MD5	M
RC4-64-MD5	SSLv2	RSA	RSA	RC4(64)	MD5	L
DES-CBC-MD5	SSLv2	RSA	RSA	DES(56)	MD5	L
EXP-DES-CBC-SHA	SSLv3	RSA (512)	RSA	DES(40)	SHA1	E
EXP-RC2-CBC-MD5	SSLv3	RSA (512)	RSA	RC2(40)	MD5	E
EXP-RC4-MD5	SSLv3	RSA (512)	RSA	RC4(40)	MD5	E
EXP-RC2-CBC-MD5	SSLv2	RSA (512)	RSA	RC2(40)	MD5	E
EXP-RC4-MD5	SSLv2	RSA (512)	RSA	RC4(40)	MD5	E

Listing of Various Ciphers

HTTP Header Information

The SA8250 includes the client IP address and current encryption information in the HTTP request sent to the server. This information is listed in this table.

Tag	Value
HP_CLIENT_ CERTIFICATE	The client certificate in ASCII.
HP_CIPHER_USED	The cipher suite for the connection. For example: DES-CBC-SHA
HP_SOURCE_IP	The client's IP address in ASCII. For example: 209.249.194.100
HP_SSL_SESSION_ID	The SSL session ID in ASCII. For example: 8273A4F348EFF90

HTTP Header Information

Procedure

These are the steps for setting up Header Certificates.

1. Verify that "header" is enabled (the default) at the service level by typing this command:

   ```
   config policygroup <policygroup name> service
     <service name> info
   ```

NOTE: *For more information on these commands, see Chapter 6.*

2. If "header" is disabled, enable it by typing this command:

   ```
   config policygroup <policygroup name> service
     < service name > header enable
   ```

3. Enable "header-certificate" (disabled by default) by typing this command:

   ```
   config policygroup <policygroup name> service
     < service name> key client-ca header-
     certificate enable"
   ```

Notes

C Failover Method Dependencies

Failover Modes

This table describes the failover modes.

Failover Mode	Description
Disabled	No failover method is selected
Serial Cable Failover	An “out-of-band” failover mode that uses the serial cable to share both configuration and failure status
Routed Failover	An “in-band” failover mode that employs routing protocols

Description of Failover Modes

This table shows the feature availability under different failover modes.

Failover Mode	Feature	Single Interface with "outside" router	Dual Interface	Dual Interface with "outside" router	Dual Interface with "inside" and "outside" routers (3)
Serial Cable Failover OR Disabled	VIP ARPing	Only on same subnet	Same subnet, only on "outside"	Same subnet, only on "outside"	Same subnet, only on "outside"
	DHCP	Not with "Serial"	No	No	No
	HOT	Yes	Yes	Yes	Yes (5)
	HOT and SAP	Yes (1)	Yes (1)	Yes (1)	Yes (1) (4)
	OPR	Yes (needs router)	N/A	Yes	No
	RICH	Yes	Yes	Yes	Yes (5)
	RICH and SAP	Yes (1)	Yes (1)	Yes (1)	Yes (1) (4)
Routed	VIP ARPing	No (uses loopback)	Requires router	No (uses loopback)	Same subnet, only on "outside"
	DHCP	Yes	Requires router	No	No
	HOT	Yes	Requires router	Yes	Yes (5)
	HOT and SAP	No	Requires router	Yes (1)	Yes (1) (4)
	OPR	No	Requires router	No	No
	RICH	Yes	Requires router	Yes	Yes (5)
	RICH and SAP	No	Requires router	Yes (1)	Yes (1) (4)

Availability Under Different Failure Modes

Failover Mode	Feature	Single Interface with "outside" router	Dual Interface	Dual Interface with "outside" router	Dual Interface with "inside" and "outside" routers (3)
Serial Cable Failover AND Routed (2)	VIP ARPing	N/A	Same subnet, only on "outside"	N/A	Same subnet, only on "outside"
	DHCP	No	No	No	No
	HOT	Yes	Yes	Yes	Yes (5)
	HOT and SAP	Yes (1)	Yes (1)	Yes (1)	Yes (1) (4)
	OPR	Yes	N/A	Yes	No
	RICH	Yes	Yes	Yes	Yes (5)
	RICH and SAP	Yes (1)	Yes (1)	Yes (1)	Yes (1) (4)

Availability Under Different Failure Modes (Continued)

Notes for the table above:

1. SAP only works if the default gateway = SA8250.
2. The offline SA8250's routed mode is inactive.
3. Server(s) are on the other side of the inside router.
4. SAP only works if inside router has a default route to the SA8250.
5. The router must have static routes from brokered subnet to server-side subnet.

Notes

D Configuring Out-of-Path Return

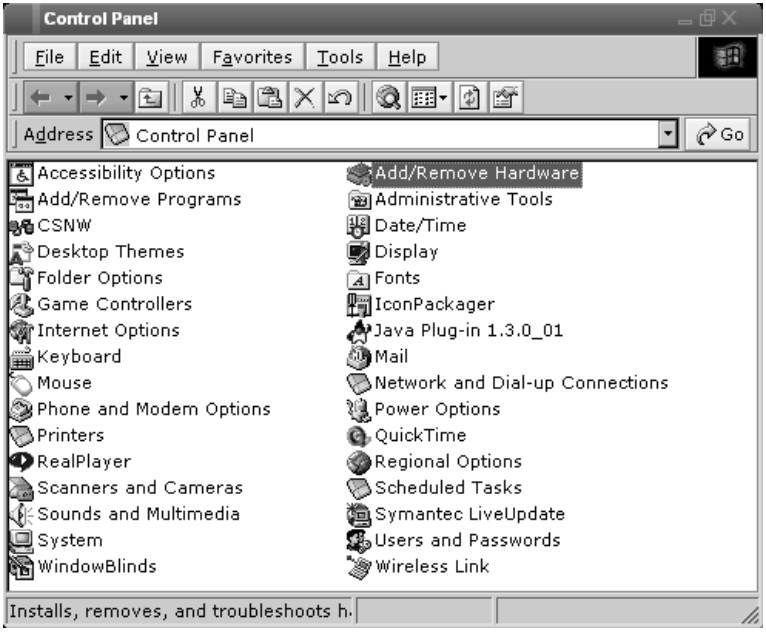
Configure OPR for Windows* 2000

Set the Loopback

1. From the **Start** menu, click *Settings.*
2. Open the *Control Panel.*

NOTE: *OPR is not available for SSL-enabled services.*

This figure shows the Control Panel.



Windows 2000 Control Panel

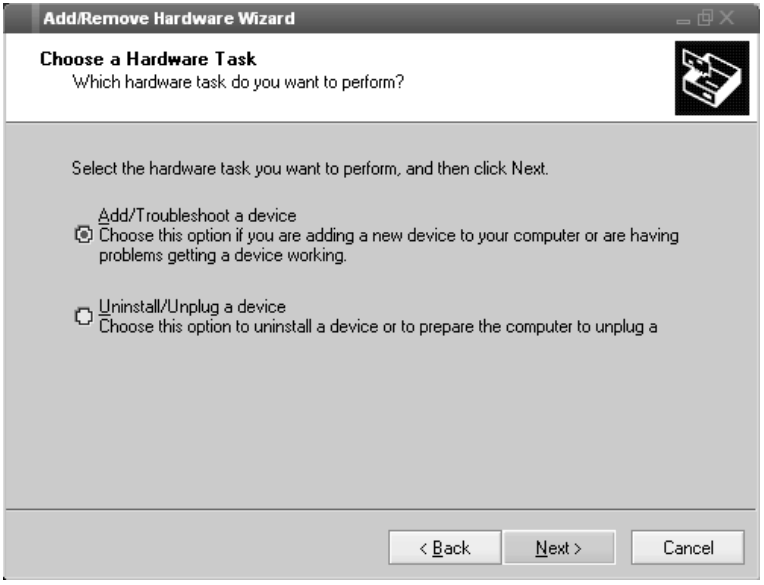
3. Double-click **Add/Remove Hardware**.

This figure shows the Add/Remove Hardware Wizard main screen.

Add/Remove Hardware Wizard

4. Click *Next.*

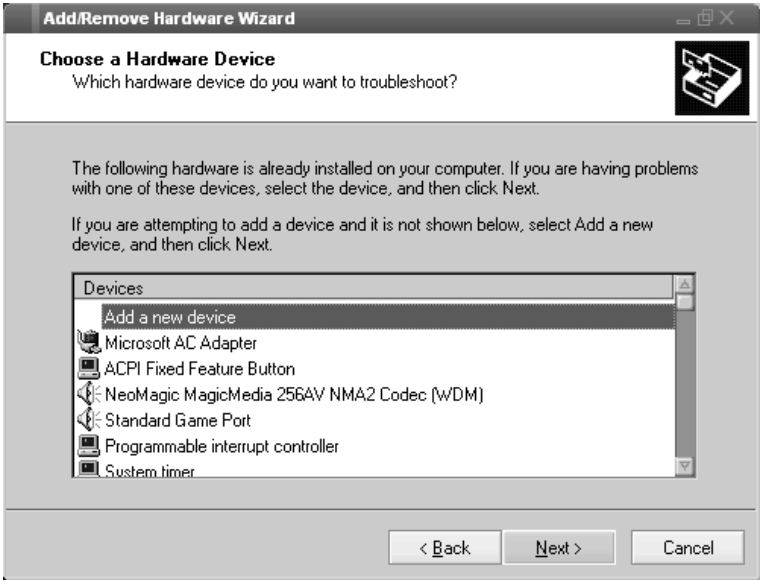
This figure shows the Choose a Hardware Task screen.



Choose a Hardware Task Screen

5. Select *Add/Troubleshoot a device*.
6. Click *Next*.

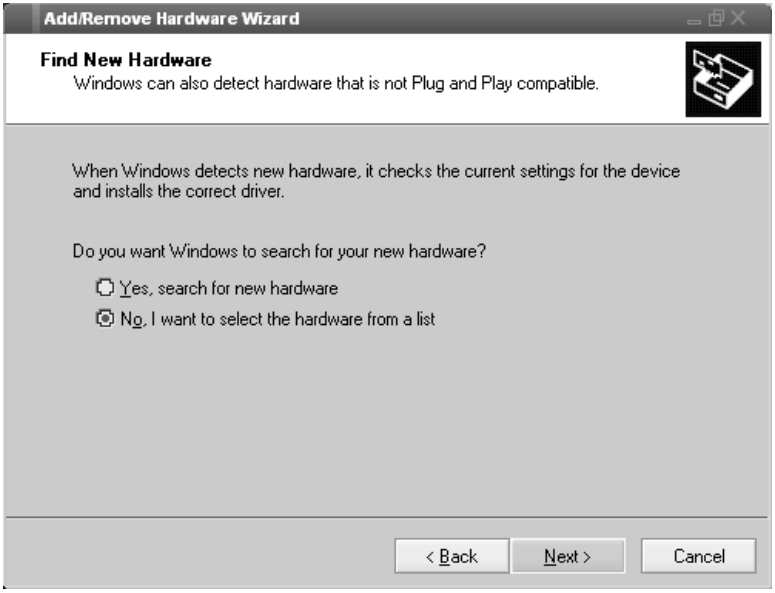
This figure shows the Devices list.



Devices List

7. From the *Devices* list, select **Add a new device**.
8. Click *Next*.

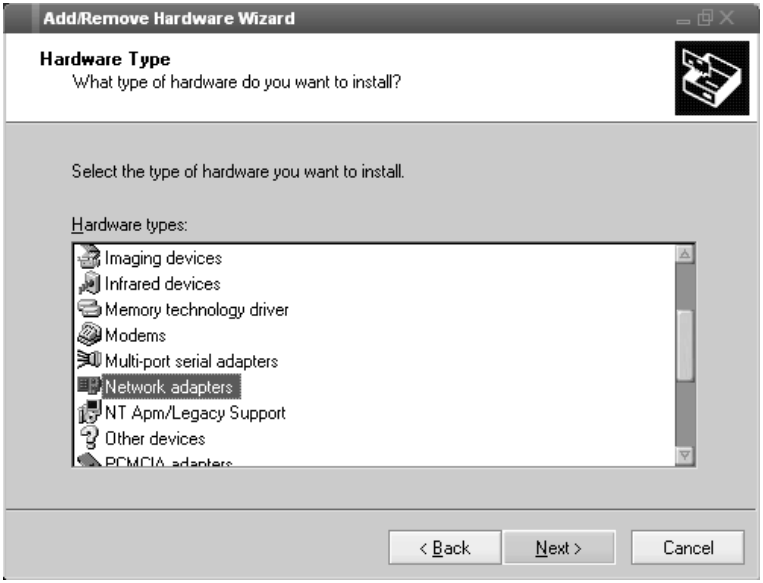
This figure shows the Find New Hardware screen.



Find New Hardware Screen

9. Select *No, I want to select the hardware from a list* to search for new hardware.
10. Click *Next.*

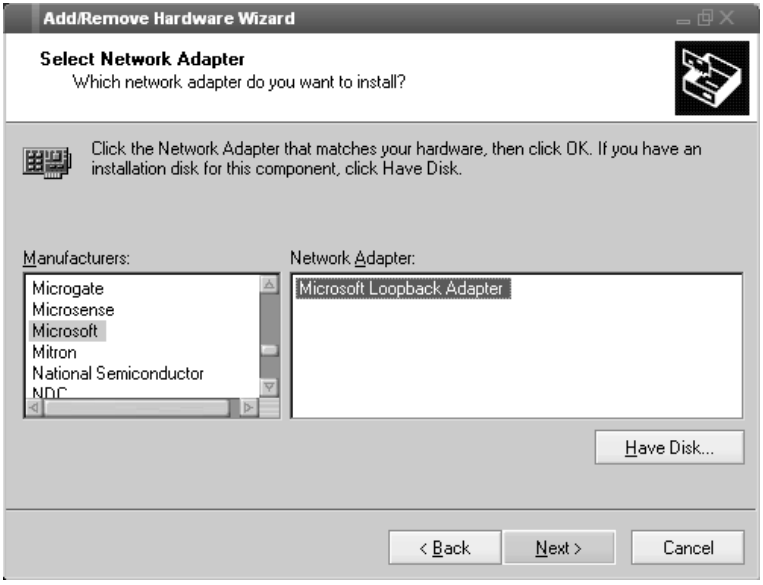
This figure shows the Hardware Type screen.



Hardware Type Screen

11. From the *Hardware types* menu, select **Network adapters**.
12. Click *Next*.

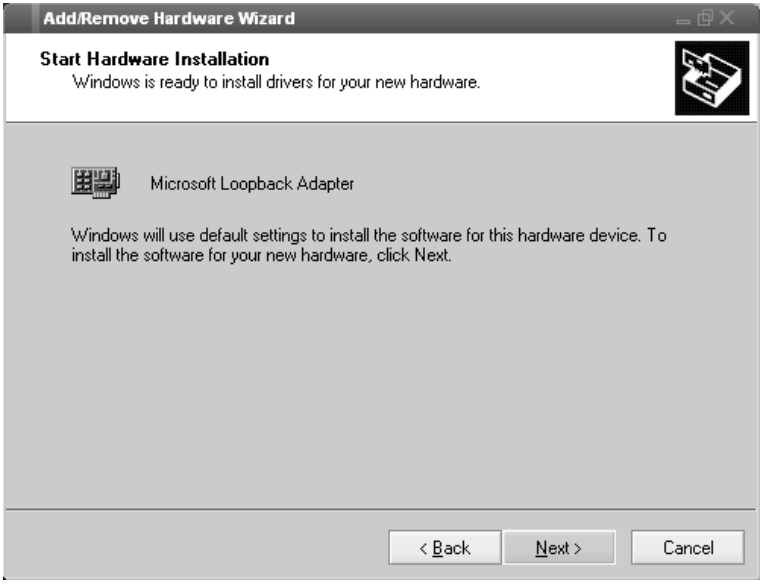
This figure shows the Select Network Adapter screen.



Select Network Adapter Screen

13. From the *Manufacturers* list, select **Microsoft**.
14. From the *Network Adapter* list, select **Microsoft Loopback Adapter**.
15. Click *Next*.

This figure shows the Start Hardware Installation screen.



Start Hardware Installation Screen

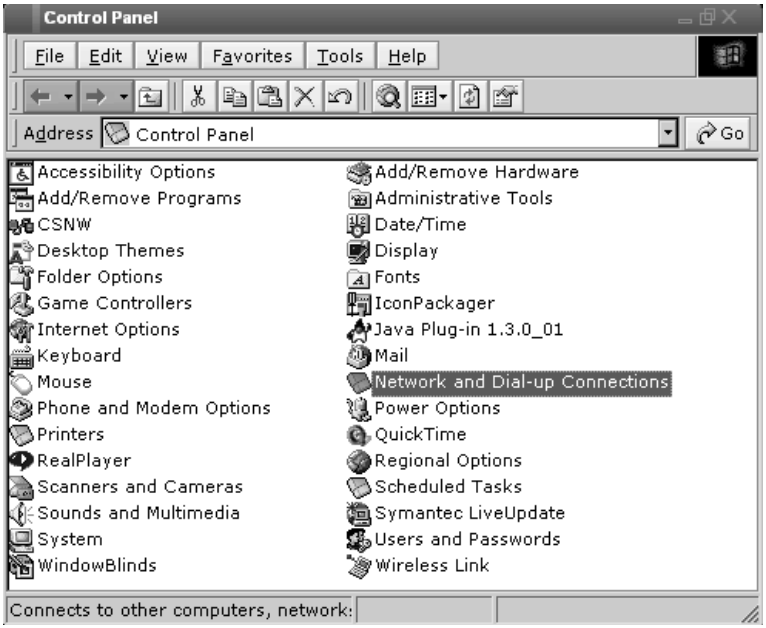
16. Click *Next.*

This figure shows the Completing the Add/Remove Hardware Wizard screen.

Completing the Add/Remove Hardware Wizard Screen

17. Click *Finish*.
18. To configure the Loopback, open the *Control Panel.*

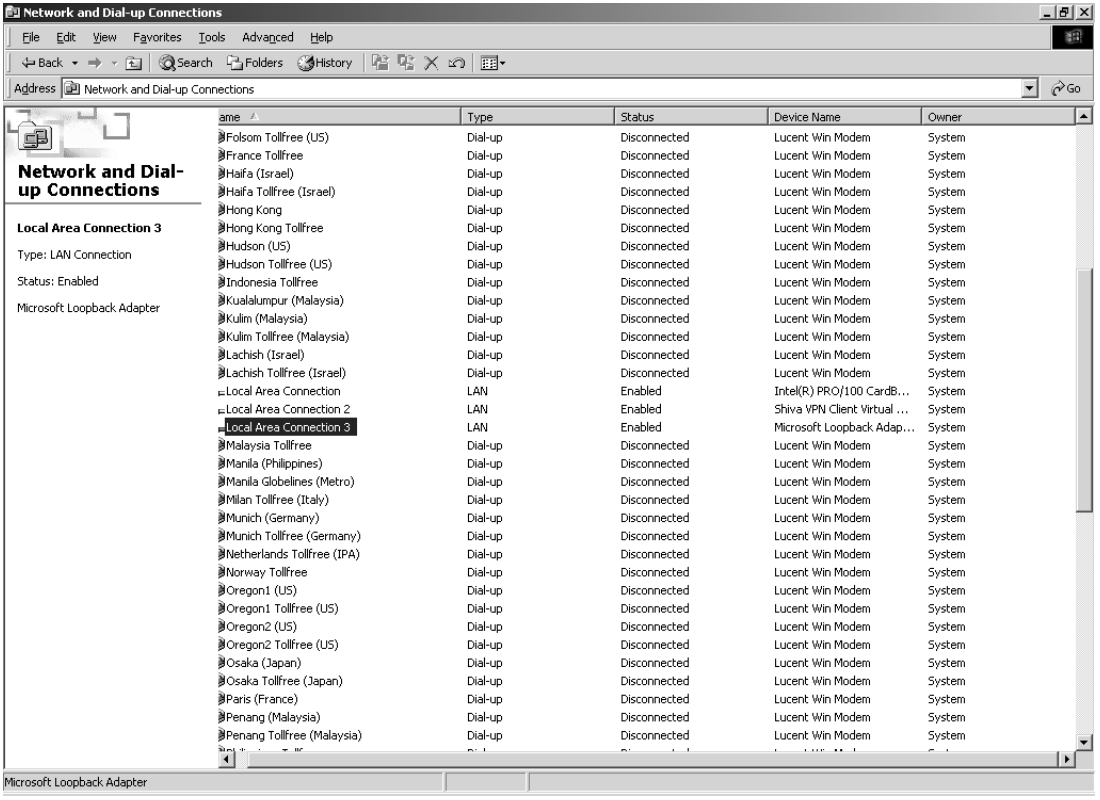
This figure shows the Control Panel.



Windows 2000 Control Panel

19. Double-click **Network and Dial-up Connections**.

This figure shows the Network and Dial-up Connections screen.

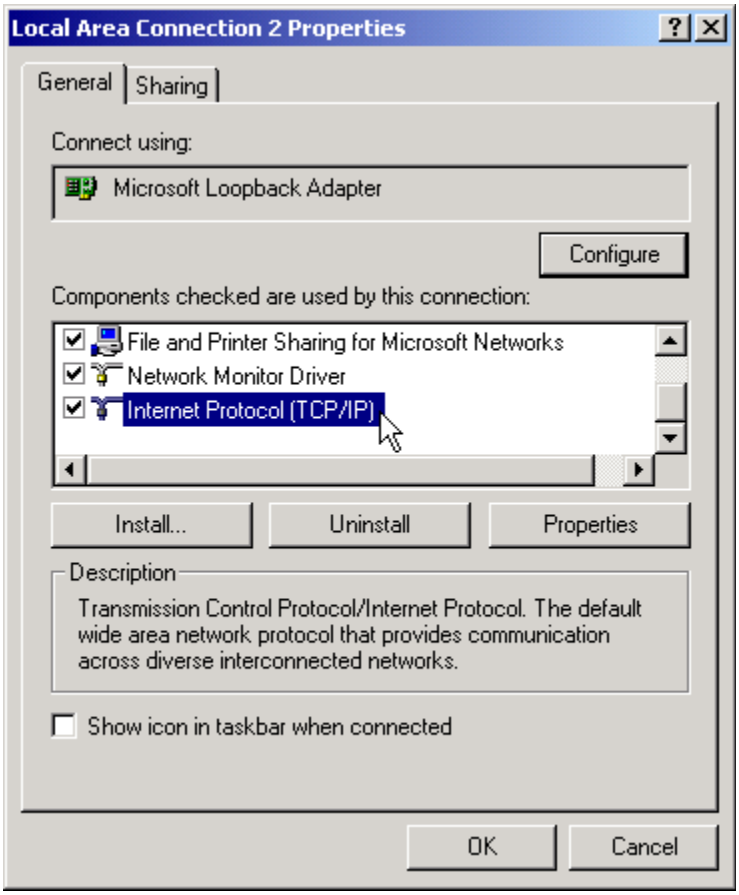


Network and Dial-up Connections Screen

20. From the *Device Name* list, select the **Microsoft Loopback Adapter**.

21. From the menu bar, select *File* > *Properties.*

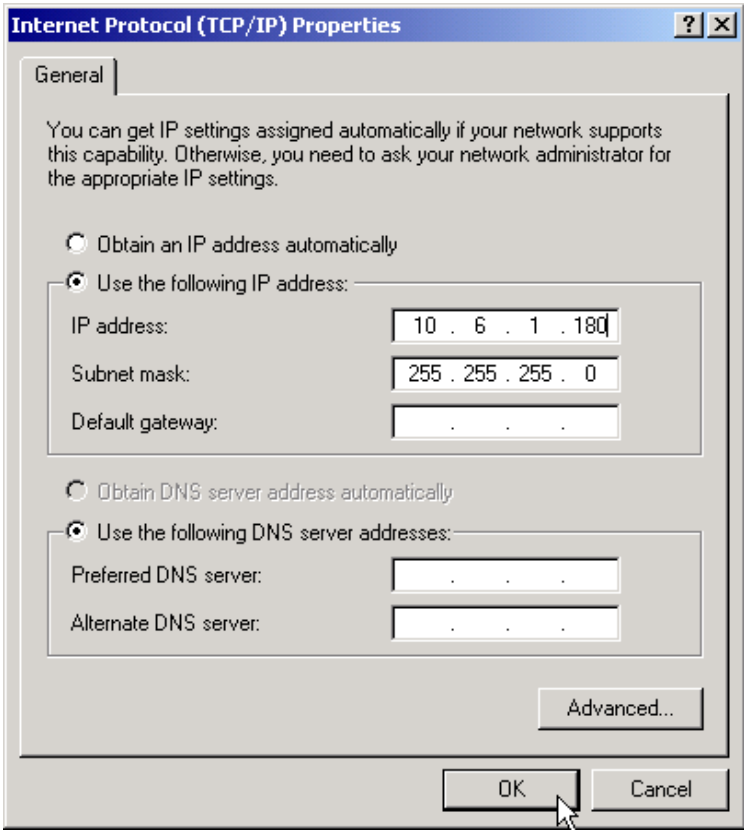
This figure shows the *Properties* screen.



Properties Screen

22. From the menu, double-click **Internet Protocol (TCP/IP)** to display its properties.

This figure shows the Internet Protocol (TCP/IP) Properties screen.



Internet Protocol (TCP/IP) Properties Screen

23. In the *IP address* field, type the Virtual IP (VIP) address of the SA8250.
24. In the *Subnet Mask* field, type the subnet mask appropriate for your environment.
25. Leave the *Default Gateway* field blank.
26. Click *OK*.
27. Reboot the computer.

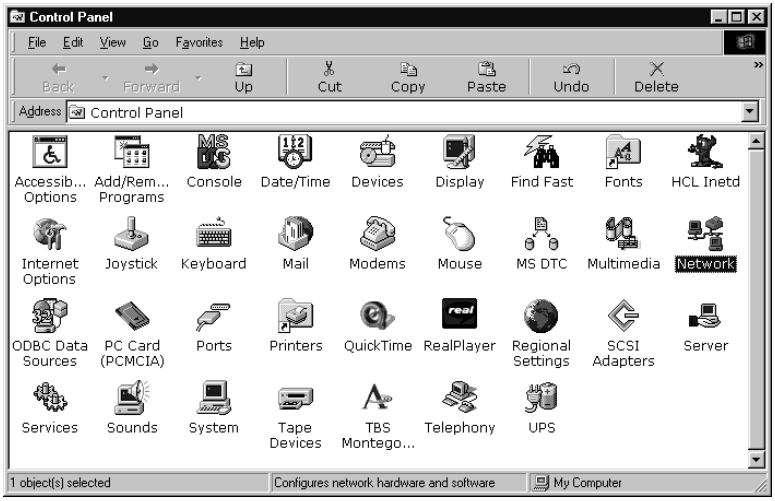
Configure OPR for Windows* NT*

Set the Loopback

NOTE: *OPR is not available for SSL-enabled services.*

1. From the **Start** menu, click on *Settings*.
2. Open the *Control Panel.*

   This figure shows the Control Panel.



Control Panel

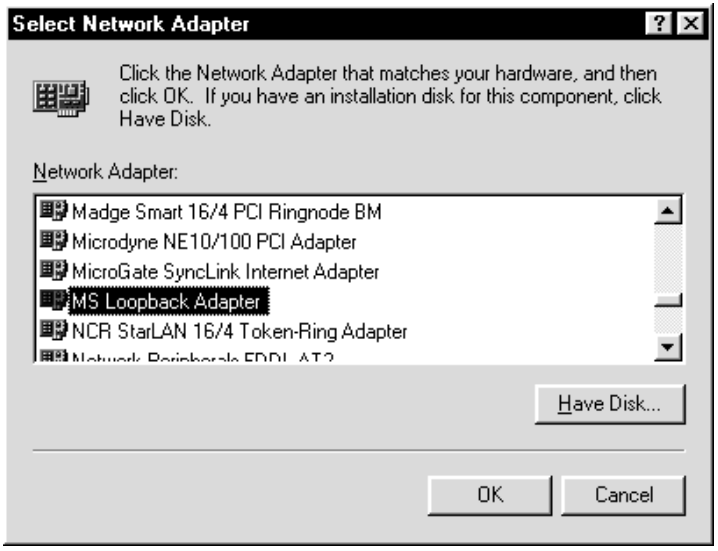
3. Double-click on the **Network** icon.

This figure shows the Network dialog display.

Network Adapter Setting

4. Click the *Adapters* tab.
5. Click *Add*.

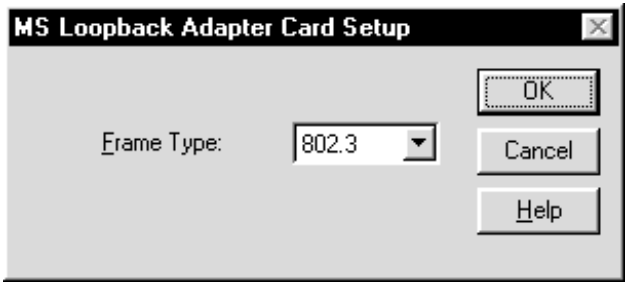
This figure shows the Select Network Adapter dialog.



Choosing the MS Loopback Adapter

6. From the *Network Adapter* list, select **MS Loopback Adapter** and click *OK*.

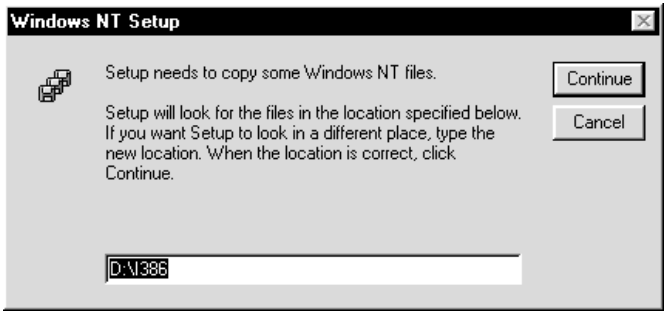
   This figure shows the MS Loopback Adapter Card Setup dialog.



Adapter Card Setup

7. Choose the default *Frame Type* (**802.3**) and click *OK*.

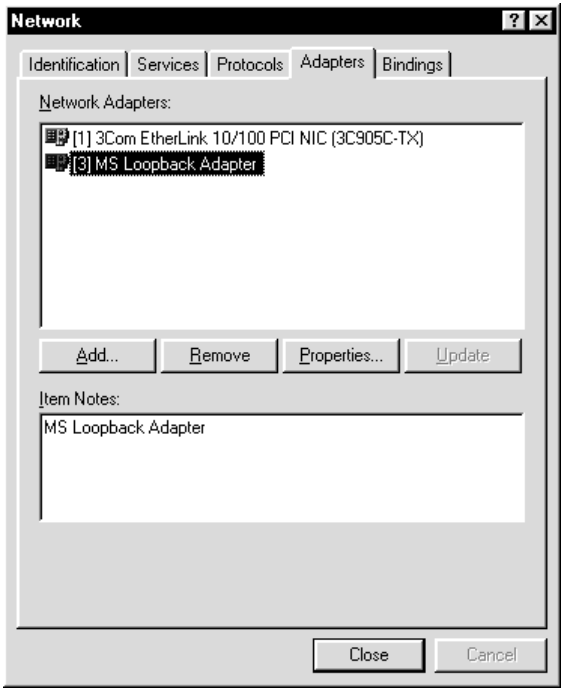
If the necessary files are not found on your system, the Windows NT Setup dialog displays:



Copying Windows NT Files

8. If necessary, specify where Windows NT can find the files and click *Continue*.

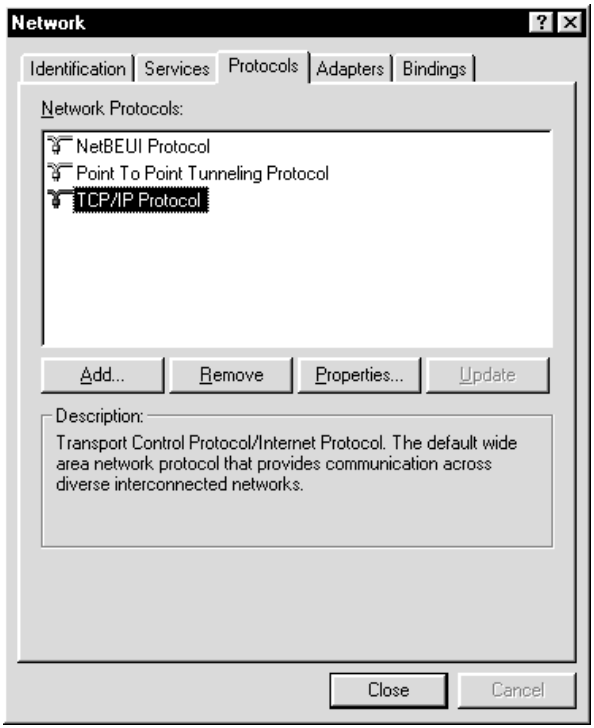
   The files load on your system, and the **MS Loopback Adapter** displays in the *Network Adapters* list:



MS Loopback Adapter Installed

9. Click the *Protocols* tab.

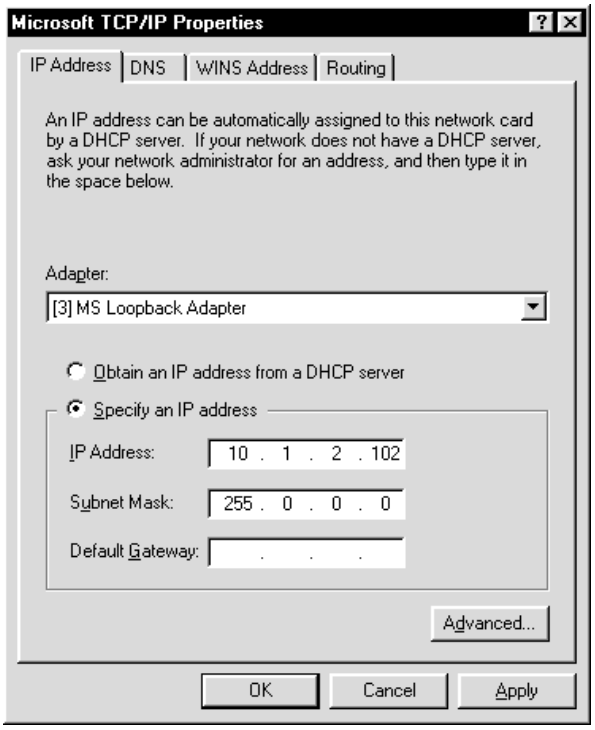
   This figure shows the protocol settings.



Protocol Settings

10. From the *Network Protocols* list, click **TCP/IP Protocol**.
11. Click *Properties...*.

This figure shows the Microsoft TCP/IP Properties dialog.



Setting the TCP/IP Properties

12. From the *Adapter* pull-down menu, select the **MS Loopback Adapter**.
13. Click *Specify an IP address*.
14. In the *IP address* field, type the Virtual IP (VIP) address of the SA8250.
15. In the *Subnet Mask* field, type the subnet mask appropriate for your environment.
16. Leave the *Default Gateway* field blank.
17. Click *Apply.*
18. Click *OK*.
19. Reboot the computer.

Run a Web Service on the Loopback Interface Using IIS 3.0

NOTE: *If you cannot find Microsoft Internet Server (Common), you do not have IIS running on your server. Install IIS 3.0 and start this procedure again.*

1. From the **Start** menu, click *Programs* and then *Microsoft Internet Server (Common)* to run the Internet Service Manager.
2. After the Microsoft Internet Service Manager console displays, double-click the *WWW* service.

   The WWW Service Properties for <machine-name> dialog box displays, where <machine-name> is the name of your system.
3. In the *TCP Port* field, type the port number of the OPR service on the SA8250.
4. Select the *Directories* tab and click *Add*.

   The Directory Properties displays.
5. Browse and click to select the home directory for the server.
6. Click the *Home Directory* check box.
7. Click the *Virtual Server* check box, and in the text field provided type the VIP that was aliased on the loopback. For more details, see “Set the Loopback” in this chapter.
8. Click *Ok*.
9. Add the server to the SA8250.

Run a Web Service on the Loopback Interface Using IIS 4.0

NOTE: *If you cannot find Internet Service Manager, you do not have IIS running on your server. Download and install the Option Pack, then start this procedure again.*

1. From the **Start** menu, click *Programs*, click *Windows NT 4.0 Option Pack,* and then click *Microsoft Internet Information Server.*
2. Run the Internet Service Manager.
3. After the Microsoft Management Console displays, expand the Console Root and then the Internet Information Server nodes.
4. Right-click *Default Web Service* or the predefined service for this Windows NT server and click the *Properties* option.

   The <service name> Properties dialog box displays.
5. In the *TCP Port* field, type the port number of the OPR service on the SA8250.
6. To save and close this dialog box, click *Ok*.
7. From the Internet Information Server node, right-click the <`machine-name`> node. Click *New* and then click *Web Site*.

   The New Web Site Wizard starts.
8. Type the *description*.
9. Type the *IP*, using the SA8250's VIP.
10. Type the *port number*, using the service port defined on the SA8250.
11. Browse and click to select the *home directory* for this service.
12. Configure the *access permissions*.
13. Click *Finish*.

    The new service now displays under the <`machine-name`> node as a new node.
14. Start the new service.

Configuring OPR for a UNIX-based Apache Web Server

This section reproduces the commands required to configure Out-of-Path Return for an Apache Web Server on a UNIX* machine.

```
ifconfig lo0 add <vip> or
ifconfig lo0 <vip> alias or
ifconfig lo0:1 <vip>
```

1. Add the appropriate command to an `/etc/rc` file to return this configuration at boot time.
2. Edit the httpd.conf to reflect these settings (these are usually found under `/var/www/conf/`):

   ```
   Port <port_number>,
   ServerName <the fully qualified name for this
   server machine>
   ```

3. Configure a virtual service (in the same file, *vip* is the virtual IP configured on the SA8250 to handle OPR):

   ```
   <VirtualHost vip>
   ServerName vip
   ServerAdmin admin@mailserver
   DocumentRoot (usually: /var/www/docs)
   ErrorLog /var/log/httpd/vip-error_log
   TransferLog /var/log/httpd/vip-access_log
   # CustomLog /var/log/httpd/vip-access_log
   combined
   </VirtualHost>
   ```

4. Edit the `/var/www/conf/srm.conf` and set document root to `/var/www/docs.` For the Apache server to start at boot time, the index.html file must exist. Therefore, in `/etc/rc` verify the following entry:

   ```
   if [ -f /var/www/docs/index.html ]; then
   echo -n ’ httpd’; /var/www/bin/start-apache fi
   ```

Notes

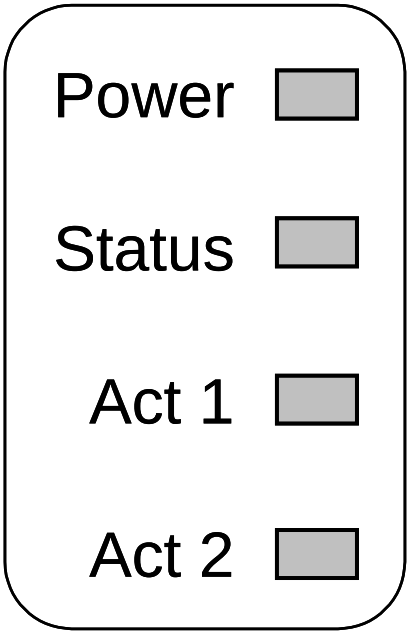
E Diagnostics & Troubleshooting

Running Diagnostics on the SA8250

This section describes the available diagnostic information and in-field diagnostics.

Diagnostic LEDs

The front panel's LEDs provide information generated by the boot-time power-on-self-test (POST) and application restart sequences. This diagram shows the four LEDs on the front panel.



Diagnostic LEDs

Power Indication

The front panel Power LED connects directly to the unit's power supply. If the Power LED is not illuminated, power is not connected to the unit, or the unit's power supply has failed.

Boot-time LED Diagnostics

The front panel's Status, Act 1 and Act 2 LEDs display the transition through a sequence of codes at boot time indicating the SA8250's progress through the boot process. If the boot process aborts, terminates, or hangs before the SA8250 is online and functional, the state of the LEDs can help in diagnosing the problem. This table describes the restart sequence and conditions.

Status	Act 1	Act 2	Condition
Off	Off	Off	BIOS boot failed
On	Off	Off	OS boot process failed
Off	On	Off	OS boot stage 1 failed
On	On	Off	OS boot stage 2 failed
Off	Off	On	OS boot stage 3 failed
On	Off	On	Application never started up
Off	On	On	Application restart stage 1 failed
On	On	On	Application restart stage 2 failed

Boot-Time LED Diagnostic Indications

After restart completes, the Status LED begins to blink and LED activity begins as described in the next section, "Run time LED Diagnostics."

Run time LED Diagnostics

At run time, the LEDs provide this information about unit activity:

Status LED

- Blinks on and off quickly when serving as the active or standalone SA8250.
- Blinks on and off slowly when configured for serial cable failover and serving as the backup SA8250.
- Continuous on or off indicates a unit that has stopped responding (hung).

Activity LEDs

This table describes the run time behavior of the Activity LEDs (Act 1, Act 2).

Act 1	Act 2	Condition
Off	Off	No NIC activity
Slow blink	Off	1 — 100 connections per second
Fast blink	Off	100 — 300 connections per second
Solid	Off	300 — 400 connections per second
Solid	Blink	400 — 600 connections per second
Solid	Solid	600+ connections per second

Activity LED Indications

Run time Errors

At run time, the SA8250's health-monitoring processes indicate critical error conditions by turning off the Status LED and blinking error patterns on the two Activity LEDs. This table describes the run time error indications.

Status	Act 1	Act 2	Condition
Off	Off	Flash	NIC failure
Off	Blink	Off	Rich Application Failure (applies only when serial cable failover is enabled)
Off	Blink	Blink	Core Application Failure (applies only when serial cable failover is enabled)
Blink	Blink	Blink	Health Monitoring Failure (each LED lights in sequence)

Run Time Error Indications

Troubleshooting

This section contains descriptions of possible difficulties followed by possible causes and suggestions for solutions.

This table contains the SA8250 Troubleshooting Guide.

Problem	Possible Cause	Solution
Cannot ping the VIP	Route role/protocol configuration is incorrect.	Ensure that the route role and protocol are set correctly. Route role must be set to "standalone" and protocol must be set to "none."
Cannot run the GUI Administrative interface	DNS name resolution is incomplete.	To run the GUI, the SA8250 must be able to resolve its own hostname via DNS, both forward and reverse. The client machine on which the browser is running must also be able to resolve its own hostname using DNS, both forward and reverse.
	Java plug-in is not installed	To run the GUI using Windows, you must have Java plug-in version 1.1.1_004 (or earlier) installed on your workstation. For more information, see the *HP e-Commerce XML Director Server Appliance SA8250 Getting Started Guide*.
	Java plug-in is the wrong version	To run the GUI using Windows, you must have Java plug-in version 1.1.1_004 (or earlier) installed on your workstation. If you have a later version installed, it must be removed before installting version 1.1.1_004 (or earlier). For more information, see the *HP e-Commerce XML Director Server Appliance SA8250 Getting Started Guide*.
	Missing a trailing slash for the GUI URL	Some browsers will not launch the GUI if the trailing slash is missing from the URL. Be sure to included the trailing slash, as shown here: `http://CSLab7k:1095/`

SA8250 Troubleshooting Guide

Problem	Possible Cause	Solution
GUI Administrative interface initialization fails	DNS name resolution is incomplete.	The client machine's host name must be DNS-resolvable by the SA8250. If DNS is not used, use the **`config sys hosts add`** command at the CLI to add the client's hostname to the SA8250's local host file. The SA8250 also needs to be added to the client machine's local hosts file. For Windows* NT*, the hosts file is located in `c:\winnt\System32\drivers\etc` directory. For Solaris*, edit the `/etc/nsswitch.conf` to allow for local resolution. For UNIX*, the hosts file is located in /etc. The format of the entry is: `<IP> <SA8250Name> <FullyQualifiedDomainName>` Example: `10.1.1.2 Broker1 Broker1.yourco.com`
Slow client response from a web server through the SA8250 compared to response time directly from the web server	Hostname/IP address resolution on the server may be misconfigured or incomplete, causing a delay in the server response.	Add the hostname/real IP address of the SA8250 to the HOSTS file on the server to eliminate any delay in hostname/IP address resolution on the server.
Slow client response from a Web server through the SA8250 compared to response time directly from the Web server	Ethernet link configuration needs adjustment.	The SA8250 defaults to auto-negotiate mode on the ethernet link. However, some older routers may not handle auto-negotiate correctly.

SA8250 Troubleshooting Guide (continued)

Problem	Possible Cause	Solution
An attempt to connect to the CLI Administrative interface results in the message "CLI not ready."	Domain configuration is incorrect or incomplete.	Verify that the domain is correct. If it is incorrect, use the **dns** command at the Boot Monitor prompt to re-enter the correct information. Reboot the SA8250 and restart for changes to take effect.
	DNS resolution is set on the SA8250 but is not being used at the site.	If the customer is not using DNS, remove the DNS entry by using the **dns** command at the Boot Monitor prompt.
	Corrupted network configuration	Perform "factory_reset" to clear network info such as host name, IP address, subnet mask, and default gateway. Reboot the SA8250 and restart for changes to take effect.
	The SA8250 is designated as the backup SA8250 in a serial failover configuration.	This message is normal on a SA8250 designated as the backup for serial failover.
Telnet connection to CLI on offline SA8250 in serial failover mode does not appear to connect, *or*, logon prompt does not appear immediately.	DNS resolution is incomplete.	The client machine's host name must be DNS-resolvable by the SA8250. If DNS is not used, use the **config sys hosts add** command at the CLI to add the client's hostname to the SA8250's local host file. The SA8250 also needs to be added to the client machine's local hosts file. For Windows NT, the hosts file is located in `c:\winnt\System32\drivers\etc` directory. For Solaris, edit the `/etc/nsswitch.conf` to allow for local resolution. For UNIX, the hosts file is located in /etc. The format of the entry is: `<IP> <SA8250Name> <FullyQualifiedDomainName>` Example*:* `10.1.1.2 Broker1 Broker1.yourco.com`

SA8250 Troubleshooting Guide (continued)

Problem	Possible Cause	Solution
Client connects directly to the fulfillment server, bypassing the SA8250	Timing issue with routers	Define a static route for the SA8250 on the router.
Unexpected routing behavior	"Keepalive" option is enabled on the fulfillment servers when configured with the sticky option on the SA8250.	Turn off "Keepalive" on the fulfillment servers when using the sticky option.
Only some images load when routing in RICH-HTTP mode	"Keepalive" option is enabled on the fulfillment servers when configured for RICH-HTTP service on the SA8250.	Turn off "Keepalive" on the fulfillment servers when using RICH-HTTP. When "Keepalive" is enabled on the fulfillment servers, each GET request from the client always returns to the same web server. If GIFs are defined on one server and JPGs on another, then only one of these image types is seen at the client.
Round Robin Load Balancing works abnormally	The directory and/or file content of the fulfillment servers defined under the service is not identical.	Configure all the servers under the same service with the same directory structure and file content.
	New TCP connections, not client sessions, are assigned to fulfillment servers in a round robin fashion.	This is normal behavior. Multiple components of a web page (such as HTML and GIFs) require separate TCP connections. The requests are assigned to the fulfillment servers in round robin fashion, although it may not be apparent from the browser.

SA8250 Troubleshooting Guide (continued)

Problem	Possible Cause	Solution
Client getting timeout or "service not found" errors	Proxy servers inhibit use of sticky src-ip option.	Some ISPs use proxy servers to load balance client sessions. When the sticky src-ip option is enabled and the client's session is switched to another proxy server, the source IP address is changed. This may cause the SA8250 to route the request to a different server. The solution is to use the "sticky cookie" option instead of "sticky src-ip." In this mode, a cookie is sent to the client to force use of the same server regardless of the source IP.
	The client is on the same subnet as server (SAP mode only). This causes the server to return the response directly to the client, bypassing the SA8250. The client discards the response since the destination is that of the server and not the SA8250.	Configure the client and server to reside on different subnets.
	For OPR configurations, the loopback adapter is not configured on the fulfillment server(s).	For instructions on configuring the loopback adapter on the server(s), see Appendix D.

SA8250 Troubleshooting Guide (continued)

Notes

F Cleaning the Dust Filter

Background

The HP e-Commerce/XML Director Server Appliance SA8250 has a dust filter element mounted behind the front grille and in front of the dual intake fans. This filter is washable and must be cleaned every six months at a minimum. If you use your SA8250 in an abnormally dusty environment, clean the filter more often. You need not interrupt the SA8250's operation to perform the following cleaning procedure.

Cleaning Procedure

To clean the dust filter, follow these steps:

1. Remove the two Phillips screws that secure the metal grille on the left side of the SA8250's front panel. Remove the grille to expose the foam filter element.
2. Remove the foam filter element from its recess.
3. Replace the grille and its screws while the filter element is being cleaned.
4. Wash the filter in warm water and set aside to dry.
5. Allow the filter to dry thoroughly before reinstalling in the SA8250.
6. When the filter element is dry, remove the SA8250's front grille and replace the filter in its recess, ensuring that its entire perimeter is behind the metal lip of the recess.
7. Replace the grille with its two Phillips screws.

Regulatory Information

Taiwan Class A EMI Statement

警告使用者 ：
這是甲類的資訊產品， 在居住的環境中使用時，
可能會造成射頻干擾， 在這種情況下，使用者會
被要求採取某些適當的對策・

VCCI Class A (Japan)

この装置は、情報処理装置等電波障害自主規制協議会（ＶＣＣＩ）の基準に基づくクラスＡ情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

VCCI Statement

Class A ITE

この装置は、情報処理装置等電波障害自主規制協議会（ＶＣＣＩ）の基準に基づくクラスＡ情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

This is a Class A product based on the standard of the Voluntary Control Council for Interference by Information Technology Equipment (VCCI). If this equipment is used in a domestic environment, radio disturbance may arise. When such trouble occurs, the user may be required to take corrective actions.

WARNING: This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Internal access to this equipment is intended only for qualified service personnel.

Australia

FCC Part 15 Compliance Statement

This product has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.

This product generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning this equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Change the direction of the radio or TV antenna.
- To the extent possible, relocate the radio, TV, or other receiver away from the product.
- Plug the product into a different electrical outlet so that the product and the receiver are on different branch circuits.

If these suggestions don't help, consult your dealer or an experienced radio/TV repair technician for more suggestions.

NOTE: This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

CAUTION: If you make any modification to the equipment not expressly approved by HP, you could void your authority to operate the equipment.

Canada Compliance Statement (Industry Canada)

Cet appareil numérique respecte les limites bruits radioélectriques applicables aux appareils numériques de Classe A prescrites dans la norme sur le matériel brouilleur: "Appareils Numériques," NMB-003 édictée par le Ministre Canadien des Communications.

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the interference-causing equipment standard entitled: "Digital Apparatus," ICES-003 of the Canadian Department of Communications.

CE Compliance Statement

The SA8250 complies with the EU Directive, 89/336/EEC, using the EMC standards EN55022 (Class A) and EN50082-1. This product also complies with the EU Directive, 73/23/EEC, using the safety standard EN60950.

CISPR 22 Statement

WARNING: This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

WARNING

The system is designed to operate in a typical office environment. Choose a site that is:

- Clean and free of airborne particles (other than normal room dust).
- Well-ventilated and away from sources of heat including direct sunlight.
- Away from sources of vibration or physical shock.
- Isolated from strong electromagnetic fields produced by electrical devices.
- In regions that are susceptible to electrical storms, we recommend you plug your system into a surge suppressor and disconnect telecommunication lines to your modem during an electrical storm.
- Provided with a properly grounded wall outlet.

Do not attempt to modify or use the supplied AC power cord if it is not the exact type required.

Ensure that the system is disconnected from its power source and from all telecommunications links, networks, or modem lines whenever the chassis cover is to be removed. Do not operate the system with the cover removed.

AVERTISSEMENT

Le système a été conçu pour fonctionner dans un cadre de travail normal. L'emplacement choisi doit être:

- Propre et dépourvu de poussière en suspension (sauf la poussière normale).
- Bien aéré et loin des sources de chaleur, y compris du soleil direct.
- A l'abri des chocs et des sources de ibrations.
- Isolé de forts champs magnétiques géenérés par des appareils électriques.
- Dans les régions sujettes aux orages magnétiques il est recomandé de brancher votre système à un supresseur de surtension, et de débrancher toutes les lignes de télécommunications de votre modem durant un orage.
- Muni d'une prise murale correctement mise à la terre.

Ne pas utiliser ni modifier le câble d'alimentation C. A. fourni, s'il ne correspond pas exactement au type requis.

Assurez vous que le système soit débranché de son alimentation ainsi que de toutes les liaisons de télécomunication, des réseaux, et des lignes de modem avant d'enlever le capot. Ne pas utiliser le système quand le capot est enlevé.

WARNUNG

Das System wurde für den Betrieb in einer normalen Büroumgebung entwickelt. Der entwickelt. Der Standort sollte:

- sauber und staubfrei sein (Hausstaub ausgenommen);
- gut gelüftet und keinen Heizquellen ausgesetzt sein (einschließlich direkter Sonneneinstrahlung);
- keinen Erschütterungen ausgesetzt sein;
- keine starken, von elektrischen Geräten erzeugten elektromagnetischen Felder aufweisen;
- in Regionen, in denen elektrische Stürme auftreten, mit einem Überspannungsschutzgerät verbunden sein; während eines elektrischen Sturms sollte keine Verbindung der Telekommunikationsleitungen mit dem Modem bestehen;
- mit einer geerdeten Wechselstromsteckdose ausgerüstet sein.

Versuchen Sie nicht, das mitgelieferte Netzkabel zu ändern oder zu verwenden, wenn es sich nicht um genau den erforderlichen Typ handelt.

Das System darf weder an eine Stromquelle angeschlossen sein noch eine Verbindung mit einer Telekommunikationseinrichtung, einem Netzwerk oder einer Modem-Leitung haben, wenn die Gehäuseabdeckung entfernt wird. Nehmen Sie das System nicht ohne die Abdeckung in Betrieb.

AVVERTENZA

Il sistema è progettato per funzionare in un ambiente di lavoro tipico. Scegliere una postazione che sia:

- Pulita e libera da particelle in sospensione (a parte la normale polvere presente nell'ambiente).
- Ben ventilata e lontana da fonti di calore, compresa la luce solare diretta.
- Al riparo da urti e lontana da fonti divibrazione.
- Isolata dai forti campi magnetici prodotti da dispositivi elettrici.
- In aree soggette a temporali, è consigliabile collegare il sistema ad un limitatore di corrente. In caso di temporali, scollegare le linee di comunicazione dal modem.
- Dotata di una presa a muro correttamente installata.

Non modificare o utilizzare il cavo di alimentazione in c. a. fornito dal produttore, se non corrisponde esattamente al tipo richiesto.

Prima di rimuovere il coperchio del telaio, assicurarsi che il sistema sia scollegato dall'alimentazione, da tutti i collegamenti di comunicazione, reti o linee di modem. Non avviare il sistema senza aver prima messo a posto il coperchio.

ADVERTENCIAS

El sistema está diseñado para funcionar en un entorno de trabajo normal. Escoja un lugar:

- Limpio y libre de partículas en suspensión (salvo el polvo normal).
- Bien ventilado y alejado de fuentes de calor, incluida la luz solar directa.
- Alejado de fuentes de vibración.
- Aislado de campos electromagnéticos fuertes producidos por dispositivos eléctricos.
- En regiones con frecuentes tormentas eléctricas, se recomienda conectar su sistema a un eliminador de sobrevoltage y desconectar el módem de las líneas de telecomunicación durante las tormentas.
- Previsto de una toma de tierra correctamente instalada.

No intente modificar ni usar el cable de alimentación de corriente alterna, si no se corresponde exactamente con el tipo requerido.

Asegúrese de que cada vez que se quite la cubierta del chasis, el sistema haya sido desconectado de la red de alimentación y de todos lo enlaces de telecomunicaciones, de red y de líneas de módem. No ponga en funcionamiento el sistema mientras la cubierta esté quitada.

Wichtige Sicherheitshinweise

1. Bitte lesen Sie sich diese Hinweise sorgfältig durch.
2. Heben Sie diese Anleitung für den spätern Gebrauch auf.
3. Vor jedem Reinigen ist das Gerät vom Stromnetz zu trennen. Vervenden Sie keine Flüssig- oder Aerosolreiniger. Am besten dient ein angefeuchtetes Tuch zur Reinigung.
4. Um eine Beschädigung des Gerätes zu vermeiden sollten Sie nur Zubehörteile verwenden, die vom Hersteller zugelassen sind.
5. Das Gerät is vor Feuchtigkeit zu schützen.
6. Bei der Aufstellung des Gerätes ist auf sichern Stand zu achten. Ein Kippen oder Fallen könnte Verletzungen hervorrufen. Verwenden Sie nur sichere Standorte und beachten Sie die Aufstellhinweise des Herstellers.
7. Die Belüftungsöffnungen dienen zur Luftzirkulation die das Gerät vor Überhitzung schützt. Sorgen Sie dafür, daß diese Öffnungen nicht abgedeckt werden.
8. Beachten Sie beim Anschluß an das Stromnetz die Anschlußwerte.
9. Die Netzanschlußsteckdose muß aus Gründen der elektrischen Sicherheit einen Schutzleiterkontakt haben.
10. Verlegen Sie die Netzanschlußleitung so, daß niemand darüber fallen kann. Es sollete auch nichts auf der Leitung abgestellt werden.
11. Alle Hinweise und Warnungen die sich am Geräten befinden sind zu beachten.
12. Wird das Gerät über einen längeren Zeitraum nicht benutzt, sollten Sie es vom Stromnetz trennen. Somit wird im Falle einer Überspannung eine Beschädigung vermieden.
13. Durch die Lüftungsöffnungen dürfen niemals Gegenstände oder Flüssigkeiten in das Gerät gelangen. Dies könnte einen Brand bzw. Elektrischen Schlag auslösen.
14. Öffnen Sie niemals das Gerät. Das Gerät darf aus Gründen der elektrischen Sicherheit nur von authorisiertem Servicepersonal geöffnet werden.

15. Wenn folgende Situationen auftreten ist das Gerät vom Stromnetz zu trennen und von einerqualifizierten Servicestelle zu überprüfen:
    a. Netzkabel oder Netzstecker sint beschädigt.
    b. Flüssigkeit ist in das Gerät eingedrungen.
    c. Das Gerät war Feuchtigkeit ausgesetzt.
    d. Wenn das Gerät nicht der Bedienungsanleitung ensprechend funktioniert oder Sie mit Hilfe dieser Anleitung keine Verbesserung erzielen.
    e. Das Gerät ist gefallen und/oder das Gehäuse ist beschädigt.
    f. Wenn das Gerät deutliche Anzeichen eines Defektes aufweist.
16. Bei Reparaturen dürfen nur Orginalersatzteile bzw. den Orginalteilen entsprechende Teile verwendet werden. Der Einsatz von ungeeigneten Ersatzteilen kann eine weitere Beschädigung hervorrufen.
17. Wenden Sie sich mit allen Fragen die Service und Repartur betreffen an Ihren Servicepartner. Somit stellen Sie die Betriebssicherheit des Gerätes sicher.
18. Zum Netzanscluß dieses Gerätes ist eine geprüfte Leitung zu verwenden, Für einen Nennstrom bis 6A und einem Gerätegewicht größer 3kg ist eine Leitung nicht leichter als H05VV-F, 3G, 0.75mm2 einzusetzen.

Notes

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Notes

Glossary

This section defines terms and acronyms used throughout the *HP e-Commerce/XML Director Server Appliance SA8250 User Guide*.

ARP	Address Resolution Protocol
B2B	Business-to-business
CA	Certificate Authority
Certificate	A digitally-signed token in an SSL-encrypted transaction containing information including the issuer (Certificate Authority that issued the certificate), the organization that owns the certificate, public key, the validity period for the certificate, and the hostname
Cipher	Any encryption algorithm, either symmetric or public key, operating either as a data stream or divided into blocks
Client Authentication	A means of requesting client certificates to verify identities.
Client CA	*See Client Authentication.*
CRL	Certificate Revocation List. A timestamped list identifying revoked certificates, each of which contain a serial number.

Default Server	If defined, the server that the SA8250 directs client traffic to if it cannot find a match for any RICH or XML expressions.
DHCP	Dynamic Host Configuration Protocol. This protocol allows servers to dynamically assign IP addresses to nodes (workstations) on the fly.
DN	Distinguished Name. Used when creating a signing request.
DNS	Domain Name Server. A mechanism used in the Internet for translating the names of host machines into addresses.
DTD	Document Type Definition
Eligible Server	A server in a lower priority service's server pool
FTP	File Transfer Protocol. A low-level and extremely fast method of transferring files over TCP/IP networks.
Fulfillment Server	A server that stores content and runs applications to respond to user requests
Heartbeat	A signal acknowledging the existence/operation of SA8250. The heartbeat command enables the SA8250 to display a message on the console every heartbeat interval.
HOT	Another name for Layer 4, the transport layer, which defines the rules for information exchange and manages end-to-end delivery of information within and between networks, including error recovery and flow control.
HTTP	Hypertext Transfer Protocol: the protocol used between a web browser and a server to request a document and transfer its contents
HTTPS	HTTP exchanged over an SSL-encrypted session
IANA	Internet Assigned Number Authority
IP	Internet Protocol
IP Address	A unique identifier for a node on an IP network. Expressed in "dotted decimal" notation. For example: 10.0.0.1
IP Service	A network-accessible, IP-accessible Application Protocol. For example: HTTP, FTP, and the like. For administration purposes, services are identified by Virtual IP:Port.
KB	Kilobytes, or thousands of bytes, of data

Key	A public key and private key pair used to encrypt/decrypt messages
Key Strength	Length, in bits, of keys used in data encryption or authentication. For example: 56, 128, 512
Keypair	Matching public and private keys
Layer 4	*See HOT*
Layer 7	*See RICH*
LDAP	Lightweight Directory Access Protocol. Used to access common directory information.
Load Balancing	The distribution of processing and communications activity across a computer network so that no single device is overwhelmed. Load balancing is particularly important for networks on which it is difficult to predict the volume of requests likely to be issued to a server. Busy Web sites typically employ two or more Web servers in load balancing roles.
MB	Megabytes, or millions of bytes, of data
MIB	Management Information Base. A repository of characteristics and parameters managed in a network device, such as a NIC, hub, switch, or router
MIME	Multipurpose Internet Mail Extensions. MIME is the standard format for including non-text information in Internet mail, thereby supporting the transmission of mixed-media messages across TCP/IP networks.
MSAP	Multi-Hop Source Address Preservation. MSAP allows requests to pass through two cascaded SA8250s in different geographical areas. Similar to SAP, but with geographic dispersal. *See also SAP*.
NIC	Network Interface Card. The attachment that connects a device to a network by executing the code needed by the connected device to share a cable or some other media with other workstations.
NTP	Network Time Protocol. A means for setting time among Internet hosts around the world.
OPR	Out of Path Return. The ability to establish a session or connection and then transfer the session to a fulfillment server. After the fulfillment server receives the original request, it responds directly to

	the client by a path other than the one established for the original connection. This method typically results in faster delivery of the requested content to the client.
OSPF	Open Shortest Path First. A link-state routing algorithm used to calculate routes based on the number of routers, transmission speed, delays, and route cost.
Policy	Rules used to effect changes in server resource apportionment according to conditions and thresholds established by a system administrator
Policy Group	A set of services chosen and prioritized to automate network performance to support a specific business model
Port	In the context of TCP/IP sessions, a unique protocol-specific handle
Priority	Description of an IP service's place in the hierarchy of services within a Policy Group
Private Key	The part of a key in a public key system that is kept secret and used only by its owner. It is used for decrypting messages and for making digital signatures.
Public Key	The part of a key in a public key system that is distributed widely, and is not kept secure. Used for encryption or for verifying signatures.
RICH	Real-time Intelligent Content Handling, or Layer 7. The manner in which the SA8250 analyzes and allocates requests for IP services according to the type of content requested.
RIP	Routing Information Protocol
SAP	Source Address Preservation. A SA8250 option which, when enabled, allows server logs to reflect the true IP addresses of requesting clients.
Service	A service is an application protocol that is offered on a network. The devices where the service is running are identified by an IP address. A port is used to identify the protocol at the designated IP address. Services contain an IP address and a port. For example, 10.54.67.6:80 describes a service consisting of a server's HTTP application listening on port 80.
Signing Request	Required for a request for certificate authentication by a Certificate Authority

S/MIME Secured MIME. *See MIME*.

SNMP Simple Network Management Protocol. A method by which network management applications can query a management agent using a supported MIB. *See also MIB.*

SSH Secure shell

SSL Secure Socket Layer. Protocol developed by Netscape* for encrypted transmission over TCP/IP networks, setting up a secure end-to-end link.

Target Response Time A time (expressed in milliseconds) representing the ideal maximum time required to serve requests for that Service

URI Uniform Resource Indicator, derived from the HTTP Request-Line that identifies the resource on which to apply the request. The URI limit is 7,500 bytes on a GET request.

URL Uniform Resource Locator. Also network or web address.

Verisign A well-known Certificate Authority

XML eXtensible Markup Language

XML Pattern A definition of one or more keywords that describe specific conditions to be compared with incoming XML data. This typically consists of a RICH (or Layer 7) Expression, an ampersand (&), an optional document number, another ampersand (&), and an XML Expression. For example:

```
*/order.asp & doc=2 & //Address[zipcode > 90000]
```

The XML Expression is optional. However, the XML Expression will be ignored if the RICH expression is missing.

XPath The XML Path Language Standard. The SA8250 uses a subset of this language for its XML expressions.

Notes

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  or

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Czech Republic – 420 2 613 07 310
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Finland – 02 03 47 288
France – 01 43 62 3434
Germany – 0180 525 8143
Greece – +30 (0) 16196411
Hungary – 36 1 382 1111
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New Zealand –
- Upper North Island – 09-356-6640
- Lower North Island – 04-499-2026
- South Island – 03-365-9805

People's Republic of China – 86-8008105959
Philippines – 63 2 811-0643
Singapore – +65-2725300
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Columbia – 9-800-91-9477
Guatemala – 1-800-999-5305
Mexico –
Ciudad de Mexico – 5258-9922
All Others – 800-472-6684
Peru – 0-800-10111
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Venezuela –
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All Others – 800-47-777

Other Countries

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