

Blue Coat® Systems SG™ Appliance

Volume 5: Advanced Networking

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Contact Information

Blue Coat Systems Inc.
420 North Mary Ave
Sunnyvale, CA 94085-4121

<http://www.bluecoat.com/support/contact.html>

bcs.info@bluecoat.com
<http://www.bluecoat.com>

For concerns or feedback about the documentation: documentation@bluecoat.com

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Chapter 1: About Advanced Networking

Volume 5: Advanced Networking discusses networking tasks that are not required in every environment, such as:

- ❑ TCP/IP settings.
- ❑ WAN Optimization, which enables you to optimize environments with application delivery networks (ADNs).
- ❑ Forwarding, which allows you to define the hosts and groups of hosts to which client requests can be redirected.
- ❑ Health Checks, which reports on the health of upstream hosts.

About This Book

This book is organized into the following chapters:

- ❑ Chapter 2: "Configuring an Application Delivery Network" on page 13
- ❑ Chapter 3: "Attack Detection" on page 53
- ❑ Chapter 4: "TCP Connection Forwarding" on page 59
- ❑ Chapter 5: "Bandwidth Management" on page 67
- ❑ Chapter 6: "Authenticating an SG Appliance" on page 87
- ❑ Chapter 7: "Configuring Failover" on page 97
- ❑ Chapter 8: "Configuring the Upstream Network Environment" on page 101
- ❑ Chapter 9: "Internet Caching Protocol (ICP) Configuration" on page 121
- ❑ Chapter 10: "Using RIP" on page 127
- ❑ Chapter 11: "Configuring the SG Appliance as a Session Monitor" on page 133
- ❑ Chapter 12: "Configuring and Using the SG Client" on page 139
- ❑ Chapter 13: "SOCKS Gateway Configuration" on page 183
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- ❑ Chapter 15: "TCP/IP Configuration" on page 233
- ❑ Chapter 16: "Virtual IP Addresses" on page 237
- ❑ Chapter 17: "WCCP Settings" on page 239
- ❑ Appendix A: "Glossary" on page 249
- ❑ Appendix B: "Using Policy to Manage Forwarding" on page 263

Document Conventions

The following table lists the typographical and Command Line Interface (CLI) syntax conventions used in this manual.

Table 1-1. Document Conventions

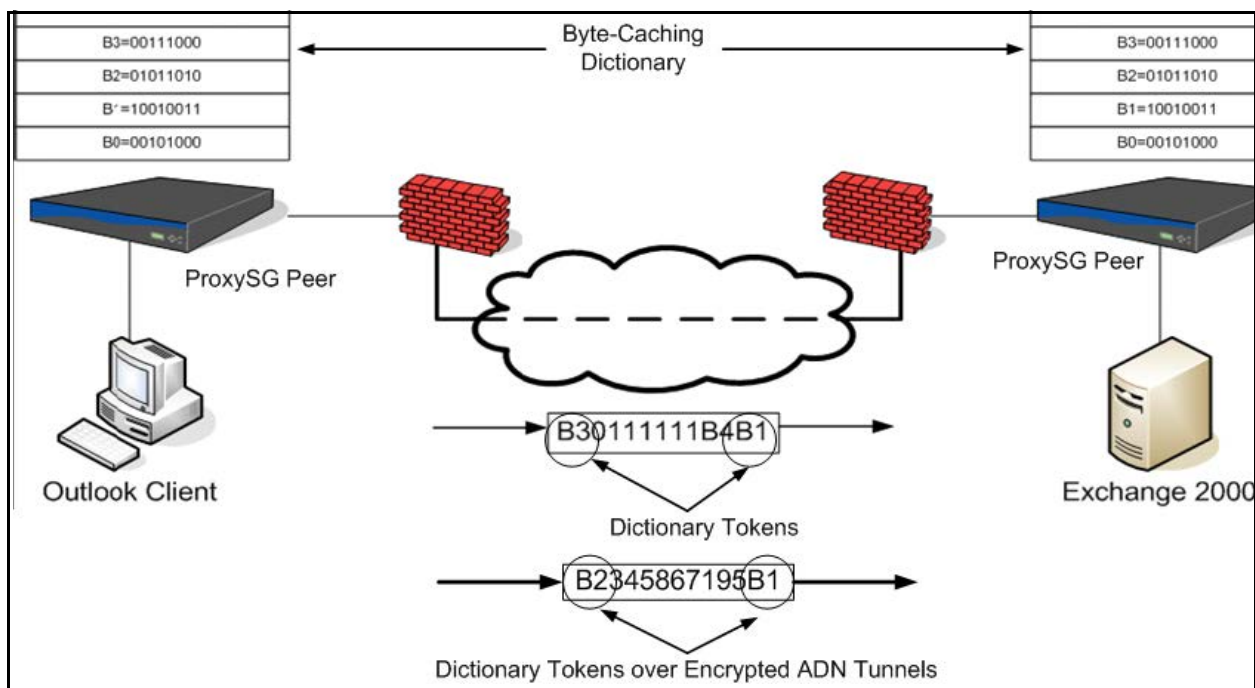
Conventions	Definition
<i>Italics</i>	The first use of a new or Blue Coat-proprietary term.
<code>Courier font</code>	Command line text that appears on your administrator workstation.
<i>Courier Italics</i>	A command line variable that is to be substituted with a literal name or value pertaining to the appropriate facet of your network system.
Courier Boldface	A Blue Coat literal to be entered as shown.
{ }	One of the parameters enclosed within the braces must be supplied
[]	An optional parameter or parameters.
	Either the parameter before or after the pipe character can or must be selected, but not both.

Chapter 2: Configuring an Application Delivery Network

The Blue Coat implementation of an Application Delivery Network (ADN) requires two-sided deployments, with an SG appliance (a *peer*) at each end of the WAN link. It also features:

- ❑ Byte caching. The use of byte caching in an application delivery network reduces the amount of TCP traffic across a WAN by replacing large chunks of repeated data with small tokens representing that data. Working with patterns detected in the WAN traffic, the ADN pair of systems handling the traffic builds a *byte cache* dictionary of small tokens.
- ❑ Acceleration techniques. The use of bandwidth management, compression, protocol optimization, and object caching reduces WAN usage even more.

In such an environment, with only minimal configuration changes, between 30 percent and 90 percent of WAN usage can be eliminated, and WAN performance can be increased from 30 percent to 90 percent. Applications that benefit from ADN optimization include Windows file servers, Web share applications such as WebDAV, CRMs such as Siebel, e-mail, and FTP.



In addition, you can configure the ADN network to provide additional security to internal ADN routing connections and to ADN tunnel connections that carry optimized application data. In a fully secured ADN network, only authenticated and authorized devices are allowed to join the ADN network. All connections between ADN nodes and the ADN manager and connections among the ADN nodes are ensured of message authenticity and privacy protection.

In this Chapter

The following topics are discussed in this chapter:

- ❑ [Section A: "About the Blue Coat Implementation for WAN Optimization"](#) on page 15.
- ❑ [Section B: "Basic ADN Setup"](#) on page 21.
- ❑ [Section C: "Transparent and Explicit Connection Deployments"](#) on page 23.
- ❑ [Section D: "Securing the ADN Network"](#) on page 32.
- ❑ [Section E: "ADN Network History, Statistics, and Health Metrics"](#) on page 39.
- ❑ [Section F: "Advanced Tunnel Optimization"](#) on page 42.
- ❑ [Section G: "Manually Re-Sizing a Byte-Cache Dictionary"](#) on page 45.
- ❑ [Section H: "Related CLI Syntax to Configure an ADN Network"](#) on page 48.
- ❑ [Section I: "Policy"](#) on page 50.

Section A: About the Blue Coat Implementation for WAN Optimization

This section provides conceptual information regarding various deployments that employ WAN optimization.

An ADN network is composed of an ADN manager and backup ADN manager, ADN nodes, and a network configuration that matches the environment.

Blue Coat recommends that you review this section for a high-level overview of the Blue Coat ADN implementation.

This section contains discussions on:

- ❑ “ADN Components” , below.
- ❑ “Choosing the Right Deployment” on page 16.
- ❑ “About ADN Compression” on page 19.
- ❑ “ADN Security” on page 19.

ADN Components

The components of the Blue Coat ADN implementation are:

- ❑ ADN manager and backup ADN manager to provide routing information and control access to the ADN network.
- ❑ ADN nodes in both branch offices and data centers that can be authenticated (identity verified) and authorized (permitted to join the network).
- ❑ (Optional) An SG Client manager if you have mobile users or users in small branch offices, where it might not be cost-justifiable to deploy an acceleration gateway.

ADN Manager and Backup Manager

The ADN manager keeps track of and advertises the routes of the appliances it knows about. The ADN manager *must* be one of the peers in the ADN optimization network.

Note: *Peer* refers to any ADN system, *manager* refers to the ADN system that broadcasts route information to all ADN peers and controls peer access to the ADN network, and *node* refers to all non-manager ADN peers. ADN managers can also act as nodes on the network.

A backup ADN manager (optional, but recommended) can also be configured. The ADN managers and the registered nodes periodically send keep-alive messages to each other. If a node detects the primary ADN manager is not responding, the node automatically fails over to the back-up ADN manager. The node repeatedly attempts to restore its connection with the primary manager. After the primary ADN manager is responding to the node again, the active routing connection of this node switches back to the primary manager.

If the ADN manager detects a node is not responding, the ADN manager removes the node from the database and notifies all other nodes in the network to do the same.

If both the ADN manager and the backup ADN manager are unavailable, no further routing advertisements are broadcast. In this case, routes already known by the peers continue to be remembered and used.

Section A: About the Blue Coat Implementation for WAN Optimization

You also can use the ADN manager and backup manager to authorize which peers are allowed to advertise or retrieve route information to and from the ADN manager, and whether plain connection requests to the ADN manager are accepted.

Connections to the ADN manager and backup manager are made at startup and kept open as long as ADN is enabled. These connections are referred to as routing connections, and are used to advertise configured server subnets and to receive routing table updates from the ADN manager.

Note: Even if you use a transparent tunnel deployment where ADN nodes do not require routing information, you must configure each ADN node and register it with the ADN manager. If you secure the network (highly recommended), the ADN manager is used to authorize ADN peers before they join the network.

Whenever the ADN manager receives a new advertisement from a node that is joining the network, a route update is sent to all the appliances in the ADN optimization network that have already established a routing connection; in addition, the current routing table is updated. The ADN manager and backup manager can each listen on two ports: one accepting the default plain (unsecured) routing connection requests and another accepting secure routing connection requests. The plain listener can be shut down if routing connections from all ADN nodes are secured.

To configure the ADN manager and backup ADN manager, see [Section B: "Basic ADN Setup"](#) on page 21.

ADN Nodes

An ADN node is any SG appliance that is configured for ADN optimization and sends routing information to the ADN manager and backup ADN manager. A node excludes those appliances that are acting as ADN managers and backup ADN managers, although the manager and backup manager can also participate as nodes in the network.

SG Client Manager

The SG Client typically connects to an SG appliance typically located in a data center. That SG appliance provides the SG Client software to users, and maintains the software and the client configuration on all clients in the ADN network. Only one SG Client Manager can be used in the ADN network.

For information on using the SG Client and SG Manager, see [Chapter 12: "Configuring and Using the SG Client"](#) on page 139.

Choosing the Right Deployment

You must decide if the network should use explicit tunnel connections, transparent connections, or a combination of both. Note that ADN peers always intercept incoming transparent connections if ADN is enabled.

- ❑ **Transparent:** The branch SG appliance connects to the original server destination address and port. If an upstream proxy is capable of transparent tunneling, the downstream proxy transfers data over the ADN tunnel. The destination port is preserved and is not affected by security being enabled. Skip to ["Transparent Connections"](#) for more information.

Section A: About the Blue Coat Implementation for WAN Optimization

- ❑ **Explicit:** The branch SG appliance connection is established to the ADN peer discovered from the routing lookup table. The connection is established to the tunnel listening port by default or, if you are preserving the destination port, to the port number the application specifies. Skip to [“Explicit Connections”](#) on page 18 for more information.
- ❑ **Combination:** In some circumstances, some ADN nodes can connect transparently, while other nodes require explicit routing. Skip to [“Combination of Transparent/Explicit Connections”](#) on page 18.

Transparent Connections

Transparent connections are used when the network is required to see the original destination IP addresses and ports. This requires that each node be configured as an ADN node and deployed in in-line mode or virtual in-line mode.

Note: Beyond setting up an ADN node in an in-line network and configuring the ADN node to point to the ADN manager and backup manager, no additional effort is required for transparent connections. If you use explicit connections, those connections must be explicitly configured.

Transparent connections take advantage of ADN tunnels that maintain layer-4 information from the original application connections. Layer-4 information provides an administrator more granular control of the ADN network and allows the enforcement of network policy.

In a transparent connection deployment, connections are not established to a particular peer in the ADN, as they are in an explicit deployment. An ADN node can establish connections to its peers automatically in the absence of any ADN routing information.

The reject-inbound per interface setting is honored for transparent tunnel interception, while the allow-intercept setting is ignored for transparent tunnel interception.

Internet-bound traffic is automatically accelerated in a transparent deployment if a transparent ADN peer is installed at the internet access point and Internet traffic is routed correctly.

Transparent Deployment Load Balancing Scenarios

In transparent load balancing, routes are not advertised, and configuration of load balancing must be done on each node in the ADN cluster.

If you are using a transparent deployment, you have two options for load balancing.

- ❑ A dedicated SG appliance as a load balancer; that system makes the decision about which node receives which traffic.
- ❑ A WCCP router or other external load balancer, where the individual nodes in the ADN cluster make the informed load balancing decision.

Section A: About the Blue Coat Implementation for WAN Optimization

Explicit Connections

Explicit connections are used when maximum network control and granularity is needed.

Blue Coat supports two explicit connections deployments: explicit or explicit but preserving the destination port. In the latter case, the destination port used is the original destination port from the client's request, such as port 80 for HTTP. The destination port is not affected by the connection setting.

In both explicit deployments, the server subnets that are fronted by each peer must be explicitly configured; the server subnets are then advertised to each ADN node.

To accelerate Internet traffic in an explicit ADN network, set up a specific ADN peer as the Internet gateway. Typically, the Internet gateway is an ADN peer close to the enterprise's Internet access point.

Note: If multiple Internet gateways are available, each peer has its own preferred Internet gateway to route all Internet subnets.

When an ADN peer is configured as an Internet gateway, all other ADN peers forward the Internet traffic to this peer. The following logic is used by an ADN peer to determine if the connection is destined to the Internet:

- ❑ If the destination address matches an advertised subnet from any of the ADN peers, the connection is forwarded to that peer over the ADN tunnel.
- ❑ If the destination address matches one of the exempted subnets, the connection is not forwarded over the ADN tunnel.
- ❑ If the destination address does not match an advertised subnet or an exempted subnet, the connection is forwarded to an ADN peer that is designated as an Internet gateway.

Explicit Deployment Load Balancing Scenarios

If you use explicit network connections, you have two options when configuring load balancing:

- ❑ A server subnet, where the branch SG appliance makes the decision about the node receiving specific traffic for a destination subnet. This is the easiest and more preferred method. For more information, see [“Using a Server Subnet”](#) on page 29.
- ❑ An external load balancer, where that system makes the informed decision about which node in the ADN cluster receives specific traffic. For more information, see [“Using an External Load Balancer”](#) on page 29.

Combination of Transparent/Explicit Connections

In some circumstances, it necessary to use explicit connections in addition to the much easier and preferred transparent connection deployment. A transparent network that can advertise explicit routing connections is supported. This configuration is useful:

- ❑ When a small branch office is using the SG Client, which allows SGOS functionality when a SG appliance is not on site.
- ❑ If some nodes are not in an in-line configuration or are incapable of initiating transparent connections.

Section A: About the Blue Coat Implementation for WAN Optimization

By default, if an ADN node is advertising routes, explicit connections are made. If no explicit routes are found and there is an upstream proxy in the path capable of transparent tunneling, the connection is intercepted. This preference is configurable.

Choosing Which Traffic to Optimize

When you configure proxy services to manage TCP traffic through the ADN network, you can set various attributes that can optimize the traffic for the network. A specific attribute, **use ADN**, allows you to disable ADN for a given service.

For information on using proxy services, including the services available, refer to *Volume 2: Proxies and Proxy Services*.

About ADN Compression

ADN compression enables organizations to fully extract every performance benefit available when sending data through an ADN tunnel between SG appliances. ADN tunnels require that SG appliances on opposite sides of the WAN be members of the same ADN network and that the upstream SG appliance either be advertising routes to servers to be accessed by appliances on the opposite side of the WAN or be deployed inline so that transparent ADN tunnels can be used.

Traffic accelerated between clients and servers is automatically compressed before being sent through the ADN tunnel, decreasing bandwidth usage and optimizing response time. ADN compression is often used in conjunction with byte caching and object caching to achieve optimum results. In the case of byte caching and compression, byte caching is first applied to the data and then the resulting data is compressed. Both features are enabled by default to optimize ADN directed traffic. ADN compression for any arbitrary protocol can also be configured on the SG appliance using policy; it can also be controlled separately for both inbound and outbound traffic on the WAN.

For more information on byte caching, see [Section G: "Manually Re-Sizing a Byte-Cache Dictionary"](#) on page 45.

ADN Security

ADN networks can and should be secured. You can limit access by:

- ❑ Authenticating and authorizing the ADN nodes that are allowed on the network and prevent unauthorized nodes from participating.
- ❑ Securing ADN connections.

Authenticating and Authorizing ADN Nodes

By default, authentication and authorization are disabled.

ADN Node Authentication

Secure ADN requires an appliance certificate for each ADN peer, including the ADN manager and backup manager for identification. You can provide your own device appliance certificates or obtain Blue Coat-issued appliance certificates from the Blue Coat CA server. For the most secure environment, Blue Coat-issued appliance certificates are recommended.

To enable secure ADN, you must enable the appliance authentication profile for the ADN network to use before configuring any other security parameters.

Section A: About the Blue Coat Implementation for WAN Optimization

In secure ADN mode, full mutual authentication can be supported between the ADN manager and the ADN nodes and among ADN communicating peers. If authorization is enabled on the ADN manager, the peer proxy is authorized through an approval mechanism by the ADN manager before joining the network. For more information on managing appliance certificates, see [Chapter 6: "Authenticating an SG Appliance"](#).

ADN Node Authorization

Authorization occurs when the ADN manager gives approval for the device to join the network.

If the profile, authentication, and authorization are configured on each peer, and the **Pending Peers** option is enabled on both the ADN manager and the backup ADN manager (if one is configured), the following behavior takes place automatically:

- ❑ When an ADN node comes up, it contacts the ADN manager for routing information.
- ❑ The ADN manager extracts the device ID from the connecting ADN node's appliance certificate and looks for the device ID in its approved list of ADN nodes.
 - If the device is on the approved list, a `REQUEST-APPROVED` response is sent, followed by the route information, and the node joins the network.
 - If the device is not on the approved list, the ADN manager adds the connecting node's device ID to a pending-peers list and sends a `REQUEST-PENDING` response. After the peer is moved to the **Approved** list by the administrator, a `REQUEST-APPROVED` response is sent, followed by the route information, and the node joins the network.
 - If the **Pending Peers** option is not enabled and a peer is not on the approved list, the ADN manager sends a `REQUEST-DENIED` response and closes the connection. The connecting node closes the connection and updates its connection status.
 - If a peer is deleted from the approved list, the ADN manager broadcasts a `REJECT-PEER` to all nodes to delete this node and terminate any existing ADN connections to it. No new connections are routed through the deleted ADN node.

For information on configuring authentication and authorization on each ADN node, see ["Configuring ADN Security Settings"](#) on page 32.

Securing ADN Connections

By default, ADN routing and tunnel connection requests are unauthenticated and all ADN protocol messaging and compressed application data are transferred in plaintext. For maximum security, you can configure the ADN network to secure ADN routing and tunnel connections using standard SSL protocol, which provides authentication, message privacy, and message authenticity security services, regardless of the application traffic that is being accelerated or tunneled.

In secure ADN mode, you can specify that the ADN manager and tunnel use secure mode to listen for routing and tunnel requests.

When secure ADN is enabled, any existing plain outbound connections are dynamically secured by activating SSL according to the `secure-outbound` setting.

For information on optimizing and securing ADN tunnels, see [Section D: "Securing the ADN Network"](#) on page 32 and [Section F: "Advanced Tunnel Optimization"](#) on page 42.

Section B: Basic ADN Setup

Section B: Basic ADN Setup

Basic ADN setup includes:

- ❑ Configuring each node in an in-line deployment; if you are configuring an explicit deployment, you do not need to configure the network in an in-line deployment.
- ❑ Plugging each node in.
- ❑ Enabling the ADN manager and backup manager on each node, starting with the ADN manager and backup manager themselves.

If you are using a transparent connection deployment without load balancing, ADN configuration is complete at this point.

If you are using an explicit connection deployment, a transparent connection deployment with load balancing, or if you are securing the ADN network (highly recommended), after finishing this section you must continue with:

- ❑ [“Explicit Load Balancing”](#) on page 28, for explicit deployment.
- ❑ [“Transparent Load Balancing”](#) on page 24, for transparent deployment.
- ❑ [Section D: “Securing the ADN Network”](#) on page 32.

Defining the ADN Manager

When an SG appliance connects to the primary ADN manager, subnet information is sent to the manager, including:

- ❑ **Peer ID:** The serial number of the device. This is a globally unique identifier for the peer SG appliance that is used as a key to select the dictionary of tokens to use.
- ❑ **Data IP Address and Port:** The destination IP address and port number that a branch proxy should use when establishing an explicit (non preserve-dest-port) tunnel connection.
- ❑ **Server Subnet Advertisements:** The list of server subnets the SG appliance contains are sent to the ADN manager.

The first step in configuring an ADN network is to define the primary ADN manager. Blue Coat also recommends deploying a backup ADN manager to prevent loss of routing information should the primary ADN manager become unavailable for any reason. The ADN manager and backup ADN manager *must* be configured on each peer that is joining the ADN network.

To enable ADN optimization and define the primary/backup ADN managers:

Note: Fill in all fields on this pane before clicking **Apply**.

1. Select **Configuration > ADN > General**.

Section B: Basic ADN Setup

The screenshot shows the 'General' configuration tab for the Application Delivery Network (ADN). It includes sections for enabling the ADN, configuring primary and backup managers, and setting manager ports. Numbered arrows indicate the steps for configuration:

- 2: Enable Application Delivery Network checkbox.
- 3: Primary ADN Manager radio buttons (Self selected) and IP Address field.
- 4: Backup ADN Manager radio buttons and IP Address field.
- 5: Manager Ports section, showing Plain Manager Port (3034) and Secure Manager Port (3036).
- 6: Reconnect to Managers and Refresh Status buttons.

2. Select **Enable Application Delivery Network**.
3. **Primary ADN Manager**: Enter the IP address of the primary ADN manager. This can be the SG appliance itself or any peer on the ADN optimization network.
4. **Backup ADN Manager** (Optional but highly recommended): Enter the IP address of the backup ADN manager or select the **Self** radio button if this SG appliance is the backup manager.
5. **Manager Ports**: The ports are set to 3034 (for plain routing connections) and port 3036 (for secure routing connections).
6. Click **Reconnect to Managers** to connect to the ADN manager and backup ADN manager, if one is configured.

Note: You cannot select this option until you select the primary ADN manager and apply the changes. The ADN manager does not exist until the changes are applied.

7. Click **Apply** to commit the changes to the SG appliance.

Section C: Transparent and Explicit Connection Deployments

Section C: Transparent and Explicit Connection Deployments

If you are configuring a transparent connection deployment without load balancing, remember that ADN peers always intercept incoming transparent connections if ADN is enabled. No special configuration is required after basic ADN configuration is completed unless you use transparent connection load balancing or if you need to configure a combined (explicit and transparent) connection network.

The basic steps for configuring a combined transparent/explicit deployment or a pure explicit deployment are:

- ❑ Connect the nodes in in-line mode or virtual in-line mode only for those nodes that are using transparent connections.
- ❑ (Optional) Secure the ADN network:
 - Configure the ADN nodes for ADN authentication and authorization for maximum security (see [“Configuring ADN Security Settings”](#) on page 32). The settings on each system should be identical.
 - Configure secure tunnels (see [Section F: “Advanced Tunnel Optimization”](#) on page 42).
- ❑ (Optional) Configure the load balancing parameters for each node to be used in load balancing (see [“Explicit Load Balancing”](#) on page 28 or [“Transparent Load Balancing”](#) on page 24).

To configure transparent connections, including transparent connection load balancing, continue with the next section.

To configure explicit connections, including explicit connection load balancing, see [“Configuring an Explicit Deployment”](#) on page 26.

To configure a combined connection deployment, skip to [“Configuring a Combined \(Transparent and Explicit\) Deployment”](#) on page 31.

Configuring a Transparent Deployment

After you have completed basic ADN configuration, transparent connections are made automatically. No further configuration is required, unless you need to configure transparent load balancing.

Transparent Deployment Notes

- ❑ The first proxy in the chain that supports transparent tunnels and is on the same ADN network intercepts ADN transparent tunnel connections.
- ❑ In transparent load balancing, routes are not advertised, and configuration of load balancing must be done on each node in the ADN cluster.
- ❑ Transparent load balancing relies on connection forwarding clusters for proper operation. All nodes in an ADN load balancing group must be part of the same connection forwarding cluster.
- ❑ If connection forwarding is not set up correctly, load balancing will fail. For information on connection forwarding, see [Chapter 4: “TCP Connection Forwarding”](#) on page 59.

Section C: Transparent and Explicit Connection Deployments

Transparent Load Balancing

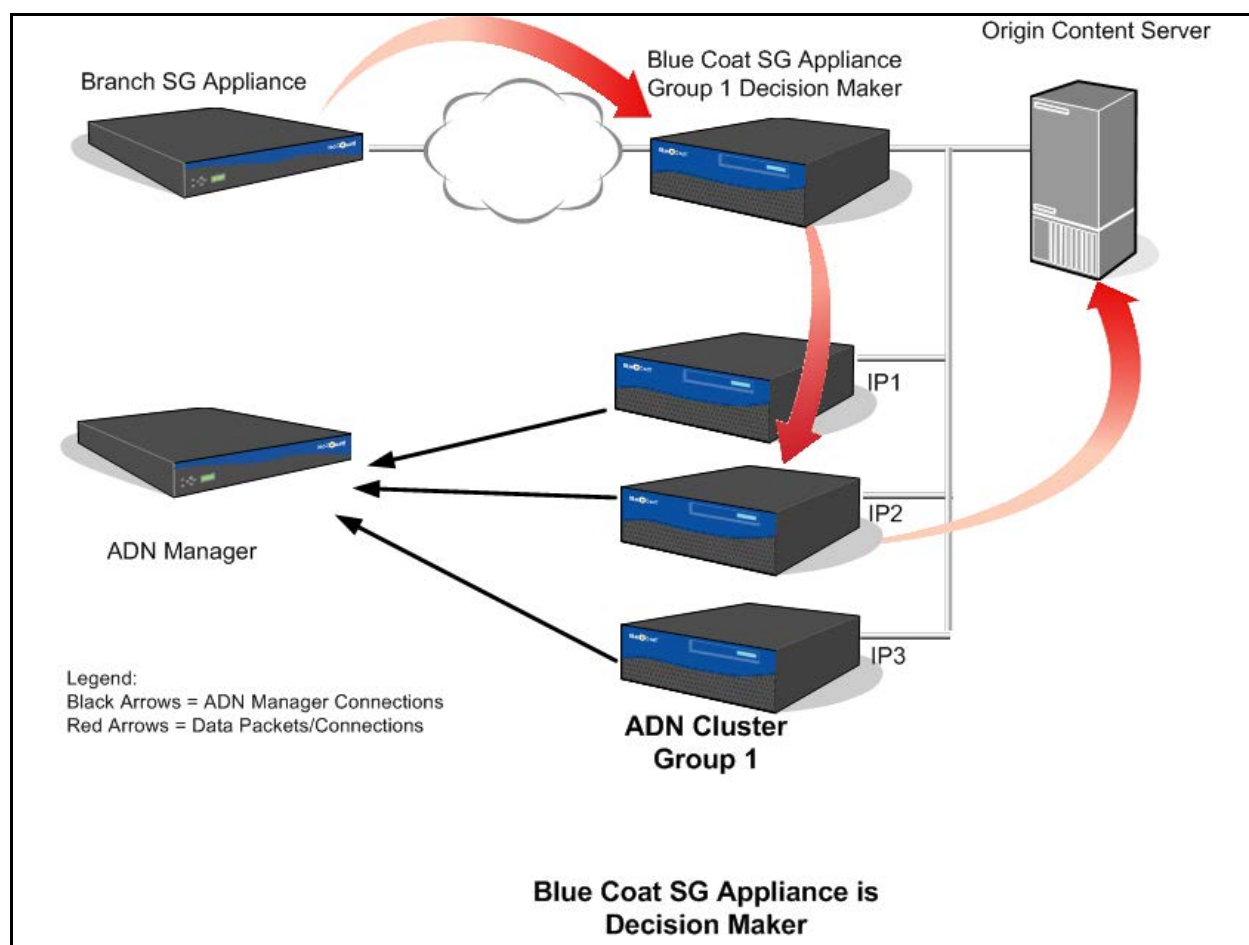
In transparent load balancing, routes are not advertised, and configuration of load balancing must be done on each node in the ADN cluster.

If you are using a transparent deployment, you have two options for load balancing.

- ❑ A dedicated SG appliance as a load balancer; that system makes the informed decision about which node receives which traffic.
- ❑ A WCCP router or other external load balancer, where the individual nodes in the ADN cluster make the informed load balancing decision.

Using the Blue Coat Appliance as a Load Balancer

When a Blue Coat appliance is used as the external load balancer, it makes the decisions about which traffic is directed to which node.



To configure transparent load balancing with a dedicated Blue Coat appliance as the decision maker:

- ❑ Deploy the load-balancing SG appliance in-line so that it can transparently intercept all traffic.
- ❑ Enable load balancing on all nodes by going to **Configuration > ADN > Tunneling > Load Balancing**, and selecting the **Enable Load Balancing** checkbox.

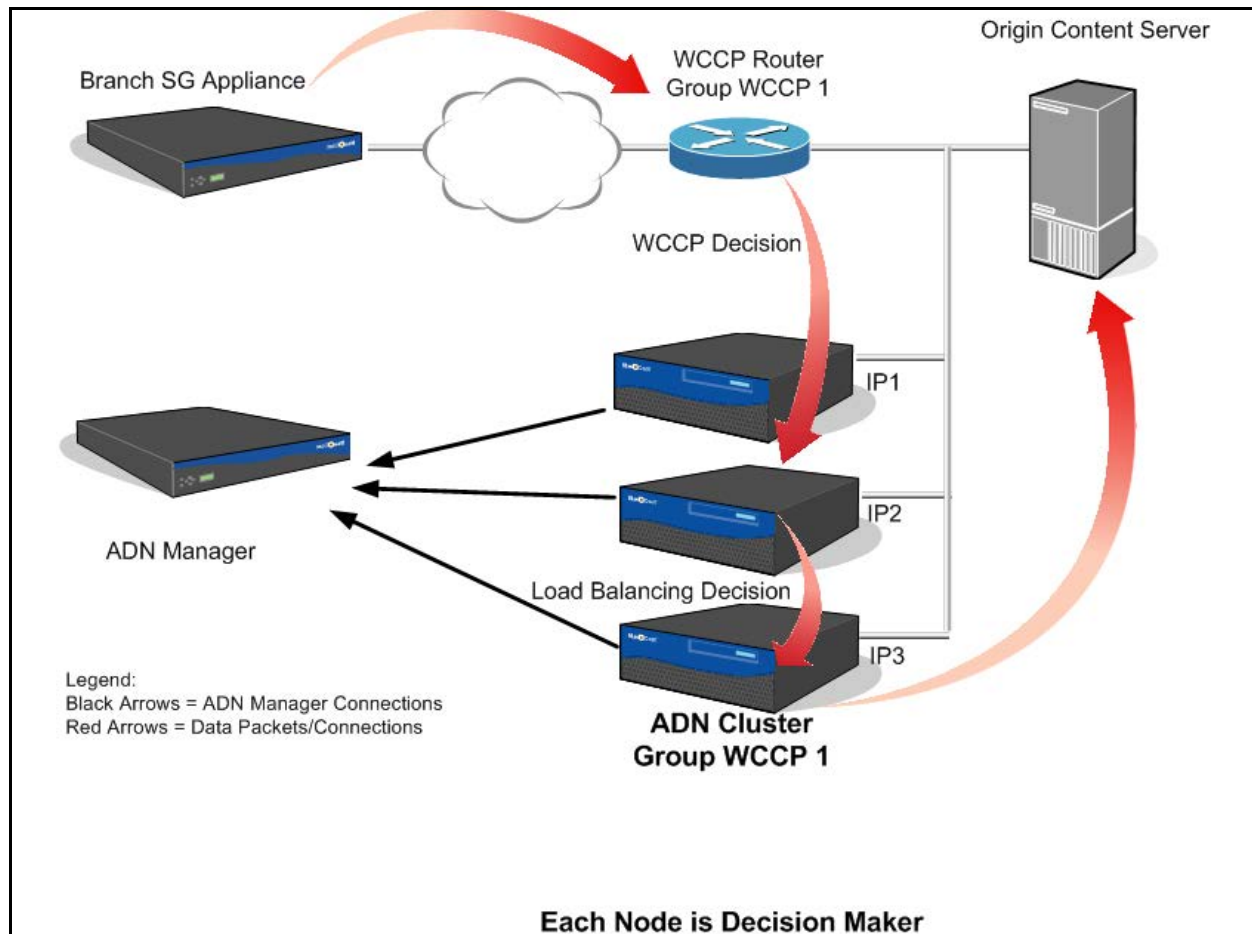
Section C: Transparent and Explicit Connection Deployments

- ❑ (Optional) Configure each box in the cluster with the same load-balancing group name.
- ❑ On the Blue Coat appliance that's acting as the dedicated load balancer, select **Act as load balancer only** through the **Configuration > ADN > Tunneling > Load Balancing** tab.
- ❑ Put all ADN nodes into a connection forwarding cluster. For more information, see [Chapter 4: "TCP Connection Forwarding"](#) on page 59.

Note: No special configuration is required for client IP spoofing beyond standard configuration, which is to enable reflect-client-ip on the branch SG appliance and to set the concentrator SG appliance to allow client-ip spoofing under ADN tunneling.

Using a WCCP Router or L4 Switch as a Load Balancer

Using a WCCP router or L4 switch as a transparent load balancer is similar to using an SG appliance as a transparent load balancer, except that WCCP router or L4 switch must be configured on each system in the cluster. In this scenario, the router or switch cannot guarantee ADN peer affinity because the router cannot use the peer ID as input for its hash. Because of this, the ADN nodes make the actual informed routing decisions.



To configure transparent load balancing with the nodes in the ADN cluster as the decision makers:

Section C: Transparent and Explicit Connection Deployments

- ❑ Enable load balancing on all nodes by going to **Configuration > ADN > Tunneling > Load Balancing**, and selecting the **Enable Load Balancing** checkbox.
- ❑ (Optional) Set the same group name on all of the nodes in the cluster.
- ❑ Put all ADN nodes into a forwarding connection cluster. For more information, see [Chapter 4: "TCP Connection Forwarding"](#) on page 59.
- ❑ Configure WCCP settings on all nodes. For more information, see [Chapter 17: "WCCP Settings"](#) on page 239.
- ❑ Configure WCCP router settings. Review the vendor's documentation for information.

Note: Note: If client IP spoofing is desired, you must configure WCCP so that both traffic from the Branch Appliance to the Origin Content Server and traffic from the Origin Content Server to the Branch Appliance is redirected through WCCP. This requires configuring WCCP on multiple interfaces on your router, or configuring "in/out" rules. If specific ports are desired (rather than all ports), you must configure both source-port and destination-port rules in two different service groups.

Configuring an Explicit Deployment

Complete the following steps to configure an explicit deployment:

- ❑ Configure server subnets on each peer and enable an Internet gateway (see ["Managing Server Subnets and Enabling an Internet Gateway"](#)).
- ❑ (Optional) Preserve the destination port (see ["Preserving the Destination Port"](#) on page 28).
- ❑ Configure explicit load balancing (see ["Explicit Load Balancing"](#) on page 28)

Managing Server Subnets and Enabling an Internet Gateway

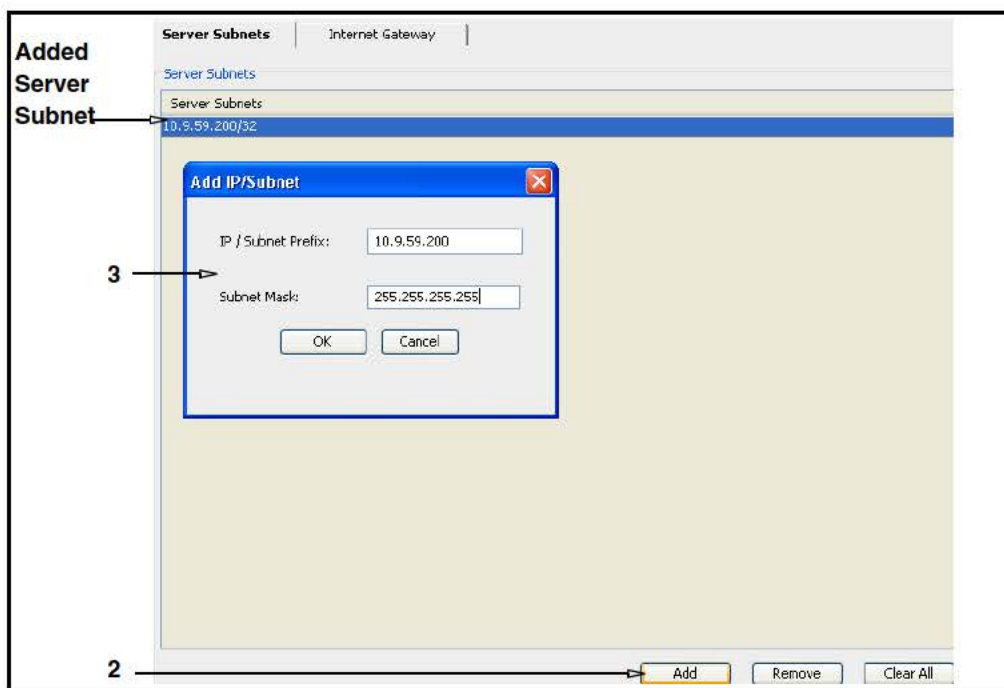
The server subnets you create here are advertised by this peer upon joining the explicit ADN network. You can also enable the peer as an Internet gateway. In addition, subnets not intended to go over ADN tunnels or to be routed to Internet gateways can be configured as exempt subnets.

Note: You can also configure the exempt subnet capability through policy that allows you to disable ADN tunnel for specific connections. For more information, refer to *Volume 10: Content Policy Language Guide*.

To create server subnets for this peer:

1. Select **Configuration > ADN > Routing > Server Subnets**.

Section C: Transparent and Explicit Connection Deployments

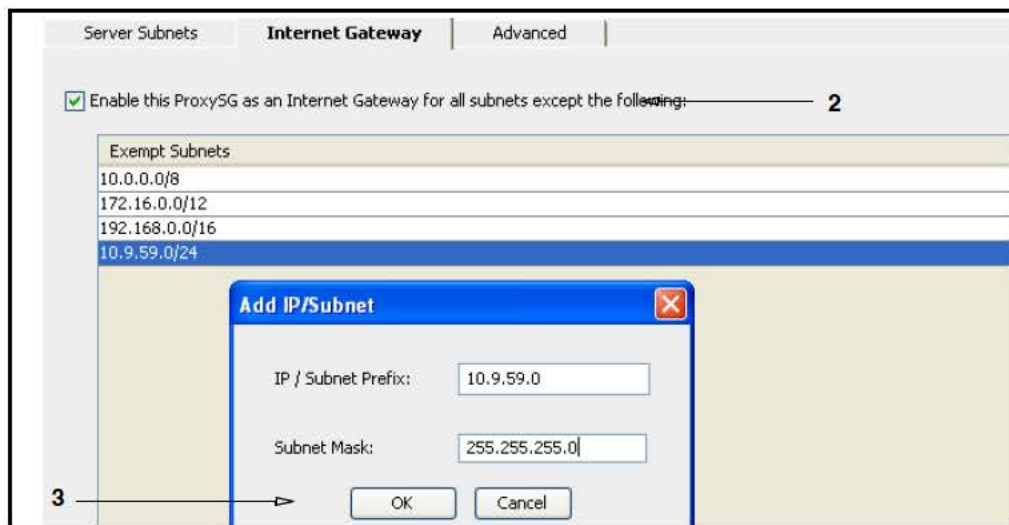


2. Click **Add**.
3. In the Add IP/Subnet dialog, enter the following information and click **OK** when you are done:
 - **IP / Subnet Prefix** field: Enter either an IP address or an IP address and subnet in Classless Inter-Domain Routing (CIDR) notation (for example, 192.168.0.1/16).
 - **Subnet Mask** field: Use this field if you entered only an IP address in the preceding field (in other words, if you used CIDR notation in the preceding field, you do not need to enter a value in this field).
 - To remove excluded subnets, click the subnets to remove and click **Remove**. You must confirm the action.
 - To clear all excluded subnets, requiring traffic from all IP addresses and subnets to be tunneled, click **Clear all**. You must confirm the action.
4. (Optional) Repeat for additional routes.
5. Click **Apply** to commit the changes to the SG appliance.

To enable this peer as an Internet gateway:

1. Select **Configuration > ADN > Routing > Internet Gateway**.

Section C: Transparent and Explicit Connection Deployments



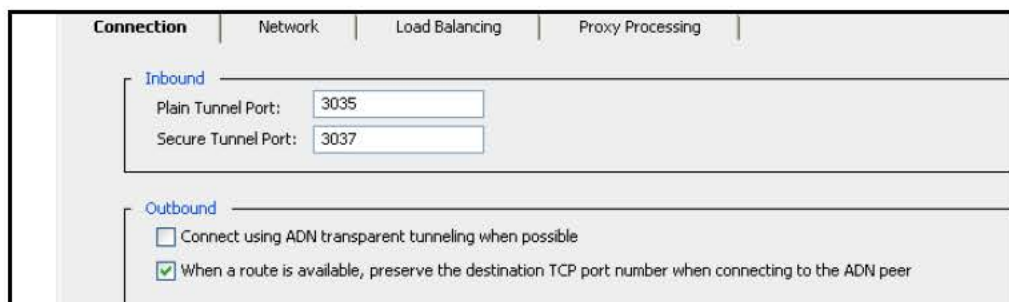
2. Select the **Enable this SG as an Internet Gateway for all subnets except the following** checkbox.
3. Click **Add**.
4. Add the IP/Subnet that must not be routed to Internet gateway(s); click **OK**.
5. (Optional) Repeat for additional subnets.
6. Click **Apply** to commit the changes to the SG appliance.

Preserving the Destination Port

Complete the following procedure.

To preserve the destination port:

1. Select **Configuration > ADN > Tunneling > Connection**.



2. Select the checkbox for **When a route is available, preserve the destination TCP port number when connecting to the ADN peer**.

Explicit Load Balancing

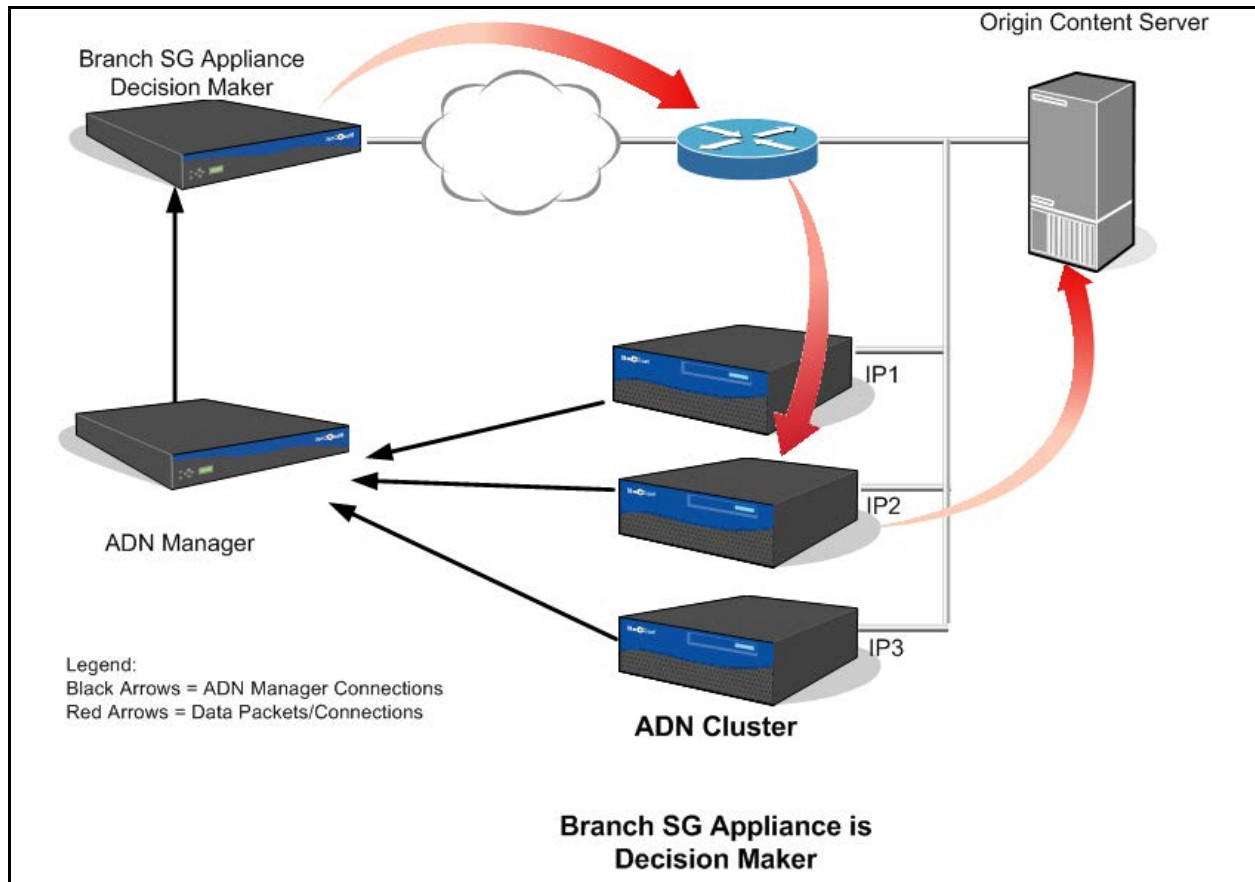
Of the two explicit load balancing types, server subnet or external load balancer, the server subnet is the preferred and easiest to use. While the server subnets must be configured, no additional load balancing settings must be made, and the ADN nodes explicitly advertise their own IP addresses.

Section C: Transparent and Explicit Connection Deployments

Using a Server Subnet

If you use an explicit deployment, or if you just want to load balance traffic destined to a specific subnet, configure the subnet as a server subnet on each ADN node within that group.

To forward the connection destined to the load balanced subnet, each ADN node selects the preferred node from the list of all peers fronting that subnet. This is done by ranking the list of all nodes fronting a given subnet from highest to lowest. The node with the highest rank is chosen to route the client traffic for that subnet.

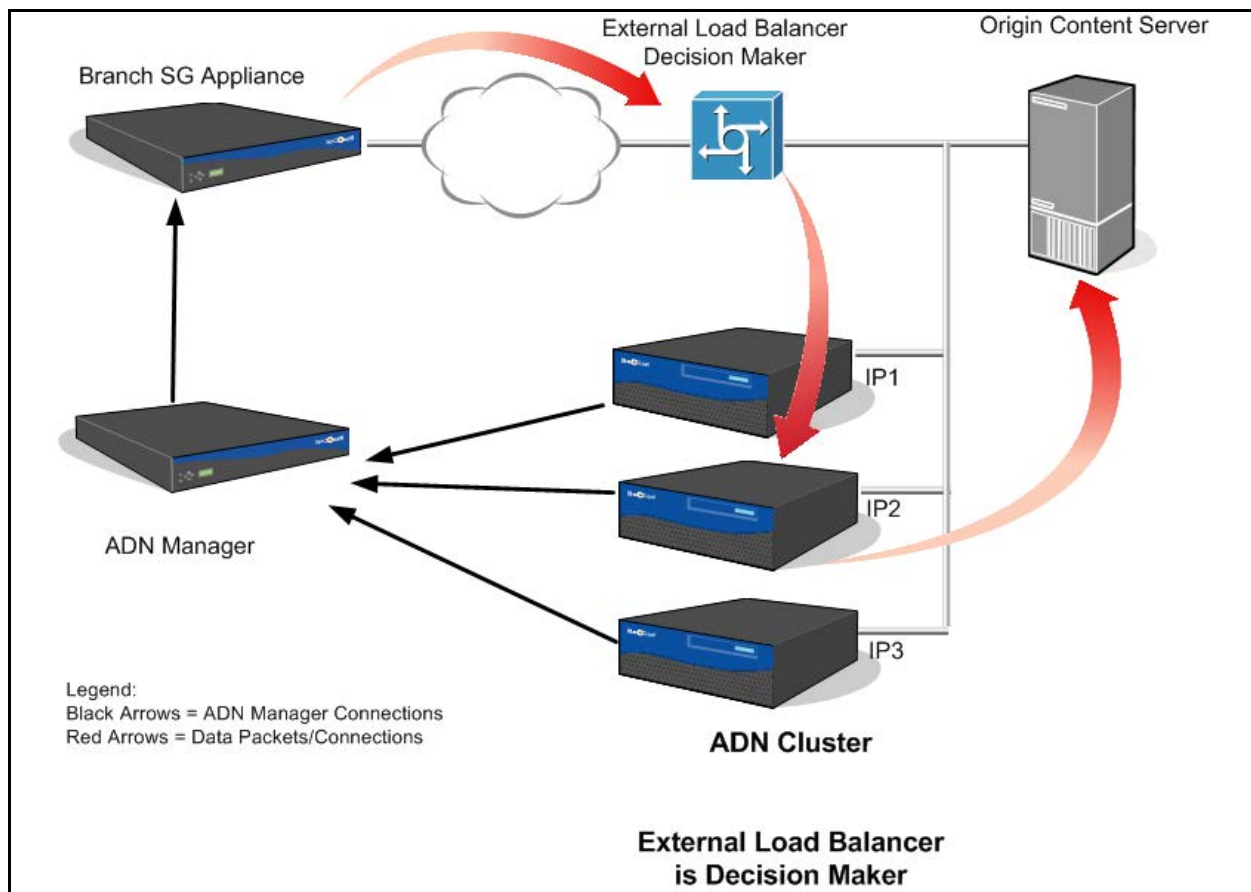
**Using an External Load Balancer**

If you use explicit deployments, you can rely upon an external load-balancer fronting a group of ADN nodes. The load balancer is configured to distribute the load among the nodes that it fronts using client/IP address affinity.

The external load balancer provides more control than the server subnet, but it requires more configuration. For example, you must create an external VIP address on the **Configuration > ADN > Tunneling > Load Balancing** tab on each system in the ADN cluster; the VIP address is explicitly advertised by the ADN manager.

Both server subnet and external load balancer use a cluster of ADN nodes for load balancing. The cluster is formed by ADN nodes that are configured to the same ADN manager and are advertising the same server subnets.

Section C: Transparent and Explicit Connection Deployments



Whether you are using server subnets or an external load balancer, you must configure server subnets. If you are using an external load balancer, you must also configure the external load balancer with a VIP address and put the address in the **Load Balancing** tab. Continue with the next procedures to configure explicit load balancing.

Explicit Load Balancing Procedures

If you want to use either the server subnet load balancing deployment or the external load balancing deployment, you must configure server subnets. If you are using the external load balancing deployment, you must also configure the external load balancer with a VIP address.

To configure server subnets:

1. Go to Select **Configuration > ADN > Routing**.
2. Click **Add**.
3. Add the IP/Subnet route to be advertised by the ADN manager; click **OK**.
4. (Optional) Repeat for additional routes.

For detailed information about configuring server subnets, see [“Managing Server Subnets and Enabling an Internet Gateway”](#) on page 26.

Section C: Transparent and Explicit Connection Deployments

To configure VIP addresses:

1. Select **Configuration > ADN > Tunneling > Load Balancing**.
2. Enter the VIP address of the external load balancer.

Note: The VIP address is added from the **Load Balancing** tab of the App Delivery Network menu, not the **Advanced** tab of the Network menu.

3. Click **Apply** to commit the changes to the SG appliance.

The address must be entered on each ADN node in the cluster.

Configuring a Combined (Transparent and Explicit) Deployment

If you set up a transparent ADN network with no explicit connections, no additional configuration is required for transparent tunnel connections to work unless you want to configure load balancing. To configure transparent load balancing, skip to [“Setting Device Security”](#) on page 32.

If you set up a combined ADN network with both explicit and transparent connections, you must:

- ❑ Configure the explicit routes you need (see [“Managing Server Subnets and Enabling an Internet Gateway”](#) on page 26).
- ❑ Configure the routing preference for each ADN node to tell ADN peers to prefer transparent connections (see [“To configure the routing preference:”](#)). The default is to always use advertised, explicit, routes.
- ❑ Set the manager listening mode to **Plain read-only** mode if SG Clients are in the network (see [“To configure ADN manager and tunnel listening mode and ports:”](#) on page 35).
- ❑ Configure transparent or explicit load balancing, if necessary. For more information, see [“Transparent Load Balancing”](#) on page 24 or [“Explicit Load Balancing”](#) on page 28.

To configure the routing preference:

1. Select **Configuration > ADN > Routing > Advanced**.

The screenshot shows a web interface with three tabs: 'Server Subnets', 'Internet Gateway', and 'Advanced'. The 'Advanced' tab is active. Below the tabs, there is a section titled 'Routing Preference' with two radio buttons. The first radio button, 'Tell ADN peers to always use advertised routes', is selected. The second radio button, 'Tell ADN peers to prefer transparent connections over advertised routes', is unselected.

2. Select the **Tell ADN peers to prefer transparent connections over advertised routes** radio button.

Section D: Securing the ADN Network

Section D: Securing the ADN Network

Depending on your environment, you might need to secure your ADN network to provide the following services:

- ❑ Host validation: Securing the ADN network allows you to be sure that the ADN peers are talking to the right devices and that the peer is authorized to join the ADN network.
- ❑ Privacy: Privacy can be an issue, especially for tunnels that carry application data. You can configure the ADN network to secure ADN routing and tunnel connections using standard SSL protocol. SSL tunnels provide authentication, message privacy, and message authenticity security services, regardless of the application traffic that is being accelerated or tunneled.
- ❑ Message authenticity: Ensure that messages sent over ADN connections are not altered. Messages include the route information sent over the routing connections and compressed application data sent over the tunnel connections.

Secure ADN implementation includes:

- ❑ Device authentication, managed through the device authentication profile.
- ❑ Securing the device, including device authentication profile selection and device ID-based peer authorization.
- ❑ Securing the connections, both inbound and outbound connection security control.
- ❑ Configuring the SSL proxy.

Note: If you only want secure routing connections to the ADN manager, an SSL license is not required. Secure tunnel connections for applications such as CIFS, MAPI, TCP Tunnel, HTTP, or HTTPS/SSL, are dependent upon an SSL license.

Configuring ADN Security Settings

For information on setting device security, continue with the next section. For information on setting connection security, continue with [“Securing Connections”](#) on page 34.

Setting Device Security

For maximum security, configure the ADN network for both device authentication and device authorization. Device authentication must be configured first.

Note: If the device being configured for authentication has Internet access, acquisition of the SG appliance certificate is automatic. If you use your own appliance certificates and profile, or if the affected device does not have Internet access, manual device authentication is required.

For information on configuring device authentication, see [Chapter 6: “Authenticating an SG Appliance”](#) on page 87.

Section D: Securing the ADN Network

After the device authentication has been set up, point the ADN manager and ADN backup manager to the profile that is being used for authentication. Then enable authorization for maximum security.

Note: You cannot enable device authorization before configuring the ADN manager and backup ADN manager. You can, however, configure the ADN manager and backup ADN manager and then, without pressing **Apply**, enable device authorization. Then press **Apply** to save both tabs.

To set device security:

1. Select **Configuration > ADN > General > Device Security**.

2. Configure the **Device Security** settings:
 - a. **Device Authentication Profile:** From the drop-down list, select the profile that you previously associated with the device authentication keyring. Note that only devices using the same profile are authenticated.
 - b. **Extracted Device ID:** The device ID that was extracted based on the selected profile is automatically displayed.

Note: The device ID is only used for security. The peer ID is the serial number.

- c. To enable authorization, select the **Validate ADN Peer Device IDs** checkbox.
 - If the primary or backup ADN manager is **Self**, the device ID is automatically displayed.
 - If the primary or backup ADN manager is a different system, click the **Retrieve Manager IDs** button to see the device ID. Click **Accept** to add the Manager device ID to the Authorization field.

Note: Authorization of devices is not complete until the devices have been approved to be part of the network. For more information on approving devices, see [“ADN Node Authorization”](#) on page 20.

Section D: Securing the ADN Network

3. Click **Apply** to commit the changes to the SG appliance.

Securing Connections

Use the Connection Security tab to set:

- ☐ Manager and Tunnel Listening Mode.
- ☐ Secure Outbound Connections.

Listening Mode Options

In secure ADN mode, you can specify that the ADN manager and tunnel use secure mode to listen for routing and tunnel requests. By default, ADN routing and tunnel connection requests are unauthenticated and all ADN protocol messaging and compressed application data are transferred in plain text.

You must enable the device authentication profile before setting any other security parameters.

After the profile is configured, the following security modes are automatically set:

- ☐ **Secure-outbound: (Secure Proxies)** Both outbound routing and secure proxy connections are secured. You can also select the radio button to:
 - Not secure ADN connections.
 - Secure only ADN routing connections.
 - Secure all ADN and routing connections.

Note: The secure-outbound feature is dependent upon an SSL license.

- ☐ **Manager-listening-mode:** (Both) Listen for requests on two ports: plain and secure. If your deployment requires a different ADN manager listening mode, you must explicitly configure it. Other options available are:
 - Secure Only.
 - Plain Only.
 - Plain Read-Only. This mode is recommended if your network uses SG clients.
- ☐ **Tunnel-listening-mode:** (Both) Listen for requests on two ports: plain and secure. Other options are:
 - Secure Only (Note that tunnel listening mode cannot be set to secure-only if SG Clients exist on the ADN network).
 - Plain Only.

Secure Outbound Connections

When secure ADN is enabled, any existing plain outbound connections are dynamically secured by activating SSL according to the `secure-outbound` setting. Determine which outbound ADN connections are secured by changing the `secure-outbound` parameter. If you select:

- ☐ **None:** Neither routing nor tunnel connections are secured. Secure proxy connections bypass ADN connections and go directly to the origin content sever.

Section D: Securing the ADN Network

- ❑ **Routing-only:** Only routing connections are secured. Secure proxy connections bypass ADN connections and go directly to the origin content sever.
- ❑ **Secure Proxies:** Routing connections and secure proxy connections are secured.
- ❑ **ALL:** All outbound connections are secured.

Note: Securing all outbound ADN connections should be done only if the platform has sufficient capacity to handle the extra overhead.

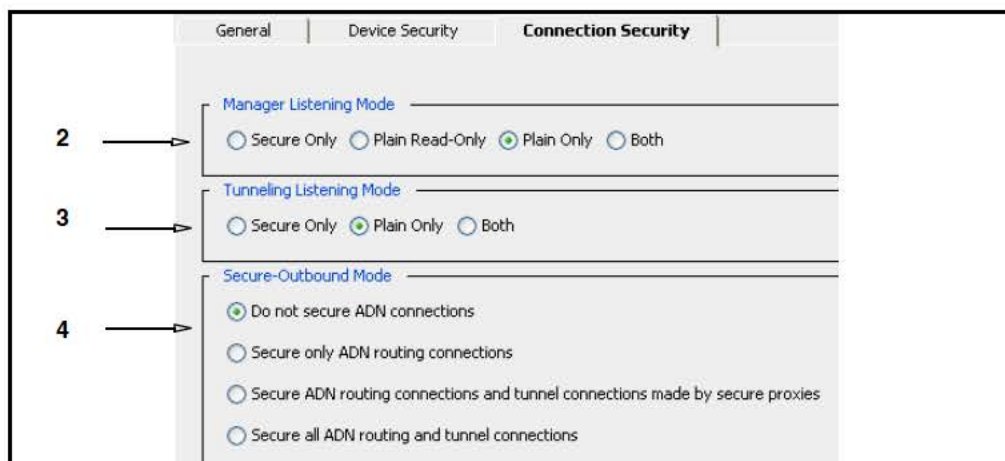
The table below describes secure outbound behavior with various applications.

Table 2-1. Secure Outbound Behavior

Secure-Outbound Setting	Routing Connections	Application Connections		
		CIFS	SSL Proxy Intercept Mode	SSL Proxy Tunnel Mode
None	Plain Text	Plain Text	Bypass ADN	Bypass ADN
Routing-only	Encrypted	Plain Text	Bypass ADN	Bypass ADN
Secure Proxies	Encrypted	Plain Text	Encrypted	Encrypted by application
All	Encrypted	Encrypted	Encrypted	Encrypted by application

To configure ADN manager and tunnel listening mode and ports:

1. Select **Configuration > ADN > General > Connection Security**.



2. To configure manager listening mode and ports:
 - To change the manager listening mode, go to **Configuration > ADN > General > Connection Security**. The default is **Plain-only** before the device authentication profile is selected. After the device authentication profile is selected, the manager listening mode switches to **Both** by default.
 - To change the manager listening ports, go to **Configuration > ADN > General > General**. The default is plain port 3034 and secure port 3036.

Section D: Securing the ADN Network

3. To configure tunnel listening mode and ports:
 - To change the tunnel listening mode, go to **Configuration > ADN > General > Connection Security**. The default is **Plain-only** before the device authentication profile is selected. After the device authentication profile is selected, the manager listening mode switches to **Both** by default.
 - To change tunnel listening ports, go to **Configuration > ADN > Tunneling > Connection**. The default is plain port 3035 and secure port 3037.

The tunnel listening port is used only if there are explicit tunnel connections to this ADN node using the non-preserve-dest-port mode.
4. Click **Apply** to commit the changes to the SG appliance.

Authorizing Devices to Join the Network

After a node is configured for authentication (device security) and peer validation is enabled on the ADN manager, the node must be accepted by the ADN manager and the backup ADN manager, if configured, before the device is allowed to join the network (authorization).

- ❑ When an ADN node comes up, it contacts the ADN manager for routing information.
- ❑ If secure-outbound is **None** on the ADN node and the ADN manager's listening mode is not secure-only, the ADN node connects to the plain manager listening port and immediately joins the ADN network.
- ❑ If the ADN node connects to the secure manager listening port, the ADN manager extracts the device ID from connecting ADN node's appliance certificate and looks for the device ID in its approved list of ADN nodes.
 - If the device is on the approved list, a **REQUEST-APPROVED** response is sent, followed by the route information, and the node joins the network.
 - If the device is not on the approved list, the ADN manager adds the connecting node's device ID to the pending-peers list and sends a **REQUEST-PENDING** response. After the peer is moved to the **Approved** list by the administrator, a **REQUEST-APPROVED** response is sent, followed by the route information, and the node joins the network.
 - If the **Pending Peers** option is not enabled and a peer is not on the approved list, the ADN manager sends a **REQUEST-DENIED** response and closes the connection. The connecting node closes the connection and updates its connection status.
 - If a peer is deleted from the approved list, the ADN manager broadcasts a **REJECT-PEER** to all nodes to delete this node and terminate any existing ADN connections to it. No new connections are routed through the deleted ADN node. To have the denied peer rejoin the ADN network, go to **ADN > Config > General > Reconnect to Managers**.

To approve a device to join the network:

Note: Device security must be enabled on all ADN peers you want to join the network before you complete this procedure on the ADN manager and backup ADN manager. For more information, see [“Setting Device Security”](#) on page 32.

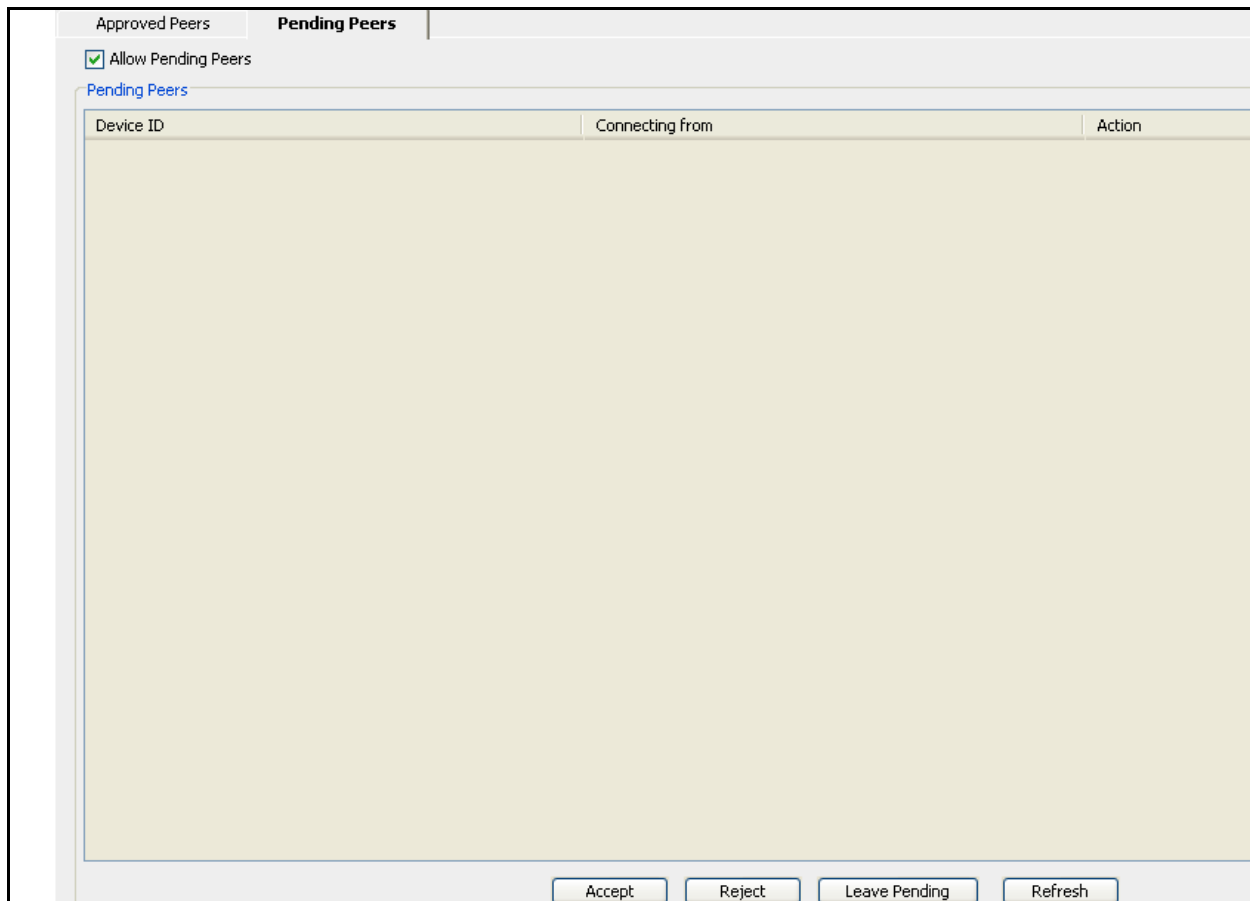
Section D: Securing the ADN Network

1. Go to **Configuration > ADN > Manager > Approved Peers**.
2. To manage peers that you want to be approved to join the network or that have previously been approved to join the network:
 - Add peers to the list by selecting **Add**; a dialog box displays that allows you to enter one or a group of peers by listing one to a line. Click **OK** when through. If the device contacts the ADN manager and is on the approved list, a `REQUEST-APPROVED` response is sent, followed by the route information, and the node joins the network.
 - Remove peers by highlighting the peer or peers and selecting **Remove**. If a peer is deleted from the approved list, the ADN manager broadcasts a `REJECT-PEER` to all nodes to delete this node and terminate any existing ADN connections to it. No new connections are routed through the deleted ADN node.
3. Click **Apply** to commit the changes to the SG appliance.

To manage devices not yet approved to join the network:

If a peer is configured to contact the ADN manager on startup but has not been added to the approved list, the ADN manager adds the peer to the list of pending peers if the **Allow Pending Peers** checkbox is selected. The peer moves from the Pending Peers list to the Approved Peers list only through human action.

1. Go to **Configuration > ADN > Manager > Pending Peers**.



Section D: Securing the ADN Network

2. Select the **Allow Pending Peers** checkbox.
3. To manage pending peers:
 - Highlight a peer and click **Accept** or **Reject**; alternatively, you can select or reject all peers in the list by clicking **Accept All** or **Reject All**. If accepted, the peer moves to the **Approved** list; if not, it is dropped from the **Pending Peers** list.
 - You can also leave peers in the pending list by not selecting them or selecting them and clicking **Leave Pending**.
4. Click **Apply** to commit the changes to the SG appliance.

Approved/Pending Notes

- ❑ Approved lists on the primary and backup ADN managers are not automatically kept in sync. You must approve peers on both the primary and backup ADN managers.

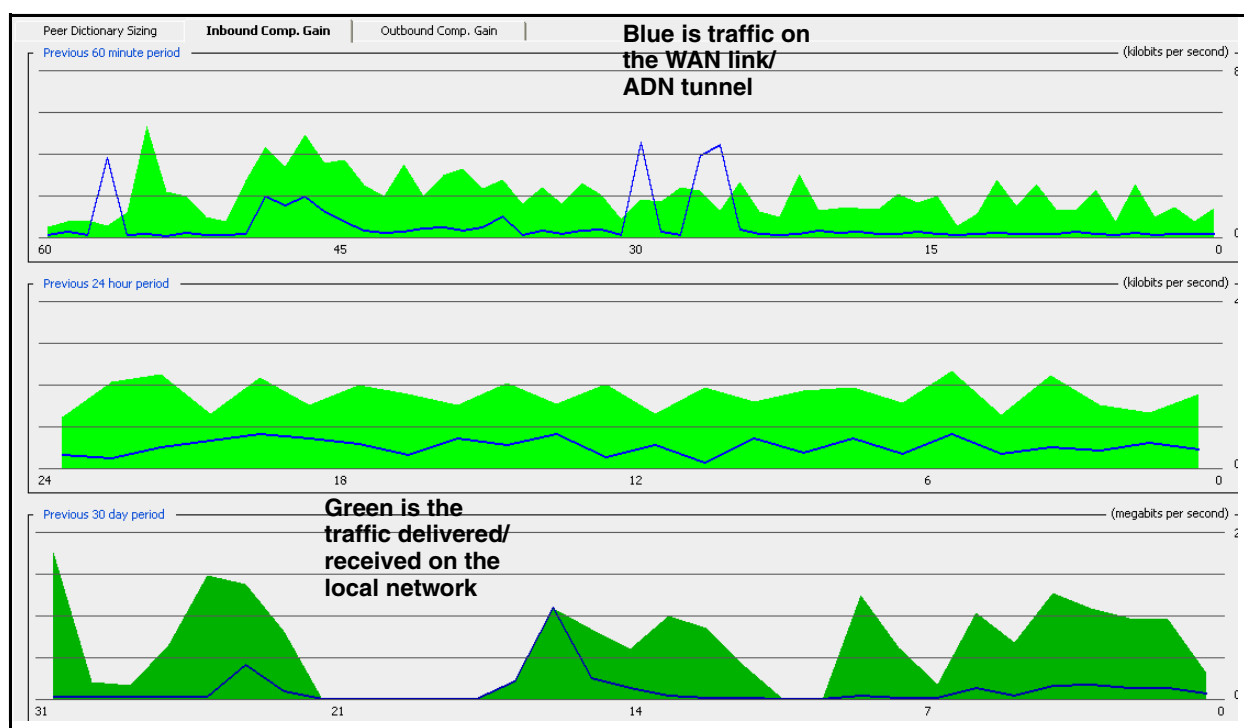
Section E: ADN Network History, Statistics, and Health Metrics

After ADN optimization has been enabled and is processing, you can review byte caching history and various byte caching statistics.

Reviewing ADN History

Review the Traffic Mix and Traffic History tabs in **Statistics** to be sure that ADN is working. For more information on Traffic Mix and Traffic History, refer to the statistics information in *Volume 9: Managing the Blue Coat SG Appliance*.

To review ADN history, select **Statistics > ADN History**.



Inbound Compression Gain represents traffic received from another peer. **Outbound Compression Gain** represents the traffic sent to other peers.

The values include both compression and byte-cache gain.

Reviewing Byte-Caching Statistics

To review byte caching statistics, select **Statistics > Advanced** and select the **ADN** link from the list.

Per connection real time statistics are provided. Each connection has the following details:

- ❑ Client IP address/port.
- ❑ Server IP address/port.
- ❑ Bytes received from the application: The total bytes received from the client/server/application proxy.

Section E: ADN Network History, Statistics, and Health Metrics

- ❑ Bytes sent to the application: The total bytes sent to the client/server/application proxy.
- ❑ Bytes received from the peer SG appliance: The bytes received on the ADN tunnel connection from the peer at the other end of the WAN link. (This is compressed unless byte caching is disabled).
- ❑ Bytes sent to the peer SG appliance: The bytes sent on the ADN tunnel connection to the peer at the other end of the WAN Link. (This is compressed unless byte caching is disabled).
- ❑ Duration: The lifetime of this connection.

Reviewing ADN Health Metrics

You can see the state of the ADN network, specifically the ADN node, by checking the **Statistics > Health > General** tab.

The status can have the values as shown in the following table. The information is meant for diagnostic and debugging purposes.

Section E: ADN Network History, Statistics, and Health Metrics

Table 2-2. Connectivity to ADN Routing Manager Health Metric

Status	Message	Description	State
ADN Health Status	Connected	The ADN node is connected to the ADN manager, ready to receive any route/peer updates. If a backup manager exists, this state indicates the node is connected to both Managers.	OK
	Functionality Disabled	ADN functionality is not enabled.	OK
	Not operational	ADN functionality is not operational yet — components are starting up or shutting down.	OK
	Connection Approved	The ADN node has been approved to connect to the ADN manager.	OK
	Connecting	The ADN node is in process of connecting to ADN manager.	OK
	Partially Connected	The ADN node is connected to one ADN manager but not the other.	Warning
	Mismatching Approval Status	The ADN node is approved by the current active ADN manager but is rejected by the backup manager. This warning only exists if a backup ADN manager is configured.	Warning
	Approval Pending	The ADN node is awaiting a decision from the active ADN manager for the node's request to join the ADN network.	Warning
	Disconnected	The ADN node is not connected to the ADN manager and cannot receive route/peer information. If a backup manager is configured, this state indicates the node is disconnected from both manager nodes.	Critical
	Connection Denied	The ADN node is rejected by the ADN managers in the node's request to join the ADN network.	Critical
ADN Manager Status	Not an ADN manager	The ADN node is not an ADN manager.	OK
	No Approvals Pending	All ADN nodes that are requesting to join the network are already on the approved list.	OK
	Approvals Pending	ADN nodes are requesting to join the network. The approvals are made by the administrator.	Warning

Section F: Advanced Tunnel Optimization

Section F: Advanced Tunnel Optimization

Tunnel connections are between the branch and concentrator proxies and are made on demand. To reduce connection startup latency, tunnel connections are pooled and reused.

If a route is present, proxies that support ADN optimization use an ADN tunnel connection. Data traveling over the tunnel connection is subject to byte caching, compression, and encryption, per the defined policies.

The tunnel connection occurs independently of the ADN optimization options chosen for that connection. These options can be configured for specific services and can also be modified in policy.

Note: Encryption options cannot be set through policy.

Optimization options include byte caching and gzip compression; byte caching and gzip compression can be controlled separately for inbound and outbound traffic on the WAN.

By default, ADN routing and tunnel connection requests are unauthenticated and all ADN protocol messaging and compressed application data are transferred in plaintext. For maximum security, you can configure the ADN network to secure ADN routing and tunnel connections using standard SSL protocol, which provides authentication, message privacy, and message authenticity security services, regardless of the application traffic that is being accelerated or tunneled.

For information on securing the network, see [Section D: "Securing the ADN Network"](#) on page 32.

Setting Advanced Tunneling Parameters

The tunneling parameters you set determine the behavior when you have special environmental needs where the default parameters are not adequate. These parameters generally do not need to be changed. Parameters that can be changed include:

- ❑ Connection Settings (see ["To configure ADN manager and tunnel listening mode and ports:"](#) on page 35).
- ❑ Network Settings (see ["To configure network tunneling settings:"](#)).
- ❑ Load Balancing Settings (see ["Transparent Load Balancing"](#) on page 24 and ["Explicit Load Balancing"](#) on page 28).
- ❑ Proxy Processing Settings (see ["To change parameters for proxy processing:"](#) on page 43).

To configure network tunneling settings:

1. Select **Configuration > ADN > Tunneling > Network**.

Section F: Advanced Tunnel Optimization

The screenshot shows the 'Network' tab in a configuration interface. Under the 'Reflect Client IP' section, there are three radio button options: 'Reject the request', 'Allow the request and reflect the client IP', and 'Allow the request but connect using a local IP'. The third option is selected. Below this, in the 'TCP Settings' section, the 'ADN Tunnel TCP Window Size' is set to 655360.

2. Determine the behavior of the concentrator proxy when a branch proxy requests client IP reflection (sending the client's IP address instead of the SG appliance IP address to the upstream server).

This setting is based on whether the concentrator was installed in-line. If the concentrator proxy is in-line and can do IP reflection, you can allow client IP address reflection requests from clients. If not, set this option to either **Reject the Request** or **Allow the request but connect using a local IP** to accept the requests but ignore the client IP address and use a local IP address.

3. In the **TCP Settings** panel, enter the TCP window size to be used on ADN optimization tunnel connections. This setting only needs to be changed for high bandwidth and high delay environments, such as satellite links. The range is between 8 KB and 4 MB (8192 to 4194304), depending on your bandwidth and the round-trip delay.

Note: If you know the bandwidth and roundtrip delay, you can compute the value to use as, roughly, $2 * \text{bandwidth} * \text{delay}$. For example, if the bandwidth of the link is 8 Mbits/sec and the round-trip delay is 0.75 seconds:

$$\text{window} = 2 * 8 \text{ Mbits/sec} * 0.75 \text{ sec} = 12 \text{ Mbits} = 1.5 \text{ Mbytes}$$

The setting in this example would be 1500000 bytes. This number goes up as either bandwidth or delay increases, and goes down as they decrease.

You can increase the window size based on this calculation but do not decrease the window size if the result is less than 64K.

The window-size setting is a maximum value; the normal TCP/IP behaviors adjust downward as necessary. Setting the window size to a lower value might result in an artificially low throughput.

4. Click **Apply** to commit the changes to the SG appliance.

To change parameters for proxy processing:

1. Select **Configuration > ADN > Tunneling > Proxy Processing**.

The screenshot shows the 'Proxy Processing' tab in a configuration interface. It contains a section titled 'Proxy Processing' with the text 'Enable proxy processing for incoming ADN tunnel connections for the following protocol:'. Below this, there is a checkbox labeled 'HTTP' which is currently unchecked.

Section F: Advanced Tunnel Optimization

2. (Optional) If the concentrator is required to perform HTTP proxy processing on requests arriving over an ADN tunnel, select **HTTP**. For most deployments, this is not needed. All proxy processing always happens at the branch proxy; generally speaking, the concentrator proxy just compresses and decompresses bytes and forwards them to and from the server. If this setting is enabled, proxy processing happens at both the branch and concentrator.

Note: If you enable this setting, do not duplicate any of the policy that exists at the branch, since the branch settings still apply. Depending on the policy involved, doing the processing twice can cause problems (such as doing URL rewrite multiple times) or it might just be unnecessary, taking up valuable resources.

3. Click **Apply** to commit the changes to the SG appliance.

Section G: Manually Re-Sizing a Byte-Cache Dictionary

Section G: Manually Re-Sizing a Byte-Cache Dictionary

The size of a byte-cache dictionary is dynamically based on the amount of traffic between two peers. Generally, the dynamic settings are acceptable; you do not need to change the dictionary size. Only if you determine that the algorithm performance does not guarantee a sufficient dictionary size for a specific peer should you manually set the dictionary size.

The byte cache itself, consisting of all data seen on the network, is stored on disk. However, byte caching stores index data in RAM. You cannot change the amount of memory allocated for a peer, but you can manually set the amount of disk space to be set aside. The amount of memory set aside is based on the disk space.

A table of peer rankings and dictionary sizes is created and maintained by the SG appliance. Peers are allocated dictionary space in order starting with the highest ranking peer in the table until each peer has been allocated resources, or maximum available amount of byte cache memory is reached.

Note: The rank table can track peers that are using SGOS 5.1.3, but these peers cannot dynamically re-size or delete their dictionary.

After the maximum available resources are reached, any peers that have not been allocated a dictionary cannot use byte caching. If those peers have existing dictionaries, the tunnels are downgraded to gzip compression only and the existing dictionary is deleted.

A node can re-negotiate a new shared dictionary size with one of its peers, and the dictionaries grow or shrink to their new resource levels. The final shared dictionary sizes between two peers is the minimum dictionary size that each peer tries to negotiate. To guarantee a minimum dictionary size, the value should be set on both peers. (See [“To manually resize byte cache dictionaries from the Statistics tab:”](#) on page 46.)

When a peer joins the network, it is added to the peer ranking table. How much dictionary space the peer is allocated depends:

- ❑ If the maximum amount of resources have already been reached, the new peer can do gzip compression only.
- ❑ If the maximum amount of resources have not been reached:
 - If no history exists for this peer, then the peer negotiates a default dictionary size based on its maximum memory and maximum disk space.
 - If history does exist for the peer and the peer's rank guarantees the peer a dictionary, the peer is allocated a dictionary based on that history.

The peer ranking table is persistent across system reboots; the dictionaries themselves are re-sized upon any of the following conditions:

- ❑ System restart.
- ❑ A full dictionary.
- ❑ If the dictionary size is set manually.

The re-ranking allows potentially unused dictionaries to be identified and removed, freeing resources.

Section G: Manually Re-Sizing a Byte-Cache Dictionary

You can manually resize an ADN byte-caching dictionary in two places in the Blue Coat appliance Management Console: From the **Statistics > ADN History > Peer Dictionary Sizing** tab, or from the **Configuration > ADN > Byte Caching** tab. You might find the Statistics tab easier to use, since you are not required to know the peer ID. Note, however, that only peers that are online are displayed in the **Statistics** tab. If a peer is offline, **Configuration > ADN > Byte Caching** can be used to configure manual dictionary size for any ADN peer.

To manually resize byte cache dictionaries from the Statistics tab, continue with the next section. To manually resize byte cache dictionaries from the ADN tab, skip to [“To manually resize byte cache dictionaries from the Configuration > ADN > Byte Caching tab:”](#) on page 47.

To manually resize byte cache dictionaries from the Statistics tab:

1. Select **Statistics > ADN History > Peer Dictionary Sizing**.

Peer Dictionary Sizing

Inbound Comp. Gain

Outbound Comp. Gain

Byte Cache Effectiveness

Rank ▲	Peer ID	Peer IP	Byte Cache Score	Peer Traffic (GB/Day)	Fill Rate (GB/Day)	Recommended Dict Size (GB)	Actual Dict Size (GB)
1	505060069	10.2.11.199	0	0.0000	0.0000	23.7953	23.7953
2	505060030	10.254.2.200	0	0.0000	0.0000	23.7953	23.7953
3	505060007	10.254.10.113	0	0.0000	0.0000	23.7953	23.7953
4	3405070047	10.254.2.158	0	0.0006	0.0000	0.0005	0.0977 (Peer)
5	1705060004	10.254.0.70	0	0.0000	0.0000	23.7953	23.7953
6	2406060150	10.254.5.130	0	0.0000	0.0000	23.7953	23.7953
7	2406060189	10.90.1.214	1	0.0020	0.0008	0.0116	0.0977 (Peer)
8	3105060067	192.168.1.254	1	0.0013	0.0001	0.0010	0.0977 (Peer)
9	1406060077	192.168.0.254	2	0.0045	0.0020	0.0277	0.0977 (Peer)
10	506060035	10.96.1.220	4	0.0115	0.0067	0.0939	0.0977 (Peer)
11	3406060044	10.254.3.100	7	0.0177	0.0104	0.1463	0.1455 (Peer)
12	3105060048	10.254.0.162	15	0.0222	0.0067	0.0935	0.0977 (Peer)
13	5105060019	10.254.2.163	16	0.0200	0.0037	0.0512	0.0977 (Peer)
14	3105060047	10.254.3.34	16	0.0882	0.0719	1.0059	1.0059 (Peer)
15	1406060030	10.254.4.2	17	0.0245	0.0072	0.1010	0.1010
16	505060004	10.254.5.66	31	0.0335	0.0023	0.0316	0.0977 (Peer)
17	4105060022	10.254.2.66	42	0.0441	0.0031	0.0429	0.0977 (Peer)
18	3505060034	10.254.1.174	45	0.0529	0.0089	0.1240	0.1230 (Peer)
19	707060014	10.254.0.70	66	0.0669	0.0019	0.0265	0.0977 (Peer)
20	5105060021	10.254.5.40	102	0.1040	0.0043	0.0599	0.0977 (Peer)

Edit

2. The Peer Dictionary Sizing tab gives you statistics relevant to the byte cache dictionary size of all peers on the network.
 - **Rank:** The value of a peer's dictionary. Manually-configured peers have a higher rank than dynamically-configured peers.
 - **Peer ID:** The serial number of the device.
 - **Peer IP:** The IP address of the device.
 - **Byte Cache Score:** The score of this peer relative to other peers. Score is based on the value of the dictionary and is used to determine rank.
 - **Peer Traffic (GB/Day):** The average amount of pre-byte-cache traffic per day.
 - **Fill Rate (GB/Day):** The average amount of data put into the dictionary per day over the last week.

Section G: Manually Re-Sizing a Byte-Cache Dictionary

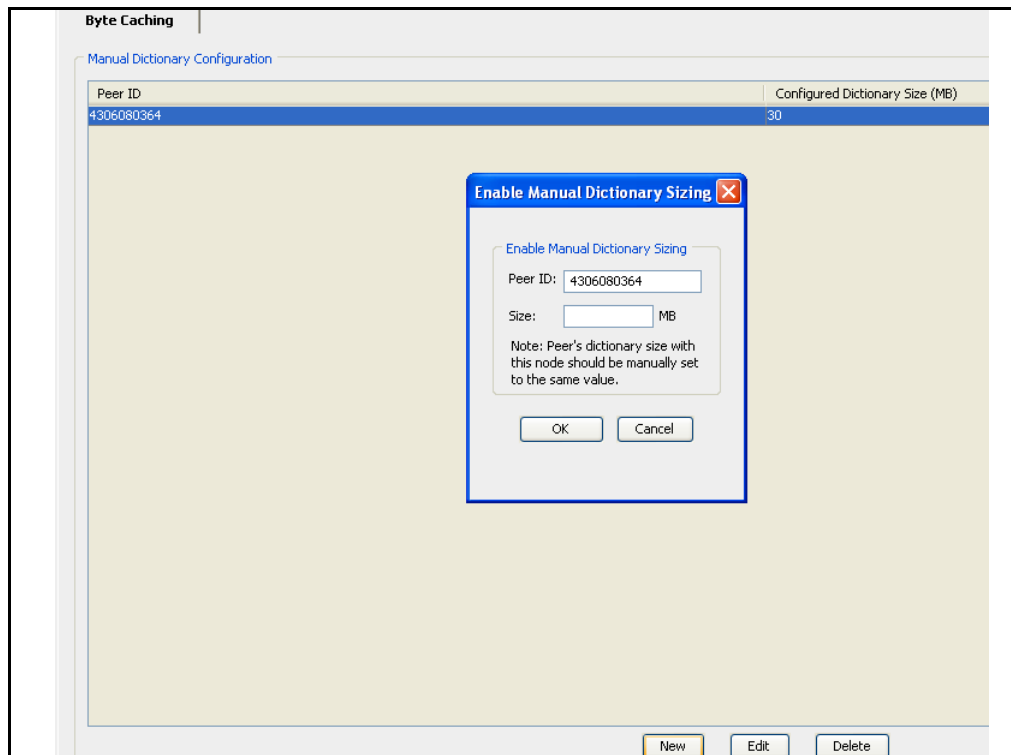
- **Recommended Dict Size (GB):** The dictionary size the Blue Coat appliance recommends, based on the peer traffic over the last week.
- **Actual Dict Size (GB):** The actual size of the dictionary.

Click anywhere on the line of the device whose dictionary you want to re-size. The **Edit Peer** dialog displays.

3. To select a dictionary size for the device, select the **Manual Re-size** radio button and enter the value you want in megabytes.
4. Click **OK** to have the resizing take effect immediately

To manually resize byte cache dictionaries from the Configuration > ADN > Byte Caching tab:

1. Select **Configuration > ADN > Byte Caching**.



2. Click **New**. The **Enable Manual Dictionary Sizing** dialog displays.
3. Enter the peer ID (serial number) of the device with whom you are sharing a dictionary.
4. Enter the new value in megabytes.
5. Click **OK**. The peer is added to the manually configured dictionary sizing list and is ranked at the top of the dictionary byte cache table.

Dynamic dictionary sizing is re-enabled through highlighting the peer and selecting **Delete**.

Section H: Related CLI Syntax to Configure an ADN Network

- ❑ To enter configuration mode:

```
SGOS#(config) adn
SGOS#(config adn)
```

Note: For detailed information on using these commands, refer to *Volume 11: Command Line Reference*.

- ❑ The following subcommands are available:

```
SGOS#(config adn) {enable | disable}
SGOS#(config adn) exit
SGOS#(config adn) byte-cache
    SGOS#(config adn byte-cache) peer-size peer-id {size_in_megabytes | auto}
    SGOS#(config adn byte-cache) exit
    SGOS#(config adn byte-cache) view
SGOS#(config adn) load-balancing
    SGOS#(config adn load-balancing) {enable | disable}
    SGOS#(config adn load-balancing) exit
    SGOS#(config adn load-balancing) external-vip IP_address
    SGOS#(config adn load-balancing) group group_name
    SGOS#(config adn load-balancing) load-balance-only {enable | disable}
    SGOS#(config adn load-balancing) no {external-vip | group}
    SGOS#(config adn load-balancing) view
SGOS#(config adn) manager
    SGOS#(config adn manager) backup-manager {IP_address [ID] | self}
    SGOS#(config adn manager) exit
    SGOS#(config adn manager) no {backup-manager | primary-manager}
    SGOS#(config adn manager) port port_number
    SGOS#(config adn manager) primary-manager {IP_address [ID] | self}
    SGOS#(config adn manager) secure-port secure_port_number
    SGOS#(config adn manager) view [approved-peers | backup-manager-id | pending-peers | primary-manager-id]
    SGOS#(config adn manager) approved-peers
        SGOS#(config adn approved-peers) add peer-device-ID
        SGOS#(config adn approved-peers) exit
        SGOS#(config adn approved-peers) remove peer-device-ID
        SGOS#(config adn approved-peers) view
    SGOS#(config adn manager) pending-peers
        SGOS#(config adn pending-peers) {accept | reject}
        SGOS#(config adn pending-peers) {enable | disable}
        SGOS#(config adn pending-peers) exit
        SGOS#(config adn pending-peers) view
SGOS#(config adn) routing
    SGOS#(config adn routing) exit
    SGOS#(config adn routing) prefer-transparent {enable | disable}
    SGOS#(config adn routing) view
    SGOS#(config adn routing) advertise-internet-gateway
```


Section H: Related CLI Syntax to Configure an ADN Network

```

SGOS#(config adn routing advertise-internet-gateway) {disable | enable}
SGOS#(config adn routing advertise-internet-gateway) exempt-subnet {add {subnet_prefix[/prefix_length]} clear-all | remove {subnet_prefix[/prefix_length]} | view}
SGOS#(config adn routing advertise-internet-gateway) exit
SGOS#(config adn routing advertise-internet-gateway) view

SGOS#(config adn routing) server-subnets
SGOS#(config adn routing server-subnets) add subnet_prefix [/prefix length]
SGOS#(config adn routing server-subnets) clear-all
SGOS#(config adn routing server-subnets) remove subnet_prefix [/prefix length]
SGOS#(config adn routing server-subnets) exit
SGOS#(config adn routing server-subnets) view

SGOS#(config adn) security
SGOS#(config adn security) authorization {enable | disable}
SGOS#(config adn security) device-auth-profile profile_name [no-authorization]
SGOS#(config adn security) exit
SGOS#(config adn security) manager-listening-mode {plain-only | plain-read-only | secure-only | both}
SGOS#(config adn security) no device-auth-profile
SGOS#(config adn security) secure-outbound {none | routing-only | secure-proxies | all}
SGOS#(config adn security) tunnel-listening-mode {plain-only | secure-only | both}
SGOS#(config adn security) view

SGOS#(config adn) tunnel
SGOS#(config adn tunnel) connect-transparent {enable | disable}
SGOS#(config adn tunnel) exit
SGOS#(config adn tunnel) preserve-dest-port {enable | disable}
SGOS#(config adn tunnel) port port_number
SGOS#(config adn tunnel) proxy-processing http {enable | disable}
SGOS#(config adn tunnel) reflect-client-ip (deny | allow | use-local-ip)
SGOS#(config adn tunnel) secure-port secure_port_number
SGOS#(config adn tunnel) tcp-window-size window_size
SGOS#(config adn tunnel) view

```

Section I: Policy

Section I: Policy

The following gestures can be used for WAN optimization from either the VPM or CPL.

Note: For more information on using the VPM or CPL to configure policy, refer to *Volume 6: VPM and Advanced Policy* or *Volume 10: Content Policy Language Guide*.

- ❑ `adn.server(yes | no)` (Note that this property overrides all other routing and intercept decisions made by ADN based on configuration and routing information.)
- ❑ `adn.server.optimize(yes | no)`
- ❑ `adn.server.optimize.inbound(yes | no)`
- ❑ `adn.server.optimize.outbound(yes | no)`
- ❑ `adn.server.optimize.byte-cache(yes | no)`
- ❑ `adn.server.optimize.inbound.byte-cache(yes | no)`
- ❑ `adn.server.optimize.outbound.byte-cache(yes | no)`
- ❑ `adn.server.optimize.compress(yes | no)`
- ❑ `adn.server.optimize.inbound.compress(yes | no)`
- ❑ `adn.server.optimize.outbound.compress(yes | no)`
- ❑ `adn.server.dscp`

Chapter 3: Attack Detection

The SGOS software can reduce the effects of distributed denial of service (DDoS) attacks and port scanning, two of the most common virus infections.

A DDoS attack occurs when a pool of machines that have been infected with a DDoS-type of virus attack a specific Web site. As the attack progresses, the target host shows decreased responsiveness and often stops responding. Legitimate HTTP traffic is unable to proceed because the infected system is waiting for a response from the target host.

Port scanning involves viruses attempting to self-propagate to other machines by arbitrarily attempting to connect to other hosts on the Internet. If the randomly selected host is unavailable or behind a firewall or does not exist, the infected system continues to wait for a response, thus denying legitimate HTTP traffic.

The SG appliance prevents attacks by limiting the number of simultaneous TCP connections from each client IP address and either does not respond to connection attempts from a client already at this limit or resets the connection. It also limits connections to servers known to be overloaded.

You can configure attack detection for both clients and servers or server groups, such as <http://www.bluecoat.com>. The *client* attack-detection configuration is used to control the behavior of virus-infected machines behind the SG appliance. The *server* attack-detection configuration is used when an administrator knows ahead of time that a virus is set to attack a specific host.

This feature is only available through the CLI. You cannot use the Management Console to enable attack detection.

This section discusses:

- ❑ “Configuring Attack-Detection Mode for the Client” on page 53
- ❑ “Configuring Attack-Detection Mode for a Server or Server Group” on page 57

Configuring Attack-Detection Mode for the Client

To enter attack-detection mode for the client:

From the (config) prompt, enter the following commands:

```
SGOS#(config) attack-detection  
SGOS#(config attack-detection) client
```

The prompt changes to:

```
SGOS#(config client)
```

Changing Global Settings

The following defaults are global settings, used if a client does not have specific limits set. They do not need to be changed for each IP address/subnet if they already suit your environment:

- ❑ client limits enabled: true
- ❑ client interval: 20 minutes

- ❑ block-action: drop (for each client)
- ❑ connection-limit: 100 (for each client)
- ❑ failure-limit: 50 (for each client)
- ❑ unblock-time: unlimited
- ❑ warning-limit: 10 (for each client)

To change the global defaults:

Remember that enable/disable limits and interval affect all clients. The values cannot be changed for individual clients. Other limits can be modified on a per-client basis.

Note: If you edit an existing client's limits to a smaller value, the new value only applies to new connections to that client. For example, if the old value was 10 simultaneous connections and the new value is 5, existing connections above 5 are not dropped.

```
SGOS#(config client) enable-limits | disable-limits
SGOS#(config client) interval minutes
SGOS#(config client) block ip_address [minutes] | unblock ip_address
SGOS#(config client) default block-action drop | send-tcp-rst
SGOS#(config client) default connection-limit
integer_between_1_and_65535
SGOS#(config client) default failure-limit integer_between_1_and_500
SGOS#(config client) default unblock-time minutes_between_10_and_1440
SGOS#(config client) default warning-limit integer_between_1_and_100
```

Table 3-1. Changing Global Defaults

enable-limits disable-limits		Toggles between enabled and disabled. The default is disabled. This is a global setting and cannot be modified for individual clients.
interval	integer	Indicates the amount of time, in multiples of 10 minutes, that client activity is monitored. The default is 20. This is a global setting and cannot be modified for individual clients.
block unblock	<i>ip_address</i> [<i>minutes</i>]	Blocks a specific IP address for the number of minutes listed. If the optional <i>minutes</i> argument is omitted, the client is blocked until explicitly unblocked. Unblock releases a specific IP address.
default block- action	<i>drop</i> <i>send- tcp-rst</i>	Indicates the behavior when clients are at the maximum number of connections or exceed the warning limit: drop the connections that are over the limit or send TCP RST for connections over the limit. The default is drop. This limit can be modified on a per-client basis.
default connection-limit	integer	Indicates the number of simultaneous connections between 1 and 65535. The default is 100. This limit can be modified on a per-client basis.
default failure- limit	integer	Indicates the maximum number of failed requests a client is allowed before the proxy starts issuing warnings. Default is 50. This limit can be modified on a per-client basis.

Table 3-1. Changing Global Defaults (Continued)

default unblock-time	<i>minutes</i>	Indicates the amount of time a client is blocked at the network level when the client-warning-limit is exceeded. Time must be a multiple of 10 minutes, up to a maximum of 1440. By default, the client is blocked until explicitly unblocked. This limit can be modified on a per-client basis.
default warning-limit	<i>integer</i>	Indicates the number of warnings sent to the client before the client is blocked at the network level and the administrator is notified. The default is 10; the maximum is 100. This limit can be modified on a per-client basis.

To create and edit a client IP address:

Client attack-detection configuration is used to control the behavior of virus-infected machines behind the SG appliance.

1. Verify the system is in the attack-detection client submode.

```
SGOS#(config) attack-detection
SGOS#(config attack-detection) client
SGOS#(config client)
```

2. Create a client.

```
SGOS#(config client) create client ip_address or ip_and_length
```

3. Move to edit client submode.

```
SGOS#(config client) edit client_ip_address
```

The prompt changes to:

```
SGOS#(config client ip_address)
```

4. Change the client limits as necessary.

```
SGOS#(config client ip_address) block-action drop | send-tcp-rst
SGOS#(config client ip_address) connection-limit
integer_between_1_and_65535
SGOS#(config client ip_address) failure-limit
integer_between_1_and_65535
SGOS#(config client ip_address) unblock-time minutes
SGOS#(config client ip_address) warning-limit
integer_between_1_and_65535
```

Table 3-2. Changing the Client Limits

block-action	drop send-tcp-rst	Indicates the behavior when the client is at the maximum number of connections: drop the connections that are over the limit or send TCP RST for the connection over the limit. The default is drop.
connection-limit	<i>integer</i>	Indicates the number of simultaneous connections between 1 and 65535. The default is 100.
failure-limit	<i>integer</i>	Indicates the behavior when the specified client is at the maximum number of connections: drop the connections that are over the limit or send TCP RST for the connection over the limit. The default is 50.

Table 3-2. Changing the Client Limits (Continued)

unlock-time	<i>minutes</i>	Indicates the amount of time a client is locked out at the network level when the client-warning-limit is exceeded. Time must be a multiple of 10 minutes, up to a maximum of 1440. By default, the client is blocked until explicitly unblocked.
warning-limit	<i>integer</i>	Indicates the number of warnings sent to the client before the client is locked out at the network level and the administrator is notified. The default is 10; the maximum is 100.

To view the specified client configuration:

Enter the following command from the edit client submode:

```
SGOS#(config client ip_address) view
Client limits for 10.25.36.47:
Client connection limit:      700
Client failure limit:         50
Client warning limit:         10
Blocked client action:        Drop
Client connection unblock time: unlimited
```

To view the configuration for all clients:

1. Exit from the edit client submode:

```
SGOS#(config client ip_address) exit
```

2. Use the following syntax to view the client configuration:

```
view {<Enter> | blocked | connections | statistics}
```

To view all settings:

```
SGOS#(config client) view <Enter>
Client limits enabled:      true
Client interval:            20 minutes

Default client limits:
Client connection limit:    100
Client failure limit:       50
Client warning limit:       10
Blocked client action:      Drop
Client connection unblock time: unlimited

Client limits for 10.25.36.47:
Client connection limit:    700
Client failure limit:       50
Client warning limit:       10
Blocked client action:      Drop
Client connection unblock time: unlimited
```

To view the number of simultaneous connections to the SG appliance:

```
SGOS#(config client) view connections
Client IP      Connection Count
127.0.0.1      1
10.9.16.112    1
10.2.11.133    1
```


To view the number of blocked clients:

```
SGOS#(config client) view blocked
Client                Unblock time
10.11.12.13           2004-07-09 22:03:06+00:00UTC
10.9.44.73            Never
```

To view client statistics:

```
SGOS#(config client) view statistics
Client IP             Failure Count    Warning Count
10.9.44.72            1                      0
```

To disable attack-detection mode for all clients:

```
SGOS#(config client) disable-limits
```

Configuring Attack-Detection Mode for a Server or Server Group

Server attack-detection configuration is used when an administrator knows ahead of time that a virus is set to attack a specific host.

You can create, edit, or delete a server. A server must be created before it can be edited. You can treat the server as an individual host or you can add other servers, creating a server group. All servers in the group have the same attack-detection parameters, meaning that if any server in the group gets the maximum number of simultaneous requests, all servers in the group are blocked.

You must create a server group before you can make changes to the configuration.

To create a server or server group:

1. At the (config) prompt:

```
SGOS#(config) attack-detection
SGOS#(config attack-detection) server
```

The prompt changes to:

```
SGOS#(config server)
```

2. Create the first host in a server group, using the fully qualified domain name:

```
SGOS#(config server) create hostname
```

To edit a server or server group:

At the (config server) prompt:

```
SGOS#(config server) edit hostname
```

The prompt changes to (config server hostname).

```
SGOS#(config server hostname) {add | remove} hostname
```

```
SGOS#(config server hostname) request-limit integer_from_1_to_65535
```

where:

<i>hostname</i>		The name of a previously created server or server group. When adding a hostname to the group, the hostname does not have to be created. The host that was added when creating the group cannot be removed.
add remove	<i>hostname</i>	Adds or removes a server from this server group.

request-limit	<i>integer</i>	Indicates the number of simultaneous requests allowed from this server or server group. The default is 1000.
---------------	----------------	--

To view the server or server group configuration:

```
SGOS#(config server hostname) view
Server limits for hostname:
Request limit:                  1500
```

Chapter 4: TCP Connection Forwarding

This chapter describes how to configure the SG appliance to join peer clusters that process requests in asymmetrically routed networks.

About Asymmetric Routing Environments

It is common in larger enterprises to have multiple SG appliances residing on different network segments; for example, the enterprise receives Internet connectivity from more than one ISP. If IP spoofing is enabled, connection errors can occur because the SG appliance terminates client connections and makes a new outbound connection (with the source IP address of the client) to the server. The response might not return to the originating SG appliance, as illustrated in the following diagram.

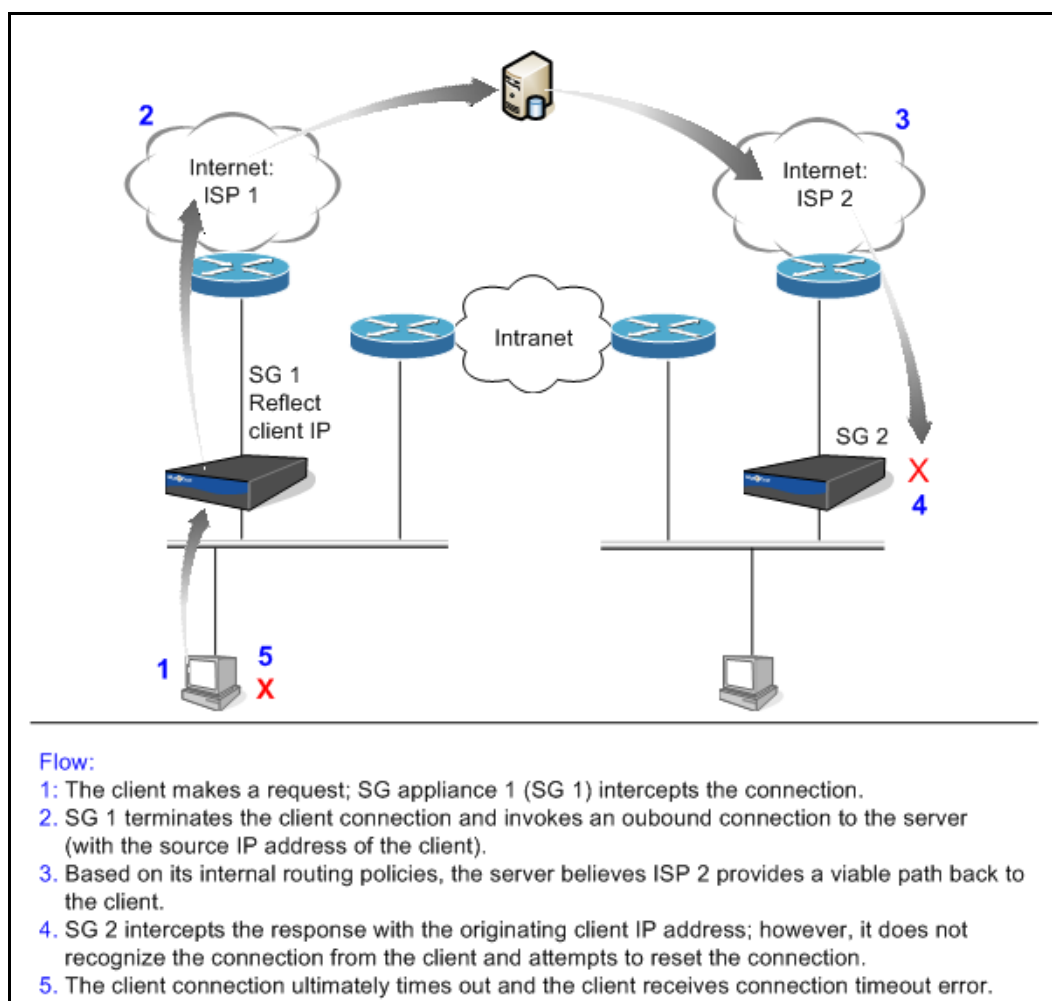


Figure 4-1. Multiple SG appliances in an asymmetric routing environment

The TCP Connection Forwarding Solution

Enabling TCP Connection Forwarding is a critical component of the following solutions:

- ❑ [“About Bidirectional Asymmetric Routing”](#) on page 60.
- ❑ [“About Dynamic Load Balancing”](#) on page 61.
- ❑ [“About ADN Transparent Tunnel Load Balancing”](#) on page 61.

About Bidirectional Asymmetric Routing

To solve the asymmetric routing problem, at least one SG appliance on each network segment must be configured to perform the functionality of an L4 switch. These selected appliances form a cluster. With this peering relationship, the connection responses are able to be routed to the network segment where the originating client resides.

In the 5.1.4.x release, cluster membership is manual; that is, SG appliances must be added to a cluster by enabling connection forwarding and adding a list of other peers in the cluster. After a peer joins a cluster, it begins sending and receiving TCP connections, and notifies the other peers about its connection requests.

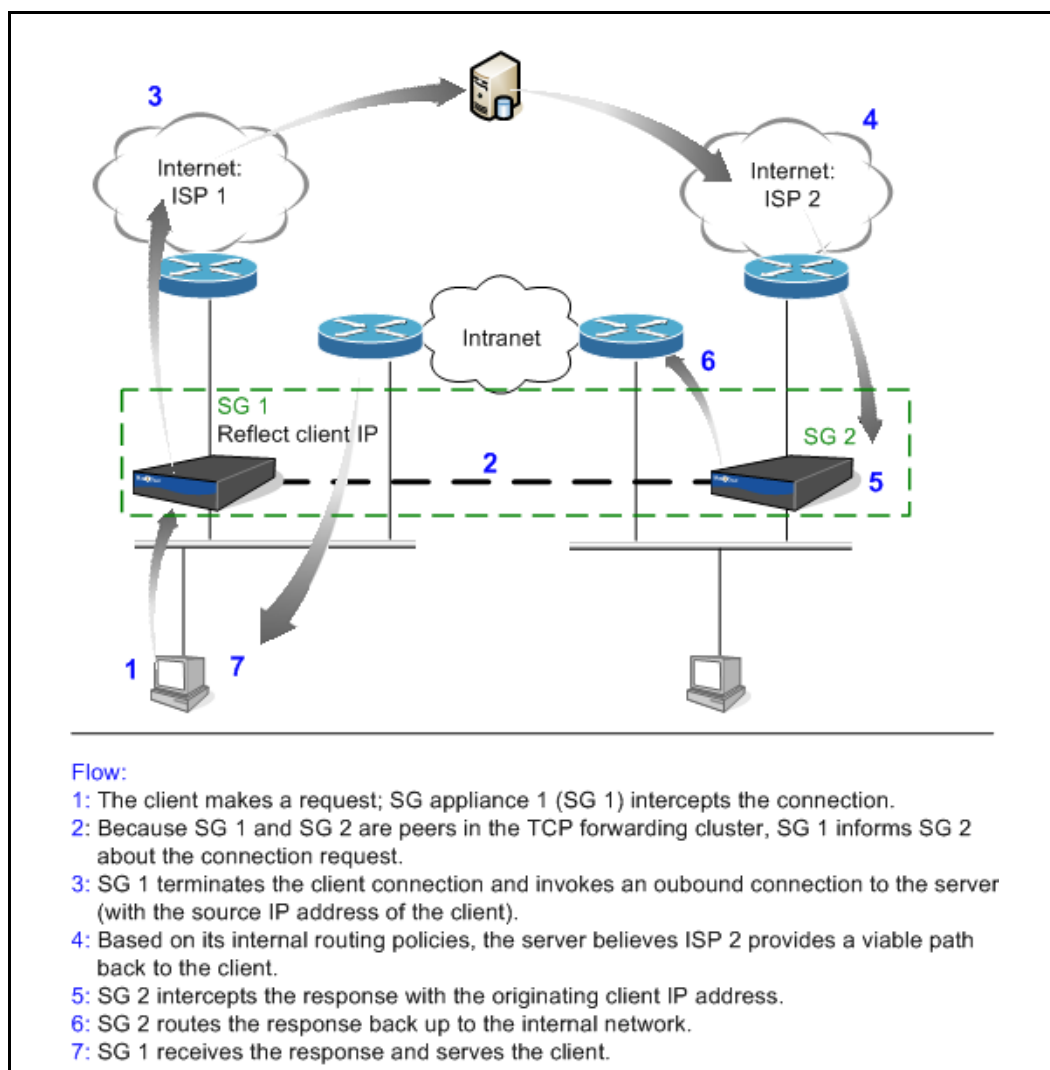


Figure 4-2. SG appliances share TCP connection information

About Dynamic Load Balancing

In a deployment where one SG appliance receives all of the traffic originating from clients and servers from an external routing device and distributes connections to other SG appliances, TCP connection forwarding enables all of the appliances to share connection information (for each new connection) and the in-line SG appliance routes the request back to the originating appliance, thus lightening the load on the inline appliance.

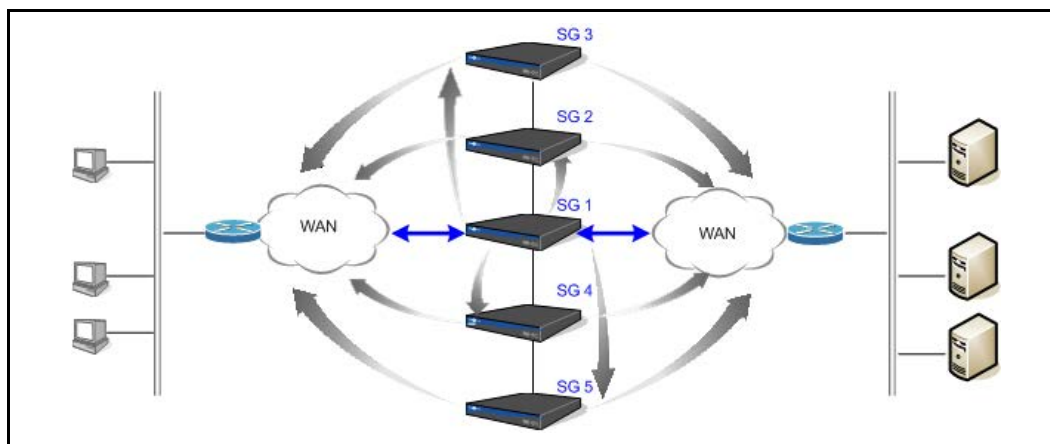


Figure 4-3. An SG appliance serving inline as a load balancer

In the above network topography, SG appliance **SG 1** is deployed inline to receive all traffic (by way of a switch) originating from the clients to the servers and servers to the clients and serves as a load balancer to the other four SG appliances. Appliances **2** through **5** also have independent connectivity to the clients and the servers. When all appliances belong to the same peering cluster and have connection forwarding enabled, appliance **SG 1** knows which of the other appliances made a specific connection and routes the response to that appliance.

In this deployment, a TCP acknowledgement is sent and retransmitted, if required, to ensure the information gets there, but each new connection message is not explicitly acknowledged. However, if the SG appliance receives packets for a connection that is unrecognized, the appliance retains those packets for a short time before deciding whether to forward or drop them, which allows time for a new connection message from a peer to arrive.

While adding more peers to a cluster increases the connection synchronization traffic, the added processing power all but negates that increase. You can have multiple peer clusters, and if you are cognoscente of traffic patterns to and from each cluster, you can create an effective cluster strategy. The only limitation is that an SG appliance can only be a peer in one cluster.

The Blue Coat load balancing solution is discussed in greater detail in earlier sections of this chapter.

About ADN Transparent Tunnel Load Balancing

TCP connection forwarding is a critical component of the Blue Coat ADN transparent tunnel load balancing deployment. Achieving efficient load balancing is difficult when ADN transparent tunneling is employed and an external load balancer is distributing requests to multiple SG appliances.

A user-noticeable performance degradation occurs if the router, switch, or load balancer sends traffic to an SG appliance that has not been servicing a particular client long enough to build up substantial byte caching dictionary, thus the compression ratio is low. When the SG appliances connected to the routing device belong to the same peer cluster and connection forwarding is enabled, the ADN managers on each appliance know which of their peers has the best byte caching dictionary with the client and forwards the request. This is illustrated in the following diagram.

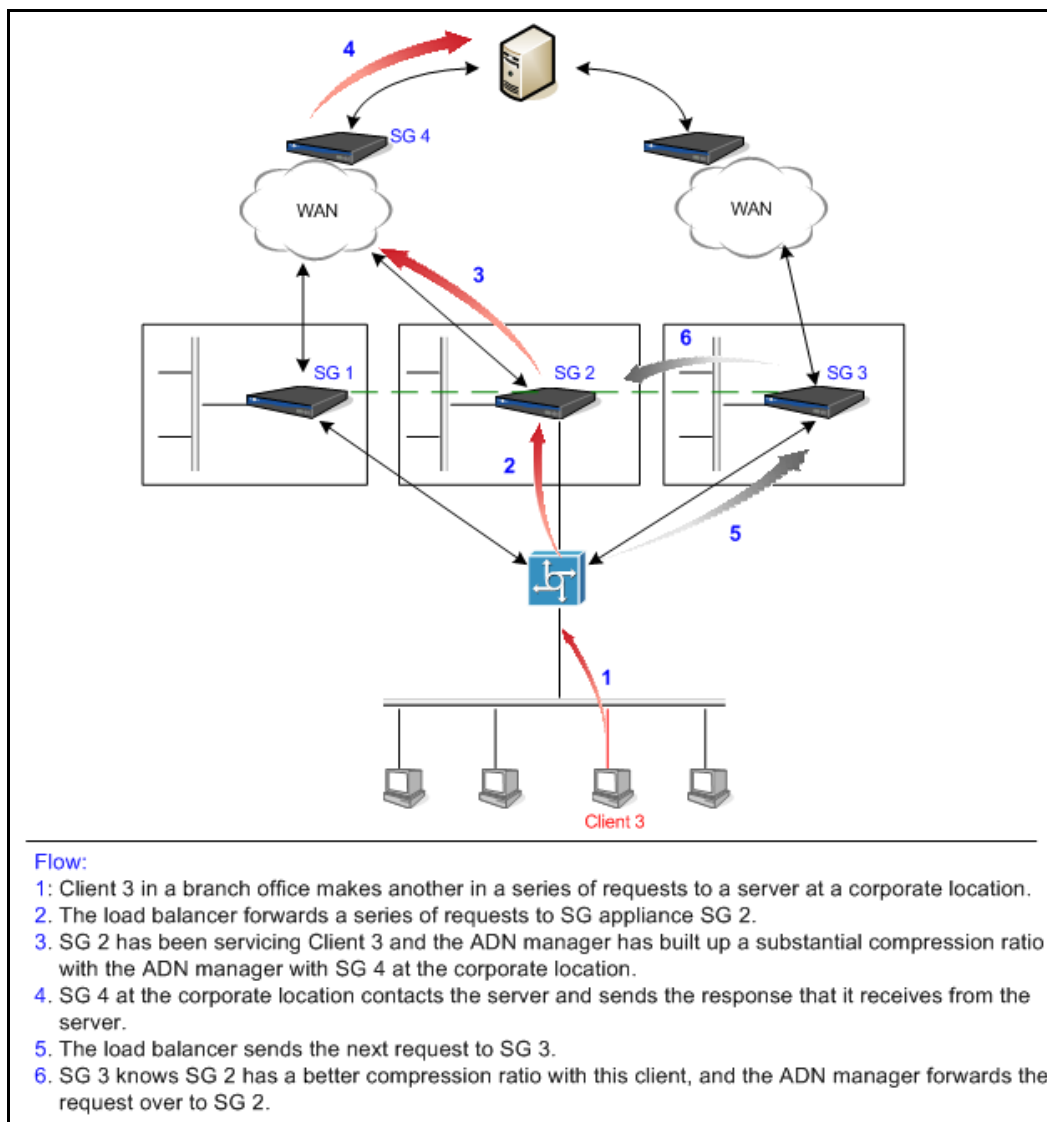


Figure 4-4. ADN Transparent Tunnel load balancing with Connection Forwarding enabled

Load balancing is based on the IP address of the remote ADN peer. This assures that all the traffic from a particular ADN peer to the local ADN cluster always goes to a specific local SG appliance, thus eliminating the inefficiency of keeping dictionaries for that remote peer on more than one local SG appliance.

The Blue Coat ADN solution is discussed in greater detail in [Chapter 2: "Configuring an Application Delivery Network"](#) on page 13.

TCP Configuration Forwarding Deployment Notes

When configuring your network for TCP connection forwarding, consider the following:

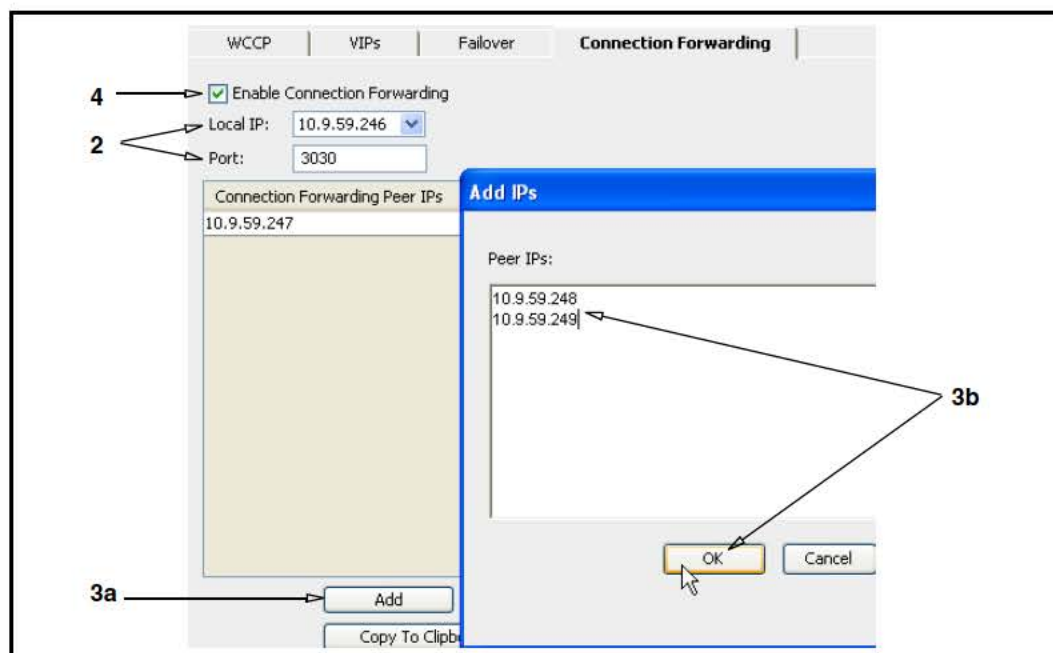
- ❑ Peers can be added to clusters at any time without affecting the performance of the other peers. An SG appliance that joins a peer cluster immediately contacts every other peer in the cluster. Likewise, a peer can leave a cluster at anytime. This might be a manual drop or a forced drop because of a hardware or software failure. If this happens, the other peers in the cluster continue to process connection forwarding requests.
- ❑ Connections between peers are not encrypted and not authenticated. If you do not assign the correct local IP address on an SG appliance with multiple IP addresses, traffic sent peer to peer might be routed through the Internet, not the intranet, exposing your company-sensitive data.
- ❑ The peering port—the connection between SG appliance connection forwarding peers—cannot be configured with bypass services. This means an SG appliance cannot be deployed in transparent mode between two SG appliances that are peers.
- ❑ SG does not enforce a maximum number of appliances a peer cluster supports, but currently the deployment is designed to function with up to 20 SG appliances.
- ❑ Because TCP connection forwarding must function across different network segments, employing multicasting, even among SG appliance peers on the same network, is not supported.
- ❑ There might be a slight overall performance impact from enabling TCP connection forwarding, especially in deployments where traffic is largely already being routed to the correct SG appliance. If a substantial amount of traffic requires forwarding, the performance hit is equitable to processing the same amount of bridging traffic.

Configuring TCP Connection Forwarding

As described in the previous concept sections, enabling TCP connection forwarding provides one component to a larger deployment solution. After you have deployed Blue Coat appliances into the network topography that best fits your enterprise requirements, enable TCP connection forwarding on each Blue Coat appliance that is to belong to the peering cluster, and add the IP address of the other peers. The peer lists on *all* of the cluster members must be the same, and an SG appliance cannot have a different local peer IP address than what is listed in another peers list. A peer list can contain only one local IP address.

To enable TCP Connection Forwarding:

1. Select **Configuration > Network > Advanced > Connection Forwarding**.



2. From the **Local IP** drop-down list, select the IP address that is routing traffic to this SG appliance.

Specify the port number (the default is **3030**) that the SG appliance uses to communicate with all peers, which includes listening and sending out connection forwarding cluster control messages to all peers in the group. *All* peers in the group must use the same port number (when connection forwarding is enabled, you cannot change the port number).

3. Add the cluster peers:
 - a. Click **Add**.
 - b. In the **Peer IPs** field, enter the IP addresses of the other peers in the cluster that this SG appliance is to communicate connection requests with.; click **OK**.
4. Select **Enable Connection Forwarding**.
5. Click **Apply**.

This SG appliance joins the peer cluster and immediately begins communicating with its peers.

Copying Peers to Another SG Appliance in the Cluster

If you have a larger cluster that contains several peer IP addresses, select all of the IP addresses in the **Connection Forwarding Peer IPs** list and click **Copy To Clipboard**; this action includes the local IP address of the peer you are copying from, and it will be correctly added as a remote peer IP address on the next appliance. When you configure connection forwarding on the next appliance, click **Paste From Clipboard** to paste the list of peers, and click **Apply**. Whichever peer IP address is the new appliance's local IP address is pulled out of the list and used as the local IP address on the new appliance. If a local IP address is not found or if more than one local IP address is found, the paste fails with an error.

Removing a Peer

A network change or other event might require you to remove a peer from the cluster. Highlight a peer IP address and click **Remove**. The peer connection is terminated and all connections associated with the peer are removed from the local system.

Note: A CLI command is available that allows you to disable a peer, which terminates the communication with other peers, but does not remove the peer from the cluster. See the next section.

Related CLI Syntax to Configure TCP Connection Forwarding

- ❑ To enter configuration mode:

```
SGOS# (config) connection-forwarding
```

- ❑ The following subcommands are available:

```
SGOS# (config connection forwarding) add ip_address  
SGOS# (config connection forwarding) port number  
SGOS# (config connection forwarding) [enable | disable]  
SGOS# (config connection forwarding) [clear | remove ip_address]  
SGOS# (config connection forwarding) [view | exit]
```

- ❑ The following configuration and statistics commands are available:

```
SGOS# show connection-forwarding configuration  
SGOS# show connection-forwarding statistics
```


Chapter 5: Bandwidth Management

Bandwidth management (BWM) allows you to classify, control, and limit the amount of bandwidth used by different classes of network traffic flowing into or out of the SG appliance. Network resource sharing (or link sharing) is accomplished by using a bandwidth-management hierarchy where multiple traffic classes share available bandwidth in a controlled manner.

Note: The SG appliance does not attempt to reserve any bandwidth on the network links that it is attached to or otherwise guarantee that the available bandwidth on the network can sustain any of the bandwidth limits which have been configured on it. The SG appliance can only shape the various traffic flows passing through it, and prioritize some flows over others according to its configuration.

By managing the bandwidth of specified classes of network traffic, you can accomplish the following:

- ❑ Guarantee that certain traffic classes receive a specified minimum amount of available bandwidth.
- ❑ Limit certain traffic classes to a specified maximum amount of bandwidth.
- ❑ Prioritize certain traffic classes to determine which classes have priority over available bandwidth.

Bandwidth Management Overview

To manage the bandwidth of different types of traffic that flow into, out of, or through the SG appliance, you must do the following:

- ❑ Determine how many bandwidth classes you need and how to configure them to accomplish your bandwidth management goals. This includes determining the structure of one or more bandwidth hierarchies if you want to use priority levels to manage bandwidth.
- ❑ Create and configure bandwidth classes accordingly.
- ❑ Create policy rules using those bandwidth classes to identify and classify the traffic in the SG appliance.
- ❑ Enable bandwidth management.

Bandwidth management configuration consists of two areas:

- ❑ Bandwidth allocation

This is the process of creating and configuring bandwidth classes and placing them into a bandwidth class hierarchy. This process can be done using either the Management Console or the CLI.

- ❑ Flow classification

This is the process of classifying traffic flows into bandwidth management classes using policy rules. Policy rules can classify flows based on any criteria testable by policy. You can create policy rules using either the Visual Policy Manager (VPM), which is accessible through the Management Console, or by composing Content Policy Language (CPL).

Note: For more information about using VPM to create policy rules, refer to *Volume 6: VPM and Advanced Policy*. For information about composing CPL, refer to *Volume 10: Content Policy Language Guide*.

Allocating Bandwidth

The process of defining bandwidth classes and grouping them into a bandwidth class hierarchy is called *bandwidth allocation*. Bandwidth allocation is based on:

- ❑ the placement of classes in a hierarchy (the parent/child relationships).
- ❑ the priority level of classes in the same hierarchy.
- ❑ the minimum and/or maximum bandwidth setting of each class.

For example deployment scenarios, see “[Bandwidth Allocation and VPM Examples](#)” on page 78.

Bandwidth Classes

To define a bandwidth class, you create the class, giving it a name meaningful to the purpose for which you are creating it. You can configure the class as you create it or edit it later. The available configuration settings are:

- ❑ Parent: Used to create a bandwidth-management hierarchy.
- ❑ Minimum Bandwidth: Minimum amount of bandwidth guaranteed for traffic in this class.
- ❑ Maximum Bandwidth: Maximum amount of bandwidth allowed for traffic in this class.
- ❑ Priority: Relative priority level among classes in the same hierarchy.

Parent Class

A parent class is a class that has children. When you create or configure a bandwidth class, you can specify another class to be its parent (the parent class must already exist). Both classes are now part of the same bandwidth-class hierarchy, and so are subject to the hierarchy rules (see “[Class Hierarchy Rules and Restrictions](#)” on page 70).

Minimum Bandwidth

Setting a minimum for a bandwidth class guarantees that class receives at least that amount of bandwidth, if the bandwidth is available. If multiple hierarchies are competing for the same available bandwidth, or if the available bandwidth is not enough to cover the minimum, bandwidth management is not be able to guarantee the minimums defined for each class.

Note: The SG appliance does not attempt to reserve any bandwidth on the network links that it is attached to or otherwise guarantee that the available bandwidth on the network can be used to satisfy bandwidth class minimums. The SG appliance can only shape the various traffic flows passing through it, and prioritize some flows over others according to its configuration.

Maximum Bandwidth

Setting a maximum for a bandwidth class puts a limit on how much bandwidth is available to that class. It does not matter how much bandwidth is available; a class can never receive more bandwidth than its maximum.

To prevent a bandwidth class from using more than its maximum, the SG appliance inserts delays before sending packets associated with that class until the bandwidth used is no more than the specified maximum. This results in queues of packets (one per class) waiting to be sent. These queues allow the SG appliance to use priority settings to determine which packet is sent next. If no maximum bandwidth is set, every packet is sent as soon as it arrives, so no queue is built and nothing can be prioritized.

Unlike minimums and priority levels, the maximum-bandwidth setting can purposely slow down traffic. Unused bandwidth can go to waste with the maximum-bandwidth setting, while the minimum-bandwidth settings and priority levels always distributes any unused bandwidth as long as classes request it. However, priority levels are not meaningful without a maximum somewhere in the hierarchy. If a hierarchy has no maximums, any class in the hierarchy can request and receive any amount of bandwidth regardless of its priority level.

Priority

When sharing excess bandwidth with classes in the same hierarchy, the class with the highest priority gets the first opportunity to use excess bandwidth. When the high-priority class uses all the bandwidth it needs or is allowed, the next class gets to use the bandwidth, if any remains. If two classes in the same hierarchy have the same priority, then excess bandwidth is shared in proportion to their maximum bandwidth setting.

Class Hierarchies

Bandwidth classes can be grouped together to form a class hierarchy. Creating a bandwidth *class* allows you to allocate a certain portion of the available bandwidth to a particular type of traffic. Putting that class into a bandwidth-class *hierarchy* with other bandwidth classes allows you to specify the relationship among various bandwidth classes for sharing available (unused) bandwidth.

The way bandwidth classes are grouped into the bandwidth hierarchy determines how they share available bandwidth among themselves. You create a hierarchy so that a set of traffic classes can share unused bandwidth. The hierarchy starts with a bandwidth class you create to be the top-level parent. Then you can create other bandwidth classes to be the children of the parent class, and those children can have children of their own.

To manage the bandwidth for any of these classes, some parent in the hierarchy must have a maximum bandwidth setting. The classes below that parent can then be configured with minimums and priority levels to determine how unused bandwidth is shared among them. If none of the higher level classes have a maximum bandwidth value set, then bandwidth flows from the parent to the child classes without limit. In that case, minimums and priority levels are meaningless, because all classes get all the bandwidth they need at all times. The bandwidth, in other words, is not being managed.

Class Hierarchy Rules and Restrictions

Certain rules and restrictions must be followed to create a valid BWM class hierarchy:

- ❑ Each traffic flow can only belong to one bandwidth management class.
You can classify multiple flows into the same bandwidth class, but any given flow is always counted as belonging to a single class. If multiple policy rules match a single flow and attempt to classify it into multiple bandwidth classes, the last classification done by policy applies.
- ❑ When a flow is classified as belonging to a bandwidth class, all packets belonging to that flow are counted against that bandwidth class.
- ❑ If a minimum bandwidth is configured for a parent class, it must be greater than or equal to the sum of the minimum bandwidths of its children.
- ❑ If a maximum bandwidth is configured for a parent class, it must be greater than or equal to the largest maximum bandwidth set on any of its children. It must also be greater than the sum of the minimum bandwidths of all of its children.
- ❑ The minimum bandwidth available to traffic directly classified to a parent class is equal to its assigned minimum bandwidth minus the minimum bandwidths of its children. For example, if a parent class has a minimum bandwidth of 600 kbps and each of its two children have minimums of 300 kbps, the minimum bandwidth available to traffic directly classified into the parent class is 0.

Relationship among Minimum, Maximum, and Priority Values

Maximum values can be used to manage bandwidth for classes whether or not they are placed into a hierarchy. This is not true for minimums and priorities, which can only manage bandwidth for classes that are placed into a hierarchy. Additionally, a hierarchy must have a maximum configured on a high-level parent class for the minimums and priorities to manage bandwidth.

This is because, without a maximum, bandwidth goes to classes without limit and there is no point to setting priorities or minimum guarantees. Bandwidth cannot be managed unless a maximum limit is set somewhere in the hierarchy.

When a hierarchy has a maximum on the top-level parent and minimums, maximums and priorities placed on the classes related to that parent, the following conditions apply:

- ❑ If classes in a hierarchy have minimums, the first thing that happens with available bandwidth is that all the minimum requests are satisfied. If the amount requested is less than the minimum for any class, it receives the entire amount, and its priority level does not matter.
Even though a minimum is considered to be a guaranteed amount of bandwidth, satisfying minimums is dependent on the parent being able to receive its own maximum, which is not guaranteed.
- ❑ When all of the classes in a hierarchy have had their minimums satisfied, any additional requests for bandwidth must be obtained. When a class requests more than its minimum, it must obtain bandwidth from its parent or one of its siblings. If, however, a class requests more than its maximum, that request is denied—no class with a specified maximum is ever allowed more than that amount.
- ❑ If a class does not have a minimum specified, it must obtain all of the bandwidth it requests from its parents or siblings, and it cannot receive any bandwidth unless all of the minimums specified in the other classes in its hierarchy are satisfied.

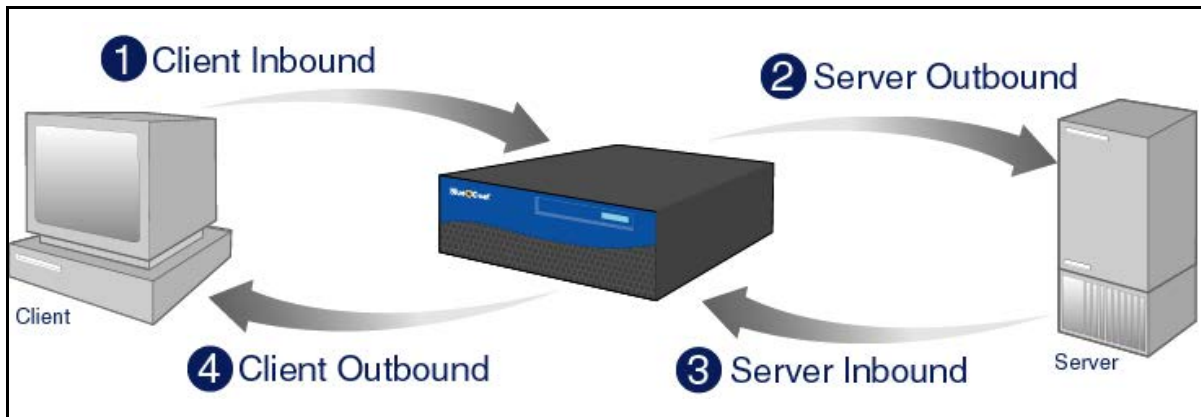
- ❑ Classes obtain bandwidth from their parents or siblings based on their priority levels—the highest priority class gets to obtain what it needs first, until either its entire requested bandwidth is satisfied or until it reaches its maximum. After that, the next highest priority class gets to obtain bandwidth, and this continues until either all the classes have obtained what they can or until the maximum bandwidth available to the parent has been reached. The amount available to the parent can sometimes be less than its maximum, because the parent must also participate in obtaining bandwidth in this way with its own siblings and/or parent if it is not a top-level class.

Flow Classification

You can classify flows to BWM classes by writing policy rules that specify the bandwidth class that a particular traffic flow belongs to. A typical transaction has four traffic flows:

1. Client inbound—Traffic flowing into the SG appliance from a client (the entity sending a request, such as a client at a remote office linked to the appliance).
2. Server outbound—Traffic flowing out of the SG appliance to a server.
3. Server inbound—Traffic flowing back into the SG appliance from a server (the entity responding to the request).
4. Client outbound—Traffic flowing back out of the SG appliance to a client.

The figure below shows the traffic flows between a client and server through the SG appliance.



Some types of traffic can flow in all four directions. The following example describes different scenarios that you might see with an HTTP request. A client sends a GET to the SG appliance (client inbound). The SG appliance then forwards this GET to a server (server outbound). The server responds to the SG appliance with the appropriate content (server inbound), and then the appliance delivers this content to the client (client outbound).

Policy allows you to configure different classes for each of the four traffic flows. See [“Using Policy to Manage Bandwidth”](#) on page 77 for information about classifying traffic flows with policy.

Configuring Bandwidth Allocation

You can use either the Management Console or the CLI to do the following tasks:

- ❑ Enable or disable bandwidth management.
- ❑ Create and configure bandwidth classes.

- ❑ Delete bandwidth classes.
- ❑ View bandwidth management class configurations.

Note: If you plan to manage the bandwidth of streaming media protocols (Windows Media, Real Media, or QuickTime), you might want to use the streaming features instead of the bandwidth management features described in this section. For most circumstances, Blue Coat recommends that you use the streaming features to control streaming bandwidth rather than the bandwidth management features. For information about the differences between these two methods, refer to *Volume 3: Web Communication Proxies*.

Enabling Bandwidth Management

The following procedures explain how to enable or disable bandwidth management.

To enable bandwidth management:

1. Select **Configuration > Bandwidth Management > BWM Classes > Bandwidth Classes**.



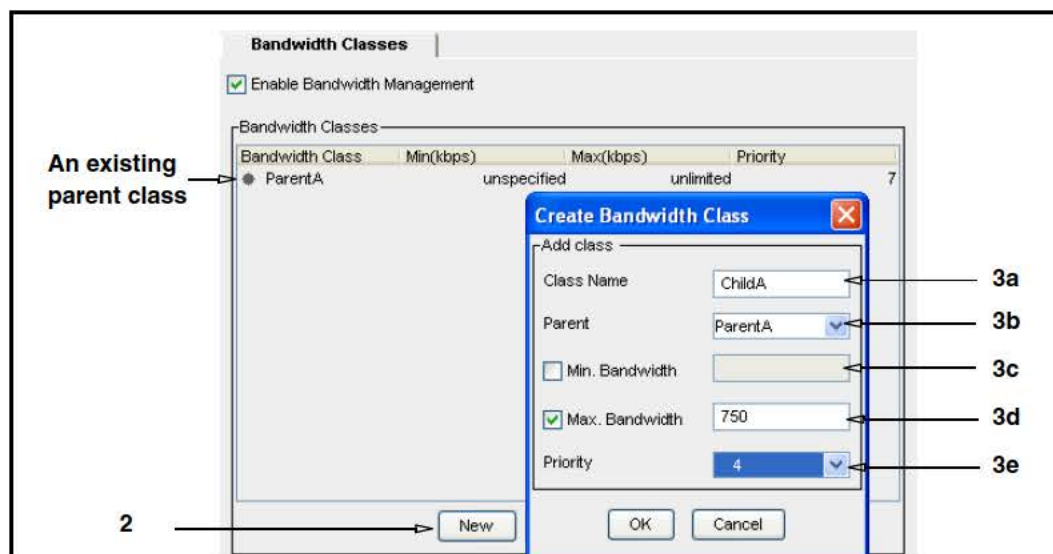
2. Select or deselect **Enable Bandwidth Management**.
3. Click **Apply** to commit the changes to the SG appliance.

Creating, Editing, and Deleting Bandwidth Classes

The following procedure details how to create bandwidth management class.

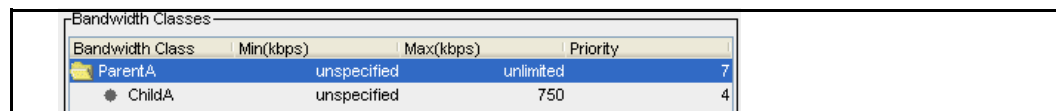
To create a BWM class:

1. Select **Configuration > Bandwidth Management > BWM Classes > Bandwidth Classes**.



2. To create a new BWM class, click **New**.

3. Fill in the fields as appropriate:
 - a. **Class name:** Assign a meaningful name for this class. The name can be up to 64 characters long; spaces are not allowed.
 - b. **Parent:** (Optional) To assign the class as a child of another parent class in the bandwidth class hierarchy, select an existing parent class from the drop-down list.
 - c. **Min. Bandwidth:** (Optional) Select **Min. Bandwidth** and enter a minimum bandwidth value in the field (kilobits per second (kbps)). The default minimum bandwidth setting is *unspecified*, meaning the class is not guaranteed a minimum amount of bandwidth.
 - d. **Max. Bandwidth:** (Optional) Select **Max. Bandwidth** and enter a maximum bandwidth value in the field. The default maximum bandwidth setting is *unlimited*, meaning the class is not limited to a maximum bandwidth value by this setting.
 - e. **Priority:** Select a priority level for this class from the **Priority** drop-down list—**0** is the lowest priority level and **7** is the highest. The default priority is **0**.
4. Click **OK**.
5. Click **Apply** to commit the changes to the SG appliance.



Bandwidth Class	Min(kbps)	Max(kbps)	Priority
ParentA	unspecified	unlimited	7
ChildA	unspecified	750	4

Figure 5-1. A child bandwidth management class added to a parent class.

After you add a child class to a parent class, the parent class is denoted by a folder icon. Double-click the folder to view all of the child classes under that parent.

To edit a BWM class:

1. Select **Configuration > Bandwidth Management > BWM Classes > Bandwidth Classes**.
2. Highlight the class and click **Edit**.
3. Edit the fields as appropriate.

To delete a BWM class:

Note: You cannot delete a class that is referenced by another class or by the currently installed policy. For instance, you cannot delete a class that is the parent of another class or one that is used in an installed policy rule. If you attempt to do so, a message displays explaining why this class cannot be deleted.

1. Select **Configuration > Bandwidth Management > BWM Classes > Bandwidth Classes**.
2. Highlight the class to delete and **Delete**.
3. Click **Yes** to delete the class.
4. Click **Apply**.

Viewing Bandwidth Management Configurations

You can view the following bandwidth class configurations:

- ▢ Level in the hierarchy (parent/child relationships)

- ❑ Priority level
- ❑ Maximum bandwidth value
- ❑ Minimum bandwidth value

To view BWM configuration:

1. Select **Configuration > Bandwidth Management > BWM Classes > Bandwidth Classes**.
On this tab, you can view a class's minimum, maximum and priority value. Top level classes are visible—classes with children have a folder icon on the left.
2. To view the configurations of the child class(es) of a class, double-click the folder icon.
The child classes become visible. A second double-click closes the folder.

Related CLI Syntax to Configure Bandwidth Management

- ❑ To enter configuration mode:
`SGOS#(config) bandwidth-management`
- ❑ The following subcommands are available:
`SGOS#(config bandwidth-management) enable | disable`
`SGOS#(config bandwidth-management) create | delete bwm_class`
- ❑ To enter edit mode:
`SGOS#(config bandwidth-management) edit bwm_class`
- ❑ The following subcommands are available:
`SGOS#(config bw-class bwm_class) min-bandwidth minimum_in_kbps`
`SGOS#(config bw-class bwm_class) max-bandwidth maximum_in_kbps`
`SGOS#(config bw-class bwm_class) priority value_from_0_to_7`
`bandwidth-management bwm_class) no {min-bandwidth | max-bandwidth}`
`SGOS#(config bandwidth-management bwm_class) parent parent_class_name`
`-or-`
`SGOS#(config bandwidth-management bwm_class) no parent`
`SGOS#(config bandwidth-management bwm_class) view`

Bandwidth Management Statistics

The bandwidth management statistics tabs (Current Class Statistics and Total Class Statistics) display the current packet rate and total number of packets served, the current bandwidth rate, and the total number of bytes served and packets dropped.

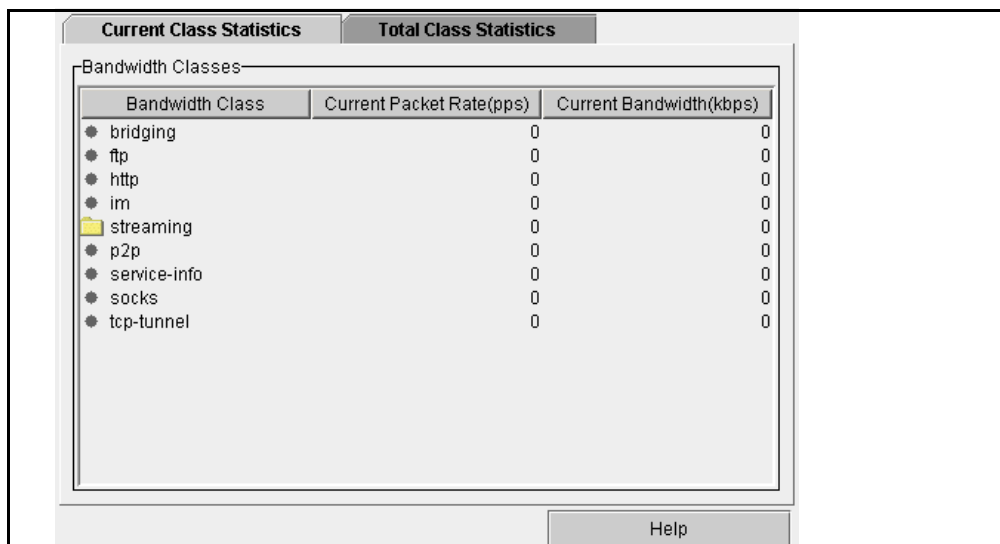
Current Class Statistics Tab

The **Current Class Statistics** tab displays the following information for each bandwidth class:

- ❑ **Current Packet Rate:** current packets-per-second (pps) value.
- ❑ **Current Bandwidth:** current bandwidth in kilobits per second (Kbps).

To view current bandwidth management class statistics:

1. Select **Statistics > Bandwidth Management > Current Class Statistics**.
The high level bandwidth classes and their statistics are visible.



- To view the statistics of child bandwidth classes, double-click the folder icon of the parent class.

The child classes become visible. A second double-click closes the folder.

Total Class Statistics Tab

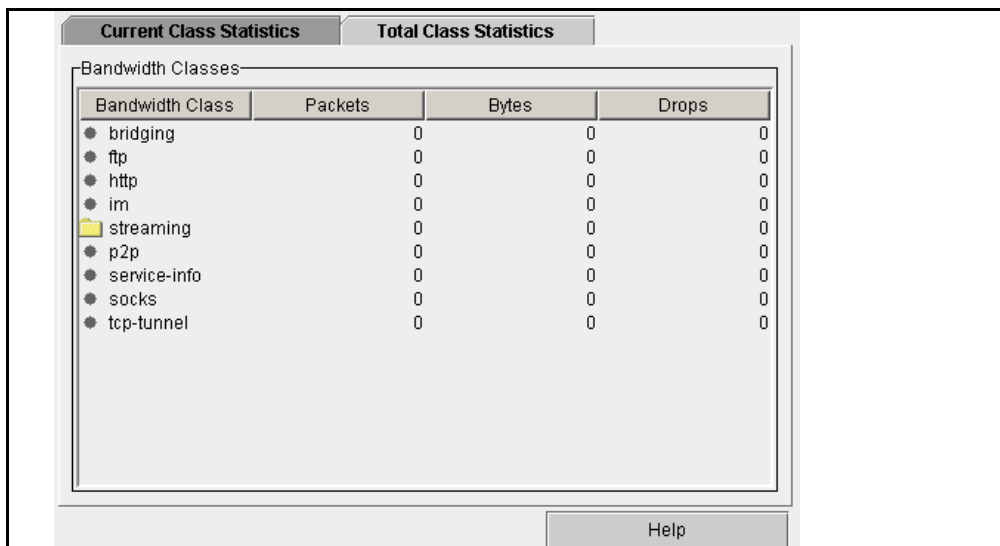
The **Total Class Statistics** tab displays the following information for each bandwidth class:

- ❑ **Packets:** the total number of packets served.
- ❑ **Bytes:** the total number of bytes served.
- ❑ **Drops:** the total number of packets dropped.

To view total bandwidth management class statistics:

- Select **Statistics > Bandwidth Management > Total Class Statistics**.

The high level bandwidth classes and their statistics are visible.



2. To view the statistics of child bandwidth classes, double-click the folder icon of the parent class. A second double-click closes the folder.

Bandwidth Management Statistics in the CLI

To view bandwidth management statistics:

1. To view all bandwidth management statistics, enter the following commands at the prompt:

```
SGOS#(config) bandwidth-management
SGOS#(config bandwidth-management) view statistics
```
2. To view the BWM statistics for a specific class, enter the following command at the (config) command prompt:

```
SGOS#(config bandwidth-management) view statistics bwm_class
```

Example

```
SGOS#(config bandwidth-management) view statistics http
Class Name:          http
Parent:              <none>
Minimum Bandwidth:   unspecified
Maximum Bandwidth:   unlimited
Priority:             0
Total Bytes:         0 bytes
Total Packets:       0 pkts
Dropped Packets:     0 pkts
Current Bandwidth:   0 kbps
Current Packet Rate: 0 pps
Queue Length:        0 bytes
```

Parent	The class name of the parent of this class.
Minimum Bandwidth	The maximum bandwidth setting for this class.
Maximum Bandwidth	The minimum bandwidth setting for this class.
Priority	The priority level for this class.
Total Bytes	The total number of bytes served.
Total Packets	The total number of packets served.
Dropped Packets	Total number of packets dropped (packets in the queue that are dropped because the queue length is reached).
Current Bandwidth	Current bandwidth value (in kilobits per second).
Current Packet Rate	Current packets-per-second value.
Queue Length	Maximum length allowed for the queue of packets that lack available bandwidth but are waiting for bandwidth to become available.

To clear bandwidth management statistics:

1. To clear bandwidth management statistics for all bandwidth management classes, enter the following command at the prompt:

```
SGOS# clear-statistics bandwidth-management
```

2. To clear bandwidth management statistics for a particular class, enter the following command at the prompt:

```
SGOS# clear-statistics bandwidth-management class bandwidth_class_name
```

Using Policy to Manage Bandwidth

After creating and configuring bandwidth management classes, create policy rules to classify traffic flows using those classes. Each policy rule can only apply to one of four traffic flow types:

- ❑ Client inbound
- ❑ Client outbound
- ❑ Server inbound
- ❑ Server outbound

You can use the same bandwidth management classes in different policy rules; one class can manage bandwidth for several types of flows based on different criteria. However, any given flow is always be counted as belonging to a single class. If multiple policy rules match a flow and try to classify it into multiple bandwidth classes, the last classification done by policy applies.

To manage the bandwidth classes you have created, you can either compose CPL (see [“CPL Support for Bandwidth Management”](#) on page 77 below) or you can use VPM (see [“VPM Support for Bandwidth Management”](#) on page 78). To see examples of policy using these methods, see [“Bandwidth Allocation and VPM Examples”](#) on page 78 or [“Policy Examples: CPL”](#) on page 85.

CPL Support for Bandwidth Management

You must use policy to classify traffic flows to different bandwidth classes. Refer to *Volume 10: Content Policy Language Guide* for more information about writing and managing policy.

CPL Triggers

You can use all of the CPL triggers for BWM classification (refer to *Volume 10: Content Policy Language Guide* for information about using CPL triggers). Basing a bandwidth decision on a trigger means that the decision does not take effect until after the information needed to make that decision becomes available. For example, if you set the CPL to trigger on the MIME type of the HTTP response, then the HTTP headers must be retrieved from the OCS before a classification can occur. The decision to retrieve those headers occurs too late to count any of the request bytes from the client or the bytes in the HTTP response headers. However, the decision affects the bytes in the body of the HTTP response and any bytes sent back to the client.

Supported CPL

Bandwidth class can be set with policy on each of these four traffic flows:

- ❑ `limit_bandwidth.client.inbound(none | bwm_class)`
- ❑ `limit_bandwidth.client.outbound(none | bwm_class)`
- ❑ `limit_bandwidth.server.inbound(none | bwm_class)`
- ❑ `limit_bandwidth.server.outbound(none | bwm_class)`

If you set policy to `none`, the traffic is unclassified and is not to be bandwidth-managed.

VPM Support for Bandwidth Management

You can manage bandwidth using VPM in the **Action** column of four policy layers: Web Access, DNS Access, Web Content, and Forwarding Layers. For more information about using VPM to manage bandwidth, refer to *Volume 6: VPM and Advanced Policy*. For examples of bandwidth management scenarios using VPM, see "Bandwidth Allocation and VPM Examples" below.

Bandwidth Allocation and VPM Examples

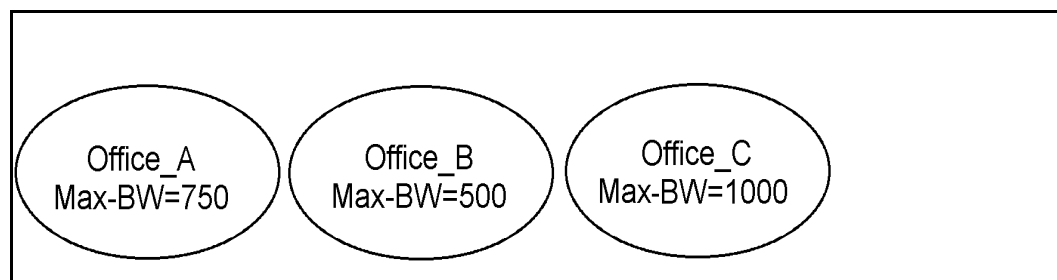
This section illustrates how to use the VPM to allocate bandwidth, arrange hierarchies, and create policy. It describes an example deployment scenario and the tasks an administrator must accomplish to manage the bandwidth for this deployment. For specific instructions about allocating bandwidth, see ["Configuring Bandwidth Allocation"](#) on page 71. For examples of CPL bandwidth management tasks, see ["Policy Examples: CPL"](#) on page 85.

Task One: Bandwidth Allocation

The administrator is responsible for managing the bandwidth of three branch offices. He was told to ensure that each office uses no more than half of its total link bandwidth for Web and FTP traffic. The total link bandwidth of each office is as follows:

- ❑ Office A: 1.5 Mb
- ❑ Office B: 1 Mb
- ❑ Office C: 2 Mb

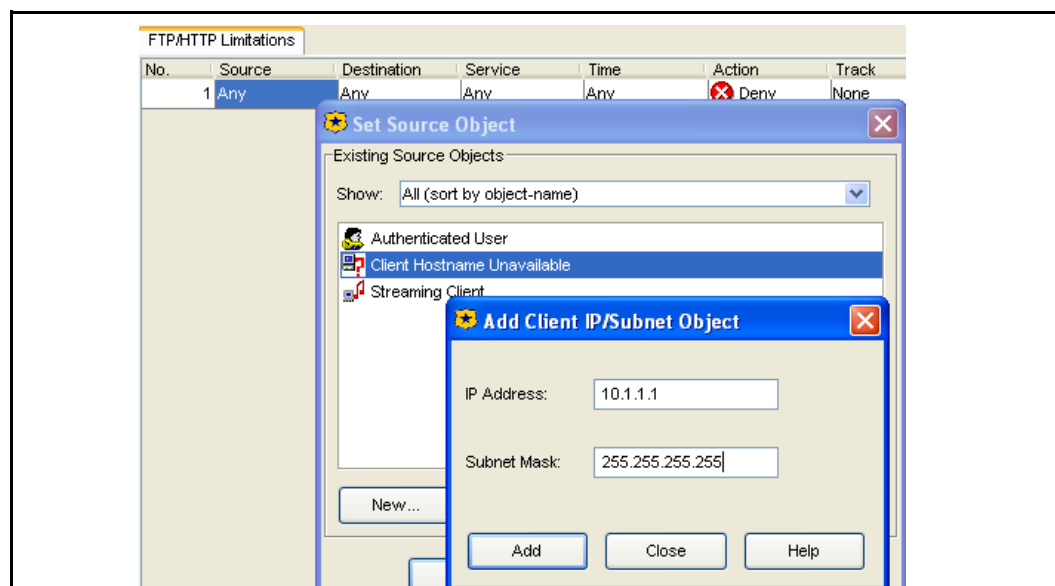
He creates one bandwidth class for each of the three offices and configures the maximum bandwidth to an amount equal to half of the total link bandwidth of each, as shown below. He also creates policy rules for each class, as described below in "Task One: VPM".



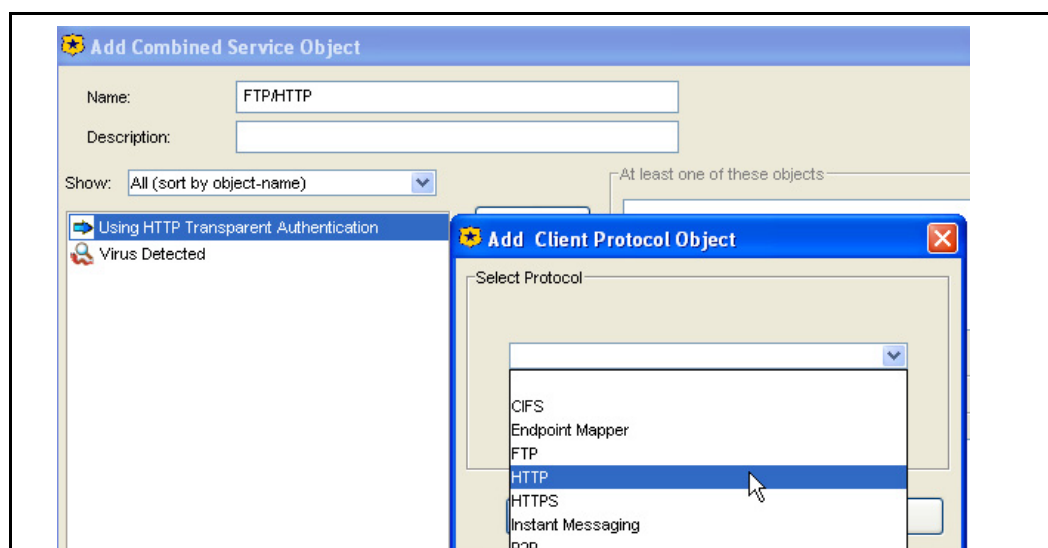
Each of the classes above has a maximum set at an amount equal to half of the total link bandwidth for each office. A hierarchy does not exist in this scenario.

Task One: VPM

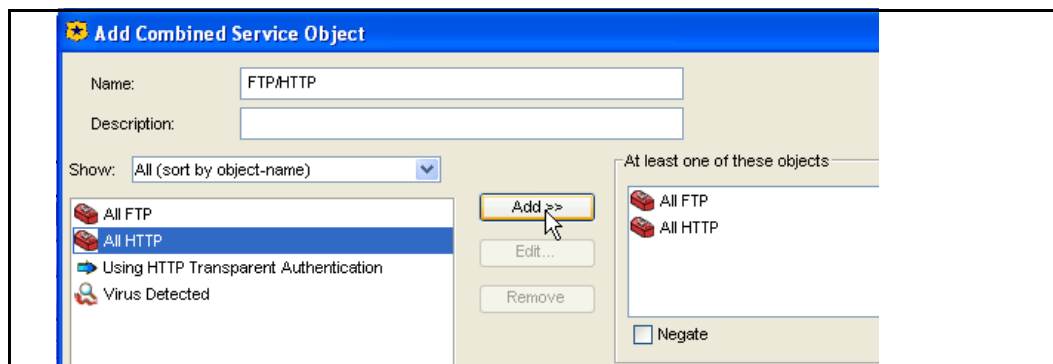
The administrator has created one bandwidth class for each office, setting a maximum bandwidth on each one equal to the half of the total link bandwidth of each. Now he must create policy rules to classify the traffic flows.



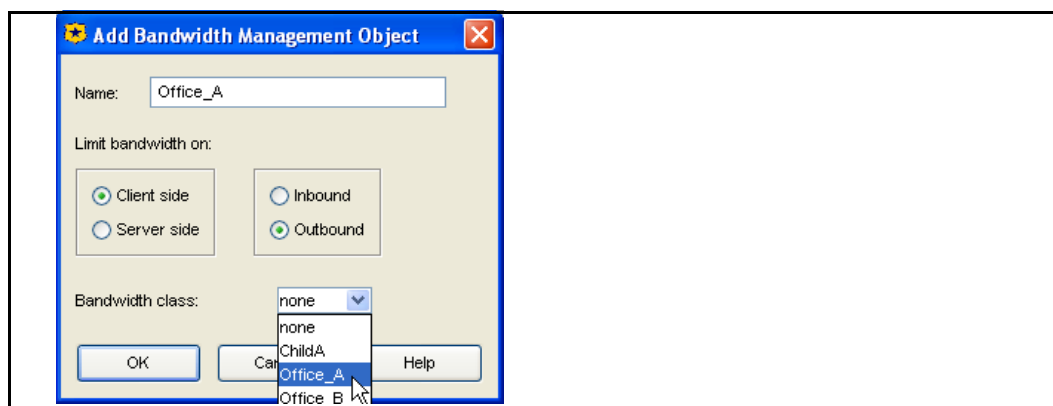
The administrator launches the VPM and creates a new Web Access Layer, naming it **FTP/HTTP Limitations**. He selects the **Client IP Address/Subnet** object in the **Source** column, filling in the IP address and mask of the subnet used by **Office_A**.



He selects a **Combined Service Object** in the **Service** column, naming it **FTP/HTTP** and adding a **Client Protocol** for FTP and for HTTP.



He adds both protocols to the **At least one of these objects** field.



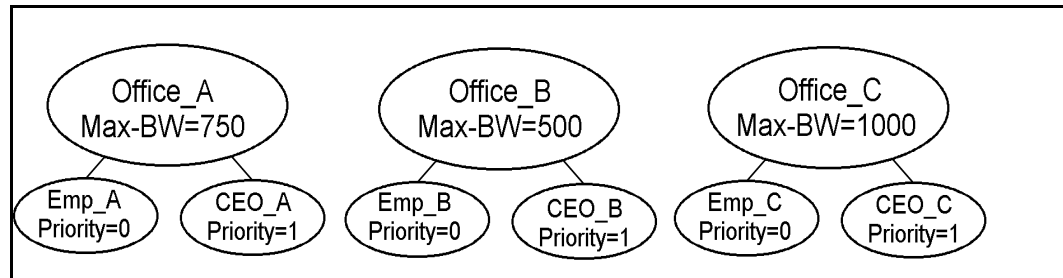
In the **Action** column, he selects **Manage Bandwidth**, naming it **Office_A** and setting it to manage the bandwidth of **Office_A** on the **Client side** in the **Outbound** direction.

He adds two more similar rules for the other two offices. He is able to reuse the same **Combined Service Object** in the **Service** column, but must add new objects specific to each office in the **Source** and **Action** columns. The order of the rules does not matter here, because each office, and thus each rule, is distinct because of its IP address/subnet mask configuration.

Task Two: Bandwidth Allocation

A few days later, the administrator gets a visit from the CEO of his company. She wants him to fix it so that she can visit any of the branch offices without having her own Web and FTP access slowed down unnecessarily.

The administrator creates two more classes for each office: one for the CEO and another for everyone else (employees). He sets the parent class of each new class to the appropriate class that he created in Task One. For example, he creates **Emp_A** and **CEO_A** and sets their parent class to **Office_A**. He also sets a priority level for each class: **0** (the lowest) for employees and **1** for the CEO. He then uses VPM to create additional policy rules for the new classes (see "Task Two: VPM" below). This figure shows the hierarchical relationship among all of the classes.

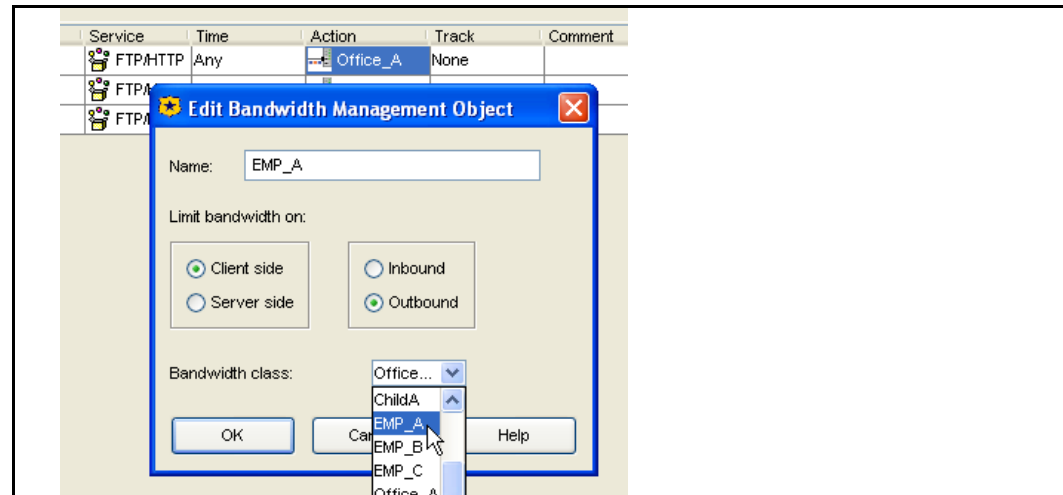


The administrator now has three separate hierarchies. In each one, bandwidth is limited by the configuration of the parent class, and the two child classes are prioritized to determine how they share any unused bandwidth. Because no minimums have been set, the highest priority class has the first opportunity to use all of the available bandwidth; whatever is left then goes to the next priority class.

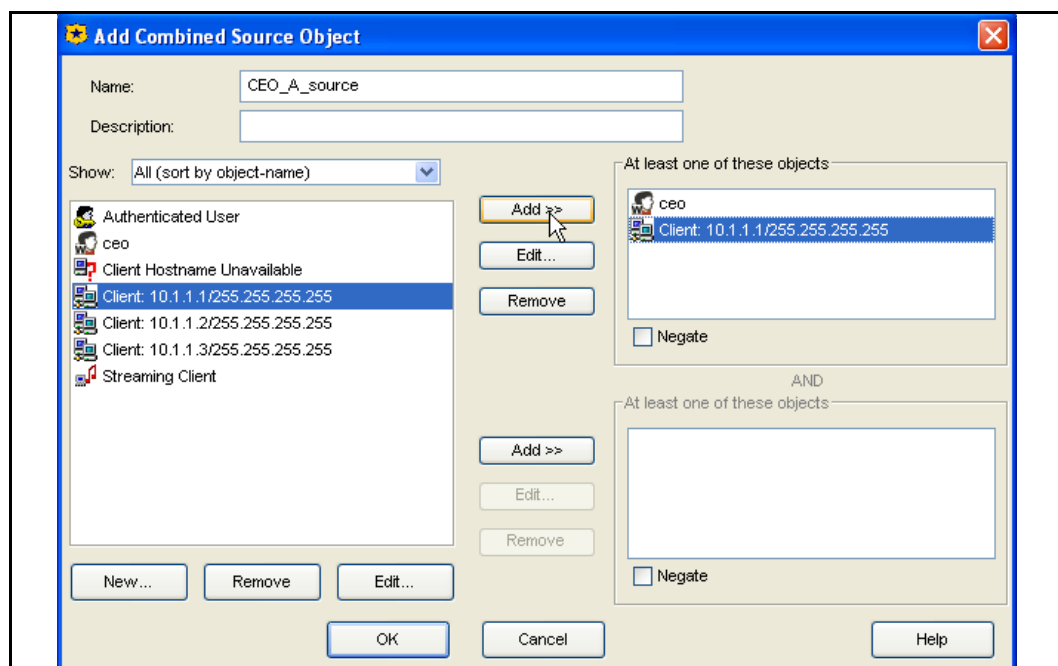
Priority levels are only effective among the classes in the same hierarchy. This means that the priority levels for the **Office_A** hierarchy do not affect the classes in the **Office_B** or **Office_C** hierarchies.

Task Two: VPM

Because the CEO wants to prioritize FTP and HTTP access among employees and herself, the administrator must create additional bandwidth classes (as described above in "Task Two: Bandwidth Allocation") and write policy rules to classify the traffic for the new classes.



He first edits each of the three VPM rules for the three offices. He edits each the Manage Bandwidth objects, changing the name of the objects to **Emp_A**, **Emp_B**, and **Emp_C** and changes the bandwidth class to the corresponding employee class.



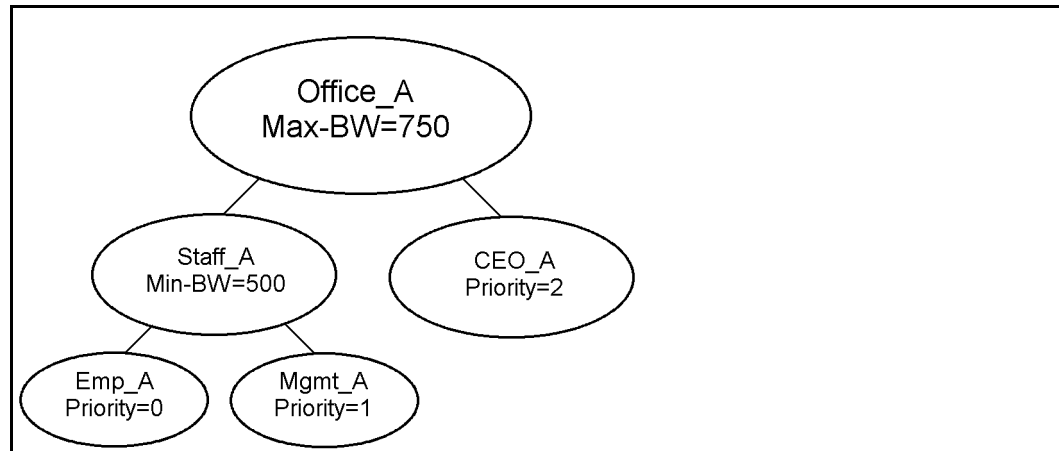
Next, he creates three more rules for the CEO, moving them above the first three rules. For the CEO rules, he selects the same combined **FTP/HTTP** object in the **Service** column; in the **Action** column, he selects a **Manage Bandwidth** object configured for client side/outbound, as before, but this time, he names the objects **CEO_A**, **CEO_B**, and **CEO_C** and selects the corresponding CEO bandwidth class. In the **Source** column, he creates a **Combined Source Object**, naming it for the CEO. He combines the **Client IP/subnet** object already created for each office with a **User** object that he creates for the CEO.

The administrator places all three CEO rules above the employee rules, because the SG appliance looks for the first rule that matches a given situation and ignores the remaining rules. If he had placed the CEO rules below the employee rules, the SG appliance would never get to the CEO rules because the CEO's Web surfing client IP address matches both the CEO rules and the employee rules, and the SG appliance would stop looking after the first match. With the CEO rules placed first, the SG appliance applies the CEO rules to the CEO's Web surfing, and an employee's Web surfing does not trigger the CEO rules and instead skips ahead to the appropriate employee rule.

Task Three: Bandwidth Allocation

It soon becomes apparent that CEO visits are causing problems for the branch offices. At times, she uses all of the available bandwidth, resulting in decreased productivity throughout the office she visits. Also, management has complained that they have been given the same priority for FTP and HTTP traffic as regular employees, and they are requesting that they be given priority over employees for this type of traffic.

First, the administrator creates two new classes for each office. In this example, we look at the classes and configurations for the first office only. He creates a class called **Staff_A** and sets a minimum bandwidth of 500 kbps on it. He also creates a class called **Mgmt_A**, setting the priority to 1 and the parent to **Staff_A**. He edits the class **Emp_A**, setting the parent to **Staff_A**. Finally, he edits the class **CEO_A**, changing the priority to 2. The resulting hierarchy is illustrated below. To see what the administrator did to the policy rules, see [“Task Three: VPM”](#) on page 83.



In the example illustrated above, employees and management combined are guaranteed a total of 500 kbps. The CEO's priority level has no effect until that minimum is satisfied. This means that the CEO can only use 250 kbps of bandwidth if the rest of the staff are using a total of 500 kbps. It also means that the CEO can use 750 kbps if no one else is using bandwidth at the time. In fact, any of the classes can use 750 kbps if the other classes use none.

Priority levels kick in after all of the minimums are satisfied. In this example, if the staff requests more than 500 kbps, they can only receive it if the CEO is using less than 250 kbps. Now notice that the minimum setting for the staff is set on the parent class, **Staff_A**, and not on the child classes, **Emp_A** or **Mgmt_A**. This means that the two child classes, representing employees and management, share a minimum of 500 kbps. But they share it based on their priority levels. This means that management has priority over employees. The employees are only guaranteed a minimum if management is using less than 500 kbps.

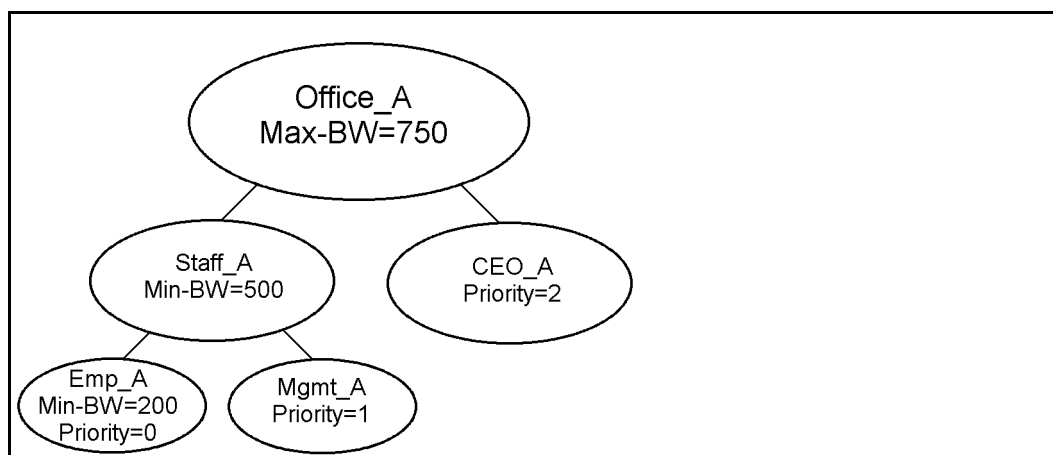
Task Three: VPM

The administrator has added additional classes for each office and edited the existing employee classes, as described above in "Task Three: Bandwidth Allocation". One of the new classes he added for each office is a parent class that does not have traffic classified to it; it was created to provide a minimum amount of bandwidth to its child classes. Not every class in the hierarchy has to have a traffic flow. This means that he needs to add just three more rules for the three new management classes. For the management rules, he selects the same combined **FTP/HTTP** object in the **Service** column; in the **Action** column, he selects a **Manage Bandwidth** object configured for client side/outbound with the bandwidth class one of the management classes (**Mgmt_A**, **Mgmt_B**, or **Mgmt_C**). In the **Source** column, he creates a **Combined Source Object** containing the subnet object for the office and the **Group** object for management.

The management rules must go above the employee rules, although it does not matter where they are placed in relation to the CEO rules. This would not be true if the CEO was part of the same group as management, however. If that were true, the CEO rules would still need to go on top.

Task Four: Bandwidth Allocation

The administrator decided later that he needed to guarantee employees some bandwidth. He configures a minimum for the class **Emp_A**, as illustrated below.



He decides to leave the minimum on the parent class **Staff_A** and not to set a minimum for the class **Mgmt_A**. This is okay, because the minimum of the parent class is available to its children if the parent class does not use all of it, and the only way that the CEO can get more than 250 kbps is if the employees and management combined use less than 500.

This last change does not require additional changes to policy; the administrator has added a minimum to a class that he has already classified for traffic using policy.

In the above scenario, the class called **Staff_A** does not have traffic configured for it—it was created to guarantee bandwidth minimums for its child classes. However, if it were configured for traffic, it would have a practical minimum of 300 kbps. The practical minimum of a parent class is equal to its assigned minimum bandwidth minus the minimums of its children. In that case, if the parent class **Staff_A** used 300 kbps and the child class **Emp_A** used 200 kbps, the child class **Mgmt_A** would not receive any bandwidth unless the class **CEO_A** was using less than 250 kbps. Under those circumstances, the administrator probably also needs to create a minimum for management.

Task Five: Bandwidth Allocation

The CEO makes another request, this time for the main office, the one the administrator himself works from. This office uses the content filtering feature of the SG appliance to control the types of Web sites that employees are allowed to view. Although the office uses content filtering, access to sports sites is not restricted because the CEO is a big fan.

The administrator creates a bandwidth management class called **Sports** with a maximum bandwidth of 500 kbps and launches VPM to create policy for this class as described below.

Task Five: VPM

To classify traffic for the **Sports** class, the administrator opens VPM, creates a Web Access Layer, and sets the **Destination** column to the **Category** object that includes sports viewing (content filtering is already set up in VPM). He sets the **Action** column to the **Manage Bandwidth** object, selecting **Server side/Inbound** and the **Sports** bandwidth class he created. After installing the policy and verifying that bandwidth management is enabled, he is finished.

Policy Examples: CPL

The examples below are complete in themselves. The administrator uses CLI to create and configure bandwidth management classes and writes CPL to classify traffic flow for these classes. These examples do not make use of a bandwidth class hierarchy. For examples of hierarchies, see [“Bandwidth Allocation and VPM Examples”](#) on page 78.

Example One: CPL

In this example, the administrator of a college is asked to prevent college students from downloading MP3 files during peak hours, while still allowing the music department to download MP3 files at any time. The CPL triggers used are authentication and/or source subnet and MIME type. The action taken is to limit the total amount of bandwidth consumed by students to 40 kbps.

CLI commands:

```
SGOS#(config) bandwidth-management
SGOS#(config bandwidth-management) create mp3
SGOS#(config bandwidth-management) edit mp3
SGOS#(config bw-class mp3) max-bandwidth 40
```

CPL:

```
define condition student_mp3_weekday
  client_address=student_subnet response_header.Content-Type="audio/
mpeg" \
  weekday=1..5 hour=9..16
end condition

<proxy>
  condition=student_mp3_weekday limit_bandwidth.server.inbound(mp3)
```

Example Two: CPL

In this example, an administrator must restrict the amount of bandwidth used by HTTP POST requests for file uploads from clients to 2 Mbps. The CPL trigger used is request method, and the action taken is to throttle (limit) the amount of bandwidth used by client side posts by limiting inbound client side flows.

CLI:

```
SGOS#(config) bandwidth-management
bandwidth-management) create http_post
SGOS#(config bandwidth-management) edit http_post
SGOS#(config bw-class http_post) max-bandwidth 2000
```

CPL:

```
define condition http_posts
  http.method=POST
end condition

<proxy>
  condition=http_posts limit_bandwidth.client.inbound(http_post)
```

Example Three: CPL

In this example, the administrator of a remote site wants to limit the amount of bandwidth used to pre-populate the content from headquarters to 50 kbps during work hours. The CPL triggers used are current-time and pre-population transactions. The action taken is to limit the total amount of bandwidth consumed by pre-pop flows.

CLI:

```
SGOS#(config) bandwidth-management  
SGOS#(config bandwidth-management) create pre-pop  
SGOS#(config bandwidth-management) edit pre-pop  
SGOS#(config bw-class pre-pop) max-bandwidth 50
```

CPL:

```
define condition prepop_weekday  
    content_management=yes weekday=1..5 hour=9..16  
end condition  
  
<proxy>  
    condition=prepop_weekday limit_bandwidth.server.inbound(pre-pop)
```


Chapter 6: Authenticating an SG Appliance

This chapter discusses device authentication, which is a mechanism that allows devices to verify each others' identity; devices that are authenticated can be configured to trust only other authenticated devices.

Note: SG appliance authentication is always used in association with other SGOS features. For example, you can use appliance authentication with the ADN implementation of secure tunnels. The secure tunnels feature uses authentication, the process of verifying a device's identity, with authorization, the process of verifying the permissions that a device has. For information on secure tunnels and appliance authentication, see [Section D: "Securing the ADN Network" on page 32](#).

Introduction

Device authentication is important in several situations:

- ❑ Securing the network. Devices that are authenticated have exchanged certification information, verified each others' identity and know which devices are trusted.
- ❑ Securing protocols. Many protocols require authentication at each end of the connection before they are considered secure.

This chapter discusses the following topics:

- ❑ ["SG Appliance Overview"](#)
- ❑ ["Appliance Certificates and Device Authentication Profiles" on page 88](#)
- ❑ ["Creating an Authentication Profile" on page 93](#)
- ❑ ["Related CLI Syntax to Manage Device Authentication" on page 95](#)
- ❑ ["Obtaining a Non Blue Coat Appliance Certificate" on page 93](#)
- ❑ ["Related CLI Syntax to Manage Device Authentication" on page 95](#)

SG Appliance Overview

The Blue Coat implementation allows devices to be authenticated without sending passwords over the network. Instead, a device is authenticated through certificates and profiles that reference the certificates. Both the profile and the referenced certificate are required for device authentication.

- ❑ **Certificates:** Certificates contain information about a specific device. Blue Coat runs an Internet-accessible Certificate Authority (CA) for the purpose of issuing appliance certificates to SGOS devices. You can also create your own appliance certificates.
- ❑ **Profiles:** A profile is a collection of information used for device-to-device authentication, including if the device has a certificate and if the certificates of other devices should be verified. The built-in profile is called *bluecoat-appliance-certificate* and references the appliance certificate on your SG appliance; you can create additional profiles.

Note: Authenticating the SG appliance and authenticating the SG appliance server name are two different procedures that require two different certificates. For information on authenticating server names, refer to *Volume 4: Securing the Blue Coat SG Appliance*.

Appliance Certificates and Device Authentication Profiles

In the Blue Coat implementation of device authentication, both an appliance certificate and a device authentication profile that references the appliance certificate keyring are required for device authentication to be successful. Each device to be authenticated must have an appliance certificate and a profile that references that certificate.

Note that device authentication does not take effect unless the profile is enabled; for example, if you use WAN optimization, you enable the profile on the **Configuration > App. Delivery Network > General > Device Security** tab.

About SG Appliance Certificates

SG appliances come with a cryptographic key that allows the system to be authenticated as an SG appliance when an *appliance certificate* is obtained.

An appliance certificate is an X.509 certificate that contains the hardware serial number of a specific SG device as the CommonName (CN) in the subject field. This certificate then can be used to authenticate the SG appliance whose hardware serial number is listed in the certificate. Information from the presented certificate is extracted and used as the *device ID*.

Blue Coat runs an Internet-accessible CA for the purpose of issuing appliance certificates. The root certificate for the Blue Coat CA is automatically trusted by SGOS for device authentication. These Blue Coat-signed certificates contain no authorization information and are valid for five years.

You can provide your own device authentication certificates for the SG appliances on your network if you prefer not to use the Blue Coat CA.

About Device Authentication Profiles

A device authentication profile contains the information related to device authentication:

- ❑ The name of the keyring that contains the private key and certificate this device uses to authenticate itself. The default is `appliance-key`. (For information on private and public keys, refer to *Volume 4: Securing the Blue Coat SG Appliance*.)
- ❑ The name of the CA Certificate List (CCL) that contains the names of certificates of CAs trusted by this profile. If another device offers a valid certificate signed by an authority in this list, the certificate is accepted. The default is `appliance-ccl`.
- ❑ Verification of the peer certificate.

When the SG appliance is participating in device authentication as an SSL client, the peer certificate verification option controls whether the server certificate is validated against the CCL. If verification is disabled, the CCL is ignored.

When the SG appliance is participating in device authentication as an SSL server, the peer certificate verification option controls whether to require a client certificate. If verification is disabled, no client certificate is obtained during the SSL handshake. The default is `verify-peer-certificate enabled`.

- ❑ Specification of how the device ID authorization data is extracted from the certificate. The default is `$(subject.CN)`.
- ❑ SSL cipher settings. The default is AES256-SHA.

Each Blue Coat appliance has an automatically-constructed profile called **bluecoat-appliance-certificate** that can be used for device-to-device authentication. This profile cannot be deleted or edited.

If you cannot use the built-in profile because, for example, you require a different cipher suite or you are using your own appliance certificates, you must create a different profile, and have that profile reference the keyring that contains your certificate.

Note: If you do not want to use peer verification, you can use the built-in **passive-attack-detection-only** profile in place of the **bluecoat-appliance-certificate** profile.

This profile uses a self-signed certificate and disables the `verify-peer` option, so that no authentication is done on the endpoints of the connection. The traffic is encrypted, but is vulnerable to active attacks.

This profile can be used only when there is no threat of an active man-in-the-middle attack. Like the **bluecoat-appliance certificate** profile, the **passive-attack-detection-only** profile cannot be edited or deleted.

If you create your own profile, it must contain the same kind of information that is contained in the Blue Coat profile. To create your own profile, skip to [“Creating an Authentication Profile”](#) on page 93.

Obtaining an SG Appliance Certificate

In many cases, if you have Internet connectivity, an appliance certificate is automatically fetched by the SG appliance, and no human intervention is required. In other cases, if the Internet connection is delayed or if you do not have Internet access, you might have to manually initiate the process of obtaining an appliance certificate.

How you obtain an appliance certificate depends upon your environment:

- ❑ If the device to be authenticated has Internet connectivity and can reach the Blue Coat CA server, continue with [“Automatically Obtaining an Appliance Certificate”](#) on page 90.
- ❑ If the device to be authenticated cannot reach the Blue Coat CA server, you must acquire the certificate manually; continue with [“Manually Obtaining an Appliance Certificate”](#) on page 90.

After the certificate is obtained, you must configure the device to use the profile you choose to use. For information on configuring the device to use the profile, see [Chapter 2: “Configuring an Application Delivery Network”](#).

If you are configuring device authorization as well as authentication, configure device authentication before authorization. For more information on device authorization, see [Chapter 2: “Configuring an Application Delivery Network”](#).

Important: Only the following SG platforms support appliance certificates:

- ❑ SG200 (manufactured after August 1, 2006)
- ❑ SG210
- ❑ SG510
- ❑ SG810
- ❑ SG8100

If you attempt to obtain an appliance certificate for other platforms (through **Configuration > SSL > Appliance Certificates > Request appliance certificate**), the request fails with the following error message:

- ❑ **Request failed: Signing server reported error: No such serial number** *serial number*.

If you receive this message, you cannot use Blue Coat appliance certificates, but you can create your own appliance certificates for use in a secure network. For more information, see [“Obtaining a Non Blue Coat Appliance Certificate”](#) on page 93.

Automatically Obtaining an Appliance Certificate

The appliance attempts to get the certificate completely automatically (with no user intervention) if it can connect to the Blue Coat CA server at boot time or within about five minutes of being booted. If the appliance does not have a certificate (for example, it had one until you did a `restore-defaults factory-defaults` command) it attempts to get one on every boot. Once the appliance gets a certificate, that certificate is used until another `restore-defaults factory-defaults` command is issued.

If Internet connectivity is established more than five minutes after the system is booted, you might need to complete the following steps.

To automatically obtain an appliance certificate:

1. Select **Configuration > SSL > Appliance Certificates > Request Certificate**.
2. Click **Request appliance certificate**.

The Blue Coat CA server does validation checks and signs the certificate. The certificate is automatically placed in the `appliance-key` keyring. Note that the `appliance-key` keyring cannot be backed up. The keyring is re-created if it is missing at boot time.

Manually Obtaining an Appliance Certificate

Complete the following steps to obtain an appliance certificate manually. The overview of the procedure is to:

- ❑ Generate a appliance certificate signing request and send it to the Blue Coat CA server for verification and signature.
- ❑ Import the signed certificate into the SG appliance.

To generate a CSR:

1. Select **Configuration > SSL > Appliance Certificates > Request Certificate**.
2. Select **Create CSR**.

Appliance Certificate Signing Request

Appliance Certificate Signing Request

```

-----BEGIN CERTIFICATE REQUEST-----
MIIBxzCCATACAQAwYYxCzAJBgNVBAYTA1VTMQswCQYDVQQLIEwJJDQTESMBAGA1UE
BxMJU3Vubn12YWx1MSAwHgYDVQKExdCmHV1IENvYXQGU31zdGVtcywgSW5jLjEf
MBOGA1UECzMWQm1ZSEBb2FOIFNMMjAwIFN1cm1lc2ETMBEGA1UEAxMKNDUwNTA2
MDAyMDCBnzANBgkqhkiG9w0BAQEFAA0BjQAwgYkCgYEAAt1Y3SaIts6ADY8BPYhVb
MrvA/aRsOE60CwwsuxiFSTHn3ijDug5ttT5DDvfmxy4YcgP7vdTaeVdqeQDBwkM
FpjxxWfjTHXINgeBWKhTMSWLC0/gBa8z7cWUryxyGS9FS3H2ZBZXsSvQT19zWu3
2XA3QtI1r8RH7MM1dbPomrOCAwEAAaAAMA0GCSqGSIb3DQEBBAUAA4GBAHBikV0c
TjM8zDmPttII7dMNCwmfPIy3zeyppdrMFL1JcnJjwqhlXrndN7WHYUXEwhYJtU9p
70kyFs+giBtIzdd8fnZaeF4JXNCzSfLqWnpKOjTBA9WLTMc1ThlHp1UZE/T11DRS

```

Copy the certificate signing request and visit <http://abrca.bluecoat.com/cgi-bin/device-authentication/sign-manual>. Follow the instructions there to obtain an appliance certificate.

Once you have obtained the appliance certificate, import it into the keyring referenced by the "bluecoat-appliance-certificate" profile.

OK

- Copy the certificate request, including the certificate request signature. Be sure to include the "Begin Certificate" and "End Certificate" statements, as well as the "Begin CSR Signature" and "End CSR Signature" statements.
- Click **OK**.
- Go to the Blue Coat CA Server Website at <https://abrca.bluecoat.com/sign-manual/index.html>.

Blue Coat - ABRCA Manual Form

```

-----BEGIN CERTIFICATE REQUEST-----
MIIBxzCCATACAQAwYYxCzAJBgNVBAYTA1VTMQswCQYDVQQLIEwJJDQTESMBAGA1UE
BxMJU3Vubn12YWx1MSAwHgYDVQKExdCmHV1IENvYXQGU31zdGVtcywgSW5jLjEf
MBOGA1UECzMWQm1ZSEBb2FOIFNMMjAwIFN1cm1lc2ETMBEGA1UEAxMKNDUwNTA2
MDAyMDCBnzANBgkqhkiG9w0BAQEFAA0BjQAwgYkCgYEAAt1Y3SaIts6ADY8BPYhVb
MrvA/aRsOE60CwwsuxiFSTHn3ijDug5ttT5DDvfmxy4YcgP7vdTaeVdqeQDBwkM
FpjxxWfjTHXINgeBWKhTMSWLC0/gBa8z7cWUryxyGS9FS3H2ZBZXsSvQT19zWu3
2XA3QtI1r8RH7MM1dbPomrOCAwEAAaAAMA0GCSqGSIb3DQEBBAUAA4GBAHBikV0c
TjM8zDmPttII7dMNCwmfPIy3zeyppdrMFL1JcnJjwqhlXrndN7WHYUXEwhYJtU9p
70kyFs+giBtIzdd8fnZaeF4JXNCzSfLqWnpKOjTBA9WLTMc1ThlHp1UZE/T11DRS
kZ6AfyhJQGhxmKuAi8LLRjPM05Y0owxo8A17
-----END CERTIFICATE REQUEST-----
-----BEGIN CSR SIGNATURE-----
KsrqFGa5jb2Az+GL/Hm90FmmBzLgOsvAwBbaYD64qNm3VH17AdAMw2LfrZ1D13ez
BOgxKJEBU5w7TULG23QJV3XpWP7XOb6ms1ekg/XPNZ2OmoNjI3VreJ+A9usYpUhh
56qFKfIcivnDchukrhI=
-----END CSR SIGNATURE-----

```

CSR+Signature

Generate Cert

- Paste the CSR and signature into the CSR panel.

7. Click **Generate Cert.**

The signed certificate displays, and can be pasted into the appliance-key keyring.

```
-----BEGIN CERTIFICATE-----
MIIF/jCCBOagAwIBAgICAMowDQYJKoZIhvcNAQEFBQAwbYxwCzAJBgNVBAYTA1VT
MRMwEQYDVQQIEWpDYWxpZm9ybmlhMRIWEAYDVQQHEw1TdW5ueXZhbGUxIDAeBgNV
BAoTF0JsdWUgQ29hdCBTeXN0ZW1zLCBjb250bWwMRkwFwYDVQQLExBChV1IENvYXQs
IEFECukNBMRswGQYDVQQDExJhYnJjYS51bHV1Y29hdC5jb20xJDAiBgkqhkiG9w0B
CQEFWFXN5c2FkbWluQGJsdWVjb2F0LmNvbTAeFw0wNzAxMjkyMDM5NDdaFw0xMjAx
MjkyMDM5NDdaMIGGMQswCQYDVQQGEwJVUzELMAkGA1UECBMCQ0ExEjAQBgNVBACt
CVN1bm55dmFsZTEgMB4GA1UEChMXQmx1ZSBDb2F0IFN5c3R1bXMsIEluYy4xHZAAd
BgNVBAsTFkJsWUgQ29hdCBTRzIwMCBTRzJpZXMxZzARBgNVBAMTCjA1MDUwNjAw
OTIwZGZ8wDQYJKoZIhvcNAQEBBQADgY0AMIGJAoGBAMBUMCuKSSsd+D5kQJiWu3OG
DNLCvf7SyKK5+SBCJU2iKwP5+EfiQ5JsScWJghtIo94EhdSC2zvBPQqWbZAJXN74
k/yM4w9ufjfo+G7xPYcMrGmwVBGnXbEhQkagclFH2orINNY8SVDYVL1V4dRM+0at
YpEiBmSxipmRSMZL4kqtAgMBAAGjggLGMIIICwAJBgNVHRMEAjAAMAsGA1UdDwQE
AwIE8DBOBgNVHsUERzBFBGgrBgEFBQcDAQYIKwYBBQUHAWIGCCsGAQUFBwMEBgsr
BgEEAfElAQECAQYLKwYBBAHxJQEBAGIGCysGAQQB8SUBAQIDMB0GA1UdDgQWBBSF
NqC2ubTI7OT5j+KqCPGLSD07DzCB6wYDVR0jBIHjMIHggBSwEYwclN6G1ZhpXn
OTIu8fNe1aGBvKSBUtCBtjELMAkGA1UEBhMCVVMxEzARBgNVBAGTCkNhbGlm3Ju
aWEwEjAQBgNVBACtCVN1bm55dmFsZTEgMB4GA1UEChMXQmx1ZSBDb2F0IFN5c3R1
bXMsIEluYy4xGTAXBgNVBAsTEEJsdWUgQ29hdCwgQUJSQ0ExGzAZBgNVBAMTEmFi
cmNhLmJsdWVjb2F0LmNvbTEkMCIGCSqGSIb3DQEJARYVc3lzYWRTaW5AYmx1ZWNV
YXQuY29tgkgAhmhbuPEEb60wgZ8GCCsGAQUFBwEBB1GSMIGPMekGCCsGAQUFBzAB
hj1odHRwcZovL2FicmNhLmJsdWVjb2F0LmNvbS9jZ2ktYmluL2Rldm1jZS1hdXRo
ZW50aWNhdGlvbi9vY3NwMEIGCCsGAQUFBzAChjZodHRwOi8vYWJyY2EuYmx1ZWNV
YXQuY29tL2Rldm1jZS1hdXRoZW50aWNhdGlvbi9jYS5jZ2kwSAYDVR0fBEEwPzA9
oDugOYY3aHR0cDovL2FicmNhLmJsdWVjb2F0LmNvbS9kZXZpY2UtYXV0aGVudG1j
YXRpb24vQ1JMLmNybDBfBgNVHSAEWBWMFQGCisGAQQB8SUBAQEwRjBEBGgrBgEF
BQcCARY4aHR0cDovL2FicmNhLmJsdWVjb2F0LmNvbS9kZXZpY2UtYXV0aGVudG1j
YXRpb24vcnBhLm0bWwwDQYJKoZIhvcNAQEFBQADggEBACIhQ7Vu6aGJBpxP255X
d2/Qw7NiVsnqOlAy913QZlieFfVATJnCeSrH+M9B/2XtnRxVT0/ZWrf4GbsdYqTF
hc9jR/IwKu6kZq32Dqo8qFU5OzbAEzT2oebB5QgwJtHcJHggp9PS9uS27qAnGQK
OeB2bYcjWtMvTvr50iDOV69BEQz+VXos8QiZmRHLVnebQSjl3bilw3VjBw31tCmc
clgz0S1N9ZmJdRU/PlWdNVqD40LqcMZQ53HqcdWNEzn2uvigIb//rM7XazK7xIaq
r23/+BsZlYKAeVMq3PEmxaA2zLzO+jf79a8ZvIKrF27nNuTN7NhFL/V6pWNE1o9A
rbs=
-----END CERTIFICATE-----
```

To import a certificate onto the SG appliance:

1. Copy the certificate to your clipboard. Be sure to include the “Begin Certificate” and “End Certificate” statements.
2. Select **Configuration > SSL > Keyrings**.
3. Select the keyring that is used for device authentication. The keyring used by the **bluecoat-appliance-certificate** profile is the **appliance-key** keyring.
4. Click **Edit/View** in the **Keyrings** tab.

5. In the **Certificate** panel, click **Import**.
6. Paste the certificate you copied into the dialog box. Click **OK**.
The certificate should display in the SSL Certificates Pane, associated with the keyring you selected earlier.

Obtaining a Non Blue Coat Appliance Certificate

If you run your own certificate signing authority for device authentication, complete the following steps:

1. Create a keyring for the appliance's certificate. For information on creating a keyring, refer to *Volume 4: Securing the Blue Coat SG Appliance*.
2. Generate the certificate signing request and get it signed. For information on creating a CSR, refer to *Volume 4: Securing the Blue Coat SG Appliance*.

Note: You cannot put a Blue Coat appliance certificate into a keyring you create yourself.

3. Create a CA certificate list. For information on creating a CCL, refer to *Volume 4: Securing the Blue Coat SG Appliance*
 - a. Import the CA's root certificate.
 - b. Add the certificate to the CCL.
4. Create a device authentication profile. (To create a profile, see [“Appliance Certificates and Device Authentication Profiles”](#) on page 88.)
5. Associate the profile with the keyring and CCL. The keyring and CCL must already exist.

Adjust other parameters, including authorization data extractor (if the certificate is to be used for authorization), as needed.

Configure each application that uses device authentication to reference the newly created profile, and set up its whitelist. To associate the device with the profile, see [Chapter 2: “Configuring an Application Delivery Network”](#).

Creating an Authentication Profile

An authentication profile only needs to be created if you cannot use the built-in **bluecoat-appliance-certificate** profile without modification; note that the **bluecoat-appliance-certificate** profile cannot be deleted or edited.

Additional profiles with different settings can be created; for example, if you require a different cipher setting than what the **bluecoat-appliance-certificate** profile uses, you can create a profile with the different cipher suite.

To create a new authentication profile:

1. Select **Configuration > SSL > Device Authentication > Profiles**.
2. Click **New**.

3. **Name:** Give the profile a meaningful name. The only valid characters are alphanumeric, the underscore, and hyphen, and the first character must be a letter.
4. **Keyring:** From the drop-down list, select the keyring you want to use for device authentication.

Note: You must create a new keyring for device authentication if you do not use the `appliance-key` keyring. The keyrings shipped with the Blue Coat SG are dedicated to other purposes. For information on creating a new keyring, refer to *Volume 4: Securing the Blue Coat SG Appliance*.

5. **CCL:** From the drop-down list, select the CA Certificate List you want to use.
6. **Device ID extractor:** The field describes how device ID information is extracted from a presented certificate. The string contains references to the attributes of the subject or issuer in the form `$(subject.attr[.n])` or `$(issuer.attr[.n])`, where `attr` is the short-form name of the attribute and `n` is the ordinal instance of that attribute, counting from 1 when the subject is in LDAP (RFC 2253) order. If `n` is omitted, it is assumed to be 1.

The default is `$(subject.CN)`; many other subject attributes are recognized, among them OU, O, L, ST, C, and DC.
7. **Verify peer:** This setting determines whether peer certificates are verified against the CCL or whether client certificates are required.
8. **Selected cipher suites:** If you want to use a different cipher suite, click **Edit cipher suites**.

Edit Cipher Suites

Cipher Suites

Available Cipher Suites

Name	Strength
RC4-MD5	Medium
RC4-SHA	Medium
DES-CBC3-SHA	High
DES-CBC-SHA	Low
EXP1024-RC4-MD5	Export
EXP1024-RC4-SHA	Export
EXP1024-RC2-CBC-MD5	Export
EXP1024-DES-CBC-SHA	Export
EXP-RC4-MD5	Export
EXP-RC2-CBC-MD5	Export
EXP-DES-CBC-SHA	Export
AES128-SHA	Medium

Add >>

<< Remove

Selected Cipher Suites

Name	Strength
AES256-SHA	High

OK Cancel

9. Select the cipher suite or suites you want to use. Click **Add** to add the cipher suite to the list of selected cipher suites. Cipher suites that you do not want to use should be removed from the selected list.
10. Click **OK** when done.
11. Click **Apply** to commit the changes to the SG appliance.

Related CLI Syntax to Manage Device Authentication

- ❑ To enter configuration mode:


```
SGOS#(config) ssl
```
- ❑ The following device-authentication commands are available:


```
SGOS#(config ssl) create device-authentication-profile profile_name keyring_ID
SGOS#(config ssl) edit device-authentication-profile test
SGOS#(config device-auth test) cipher-suite cipher-suite
SGOS#(config device-auth test) ccl ccl_name
SGOS#(config device-auth test) device-id device_ID
SGOS#(config device-auth test) exit
SGOS#(config device-auth test) keyring-id keyring_ID
SGOS#(config device-auth test) verify-peer [enable | disable]
SGOS#(config device-auth test) view
SGOS#(config ssl) request-appliance-certificate
SGOS#(config ssl) view appliance-certificate-request
SGOS#(config ssl) view device-authentication-profile
```


Chapter 7: Configuring Failover

Using IP address failover, you can create a redundant network for any explicit proxy configuration. If you require transparent proxy configuration, you can create software bridges to use failover. For information on creating software bridges, refer to *Volume 1: Getting Started*.

Note: If you use the Pass-Through adapter for transparent proxy, you must create a software bridge rather than configuring failover. For information on using the Pass-Through adapter, refer to *Volume 1: Getting Started*.

Using a pool of IP addresses to provide redundancy and load balancing, Blue Coat migrates these IP addresses among a group of machines.

This chapter discusses:

- ❑ “About Failover”
- ❑ “Configuring Failover” on page 98

About Failover

Failover allows a second machine to take over if a first machine fails, providing redundancy to the network through a master/slave relationship. In normal operations, the master (the machine whose IP address matches the group name) owns the address. The master sends keepalive messages (*advertisements*) to the slaves. If the slaves do not receive advertisements at the specified interval, the slave with the highest configured priority takes over for the master. When the master comes back online, the master takes over from the slave again.

The Blue Coat failover implementation resembles the Virtual Router Redundancy Protocol (VRRP) with the following exceptions:

- ❑ A configurable IP multicast address is the destination of the advertisements.
- ❑ The advertisement interval is included in protocol messages and is learned by the slaves.
- ❑ A virtual router identifier (VRID) is not used.
- ❑ Virtual MAC addresses are not used.
- ❑ MD5 is used for authentication at the application level.

Masters are elected, based on the following factors:

- ❑ If the failover mechanism is configured for a physical IP address, the machine owning the physical address have the highest priority. This is not configurable.
- ❑ If a machine is configured as a master using a virtual IP address, the master has a priority that is higher than the slaves.

When a slave takes over because the master fails, an event is logged in the event log. No e-mail notification is sent.

Configuring Failover

Before you begin, ensure that software bridges already exist. For information on configuring bridges, refer to *Volume 1: Getting Started*.

You also must decide which machine is the master and which machines are the slaves, and whether you want to configure explicit proxy or transparent proxy network.

When configuring the group, the master and all the systems in the group must have exactly the same failover configuration except for priority, which is used to determine the rank of the slave machines. If no priority is set, a default priority of 100 is used. If two appliances have equal priority, the one with the highest physical address ranks higher.

Note: Configuring failover on an Application Data Network (ADN) is similar to configuring failover on other appliances, with the exception that you add a server subnet on multiple boxes instead of just one.

To configure failover:

1. Select **Configuration > Network > Advanced > Failover**.
2. Click **New**.

The screenshot shows the 'Add Failover Group' dialog box. Annotations point to specific fields:

- 3f** points to the ☒ **enabled** checkbox.
- 3a** points to the **Group IP** section, which includes radio buttons for **New IP:** (10, 9, 10, 150) and **Existing IP:** (10.9.59.246).
- 3b** points to the **Group Settings** section, specifically the **Multicast Address:** (224, 1, 2, 3).
- 3c** points to the **Relative Priority:** (254) field, which also has a **Master** checkbox checked.
- 3d** points to the **Advertisement Interval:** (40) field.
- 3e** points to the **Group Secret:** field, which contains six asterisks (*****).

At the bottom of the dialog are **OK** and **Cancel** buttons.

3. Fill in the fields as appropriate:
 - a. Create a group using either a new IP address or an existing IP address. If the group has already been created, you cannot change the new IP address without deleting the group and starting over.
 - b. **Multicast address** refers to a Class D IP address that is used for multicast. It is not a virtual IP address.

Note: Class D IP addresses (224 to 239) are reserved for multicast. A Class D IP address has a first bit value of 1, second bit value of 1, third bit value of 1, and fourth bit value of 0. The other 28 bits identify the group of computers that receive the multicast message.

- c. **Relative Priority** refers to a range from 1-255 that is assigned to systems in the group. 255 is reserved for the system whose failover group ID equals the real IP address. (Optional) **Master** identifies the system with the highest priority (the priority value is greyed out).
 - d. (Optional) **Advertisement Interval** refers to the length of time between advertisements sent by the group master. The default is 40 seconds. If the group master fails, the slave with the highest priority takes over (after approximately three times the interval value). The failover time of the group is controlled by setting this value.
 - e. (Optional, but recommended) **Group Secret** refers to a password shared only with the group.
 - f. Select **enabled**.
 - g. Click **OK**.
4. Click **Apply** to commit the changes to the SG appliance.

Related CLI Syntax to Configure Failover

- ❑ To enter configuration mode:

```
SGOS#(config) failover
```

- ❑ The following subcommands are available:

```
SGOS#(config failover) create group_address
```

```
SGOS#(config failover) edit group_address
```

```
SGOS#(config failover group_address) multicast-address  
multicast_address
```

```
SGOS#(config failover group_address) master
```

```
SGOS#(config failover group_address) priority number
```

```
SGOS#(config failover group_address) interval seconds
```

```
SGOS#(config failover group_address) secret secret
```

```
-or-
```

```
SGOS#(config failover group_address) encrypted-secret encrypted_secret
```

```
SGOS#(config failover group_address) enable
```

Viewing Failover Statistics

At any time, you can view statistics for any failover group you have configured on your system.

To view failover status:

1. Select **Statistics > System > Failover**.

The screenshot shows a web-based configuration interface. At the top, there is a tab labeled "Status". Below the tab, there is a label "Failover Group:" followed by a dropdown menu that currently displays "10.9.16.150". Below this, there is a section titled "Failover status:" which contains a table of information.

Multicast address:	224.1.2.3
Local address:	10.9.16.150
State:	MASTER
Flags:	R (Real IP)

2. From the drop-down list, select the group to view.

The information displayed includes the multicast address, the local address, the state, and any flags, where **V** indicates the group name is a virtual IP address, **R** indicates the group name is a physical IP address, and **M** indicates this machine can be configured to be the master if it is available.

Chapter 8: Configuring the Upstream Network Environment

To fill requests, the SG appliance must interact with both the local network and with the upstream network environment.

This chapter includes the following sections:

- ❑ [Section A: "Overview"](#) on page 102
- ❑ [Section B: "About Forwarding"](#) on page 103
- ❑ [Section C: "Configuring Forwarding"](#) on page 106
- ❑ [Section D: "Using Forwarding Directives to Create an Installable List"](#) on page 114

Section A: Overview

Section A: Overview

To control upstream interaction, the SG appliance supports:

- ❑ The SG appliance forwarding system—Allows you to define the hosts and groups of hosts to which client requests can be redirected. Those hosts can be servers or proxies. Rules to redirect requests are set up in policy.
- ❑ SOCKS gateways—SOCKS servers provide application-level firewall protection for an enterprise. The SOCKS protocol provides a generic way to proxy HTTP and other protocols. For information on configuring SOCKS gateways, see [Chapter 13: "SOCKS Gateway Configuration"](#) on page 183.
- ❑ ICP—ICP handles ICP queries from other caching devices looking for cached data. The SG appliance also can use ICP. For information on configuring ICP, see [Chapter 9: "Internet Caching Protocol \(ICP\) Configuration"](#) on page 121.

Section B: About Forwarding

Section B: About Forwarding

Forwarding allows you to redirect requests to IP addresses other than those specified in the URL. Forwarding also allows you to organize how the Web traffic flows around the network. Forwarding does not affect the URL that appears in the request. It only affects the IP address of the upstream device a request is sent to.

The SG appliance forwarding system consists of forwarding, upstream SOCKS gateways, load balancing, host affinity, health checks, and ICP. The SG appliance forwarding system determines the upstream address where a request is sent, and is tied in with all the protocol agents, including HTTP, HTTPS, streaming, and FTP, and the network configuration. The combination of forwarding and the policy engine allows traffic management and flexible configuration.

Note: The SG appliance forwarding system directly supports the forwarding of HTTP, HTTPS, FTP, Windows Media, RTSP, Telnet, and TCP tunnels.

About Load Balancing

Load balancing is a way to share traffic requests among multiple upstream systems or multiple IP addresses on a single host. Load-balancing methods include round robin, which selects the next system in the list, or least connections, which selects the system with the least number of connections among the selected group.

You can configure load balancing two ways:

- ❑ For individual hosts: If a host is DNS-resolved to multiple IP addresses, then that host's load-balancing method (round robin, least connections, or none) is applied to those IP addresses. The method is either explicitly set for that host or taken from the configurable global default settings.
- ❑ For groups: Load balancing for groups works exactly the same as load balancing for hosts with multiple IP addresses—the forwarding system collects all of the IP addresses for all of the hosts in the group and load balances over that set using the method that is specified. You can also use a domain or URL hash, as well.

About Host Affinity

Host affinity is the attempt to direct multiple connections by a single user to the same group member. Host affinity is closely tied to load balancing behavior; both should be configured if load balancing is important. For example, a Web site uses shopping carts to allow customers to purchase items. The site might use load balancing with a group of Web servers working in parallel, but only one server in the group has information on a single user. If the user connections are sent to a different server, the server has no previous information on the user and might start over.

Host affinity forces the user's connections to return to the same server until the user is idle. After a configurable period of inactivity, the host affinity times out and the association of multiple connections with that single user is lost.

Host affinity allows you to use the following options:

- ❑ Use the client IP address to determine which group member was last used. When the same client IP sends another request, the host makes the connection is made to that group member.

Section B: About Forwarding

- ❑ Place a cookie in the response to the client. When the client makes further requests, the cookie data is used to determine which group member the client last used. The host makes the connection to that group member.
- ❑ For HTTPS, extract the SSL session ID name from the connection information. The host uses the session ID in place of a cookie or client IP address to determine which group member was last used. The host makes the connection to that group member.

Using Load Balancing with Host Affinity

By default, if you use load balancing, each connection is treated independently. The connection is made to whichever member of the load-balancing group that the load-balancing algorithm selects. The load balancing responsibility is to distribute the connections among group members to share the load.

If host affinity is configured, the system checks host affinity first to see if the request comes from a known client. If this is a first connection, the load-balancing algorithm selects the group member to make the connection. Host affinity records the result of the load balancing and uses it if that client connects again.

Host affinity does not make a connection to a host that health checks report is down; instead, if host affinity breaks, the load-balancing algorithm selects a group member that is healthy and re-establishes affinity on that working group member.

Note: You might find it necessary to disable caching for traffic sent to the load-balanced groups (or hosts if DNS hides a group under one entry) to prevent copies of customized Web pages being served to a different user.

It is not always necessary to disable caching; for example, load balancing can be used without host affinity or without disabling caching to distribute load among several proxies.

However, if caching is enabled for traffic going through load balancing, retrieval of updated content by the cache is done according to load balancing rules; the cache does not support host affinity and ignores it if enabled.

Host affinity methods are discussed in the table below.

Table 8-1. Host Affinity Methods

Setting	Description	HTTP	SSL	Other (TCP Tunnel or Telnet)
Global Default	Use the default setting for all forwarding hosts on the system.	✓	✓	✓
None	Disables host affinity.	✓	✓	✓
Client IP Address	Uses the client IP address to determine which group member was last used.	✓	✓	✓
Accelerator Cookie	Inserts a cookie into the response to the client.	✓	✓	

Section B: About Forwarding

Table 8-1. Host Affinity Methods (Continued)

SSL Session ID	Used in place of a cookie or client IP address. Extracts the SSL session ID name from the connection information.		✓	
-----------------------	---	--	---	--

Section C: Configuring Forwarding

Section C: Configuring Forwarding

High-level steps to configure forwarding are:

- ❑ Create the forwarding hosts and groups, including parameters such as protocol agent and port.
- ❑ Set Load Balancing and Host Affinity values.

Creating Forwarding Hosts and Groups

You can create as many hosts, groups, or members of a group as you need.

To create groups, see [“To create forwarding groups:”](#) on page 107

To create forwarding hosts:

1. Click **Configuration > Forwarding > Forwarding Hosts**.
2. Click **New** to create a new forwarding host.

3. Enter the fields as follows:
 - a. In the **Alias** field, enter the name of the host as it will be named in policy.

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Note: The host alias cannot be a CPL keyword, such as `no`, `default`, or `forward`.

- b. In the **Host** field, give the name of the host domain or its IP address.
- c. Define the host type by selecting either the **Proxy** or **Server** radio button. Terminated HTTPS, TCP tunnels, and Telnet can be forwarded to a server only; they cannot be forwarded to a proxy. **Server** specifies to use the relative path for URLs in the HTTP header because the next hop is a Web server, not a proxy server. The default is **Proxy**.
- d. Select the port you want to use.

Port 80 is the default for HTTP. The rest of the host types default to their appropriate Internet default port, except TCP tunnels, which have no default and for which a port must be specified.

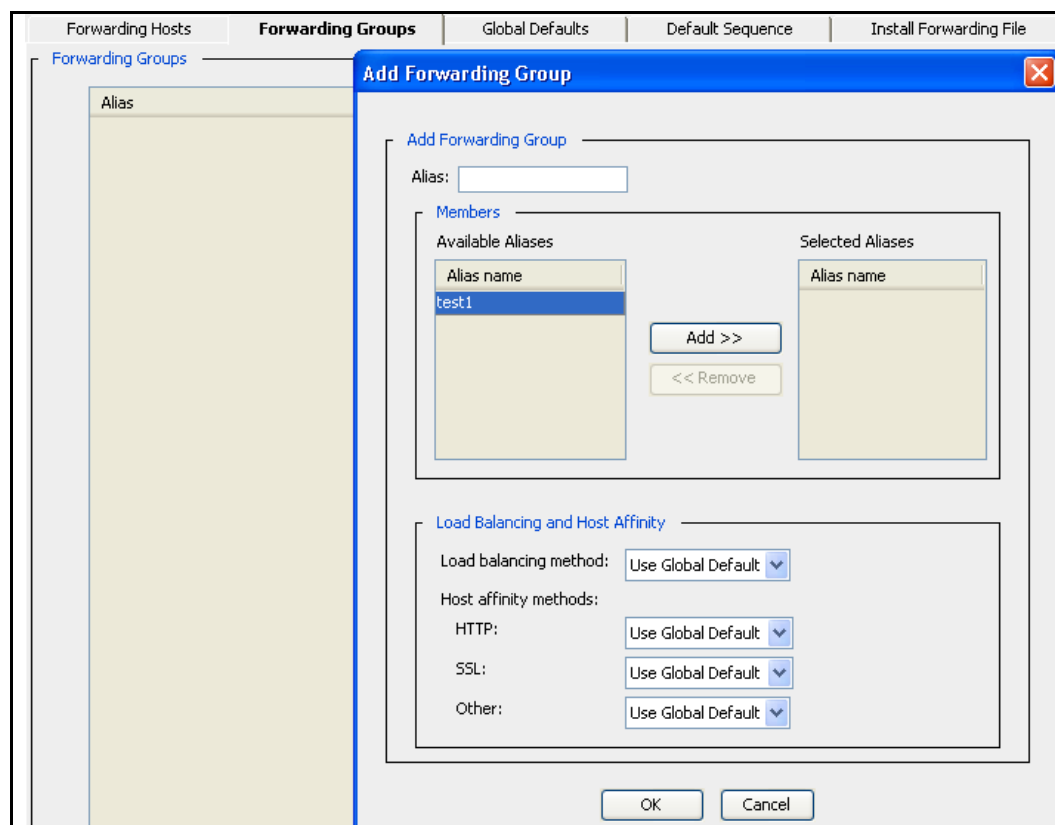
- e. In the **Load Balancing and Host Affinity** section, select a load-balancing method from the drop-down list. **Global default** (configured on the **Configuration > Forwarding > Global Defaults** tab), sets the default for all forwarding hosts on the system. You can also specify the load-balancing method for this system: **Least Connections** or **Round Robin**, or you can disable load balancing by selecting **None**.
 - f. In the **Host affinity methods** drop-down list (see [Table 8-1, “Host Affinity Methods,”](#) on page 104), select the method you want to use.
4. Click **OK**.
 5. Click **Apply** to commit the changes to the SG appliance.

To create forwarding groups:

An existing host can belong to one or more groups as needed. It can only belong once to a single group.

1. Click **Configuration > Forwarding > Forwarding Groups**.
2. Click **New** to create a new forwarding group. The Add Forwarding Group dialog displays, showing the available aliases.

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3. Enter a name for the new group in the **Alias** field.

Note: The group alias cannot be a CPL keyword, such as `no`, `default`, or `forward`.

4. To add members to a group, highlight the hosts you want grouped and click **Add**. You can also create a group with no members.
5. In the **Load Balancing and Host Affinity** section, select the load-balancing method from the drop-down list. **Global default** (configured on the **Configuration > Forwarding > Global Defaults** tab), are the defaults that were set for all forwarding groups on the system. To specify the load-balancing method for this system, select **Least Connections**, **Round Robin**, **Domain Hash**, **URL Hash**, or you can disable load balancing by selecting **None**.
6. In the **Host affinity methods** drop-down list (see [Table 8-1, "Host Affinity Methods,"](#) on page 104), select the method you want to use.
7. Click **OK**.
8. Click **Apply** to commit the changes to the SG appliance.

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Configuring Global Forwarding Defaults

The global defaults apply to all forwarding hosts and groups unless the settings are specifically overwritten during host or group configuration.

To configure global defaults:

1. Select **Configuration > Forwarding > Global Defaults**.

2. Configure General Settings as follows:
 - a. Determine how you want connections to behave if no forwarding is available. Note that failing open is an insecure option. The default is to fail closed. This setting can be overridden by policy, if it exists.
 - b. Decide if you want to **Use forwarding for administrative downloads**. The default is to use forwarding in this case.

This option determines whether forwarding is applied to requests generated for administrative reasons on the system, such as downloading policy files or new system images.

If the option is on, meaning that forwarding is applied, you can control the forwarding in policy as needed.

This option also affects the use of SOCKS gateways.

- c. Enter the **Timeout for integrated hosts** interval: An integrated host is an Origin Content Server (OCS) that has been added to the health check list. The host, added through the `integrate_new_hosts` policy property, ages out after being idle for the specified time. The default is 60 minutes.
3. Configure Global Load Balancing and Host Affinity Settings.

Section C: Configuring Forwarding

- a. Load-balancing methods:
 - Forwarding hosts: Specify the load-balancing method for all forwarding hosts unless their configuration specifically overwrites the global settings. You can choose **Least Connections** or **Round Robin**, or you can disable load balancing by selecting **None**. **Round Robin** is specified by default.
 - Forwarding groups: Specify the load-balancing method for all forwarding groups unless their configuration specifically overwrites the global settings. You can choose to do a **domain hash** or a **URL hash**. You can also select **Least Connections** or **Round Robin**, or disable load balancing by selecting **None**. **Round Robin** is specified by default.
 - b. In the Global Host Affinity methods (see [Table 8-1, "Host Affinity Methods,"](#) on page 104), select the method you want to use.
 - c. Enter the **Host Affinity Timeout** interval, the amount of time a user's IP address, SSL ID, or cookie remains valid after its most recent use. The default is 30 minutes, meaning that the IP address, SSL ID or cookie must be used once every 30 minutes to restart the timeout period.
4. Click **Apply** to commit the changes to the SG appliance.

Configuring the Default Sequence

The default sequence is the default forwarding rule, used for all requests lacking policy instructions. Failover is supported if the sequence (only one is allowed) has more than one member.

Note: Creating the default sequence through the CLI is a legacy feature. You can set up sequences by using policy alone. The default sequence (if present) is applied only if no applicable forwarding gesture is in policy.

For information on using VPM, refer to *Volume 6: VPM and Advanced Policy*; for information on using CPL, refer to *Volume 10: Content Policy Language Guide*. For information on using forwarding with policy, see [Appendix B: "Using Policy to Manage Forwarding"](#) on page 263.

The default sequence (and any sequence specified in policy) works by allowing healthy hosts to take over for an unhealthy host (one that is failing its DNS Resolution or its health check). If more than one member is in the sequence, the sequence specifies the order of failover, with the second host taking over for the first host, the third taking over for the second, and so on.

Note: In normal circumstances, only the first member of the sequence is ever used. Traffic is forwarded to the first member of the sequence until it fails, then traffic is sent to the second member of list until it fails or the first member becomes healthy again, and so on.

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To create a default sequence:

1. Select **Configuration > Forwarding > Default Sequence**. The available aliases are displayed.

2. To select an alias, highlight it and click **Add**.

Note: Any host or group in the default sequence is considered in use by policy. As a result, if you try to delete a host or group while it is in the default sequence, you receive an error message. You must remove the host/group from the sequence first, then delete the host or group.

3. Click **Promote** or **Demote** to change the order of the hosts in the failover sequence.
4. Click **Apply** to commit the changes to the SG appliance.

Related CLI Syntax to Configure Forwarding

- ❑ To enter configuration mode for forwarding:

```
SGOS#(config) forwarding
SGOS#(config forwarding)
```

- ❑ The following subcommands are available:

```
SGOS#(config) forwarding
SGOS#(config forwarding) create host host_alias host_name [http[=port]
[https[=port]] [ftp[=port]] [mms[=port]] [rtsp[=port]] [tcp[=port]]
[telnet[=port]] [ssl-verify-server[=yes | =no]] [group=group_name]
[server | proxy]
SGOS#(config forwarding) create group group_name
SGOS#(config forwarding) delete all
SGOS#(config forwarding) delete group group_name
SGOS#(config forwarding) delete host host_alias
SGOS#(config forwarding) download-via-forwarding {disable | enable}
```

Section C: Configuring Forwarding

```

SGOS#(config forwarding) edit host_alias
SGOS#(config forwarding host_alias) exit
SGOS#(config forwarding host_alias) {ftp | http | https | mms |
rtsp | tcp | telnet} [port]}
SGOS#(config forwarding host_alias) host hostname
SGOS#(config forwarding host_alias) host-affinity http {default |
none | client-ip-address | accelerator-cookie}
SGOS#(config forwarding host_alias) host-affinity ssl {default |
none | client-ip-address | accelerator-cookie | ssl-session-id}
SGOS#(config forwarding host_alias) host-affinity other {default |
none | client-ip-address}
SGOS#(config forwarding host_alias) load-balance method {default |
least-connections | none | round-robin}
SGOS#(config forwarding host_alias) no {ftp | http | https | mms |
rtsp | ssl-verify-server | tcp | telnet}
SGOS#(config forwarding host_alias) proxy | server
SGOS#(config forwarding host_alias) ssl-verify-server
SGOS#(config forwarding host_alias) view
SGOS#(config forwarding) edit group_alias
SGOS#(config forwarding group_alias) {add | remove} host_alias
SGOS#(config forwarding group_alias) exit
SGOS#(config forwarding group_alias) host-affinity http {default |
none | client-ip-address | accelerator-cookie}
SGOS#(config forwarding group_alias) host-affinity ssl {default |
none | client-ip-address | accelerator-cookie | ssl-session-id}
SGOS#(config forwarding group_alias) host-affinity other {default |
none | client-ip-address}
SGOS#(config forwarding group_alias) load-balance {default |
domain-hash | least-connections | none | round-robin | url-hash}
SGOS#(config forwarding group_alias) view
SGOS#(config forwarding) exit
SGOS#(config forwarding) failure-mode {closed | open}
SGOS#(config forwarding) host-affinity http {default | none | client-
ip-address | accelerator-cookie} host_or_group_alias
SGOS#(config forwarding) host-affinity http {none | client-ip-address
| accelerator-cookie}
SGOS#(config forwarding) host-affinity ssl {default | none | client-
ip-address | accelerator-cookie | ssl-session-id} host_or_group_alias
SGOS#(config forwarding) host-affinity ssl {none | client-ip-address |
accelerator-cookie | ssl-session-id}
SGOS#(config forwarding) host-affinity other {default | none | client-
ip-address} host_or_group_alias
SGOS#(config forwarding) host-affinity other {none | client-ip-
address}
SGOS#(config forwarding) host-affinity timeout minutes

```

Section C: Configuring Forwarding

```
SGOS#(config forwarding) integrated-host-timeout minutes
SGOS#(config forwarding) load-balance group {default | none | domain-  
hash | url-hash | round-robin | least-connections} group_alias
SGOS#(config forwarding) load-balance group {none | domain-hash | url-  
hash | round-robin | least-connections}
SGOS#(config forwarding) load-balance host {default | none | round-  
robin | least-connections} host_alias
SGOS#(config forwarding) load-balance host {none | round-robin |  
least-connections}
SGOS#(config forwarding) no path
SGOS#(config forwarding) path url
SGOS#(config forwarding) sequence add host_or_group_alias
SGOS#(config forwarding) sequence clear
SGOS#(config forwarding) sequence demote host_or_group_alias
SGOS#(config forwarding) sequence promote host_or_group_alias
SGOS#(config forwarding) sequence remove host_or_group_alias
SGOS#(config forwarding) view
```

Statistics

To view forwarding statistics, select **Statistics > Advanced > Forwarding**.

Section D: Using Forwarding Directives to Create an Installable List

Section D: Using Forwarding Directives to Create an Installable List

You can use directives instead of using the Management Console or CLI to configure forwarding. Note that the Management Console offers the easiest method of configuration. Using directives, you can:

- ❑ Create the forwarding hosts and groups
- ❑ Provide load balancing and host affinity

Table 8-2. Forwarding Directives

Directive	Meaning	See
<code>fwd_fail</code>	Determines whether the forwarding host should fail open or fail closed if an operation does not succeed.	“Setting Fail Open/Closed and Host Timeout Values” on page 116.
<code>fwd_host</code>	Creates a forwarding host and sets configuration parameters for it, including protocols and ports.	“Creating Forwarding Hosts” on page 115.
<code>group</code>	Creates a forwarding group and identifies members of the group.	“Creating Forwarding Groups Using Directives” on page 116.
<code>host_affinity</code>	Directs multiple connections by a single user to the same group member.	“Configuring Host Affinity Directives” on page 117.
<code>integrated_host_timeout</code>	Manages an origin content server that has been added to the health check list. The host ages out after being idle for the specified time.	“Setting Fail Open/Closed and Host Timeout Values” on page 116.
<code>load_balance</code>	Manages the load among forwarding hosts in a group, or among multiple IP addresses of a host.	“Configuring Load-Balancing Directives” on page 117.
<code>sequence</code>	Sets the default sequence to the space separated list of one or more forwarding host and group aliases. (The default sequence is the default forwarding rule, used for all requests lacking policy instructions.)	“Creating a Default Sequence” on page 118.

Creating Forwarding Host and Group Directives

A forwarding host directive creates a host along with all its parameters. You can include a group that the forwarding host belongs to.

A group directive creates a group and identifies group members. For more information on group directives, skip to [“Creating Forwarding Groups Using Directives”](#) on page 116.

Section D: Using Forwarding Directives to Create an Installable List

Creating Forwarding Hosts

To create a forwarding host, choose the protocols you want to use and add the forwarding host to a group, enter the following into your installable list. Create a `fwd_host` directive for each forwarding host you want to create.

```
fwd_host host_alias hostname [http[=port]] [https[=port]] [ftp[=port]]
[mms[=port]] [rtsp[=port]] [tcp=port] [telnet[=port]] [ssl-verify-
server[=yes | =no]] [group=group_name [server | proxy]]
```

Table 8-3. Commands to Create Forwarding Host and Group Directives

host_alias		This is the alias for use in policy. Define a meaningful name.
hostname		The name of the host domain, such <code>www.bluecoat.com</code> , or its IP address.
http https ftp mms rtsp telnet	=port	At least one protocol must be selected HTTPS and Telnet cannot be used with a proxy. Note that HTTPS refers to terminated HTTPS, so it is used only for a server.
tcp	=port	If you choose to add a TCP protocol, a TCP port must be specified. TCP protocols are not allowed if the host is a proxy.
ssl-verify-server	=yes =no	Sets SSL to specify that the SG appliance checks the CA certificate of the upstream server. The default for <code>ssl-verify-server</code> is <code>yes</code> . This can be overridden in the SSL layer in policy. To disable this feature, you must specify <code>ssl-verify-server=no</code> in the installable list or CLI. In other words, you can configure <code>ssl-verify-server=yes</code> in three ways: do nothing (<code>yes</code> is the default), specify <code>ssl-verify-server=no</code> , or specify <code>ssl-verify-server=yes</code> .
group	=group_name	Specifies the group (or server farm or group of proxies) to which this host belongs. If this is the first mention of the group <code>group_name</code> then that group is automatically created with this host as its first member. The SG appliance uses load balancing to evenly distribute forwarding requests to the origin servers or group of proxies.
server proxy		<code>server</code> specifies to use the relative path for URLs in the HTTP header because the next hop is a Web server, not a proxy server. The default is <code>proxy</code> .

Example

```
fwd_host www.bluecoat1.com 10.25.36.48 ssl-verify-server=no
group=bluecoat
```

Section D: Using Forwarding Directives to Create an Installable List

Creating Forwarding Groups Using Directives

The forwarding groups directive has the following syntax:

```
group group_name host_alias_1 host_alias_2...
```

where *group_name* is the name of the group, and *host_alias_1*, *host_alias_2*, and so forth are the forwarding hosts you are assigning to the forwarding group.

Forwarding host parameters are configured through the forwarding host directives.

Setting Special Parameters

After you configure the forwarding hosts and groups, you might need to set other special parameters to fine tune the hosts. You can configure the following settings:

- ❑ “Setting Fail Open/Closed and Host Timeout Values” .
- ❑ “Configuring Load-Balancing Directives” on page 117.
- ❑ “Configuring Host Affinity Directives” on page 117.

Setting Fail Open/Closed and Host Timeout Values

Using directives, you can determine if the forwarding host fails open or closed, if an operation does not succeed, and the interval it takes for integrated hosts to be aged out.

An integrated host is an Origin Content Server (OCS) that has been added to the health check list. If the policy property *integrate_new_hosts* applies to a forwarding request as a result of matching the *integrate_new_hosts* property, the SG appliance makes a note of each OCS and starts health checking to help future accesses to those systems. If the host is idle for the interval you specify, it is aged out. Sixty minutes is the default interval.

The syntax is:

```
fwd_fail {open | closed}
integrated_host_timeout minutes
```

Table 8-4. Commands to Set Fail Open/Closed and Host Timeout Values

<code>fwd_fail</code>	<code>{open closed}</code>	Determines whether the forwarding host should fail open or fail closed if an operation does not succeed. Fail open is a security risk, and fail closed is the default if no setting is specified. This setting can be overridden by policy, (using the <code>forward.fail_open(yes no)</code> property).
<code>integrated_host_timeout</code>	<code>minutes</code>	An OCS that has been added to the health check list is called an integrated host. The host ages out after being idle for the specified time.

Examples

```
fwd_fail open
integrated_host_timeout 90
```

Section D: Using Forwarding Directives to Create an Installable List

Configuring Load-Balancing Directives

Load balancing shares the load among a set of IP addresses, whether a group or a host with multiple IP addresses.

The syntax is:

```
load_balance group {none | domain-hash | url-hash | round-robin |
least-connections} [group_alias]
load_balance host {none | round-robin | least-connections}
[host_alias]
```

Table 8-5. Load Balancing Directives

Command	Suboptions	Description
load_balance group	{none domain-hash url-hash round-robin least-connections} [group_alias]	If you use group for load balancing, you can set the suboption to none or choose another method. If you do not specify a group, the settings apply as the default for all groups.
load_balance host	{none round-robin least-connections} [host_alias]	If you use host for load balancing, you can set the suboption to none or choose another method. If you do not specify a host, the settings apply as the default for all hosts.

Example

```
load_balance host least_connections
```

Configuring Host Affinity Directives

Host affinity is the attempt to direct multiple connections by a single user to the same group member.

The syntax is:

```
host_affinity http {none | client-ip-address | accelerator-cookie}
[host_or_group_alias]
host_affinity ssl {none | client-ip-address | accelerator-cookie |
ssl-session-id} [host_or_group_alias]
host_affinity other {none | client-ip-address} [host_or_group_alias]
host_affinity timeout minutes
```

Table 8-6. Commands to Configure Host Affinity Directives

Command	Suboption	Description
host_affinity http	{accelerator-cookie client-ip-address none} [host_or_group_alias]	Determines which HTTP host-affinity method to use (accelerator cookie or client-ip-address), or you can specify none. If you do not specify a host or group, the settings apply as the default for all hosts or groups.

Section D: Using Forwarding Directives to Create an Installable List

Table 8-6. Commands to Configure Host Affinity Directives (Continued)

Command	Suboption	Description
host_affinity ssl	{accelerator-cookie client-ip-address none ssl-session-id} [host_or_group_alias]	Determines which SSL host-affinity method to use (accelerator cookie, client-ip-address, or ssl-session-id), or you can specify none. If you do not specify a host or group, the settings apply as the default for all hosts or groups.
host_affinity other	{none client-ip- address} [host_or_group_alias]	Determines whether client-ip-address mode is used with TCP tunnels or Telnet.
host_affinity timeout	minutes	Determines how long a user's IP address, SSL ID, or cookie remains valid when idle

Example

```
host_affinity ssl_method 10.25.36.48
host_affinity timeout 5
```

Creating a Default Sequence

The default sequence is the default forwarding rule, used for all requests lacking policy instructions. Failover is supported if the sequence (only one is allowed) has more than one member.

Note: The default sequence is completely overridden by policy.

A default failover sequence works by allowing healthy hosts to take over for an unhealthy host (one that is failing its DNS resolution or its health check). The sequence specifies the order of failover, with the second host taking over for the first host, the third taking over for the second, and so on).

If all hosts are unhealthy, the operation fails either open or closed, depending upon your settings.

This configuration is generally created and managed through policy. If no forwarding policy applies, you can create a default sequence through the CLI. This single default sequence consists of a single default host (or group) plus one or more hosts to use if the preceding ones are unhealthy.

The syntax is:

```
sequence alias_list
```

where *alias_list* is a space-separated list of one or more forwarding host and group aliases.

Example

```
sequence bluecoat
```


Section D: Using Forwarding Directives to Create an Installable List

Creating a Forwarding Installable List

You can create and install the forwarding installable list using one of the following methods:

- ❑ Text Editor, which allows you to enter the installable list of directives (or copy and paste the contents of an already-created file) directly onto the appliance.
- ❑ A local file, created on your system; the SG appliance can browse to the file and install it.
- ❑ A remote URL, where you placed an already-created file on an FTP or HTTP server to be downloaded to the SG appliance.
- ❑ CLI `inline` command.

When the Forwarding Installable List is installed, it replaces the forwarding configuration on the SG appliance. The configuration remains in effect until overwritten by another installable list; the configuration can be modified or overwritten using CLI commands.

Note: During the time that a forwarding installable list is being compiled and installed, forwarding might not be available. Any transactions that come into the SG appliance during this time might not be forwarded properly.

Installation of forwarding installable lists should be done outside peak traffic times.

To create a forwarding installable list:

1. Select **Configuration > Forwarding > Install Forwarding File**.
2. From the drop-down list, select the method to use to install the forwarding installable list; click **Install**.

Note: A message is written to the event log when you install a list through the SGOS software.

- **Remote URL:**
Enter the fully-qualified URL, including the filename, where the installable list is located. To view the file before installing it, click **View**. Click **Install**. Examine the installation status that displays; click **OK**.
- **Local File:**
Click **Browse** to display the Local File Browse window. Browse for the installable list file on the local system. Open it and click **Install**. When the installation is complete, a results window opens. View the results, close the window, click **Close**.
- **Text Editor:**
The current configuration is displayed in installable list format. You can customize it or delete it and create your own. Click **Install**. When the installation is complete, a results window opens. View the results, close the window, click **Close**.

Section D: Using Forwarding Directives to Create an Installable List

Note: The Management Console text editor is a way to enter an installable list for forwarding. It is not a way to enter CLI commands. The directives are understood only by the installable list parser for forwarding.

3. Click **Apply**.

Note: You can create forwarding settings using the CLI `#inline forwarding` command. You can use any of the forwarding directives.

For more information on using inline commands, refer to *Volume 11: Command Line Reference*.

To delete forwarding settings on the SG appliance:

From the `(config)` prompt, enter the following commands to delete a host, a group, or all hosts and groups from the forwarding configuration:

```
SGOS#(config) forwarding
SGOS#(config forwarding) delete {all | group group_name | host
host_alias}
```

Note: : Any host or group in the default sequence (or the DRTR service configuration) is considered in use by policy. As a result, if you try to delete a host or group while it is in the default sequence or DRTR service configuration, you will receive an error message. You must remove the host/group from the sequence or service first, then delete.

Chapter 9: Internet Caching Protocol (ICP) Configuration

ICP is a communication protocol for caches. It allows a cache (not necessarily a SG appliance) to query other caches for an object, without actually requesting the object. By using ICP, the cache can determine if the object is available from a neighboring cache, and which cache provides the fastest response.

Note: The SG appliance (assuming ICP is configured) does ICP queries only if no forwarding host or SOCKS gateway is identified as an upstream target. If ICP is used by the appliance, it prompts other cache devices for the item, and upon a positive response re-directs the upstream request to that cache device instead of the content origin server.

Only use ICP if you have ICP hosts available or to have the SG appliance support requests from other ICP hosts.

By default, the ICP protocol requires the requesting host to wait up to two seconds for all ICP hosts to respond to the request for an object (the time is configurable).

If the ICP service is configured and running, the service is used if no forwarding or SOCKS gateway target was specified. In other words, the policy rule `icp(yes)` is the default, assuming that the ICP service is available. You can disable ICP with the policy rule `icp(no)` to control ICP queries for requests.

Configuring ICP

An ICP *hierarchy* is comprised of a group of caches, with defined parent and sibling relationships. A cache parent is one that can return the object if it is in the cache, or request the object from the source on behalf of the requester if the object is not in the cache. A cache sibling is a device that can only return the object if it is in the cache. One cache acting as a parent can also act as a sibling to other cache devices.

- ❑ When an object is not cached, the cache device sends an ICP query to its neighbors (parents and siblings) to see if any of its peers holds the object.
- ❑ Each neighbor that holds the requested object returns an `ICP_HIT` reply.
- ❑ Each neighbor that does not hold the object returns an `ICP_MISS` reply.

Based on the responses, the cache can determine where to request the object: from one of its neighbors or from the source. If an `ICP_HIT` reply is received, the request is sent to the host that returned the first reply. If no `ICP_HIT` reply is received, the request is forwarded to the first parent that replied. If no parents respond or are configured, the request is made directly to the source.

Using ICP Configuration Directives to Create an Installable List

To configure ICP you must create an installable list and load it on the SG appliance. The ICP protocol contains a number of *directives*, commands used to create a list that can be installed on the SG appliance.

For information on installing the file itself, see [“Creating an ICP Installable List”](#) on page 125.

The ICP configuration includes directives that:

- ❑ Name the ICP hosts
 - ❑ Restrict ICP access to only these hosts
- Available directives are listed in [Table 9-1](#).

Table 9-1. ICP Directives

Directive	Meaning	Where used
<code>icp_host</code>	The <code>icp_host</code> directive describes cache peers in the hierarchy. There should be one entry for each SG appliance you want to use.	Names the ICP hosts. See “Naming the IP Hosts” on page 123.
<code>icp_access_domain</code>	The <code>icp_access_domain</code> directive is used to control which ICP queries are accepted. The <code>icp_access_domain</code> directive requires a reverse DNS lookup of each ICP query to validate the IP address.	Restricts access. See “Restricting Access” on page 123.
<code>icp_access_ip</code>	The <code>icp_access_ip</code> directive works like the <code>icp_access_domain</code> command, except that you can specify an IP address and subnet mask rather than a domain.	Restricts access. See “Restricting Access” on page 123.
<code>icp_port</code>	The <code>icp_port</code> directive sets the port the SG appliance uses to listen for ICP requests. The default port is 3130. If you set the port to 0, ICP is disabled.	Connects to other ICP hosts. See “Connecting to Other ICP Hosts” on page 124.
<code>neighbor_timeout</code>	The <code>neighbor_timeout</code> directive sets the number of seconds the SG appliance waits for ICP replies. When the cache device sends an ICP request, it waits for all hosts to reply or for the <code>neighbor_timeout</code> to expire. The default timeout is two seconds.	Connects to other ICP hosts. See “Connecting to Other ICP Hosts” on page 124.
<code>icp_failcount</code>	The <code>icp_failcount</code> directive sets the number of consecutive failures the cache device can receive before considering the ICP host as failed. By default, the ICP failure count is set to 20. Each time a request fails, the failure count is incremented. When a request succeeds, the failure count is reset to zero.	Connects to other ICP hosts. See “Connecting to Other ICP Hosts” on page 124.
<code>http_failcount</code>	The <code>http_failcount</code> directive sets the number of consecutive failures the cache device can receive before considering the HTTP host as failed. By default, the HTTP failure count is set to five. The failure count increments each time a request fails. When a request succeeds, the failure count is reset to zero. When an HTTP host fails, the cache device waits five minutes before attempting to use it again as a forwarding target. If the next request fails, the cache device continues to wait five minutes between attempts until the cache becomes available.	Connects to other ICP hosts. See “Connecting to Other ICP Hosts” on page 124.
<code>host_fail_notify</code>	The <code>host_fail_notify</code> directive tells the cache device to send event notification e-mail when a connect fails persistently.	Connects to other ICP hosts. See “Connecting to Other ICP Hosts” on page 124.
<code>host_recover_notify</code>	The <code>host_recover_notify</code> directive tells the cache device to send event notification e-mail when a failed host recovers.	Connects to other ICP hosts. See “Connecting to Other ICP Hosts” on page 124.

Naming the IP Hosts

The `icp_host` directive describes peers in the hierarchy. One entry is required for each SG appliance you want to use.

```
icp_host hostname peertype HTTPport ICPport [default | backup |
feeder]
```

Table 9-2. ICP_host Directive

Command	Suboptions	Description
hostname		The host name of the SG appliance.
peertype	{parent sibling}	Relationship of the SG appliance to the cache device you are configuring.
HTTPport		TCP port where the SG appliance accepts HTTP requests. The common HTTP port is 80 or 8080.
ICPport		UDP port where the SG appliance accepts ICP requests. The common ICP port is 3130.
default		If specified, designates a SG host parent to be the default ICP parent. If no ICP reply is received, all requests are forwarded to the default parent.
backup		If specified, designates the cache device host parent to be the backup default ICP parent. If the default parent is not available, the cache device uses the backup default parent.
feeder		If specified, designates the SG host sibling as a feeder-type host, using ICP request loops to populate the appliance.

The following are sample `icp_host` directives that can be entered into the ICP configuration:

```
; Define ICP parent and sibling hosts.
icp_host cm1.bluecoat.com parent 8080 3130 default
icp_host cm2.bluecoat.com sibling 8080 3130
icp_host cm3.bluecoat.com sibling 8080 3130
icp_host cm4.bluecoat.com sibling 8080 3130
icp_host cm5.bluecoat.com parent 8080 3130
```

Restricting Access

You can restrict access to SG appliances acting as caches by other ICP hosts using the `icp_access_domain` and `icp_access_ip` directives. By default, when ICP is configured, all ICP hosts are allowed access. You should deny access to all domains other than the ICP hosts you want to use.

icp_access_domain Directive

The `icp_access_domain` directive defines which hosts can request objects from the Web cache using ICP. The default action is to allow all requests. When you use `icp_access_domain`, each ICP query requires a reverse DNS lookup to validate the IP address. Depending on the number of ICP requests, these lookups can consume SG appliance resources.

```
icp_access_domain {allow | deny} domain
```

Table 9-3. ICP_Access_Domain Directive

Directive Option	Description
allow deny	Allows or denies ICP queries from neighbors that match the domain specification.
domain	The domain to match. All ICP queries from neighbors that match the specified domain are handled by the host. The special domain of <i>all</i> defines the default action when there is no domain match.

The following are sample `icp_access_domain` directives to be entered into the ICP configuration:

```
; allow ICP access to this Blue Coat Systems SG Appliance from the
; bluecoat.com domain
icp_access_domain allow bluecoat.com
icp_access_domain deny all
; the deny all option should always be specified to deny all other
; domains
```

icp_access_ip Directive

The `icp_access_ip` directive works like the `icp_access_domain` command, except that you can specify an IP address and subnet mask rather than a domain. The following describes the parameters for the `icp_access_ip` command:

```
icp_access_ip {allow | deny} subnet mask
```

Table 9-4. ICAP_Access_IP Directive

Directive Option	Description
allow deny	Allow or deny ICP queries from neighbors that match the address specification.
address/subnet mask	The address and subnet mask to match. All ICP queries that match the specified address are handled by the ICP host. The special address of 0.0.0.0 defines the default action when there is no address match.

The following are sample `icp_access_ip` directives to be entered into the ICP configuration:

```
; allow ICP access to this Blue Coat Systems SG Appliance from the
local subnet
icp_access_ip allow 192.168.10.0/255.255.255.0
icp_access_ip deny 10.25.36.47
; the deny all option should always be specified to deny all other
domains
```

Connecting to Other ICP Hosts

In addition to the ICP directives described in the sections above, you can specify the following directives in the ICP configuration:

```
icp_port 0
neighbor_timeout 2
icp_failcount 20
http_failcount 5
host_fail_notify on
host_recover_notify on
```

Table 9-5. Connecting to Other ICP Hosts

Directive	Description
icp_port	The default port is 3130. If you set the port to 0, ICP is disabled.
neighbor_timeout	When the cache device sends an ICP request, it waits for all hosts to reply or for the <code>neighbor_timeout</code> to expire. The default timeout is two seconds.
http_failcount	By default, the HTTP failure count is set to five. The failure count increments each time a request fails. When a request succeeds, the failure count resets to zero. When an HTTP host fails, the cache device waits five minutes before attempting to use it again as a forwarding target.
icp_failcount	By default, the ICP failure count is set to 20. Each time a request fails, the failure count is incremented. When a request succeeds, the failure count is reset to zero.
host_fail_notify	<code>on</code> tells the cache to send event notification e-mail when a connect fails persistently; <code>off</code> disables this setting.
host_recover_notify	<code>on</code> tells the cache to send event notification e-mail when a failed host recovers; <code>off</code> disables this setting.

Creating an ICP Installable List

You can create the ICP installable list using one of the following methods:

- ❑ Text Editor, which allows you to enter directives (or copy and paste the contents of an already-created file) directly onto the SG appliance.
- ❑ Local file, installed on your system; the SG appliance can browse to the file and install it.
- ❑ A remote URL, where you place an already-created file on an FTP or HTTP server to be downloaded to the SG appliance.
- ❑ The CLI `inline` command.

When the ICP installable list is created and installed, it overwrites any ICP settings on the SG appliance.

To create an ICP installable list:

1. Select **Configuration > Forwarding > ICP**.
2. From the drop-down list, select the method you want to use to install the ICP configuration; then click **Install**.
 - Remote URL:

Enter the fully-qualified URL, including the filename, where the configuration is located. To view the file before installing it, click **View**. Click **Install**. Examine the installation status that displays; click **OK**.
 - Local File:

Click **Browse** to bring up the Local File Browse window. Browse for the file on the local system. Click **Install**. When the installation is complete, a results window opens. View the results, close the window, click **Close**.

- **Text Editor:**

The current configuration is displayed in installable list format. You can customize it or delete it and create your own. Click **Install**. When the installation is complete, a results window opens. View the results, close the window, click **Close**.

3. Click **Apply** to commit the changes to the SG appliance.

Note: You can create ICP settings using the CLI inline commands.

For more information on using inline commands, refer to *Volume 11: Command Line Reference*.

Enabling ICP

Before ICP can be used in the SG environment:

- ☐ ICP must be running
- ☐ At least one forwarding host must be configured

ICP can be enabled or disabled through the policy rule `icp`. The default is `icp (yes)`. You can disable ICP with the policy rule `icp (no)` to control ICP queries for requests.

Chapter 10: Using RIP

The Routing Information Protocol (RIP) is designed to select the fastest route to a destination. RIP support is built into the SG appliance, and is configured by creating and installing an RIP configuration text file onto the device.

The Blue Coat RIP implementation also supports advertising default gateways. Default routes added by RIP are treated the same as the static default routes; that is, the default route load balancing schemes apply to the default routes from RIP as well.

This chapter discusses:

- ❑ [“Installing RIP Configuration Files”](#) on page 127
- ❑ [“Configuring Advertising Default Routes”](#) on page 128
- ❑ [“RIP Commands”](#) on page 129
- ❑ [“RIP Parameters”](#) on page 130
- ❑ [“SG-Specific RIP Parameters”](#) on page 131
- ❑ [“Using Passwords with RIP”](#) on page 131

Installing RIP Configuration Files

No RIP configuration file is shipped with the appliance. For commands that can be entered into the RIP configuration file, see [“RIP Commands”](#) on page 129.

After creating an RIP configuration file, install it using one of the following methods:

- ❑ Using the Text Editor, which allows you to enter settings (or copy and paste the contents of an already-created file) directly onto the appliance.
- ❑ Creating a local file on your local system; the SG appliance can browse to the file and install it.
- ❑ Using a remote URL, where you place an already-created file on an FTP or HTTP server to be downloaded to the SG appliance.
- ❑ Using the CLI `inline rip-settings` command, which allows you to paste the RIP settings into the CLI.
- ❑ Using the CLI `rip` commands, which require that you place an already-created file on an FTP or HTTP server and enter the URL into the CLI. You can also enable or disable RIP with these commands.

To install an RIP configuration file:

Note: When entering RIP settings that affect current settings (for example, when switching from `ripv1` to `ripv2`), disable RIP before you change the settings; re-enable RIP when you have finished.

1. Select **Configuration > Network > Routing > RIP**.
2. To display the current RIP settings, routes, or source, click one or all of the **View RIP** buttons.

3. In the **Install RIP Setting from** the drop-down list, select the method used to install the routing table; click **Install**.
 - Remote URL:

Enter the fully-qualified URL, including the filename, where the routing table is located. To view the file before installing it, click **View**. Click **Install**. To view the installation results, click **Results**; close the window when you are finished. Click **OK**.
 - Local File:

Click **Browse** to display the Local File Browse window. Browse for the file on the local system. Open it and click **Install**. When the installation is complete, a results window opens. View the results and close the window.
 - Text Editor:

The current configuration is displayed in installable list format. You can customize it or delete it and create your own. Click **Install**. When the installation is complete, a results window opens. View the results, close the window, and click **OK**.
4. Click **Apply** to commit the changes to the SG appliance.
5. Select **Enable RIP**.
6. Click **Apply**.

Related CLI Syntax to Configure RIP

- ```
SGOS#(config) rip {disable | enable}
```
- ❑ To enter a path to a remote URL where you have placed an already-created RIP configuration file, enter the following commands at the (config) command prompt:

```
SGOS#(config) rip path url
SGOS#(config) load rip-settings
```
  - ❑ To paste an RIP configuration directly into the CLI, enter the following command at the (config) command prompt:

```
SGOS#(config) inline rip-settings end-of-file_marker
```

## Configuring Advertising Default Routes

Default routes advertisements are treated the same as the static default routes; that is, the default route load balancing schemes also apply to the default routes from RIP.

By default, RIP ignores the default routes advertisement. You can change the default from disable to enable and set the preference group and weight through the CLI only.

#### **To enable and configure advertising default gateway routes:**

1. At the (config) command prompt:

```
SGOS#(config) rip default-route enable
SGOS#(config) rip default-route group group_number
SGOS#(config) rip default-route weight weight_number
```

Where *group\_number* defaults to 1, and *weight\_number* defaults to 100, the same as the static default route set by the `ip-default-gateway` command.

2. (Optional) To view the default advertising routes, enter:

```
SGOS#(config) show rip default-route
RIP default route settings:
Enabled: Yes
Preference group: 3
Weight: 30
```

## RIP Commands

You can place any of the commands below into a Routing Information Protocol (RIP) configuration text file. You cannot edit a RIP file through the command line, but you can overwrite a RIP file using the `inline rip-settings` command.

Once the file is complete, place it on an HTTP or FTP server accessible to the SG appliance and download it.

### *net*

```
net Nname[/mask] gateway Gname metric Value {passive | active |
external}
```

Table 10-1. net Commands

| Parameters                  | Description                                                                                                                            |
|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| <i>Nname</i>                | Name of the destination network. It can be a symbolic network name, or an Internet address specified in dot notation.                  |
| <i>/mask</i>                | Optional number between 1 and 32 indicating the netmask associated with <i>Nname</i> .                                                 |
| <i>Gname</i>                | Name or address of the gateway to which RIP responses should be forwarded.                                                             |
| <i>Value</i>                | The hop count to the destination host or network. A net <i>Nname</i> /32 specification is equivalent to the host <i>Hname</i> command. |
| passive   active   external | Specifies whether the gateway is treated as passive or active, or whether the gateway is external to the scope of the RIP protocol.    |

### *host*

```
host Hname gateway Gname metric Value {passive | active | external}
```

Table 10-2. host Commands

| Parameters                  | Description                                                                                                                                                     |
|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>Hname</i>                | Name of the destination network. It can be a symbolic network name, or an Internet address specified in dot notation.                                           |
| <i>Gname</i>                | Name or address of the gateway to which RIP responses should be forwarded. It can be a symbolic network name, or an Internet address specified in dot notation. |
| <i>Value</i>                | The hop count to the destination host or network. A net <i>Nname</i> /32 specification is equivalent to the host <i>Hname</i> command.                          |
| passive   active   external | Specifies whether the gateway is treated as passive or active, or whether the gateway is external to the scope of the RIP protocol.                             |

## RIP Parameters

Lines that do not start with `net` or `host` commands *must* consist of one or more of the following parameter settings, separated by commas or blank spaces:

Table 10-3. RIP Parameters

| Parameters                       | Description                                                                                                                                                                                       |
|----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>if=[0 1 2 3]</code>        | Specifies that the other parameters on the line apply to the interface numbered 0,1,2, or 3 in SGOS terms.                                                                                        |
| <code>passwd=XXX</code>          | Specifies an RIPv2 password included on all RIPv2 responses sent and checked on all RIPv2 responses received. The password must not contain any blanks, tab characters, commas or '#' characters. |
| <code>no_ag</code>               | Turns off aggregation of subnets in RIPv1 and RIPv2 responses.                                                                                                                                    |
| <code>no_super_ag</code>         | Turns off aggregation of networks into supernets in RIPv2 responses.                                                                                                                              |
| <code>passive</code>             | Marks the interface to not be advertised in updates sent through other interfaces, and turns off all RIP and router discovery through the interface.                                              |
| <code>no_rip</code>              | Disables all RIP processing on the specified interface.                                                                                                                                           |
| <code>no_ripv1_in</code>         | Causes RIPv1 received responses to be ignored.                                                                                                                                                    |
| <code>no_ripv2_in</code>         | Causes RIPv2 received responses to be ignored.                                                                                                                                                    |
| <code>ripv2_out</code>           | Turns off RIPv1 output and causes RIPv2 advertisements to be multicast when possible.                                                                                                             |
| <code>ripv2</code>               | Is equivalent to <code>no_ripv1_in</code> and <code>no_ripv1_out</code> . This parameter is set by default.                                                                                       |
| <code>no_rdisc</code>            | Disables the Internet Router Discovery Protocol. This parameter is set by default.                                                                                                                |
| <code>no_solicit</code>          | Disables the transmission of Router Discovery Solicitations.                                                                                                                                      |
| <code>send_solicit</code>        | Specifies that Router Discovery solicitations should be sent, even on point-to-point links, which by default only listen to Router Discovery messages.                                            |
| <code>no_rdisc_adv</code>        | Disables the transmission of Router Discovery Advertisements.                                                                                                                                     |
| <code>rdisc_adv</code>           | Specifies that Router Discovery Advertisements should be sent, even on point-to-point links, which by default only listen to Router Discovery messages.                                           |
| <code>bcast_rdisc</code>         | Specifies that Router Discovery packets should be broadcast instead of multicast.                                                                                                                 |
| <code>rdisc_pref=N</code>        | Sets the preference in Router Discovery Advertisements to the integer N.                                                                                                                          |
| <code>rdisc_interval=N</code>    | Sets the nominal interval with which Router Discovery Advertisements are transmitted to N seconds and their lifetime to 3*N.                                                                      |
| <code>trust_gateway=rname</code> | Causes RIP packets from that router and other routers named in other <code>trust_gateway</code> keywords to be accept, and packets from other routers to be ignored.                              |
| <code>redirect_ok</code>         | Causes RIP to allow ICMP Redirect messages when the system is acting as a router and forwarding packets. Otherwise, ICMP Redirect messages are overridden.                                        |

## SG-Specific RIP Parameters

The following RIP parameters are unique to SG configurations:

Table 10-4. SG-Specific RIP Parameters

| Parameters                                      | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|-------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| supply_routing_info<br>-or-<br>advertise_routes | <p><b>-s option:</b><br/>Supplying this option forces routers to supply routing information whether it is acting as an Internetwork router or not. This is the default if multiple network interfaces are present or if a point-to-point link is in use.</p> <p><b>-g option:</b><br/>This flag is used on Internetwork routers to offer a route to the 'default' destination. This is typically used on a gateway to the Internet, or on a gateway that uses another routing protocol whose routes are not reported to other local routers.</p> <p><b>-h option:</b><br/>Suppress_extra_host_routes advertise_host_route</p> <p><b>-m option:</b><br/>Advertise_host_route on multi-homed hosts</p> <p><b>-A option:</b><br/>Ignore_authentication //</p> |
| no_supply_routing_info                          | <b>-q option:</b><br>opposite of <b>-s</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| no_rip_out                                      | Disables the transmission of all RIP packets. This setting is the default.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| no_ripv1_out                                    | Disables the transmission of RIPv1 packets.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| no_ripv2_out                                    | Disables the transmission of RIPv2 packets.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| rip_out                                         | Enables the transmission of RIPv1 packets.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| ripv1_out                                       | Enables the transmission of RIPv1 packets.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| rdisc                                           | Enables the transmission of Router Discovery Advertisements.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| ripv1                                           | Causes RIPv1 packets to be sent.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| ripv1_in                                        | Causes RIPv1 received responses to be handled.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

## Using Passwords with RIP

The first password specified for an interface is used for output. All passwords pertaining to an interface are accepted on input. For example, with the following settings:

```
if=0 passwd=aaa
if=1 passwd=bbb
passwd=ccc
```

Interface 0 accepts passwords `aaa` and `ccc`, and transmits using password `aaa`. Interface 1 accepts passwords `bbb` and `ccc`, and transmits using password `bbb`. The other interfaces accept and transmit the password `ccc`.



## Chapter 11: Configuring the SG Appliance as a Session Monitor

You can configure the SGOS software to monitor RADIUS accounting messages and to maintain a session table based on the information in these messages. The session table can then be used for logging or authentication.

You can also, optionally, configure multiple appliances to act as a session monitor *cluster*. The session table is then replicated to all members of the cluster.

Once configured and enabled, the session monitor maintains a session table that records which sessions are currently active and the user identity for each session.

### Configuring the Session Monitor

Three steps are required to configure the session monitor:

- ❑ Configure the RADIUS accounting protocol parameters for the session monitor.
- ❑ (Optional) Configure the session monitor cluster.
- ❑ Configure the session monitor parameters.

### Configuring the RADIUS Accounting Protocol Parameters

The configuration commands to create the RADIUS accounting protocol parameters can only be done through the CLI. If you are using session-monitor clustering, the commands must be invoked on each system in an already-existing failover group. (For information on configuring a failover group, see [Chapter 7: "Configuring Failover"](#) on page 97.)

**To configure the RADIUS accounting protocol parameters:**

- ❑ To enter configuration mode:  
SGOS#(config) **session-monitor**
- ❑ The following subcommands are available:  
SGOS#(config session-monitor) **radius acct-listen-port** *port\_number*  
SGOS#(config session-monitor) **radius authentication** {**enable** | **disable**}  
SGOS#(config session-monitor) **radius encrypted-shared-secret** *encrypted\_secret*  
SGOS#(config session-monitor) **radius no encrypted-shared-secret**  
SGOS#(config session-monitor) **radius response** {**enable** | **disable**}  
SGOS#(config session-monitor) **radius shared-secret** *plaintext\_secret*

Table 11-1. Session Monitor Accounting Command Descriptions

| Command                        | Option                         | Description                                                                                                                                                                     |
|--------------------------------|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| radius acct-listen-port        | <i>port_number</i>             | The port number where the SG appliance listens for accounting messages                                                                                                          |
| radius authentication          | enable   disable               | Enable or disable (the default) the authentication of RADIUS messages using the shared secret. Note that the shared secret must be configured before authentication is enabled. |
| radius encrypted-shared-secret | <i>encrypted_shared_secret</i> | Specify the shared secret (in encrypted form) used for RADIUS protocol authentication. The secret is decrypted using the configuration-passwords-key.                           |
| radius no shared-secret        |                                | Clears the shared secret used for RADIUS protocol authentication.                                                                                                               |
| radius response                | enable   disable               | Enable (the default) or disable generation of RADIUS responses.                                                                                                                 |
| radius shared-secret           | <i>plaintext_secret</i>        | Specify the shared secret used for RADIUS protocol in plaintext.                                                                                                                |

## Configuring a Session Monitor Cluster

Configuring a session monitor cluster is optional. When a session monitor cluster is enabled, the session table is replicated to all members of the cluster. The cluster members are the SG appliances that are configured as part of the failover group referenced in the session monitor cluster configuration. The failover group must be configured before the session monitor cluster. (For information on configuring a failover group, see [Chapter 7: "Configuring Failover"](#) on page 97.)

To replicate the session table to all the members of a failover group, you can use the following commands.

---

**Note:** When using a session monitor cluster, the RADIUS client must be configured to send the RADIUS accounting messages to the failover group's virtual IP address.

---

Proxy traffic can be routed to any of the machines in the cluster.

---

**Note:** Each member of the failover group must be configured with the cluster commands to maintain the session table for RADIUS accounting messages.

---

### To configure session monitor cluster parameters:

```
SGOS#(config) session-monitor
```

- ❑ The following subcommands are available:

```
SGOS#(config session-monitor) cluster {enable | disable}
```

```
SGOS#(config session-monitor) cluster group-address IP_address
```

```
SGOS#(config session-monitor) cluster port port_number
```

```
SGOS#(config session-monitor) cluster grace-period seconds
```

```
SGOS#(config session-monitor) cluster synchronization-delay seconds
```



Table 11-2. Session Monitor Cluster Command Descriptions

| Command                                     | Option           | Description                                                                                                                                                                                                                                                               |
|---------------------------------------------|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| cluster                                     | enable   disable | Enable or disable (the default) clustering on a failover group. The group address must be set before the cluster can be enabled.                                                                                                                                          |
| cluster group-address<br>  no group-address | IP_address       | Set or clear (the default) the failover group IP address. This must be an existing failover group address.                                                                                                                                                                |
| cluster port                                | port_number      | Set the TCP/IP port for the session replication control. The default is 55555.                                                                                                                                                                                            |
| cluster synchronization-delay               | seconds          | Set the maximum time to wait for session table synchronization. The default is zero; the range is from 0 to 2 <sup>31</sup> -1 seconds. During this time evaluation of \$(session.username) is delayed, so proxy traffic might also be delayed.                           |
| cluster grace-period                        | seconds          | Set the time to keep session transactions in memory while waiting for slave logins. This can be set to allow session table synchronization to occur after the synchronization-delay has expired. The default is 30 seconds; the range is 0 to 2 <sup>31</sup> -1 seconds. |

## Configuring the Session Monitor

The session monitor commands set up session monitoring behavior. If using session-monitor clustering, these commands must be invoked on all systems in the failover group.

### To configure the session monitor:

- At the (config) prompt:
 

```
SGOS#(config) session-monitor
SGOS#(config session-monitor) disable | enable
SGOS#(config session-monitor) max-entries integer
SGOS#(config session-monitor) timeout minutes
```

Table 11-3. Session Monitor Configuration Command Descriptions

| Command          | Option  | Description                                                                                                                                                                            |
|------------------|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| enable   disable |         | Enable or disable (the default) session monitoring                                                                                                                                     |
| max_entries      | integer | The maximum number of entries in the session table. The default is 500,000; the range is from 1 to 2,000,000. If the table reaches the maximum, additional START messages are ignored. |
| timeout          | minutes | The amount of time before a session table entry assumes a STOP message has been sent. The default is 120 minutes; the range is from 0 to 65535 minutes. Zero indicates no timeout.     |

2. (Optional) To view the session-monitor configuration, you can either use the `session-monitor view` command or the `config show session-monitor` command.

```
SGOS#(config) show session-monitor
General:
Status: enabled
Entry timeout: 120 minutes
Maximum entries: 500000
Cluster support: enabled
Cluster port: 55555
Cluster group address: 10.9.17.159
Synchronization delay: 0
Synchronization grace period: 30
Accounting protocol: radius
Radius accounting:
Listen ports:
Accounting: 1813
Responses: Enabled
Authentication: Enabled
Shared secret: *****
```

## Creating the CPL

Be aware that the examples below are just part of a comprehensive authentication policy. By themselves, they are not adequate.

---

**Note:** Refer to *Volume 10: Content Policy Language Guide* for details about CPL and how transactions trigger the evaluation of policy file layers.

---

- ❑ In this example, the SG appliance is using the session table maintained by the session monitor for authentication.

```
<proxy>
 allow authenticate(session)
```

where `session` is a policy substitution realm that uses `$(session.username)` in building the username. (For information on creating a Policy Substitution realm, refer to *Volume 4: Securing the Blue Coat SG Appliance*.)

## Notes

- ❑ The session table is stored entirely in memory. The amount of memory needed is roughly 40MB for 500,000 users.
- ❑ The session table is kept in memory. If the system goes down, the contents of the session table are lost. However, if the system is a member of a failover cluster, the current contents of the session table can be obtained from another machine in the cluster. The only situation in which the session table is entirely lost is if all machines in the cluster go down at the same time.
- ❑ The session replication protocol replicates session information only; configuration information is not exchanged. That means that each SG appliance must be properly configured for session monitoring.
- ❑ The session replication protocol is not secured. The failover group should be on a physically secure network to communicate with each other.

- ❑ The session monitor requires sufficient memory and at least 100Mb-per-second network links among the cluster to manage large numbers of active sessions.
- ❑ The username in the session table is obtained from the Calling-Station-ID attribute in the RADIUS accounting message and can be a maximum of 19 bytes.



## Chapter 12: Configuring and Using the SG Client

The Blue Coat SG Client enables users to benefit from accelerated application delivery directly to their desktops. This allows mobile users or users in small branch offices—where it might not be cost-justifiable to deploy an acceleration gateway—to enjoy improved networked application access.

This chapter includes the following topics:

- ❑ [“Overview”](#) on page 140
- ❑ [“About ADN Features”](#) on page 143
- ❑ [“Configuring Client Settings”](#) on page 146
- ❑ [“Configuring the Client Manager”](#) on page 151
- ❑ [“Configuring the SG Client from the Command Line”](#) on page 155
- ❑ [“Making the SG Client Software Available to Users”](#) on page 158
- ❑ [“Using the SG Client”](#) on page 171
- ❑ [“Troubleshooting Tips for Administrators”](#) on page 171
- ❑ [“Licensing”](#) on page 181

## Overview

This section discusses the concepts you need to know to implement the SG Client in your enterprise:

- ❑ [“About the Terminology”](#) on page 140
- ❑ [“SG Client Features and Benefits”](#) on page 141
- ❑ [“About SG Client Deployment”](#) on page 142

## About the Terminology

The following figure illustrates the terminology discussed in this chapter:

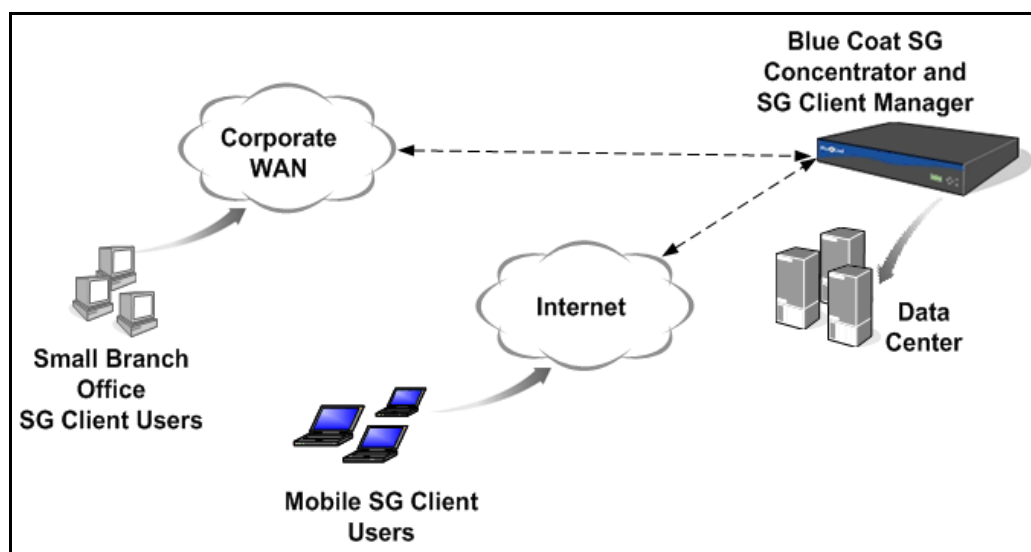


Figure 12-1. Sample SG Client Deployment

The SG Client typically connects to a *concentrator*, which is a Blue Coat SG appliance that is usually located in a data center. The SG Client connection over the Internet is assumed to use Virtual Private Networking (VPN).

The concentrator receives inbound Application Delivery Network (ADN) tunnels from the SG Client and serves as a front end for data center resources for which it provides acceleration services.

To use the SG Client, you must configure SG appliances for the following roles:

- ❑ **Concentrator**  
An SG appliance, usually located in a data center, that provides access to data center resources, such as file servers.
- ❑ **Client Manager**  
An SG appliance that provides the SG Client software to users, and maintains the software and the client configuration on all clients in the ADN network.

You configure the Client Manager as discussed in [“Configuring the Client Manager”](#) on page 151.

- ADN manager and backup manager (not shown in the preceding figure)

Every ADN network must have an *ADN manager*, which is responsible for publishing the routing table to SG Clients (and to other SG appliances). Although not required, Blue Coat recommends configuring an *ADN backup manager*, which takes over for the ADN manager in the event it becomes unavailable.

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**Note:** The Client Manager can be *any* appliance in the ADN network, including a concentrator, the ADN manager, or backup manager. For example, the Client Manager could also be the ADN manager but that is not a requirement.

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To configure an ADN manager and backup manager, see “[Defining the ADN Manager](#)” on page 21.

## SG Client Features and Benefits

The following table discusses features and benefits of the SG Client:

Table 12-1. SG Client Features and Benefits

Feature	Benefit
Common Internet File System (CIFS) acceleration	The SG Client significantly enhances Wide Area Network (WAN) file service delivery, improving user productivity by implementing the following: <ul style="list-style-type: none"> <li>• Client object caching, which enables clients to get previously obtained data from cache rather than across the WAN.</li> <li>• CIFS protocol optimization, which improves performance by consolidating data forwarded across the WAN.</li> </ul>
Connect from anywhere	The SG Client enables any user to remotely connect to an ADN network.
ADN optimization	Uses gzip compression to improve bandwidth utilization for TCP applications.
Centralized management and distribution	Administrators use a particular SG appliance designated as the <i>Client Manager</i> to download to clients SG Client software and configuration updates.
Load balancing and failover	Enables you to efficiently use your ADN network as a robust infrastructure for clients.
Client statistics	Provides users with real-time performance data.

## About SG Client Deployment

The SG Client software is deployed in two basic steps: the administrator configures the Client Manager to install and configure the client, then the user (or administrator) installs the client. After installation, the client connects to an appliance in the ADN network. This section discusses administrator configuration tasks and client installation tasks.

### Administrator Configuration Tasks

The administrator:

1. Sets up an ADN manager, backup manager, and configures the ADN network.
2. Configures an SG appliance as the Client Manager, as discussed in [“Configuring the Client Manager”](#) on page 151.

The Client Manager must be licensed, as discussed in [“Licensing”](#) on page 181.

The Client Manager is the device from which users download the SG Client software, software updates, and configuration updates.

3. Sets up the SG Client configuration (such as CIFS and ADN), as discussed in [“Configuring General Client Settings”](#) on page 146.
4. Provides the SG Client software to users in one of the ways discussed in this chapter.

For more information, see [“Making the SG Client Software Available to Users”](#) on page 158.

### Client Installation Tasks

The SG Client deployment process can be summarized as follows:

1. A user obtains the SG Client software from the Client Manager or preinstalled by an administrator some other way.

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**Note:** Installation methods are discussed in [“Making the SG Client Software Available to Users”](#) on page 158.

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To download the SG Client software from the Client Manager, the user must go to a URL provided by the administrator.

When the user connects to the Client Manager using the URL, the user runs a setup application (SGClientSetup.exe) that in turn downloads and starts a Microsoft Installer (SGClientSetup.msi).

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**Note:** To run SGClientSetup.exe and SGClientSetup.msi, the user must be in the Administrators group on the machine.

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2. After installing the SG Client software, the user must reboot the machine.
3. Periodically, the SG Client polls the Client Manager for changes to the SG Client software and configuration.

## Software and Hardware Requirements

For information about software and hardware requirements, see the *SG Client Release Notes*.

## About ADN Features

This section discusses the ADN features supported by the SG Client in this release:

- ❑ [“General ADN Feature Support”](#) on page 143
- ❑ [“Configuring Listening Modes”](#) on page 144
- ❑ [“About Internet Gateways”](#) on page 146

## General ADN Feature Support

The SG Client supports the following ADN features:

- ❑ Gzip compression, which improves bandwidth utilization
- ❑ CIFS protocol optimization and CIFS caching on the client
- ❑ Load balancing and failover

The SG Client makes two types of connections in the ADN network: the *routing connection* and the *ADN tunneling connection*. The *routing connection* obtains the routing table from the ADN manager or backup manager, and the *tunneling connection* transfers data to the ADN network.

The SG Client first attempts to connect to the primary ADN manager to get routing information; if it is not available, the client attempts to connect to the backup ADN manager. If the backup ADN manager is also not available, the connection goes directly to its destination as a result of *fail open*, which is discussed in the next bullet.

Assuming there is more than one active SG appliance in the ADN network, the SG Client randomly picks an appliance from the list of appliances in the routing table and iterates through the list until it finds an active appliance.

Randomly choosing an appliance—assuming there is more than one—achieves simple *load balancing*. Iterating through the list of appliances achieves *failover*. If no appliance is active, the connection goes directly to its destination as a result of *fail open*, which is discussed next.

- ❑ Fail open, which means that if all client connections to concentrators fail for any reason, the client opens a connection directly to a destination, such as a CIFS server.

Client connections that do not go through a concentrator are not accelerated and remain unaccelerated as long as the connection is open (that is, until the connection is closed by the application).

After a concentrator becomes available, new connections are accelerated.

## Configuring Listening Modes

To use the SG Client in your ADN network, you must configure options for Manager Listening Mode and Tunnel Listening Mode as discussed in this section.

The SG Client does not publish routes (instead, it gets routes from the ADN Manager), and it uses plain communications only. The options you select for Manager Listening Mode and Tunnel Listening Mode must be compatible with the SG Client.

This section discusses the following topics:

- ❑ [“Manager Listening Mode”](#) on page 144
- ❑ [“Tunnel Listening Mode”](#) on page 145
- ❑ [“Secure Outbound Mode”](#) on page 145

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**Note:** To select options for either Manager Listening Mode or Tunnel Listening Mode, you must have previously set up a device authentication profile on the SG appliance. For more information about device authentication profiles, see [“About Device Authentication Profiles”](#) on page 88.

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### Manager Listening Mode

Manager Listening Mode determines the way routes are published in the ADN network: using the Plain Manager Port (non-secure communication) or the Secure Manager Port (secure communication), or both.

Select Manager Listening Mode options on the ADN manager and backup manager only. Manager Listening Mode options are not available on other SG appliances.

For more information about setting the Plain Manager Port and the Secure Manager Port, see [“Defining the ADN Manager”](#) on page 21.

As discussed in [“Securing Connections”](#) on page 34, the following options are available:

❑ **Secure Only**

This option means that only SG appliances using secure connections can publish routes. However, because only the secure listener is active, you *cannot* select this option if you have SG Clients in your ADN network because SG Clients use only plain connections.

❑ **Plain Read-Only**

Select this option if all SG appliances in the ADN network use SGOS version 5.1.4 or later—where all appliances support secure routing, *and* you have chosen to utilize secure routing on those SG appliances.

This option means that SG appliances that use secure connections can publish routes. Devices that use plain communications can get routes but cannot publish routes.

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**Note:** Select this option only if all appliances in the ADN network run SGOS version 5.1.4 or later.

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☐ **Plain Only**

Select this option in cases where you do *not* secure any ADN connections between SG appliances.

This option means that only SG appliances that use plain connections can publish routes.

☐ **Both**

Select this option if you use the SG Client in your ADN network and some appliances in the network are not capable of using secure connections (for example, some appliances run SGOS version 5.1.3 or earlier).

This option means that SG appliances that use either secure or plain connections can publish routes.

## Tunnel Listening Mode

Tunnel Listening Mode determines the type of incoming tunnel communications this SG appliance accepts: using the Plain Tunnel Port (non-secure communications) or the Secure Tunnel Port (secure communications).

Select options for Tunnel Listening Mode on every concentrator to which you expect SG Clients to connect. For example, select a Tunnel Listening Mode option for the concentrator shown in Figure 12-1 on page 140.

For more information about the Plain Tunnel Port and the Secure Tunnel Port, see [“Securing Connections”](#) on page 34.

The following options are available:

☐ **Secure Only**

This option means this SG appliance accepts only secure tunneling connections. Because the SG Client uses only plain connections, you *cannot* select this option if you have SG Clients in your ADN network.

☐ **Plain**

Select this option to enable the SG Client to connect to the appliance in cases where you do *not* secure any ADN connections between SG appliances.

This option means this SG appliance accepts only plain tunneling connections.

☐ **Both**

Select this option if you use the SG Client in your ADN network and some appliances in the network are not capable of accepting incoming secure tunneling connections (for example, some appliances run SGOS version 5.1.3 or earlier).

This option means this SG appliance accepts both plain and secure tunneling connections.

## Secure Outbound Mode

The Secure Outbound Mode options have no impact on the SG Client because these options determine how SG appliances communicate with each other. For a tunneling connection to be established between two SG appliances, the initiating appliance’s secure outbound mode must be compatible with the tunnel listening mode of the receiving appliance.

## About Internet Gateways

The SG Client ignores Internet Gateway settings; however, if you want to route all SG Client traffic through a concentrator, you can configure the concentrator to publish all addresses, as discussed in [“Managing Server Subnets and Enabling an Internet Gateway”](#) on page 26.

## Configuring Client Settings

This section discusses how to configure the settings that affect SG Client configuration. Available settings include:

- ❑ General settings—Software update interval, TCP window size, and maximum percentage of client disk space to allocate for object caching. See the next section.
- ❑ CIFS settings—Disabling CIFS or enabling CIFS with options for write-back and directory cache time. See [“Configuring Client CIFS Settings”](#) on page 148.
- ❑ ADN settings—Primary and backup ADN manager IP addresses and port, excluded subnets, and included or excluded ports. See [“Configuring Client ADN Settings”](#) on page 149.

## Configuring General Client Settings

This section discusses how to configure the following client settings:

- ❑ SG Client software update interval
- ❑ TCP window size

If you know the bandwidth and round-trip delay, the TCP window size you should use is approximately  $2 * \text{bandwidth} * \text{delay}$ . For example, if the bandwidth of the link is 8 Mbits per second and the round-trip delay is 0.75 seconds:

$\text{TCP window size} = 2 * 8 \text{ Mbits/sec} * 0.75 \text{ sec} = 12 \text{ Mbits} = 1.5 \text{ Mbytes}$

The setting in this example would be 1572864 bytes. This number goes up as bandwidth or delay increases, and goes down as they decrease. Because the bandwidth and delay for SG Client users can vary, Blue Coat recommends you test SG Client performance in a controlled environment before deciding on a TCP window size value to use in production.

- ❑ Maximum percentage of client disk space to use for object caching

Regions of files that are read or written by the client are placed in the cache. Object caching applies to both read and write file activities.

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**Note:** In this release, the object cache is not encrypted.

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You can set the maximum percentage of *total* disk space (as opposed to *available* disk space) the SG Client allocates to the object cache. The SG Client always leaves at least 1GB of available disk space on the client machine’s system root volume.

Following is a summary of how object caching works on the client:

- a. The SG Client starts.
- b. The user requests a cacheable object, such as a file.
- c. The SG Client allocates sufficient disk space on the system root volume to cache the object—up to the limit set by the administrator.

In other words, if the client machine's system root volume has 100GB of total space and the administrator configures the object cache to use a maximum of 10%, the SG Client allocates up to 10GB for the object cache.

However, if the maximum cache size leaves less than 1GB of available disk space, the cache size is further limited. Continuing this example, if the client has only 9GB of available space, the maximum cache size is 8GB instead of 10GB.

- d. If any single object (such as a file) exceeds the maximum cache size, that object is not cached.

To continue the preceding example, if the maximum size of the object cache is 10GB, and the client requests a file that is 11GB in size, that file is not cached.

- e. If the object cache is full, objects are expired from the cache based on a number of criteria, such as unopened files and oldest objects first.

#### To configure general client settings:

1. Log in to the Management Console as an administrator.
2. Select **SG Client > Client Configuration**.
3. In the right pane, click the **General** tab.
4. Enter the following information:

Table 12-2. Configuring General Client Settings

Field	Description
<b>Update interval</b>	Enter the frequency, in minutes, for clients to check the Client Manager for updated SG Client software or configuration updates. The default is 120. Valid values are between 10–432000 (that is, 300 days).
<b>TCP window size</b>	Enter the number of bytes allowed before acknowledgement (the value must be between 8192 and 4194304). The default is 65536.
<b>Maximum percentage of disk space to use for object caching</b>	Maximum percentage of client disk space to use for caching objects, such as CIFS objects. Valid values are 1–90; the default is 10. Note: The cache leaves at least 1GB available space on the system root volume. For more information, see <a href="#">“Configuring General Client Settings”</a> on page 146.

5. Click **Apply** to commit the changes to the SG appliance.

## Configuring Client CIFS Settings

This section discusses how to configure the following:

- ❑ Enable or disable CIFS acceleration
- ❑ Enable or disable write-back
- ❑ Set the directory cache time

### To configure CIFS settings:

1. Log in to the Management Console as an administrator.
2. Select **SG Client > Client Configuration**.
3. In the right pane, click the **CIFS** tab.
4. Enter the following information:

Table 12-3. Configuring Client Settings for CIFS

Item	Description
<b>Enable CIFS acceleration</b> check box	<ul style="list-style-type: none"> <li>Select the check box to enable CIFS acceleration for clients.</li> <li>Clear the check box to disable CIFS acceleration. If you clear the check box, the other options on this tab page are unavailable.</li> </ul> <p>For more information about CIFS acceleration, see <a href="#">“SG Client Features and Benefits”</a> on page 141.</p>
<b>Write back</b>	<p>Determines whether or not users can continue sending data to the appliance while the appliance is writing data on the back end.</p> <ul style="list-style-type: none"> <li>Select <b>Full</b> to enable write-back, which in turn makes the local SG Client proxy appear to the user as a file server; in other words, the local SG Client proxy constantly sends approval to the client and allows the client to send data while the back end takes advantage of the compressed TCP connection.</li> <li>Select <b>None</b> to disable write-back. Disabling write-back can introduce substantial latency while clients send data to the appliance and wait for acknowledgement before sending more data.</li> </ul> <p>One reason to set this option to <b>None</b> is the risk of data loss if the link from the branch to the core server fails. There is no way to recover queued data if such a link failure occurs.</p>
<b>Directory cache time</b> field	Number of seconds for directory listings to remain in the client’s cache.

5. Click **Apply** to commit the changes to the SG appliance.

## Configuring Client ADN Settings

This section discusses how to configure the following:

❑ ADN manager settings:

- Primary and backup ADN manager IP addresses
- ADN manager port

❑ ADN rules settings:

- Excluded subnets

Adds or removes subnets from the list of subnets not included in ADN tunnels. Assuming SG Clients can connect to an SG appliance that can optimize traffic to the destination address, this is the list of IP addresses and subnets that bypass ADN tunneling on the way to the destination.

- Include and exclude ports

Includes or excludes TCP ports in ADN tunnels. Assuming SG Clients can connect to an SG appliance that can optimize traffic to the destination address, this setting determines ports accelerated (or not accelerated) for clients. You can use either the excluded ports list or included ports list, but not both.

The include and exclude ports list are advanced settings that limit the traffic that is accelerated by the ADN network. Because the ADN manager sets options for both its peers in the ADN network and for SG Clients, you can use the include or exclude ports list to fine-tune the way SG appliances interact with the SG Client.

For example, if you know that SG Client traffic over particular ports is not compressible, you can put those ports in the exclude ports list. Blue Coat strongly recommends you test the include/exclude ports settings in a controlled environment before using them in production because improper settings can have an adverse impact on performance.

## Configuring Client ADN Manager Settings

**To configure client ADN Manager settings:**

1. Log in to the Management Console as an administrator.
2. Select **SG Client > Client Configuration**.
3. In the right pane, click the **ADN Manager** tab.

4. Enter the following information:

Table 12-4. Configuring Client Settings for ADN Manager

Field	Description
<b>ADN Manager</b>	Enter the primary ADN manager's IP address. The ADN manager tracks and advertises the routes to the appliances it knows about.  The SG Client obtains the routing table from the ADN manager.
<b>Backup Manager</b>	Enter the backup ADN manager's IP address. Configuring a backup ADN manager is optional but recommended.  If the ADN manager becomes unavailable for any reason, the backup ADN manager takes over the task of advertising routes to all ADN nodes—including SG Clients.
<b>Port</b>	Enter the ADN manager plain listen port.

5. Click **Apply** to commit the changes to the SG appliance.

## Configuring Client ADN Rules Settings

This section discusses how to set ADN rules settings for clients, which consist of the list of excluded subnets, included ports, and excluded ports.

### To configure client ADN Manager settings:

1. Log in to the Management Console as an administrator.
2. Select **SG Client > Client Configuration**.
3. In the right pane, click the **ADN Rules** tab.
4. In the Excluded Subnets section, do one of the following:
  - To add excluded subnets (in other words, to cause SG Client traffic from these subnets to bypass the ADN tunnel), click **Add**.  
  
In the Add IP/Subnet dialog, enter the following information and click **OK** when you are done:
    - **IP / Subnet Prefix** field: Enter either an IP address or an IP address and subnet in Classless Inter-Domain Routing (CIDR) notation (for example, 192.168.0.1/16).
    - **Subnet Mask** field: Use this field if you entered only an IP address in the preceding field (in other words, if you used CIDR notation in the preceding field, you do not need to enter a value in this field).
  - To remove excluded subnets, click the subnets to remove and click **Remove**. You are required to confirm the action.
  - To clear all excluded subnets (in other words, to cause SG Client traffic from all IP addresses and subnets to be tunneled), click **Clear all**. You are required to confirm the action.



5. In the Ports section, enter the following information:

Table 12-5. Configuring Included or Excluded Ports

Item	Description
<b>Exclude</b>	Client traffic from specified ports is <i>not</i> routed through the ADN tunnel. All other traffic is accelerated. Valid values: Comma-separated list of ports and port ranges (no spaces, separated by a dash character). Example: 22, 88, 443, 993, 995, 1352, 1494, 1677, 3389, 5900-5902
<b>Include</b>	Client traffic from specified ports is routed through the ADN tunnel and, therefore, accelerated. All other traffic bypasses the tunnel and is, therefore, not accelerated. Valid values: Comma-separated list of ports and port ranges (no spaces, separated by a dash character). Example: 80, 139, 445, 8080-8088

**Note:** The include and exclude ports lists are advanced settings that limit the traffic that is accelerated by the ADN network. To cause all traffic to be accelerated by the ADN network, click either option and delete all the ports in the list.

6. Click **Apply** to commit the changes to the SG appliance.

## Configuring the Client Manager

You must configure one SG appliance in your ADN network as the Client Manager, meaning it is responsible for providing the SG Client software, software updates, and client configuration to SG Clients. The Client Manager must be licensed as discussed in “[Licensing](#)” on page 181.

**Note:** The Client Manager can be a different appliance than the ADN manager or the backup ADN manager. In other words, you can configure the ADN manager or the backup ADN manager as the Client Manager, but it is not required.

### Setting an Appliance as the Client Manager

This section discusses how to configure an appliance in the ADN network as the Client Manager. Before configuring the Client Manager, you must first specify an ADN manager as discussed in “[Configuring Client ADN Manager Settings](#)” on page 149.

#### To set an SG appliance as the Client Manager:

1. Log in to the Management Console as an administrator.
2. Select **SG Client > Client Manager**.
3. In the right pane, click the **Client Manager** tab.
4. Select the **Enable Client Manager** check box.

## 5. Enter or edit the following information:

**Note:** Before you can enable an appliance to be the Client Manager, you must configure the ADN manager SG Clients will use. If you enable the Client Manager before you configure an ADN manager for clients, the following error displays when you attempt to apply the change: The ADN primary manager must be set prior to enabling the SG Client Manager. To configure the clients' ADN manager, see [“Configuring Client ADN Manager Settings”](#) on page 149.

License information displays below the check box. For more information, see [“Licensing”](#) on page 181.

Table 12-6. Client Manager Section

Item	Description
<b>Host</b>	<p>Specify the host from which users get the SG Client software, configuration, and updates. Blue Coat recommends you specify a fully qualified host name, and not an unqualified (short) host name or IP address. If you use a fully qualified host name and the Client Manager's IP address changes later, you need only to update DNS for the Client Manager's new address and clients can continue to download the software and updates from the Client Manager.</p> <p>After you set this option, provide the appropriate URL to users in an e-mail or by some other means so they can download the SG Client software, configuration, and updates from that URL.</p> <p>You have the following options:</p> <ul style="list-style-type: none"> <li>• <b>Use host from initial client request:</b> (<i>Recommended.</i>) Select this option to enable clients to download the SG Client software, configuration, and updates from the host from which the clients originally obtained the software and configuration. This option is compatible with all methods of deploying the SG Client, including Windows Group Policy Object (GPO) and Microsoft Systems Management Server (SMS). For more information about these deployment options, see <a href="#">“Making the SG Client Software Available to Users”</a> on page 158.</li> <li>• <b>Use host:</b> Select this option to download the SG Client software and configuration from the host name you specify. Enter a fully qualified host name or IP address only; <i>do not</i> preface it with <code>http://</code> or <code>https://</code> because downloads will fail. Use this option to migrate users from one Client Manager to another Client Manager. (Also see <a href="#">“Changing the Client Manager URL”</a> on page 175.)</li> </ul>
<b>Port field</b>	Enter the port on which the Client Manager listens for requests from clients. The default is 8084.
<b>Keyring list</b>	Select the keyring to use when clients connect to the Client Manager.

6. Click **Apply** to commit the changes to the SG appliance.

After you apply the changes, the Client Components section displays a summary of the information you selected, as follows:

Table 12-7. Client Components Section

Item	Description
<b>Client setup</b>	<p>Displays the URL from which users will download the SG Client setup application. The setup application (SGClientSetup.exe) downloads the Microsoft Installer (MSI)—named SGClientSetup.msi—to the client.</p> <p>If you want users to install the SG Client software from the Client Manager, provide this URL to them. To install the software this way, the user must have administrative privileges on the client machine.</p> <p><b>Note:</b> If you chose <b>Use host from client request</b> for <b>Host</b> as discussed in <a href="#">Table 12-6 on page 152</a>, the URL displays as follows:  <code>https://host-from-client-request:8084/sgclient/SGClientSetup.exe</code></p> <p>To download the SG Client using this URL, substitute the Client Manager's host name or IP address for <i>host-from-client-request</i>.</p>
<b>Client install MSI</b>	<p>Displays the URL from which SGClientSetup.exe downloads SGClientSetup.msi.</p> <p>To install the SG Client software on client machines silently or using Group Policy Objects (GPO) or the Microsoft Systems Management Server (SMS), use SGClientSetup.msi.</p>
<b>Client configuration</b>	Displays the URL from which the SG Client installer downloads the client configuration file (SGClientConfig.xml).
<b>Client configuration last modified</b>	Displays the most recent date and time SGClientConfig.xml was updated on the Client Manager.

## Uploading the SG Client Software to the Client Manager

This section discusses how to upload updated SG Client software to the Client Manager so it can make the latest SG Client software available to install or to update on client machines.

**Important:** After you update the Client Manager's SG Client software, whenever users connect using the SG Client, they must update their SG Client software.

### To upload the SG Client software to the Client Manager:

1. If necessary, copy SGClient.car to a location that is accessible from the machine on which you are running the Management Console.

That is, if you want to upload the SG Client software from your local file system or from a network share drive (as opposed to uploading it from a remote URL), you must copy SGClient.car to an accessible location.

2. Log in to the Management Console as an administrator.
3. Select **SG Client > Client Manager**.
4. In the right pane, click the **Client Software** tab.

On the Client Software tab page, the Current SG Client Software section displays information about the SG Client software this Client Manager is currently using.

5. From the **Install SG Client software from** list, select one of the following:
  - **Remote URL:** Upload `SGClient.car` from a location specified by a URL in the following format:  
`https://host:port/sgclient/SGClient_timestamp.car`  
For example,  
`http://mysg.example.com:8004/sgclient/SGClient_timestamp.car`
  - **Local file:** Upload the SG Client software from a location accessible by the machine on which you are running the Management Console.
6. Click **Install**.

You are required to confirm the action. Remember that any software or configuration updates require SG Client users to download the updates the next time they connect to the ADN network.
7. Follow the prompts on your screen to complete the download.

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**Note:** A compatibility check is performed on the SG Client version you just uploaded. If the upload fails, you must upgrade your SGOS version before you can upload the SG Client `.car` file.

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## Configuring the SG Client from the Command Line

This section includes the following topics:

- ❑ [“Configuring General Client Settings \(Command Line\)”](#) on page 155
- ❑ [“Configuring Client CIFS Settings \(Command Line\)”](#) on page 155
- ❑ [“Configuring Client ADN Manager Settings \(Command Line\)”](#) on page 156
- ❑ [“Configuring Client ADN Rules Settings \(Command Line\)”](#) on page 156
- ❑ [“Setting the Client Manager \(Command Line\)”](#) on page 157
- ❑ [“Loading the Software \(Command Line\)”](#) on page 157

### *Configuring General Client Settings (Command Line)*

For more information about general client settings, see [“Configuring General Client Settings”](#) on page 146.

#### **To configure general client settings:**

1. At the `#(config)` command prompt, enter `sg-client`.
2. Configure general client settings:

```
#(config sg-client) max-cache-disk-percent percentage
#(config sg-client) software-upgrade-path url
#(config sg-client) tcp-window-size bytes
#(config sg-client) update-interval minutes
#(config sg-client) view
```

### *Configuring Client CIFS Settings (Command Line)*

For more information about CIFS client settings, see [“Configuring Client CIFS Settings”](#) on page 148.

#### **To configure client CIFS client settings:**

1. At the `#(config)` command prompt, enter `sg-client`.
2. At the `#(config sg-client)` prompt, enter `cifs`.
3. Configure CIFS settings:

```
#(config sg-client cifs) directory-cache-time seconds
#(config sg-client cifs) {disable | enable}
#(config sg-client cifs) exit
#(config sg-client cifs) write-back {full | none}
#(config sg-client cifs) view
```

## Configuring Client ADN Manager Settings (Command Line)

For more information about client ADN Manager settings, see [“Configuring Client ADN Manager Settings”](#) on page 149.

### To configure client ADN manager settings:

1. At the `#(config)` command prompt, enter `sg-client`.
2. At the `#(config sg-client)` prompt, enter `adn`.
3. Configure ADN manager settings:

```
#(config sg-client adn) primary-manager ip-address
#(config sg-client adn) backup-manager ip-address
#(config sg-client adn) manager-port plain-port
```

## Configuring Client ADN Rules Settings (Command Line)

For more information about client ADN rules settings, see [“Configuring Client ADN Rules Settings”](#) on page 150.

### To configure client ADN rules settings:

1. At the `#(config)` command prompt, enter `sg-client`.
2. At the `#(config sg-client)` prompt, enter `adn`.
3. Configure ADN rules settings:

```
#(config sg-client adn) port-list {exclude-ports | include-ports}
#(config sg-client adn) {exclude-ports | include-ports} {port-list |
port-range}
#(config sg-client adn) exclude-subnets
#(config sg-client adn exclude-subnets) {add | remove}
subnet_prefix[/prefix length]
#(config sg-client adn exclude-subnets) clear
#(config sg-client adn exclude-subnets) exit
#(config sg-client adn exclude-subnets) view
#(config sg-client adn) exit
```

## Setting the Client Manager (Command Line)

For more information about configuring the Client Manager, see [“Configuring the Client Manager”](#) on page 151.

### To configure the Client Manager:

1. At the `#(config)` command prompt, enter `sg-client`.
2. Enable this appliance as the Client Manager:

```
#(config sg-client) enable
```

---

**Note:** Before you can enable an appliance to be the Client Manager, you must configure the ADN manager SG Clients will use. If you enable the Client Manager before you configure an ADN manager for clients, the following error displays: The ADN primary manager must be set prior to enabling the SG Client Manager. To configure the clients' ADN manager, see [“Configuring Client ADN Rules Settings”](#) on page 150.

---

3. Configure Client Manager settings:

```
#(config sg-client) client-manager host {from-client-address | <ip-
address | host>}
#(config sg-client) client-manager install-port port
#(config sg-client) client-manager keyring keyring
```

## Loading the Software (Command Line)

The following commands enable you to upload an updated SGClient.car file to the Client Manager.

```
#(config sg-client) software-upgrade-path path-to-SGClient-car
#(config) load sg-client-software
```

## Making the SG Client Software Available to Users

This section discusses how administrators can make the SG Client software available to users in the following ways:

- ❑ Interactive installations started from:
  - A command line on the user's machine
  - The Client Manager

For more information, see [“Setting Up Interactive Installations”](#) on page 159

- ❑ Silent installations

For more information, see [“Setting Up Silent Installations and Uninstallations”](#) on page 162

- ❑ Windows Group Policy Object distribution

For more information, see [“Using Group Policy Object Distribution”](#) on page 168

- ❑ Windows Systems Management Server (SMS) distribution

For more information about SMS, consult the documentation provided with your SMS server.

---

**Note:** For the user to run `SGClientSetup.exe` or `SGClientSetup.msi`, the user must be in the Administrators group on the client machine.

---

---

**Important:** Do not rename `SGClientSetup.msi`; doing so causes future updates to fail. Do not edit `SGClientConfig.xml` on the client machine; doing so causes unpredictable results in future configuration updates.

---



## Setting Up Interactive Installations

Users can install the SG Client software either by downloading `SGClientSetup.exe` from the Client Manager, or manually by running `SGClientSetup.msi` from a command line, as shown in the following table:

Table 12-8. SG Client Installation Options

Option	Description
Install from Client Manager	<p>Provide users the URL to <code>SGClientSetup.exe</code>, which displays on the Client Manager tab page when you select <b>SG Client &gt; Client Manager</b>.</p> <p><code>SGClientSetup.exe</code> downloads and runs <code>SGClientSetup.msi</code> on the client machine. Users see the installation in progress and have the option of canceling the installation.</p> <p>For more information about this installation method, see <a href="#">“Interactive Installations from the Client Manager”</a> on page 159.</p>
Install from the command line	<p>To install the SG Client using <code>SGClientSetup.msi</code>, users must first download it to the client machine, then execute it from the command line as discussed in <a href="#">“Interactive Manual Installations”</a> on page 161.</p> <p>Note: For a complete discussion of <code>SGClientSetup.msi</code> command-line parameters, see <a href="#">“Setting Up Silent Installations and Uninstallations”</a> on page 162.</p>

---

**Note:** Users who run the SG Client setup application must be in the Administrators group on the client machine.

---

### Interactive Installations from the Client Manager

To interactively install the SG Client software from the Client Manager, the user must be in the Administrators group on the client machine.

#### To enable users to run `SGClientSetup.exe` from the Client Manager:

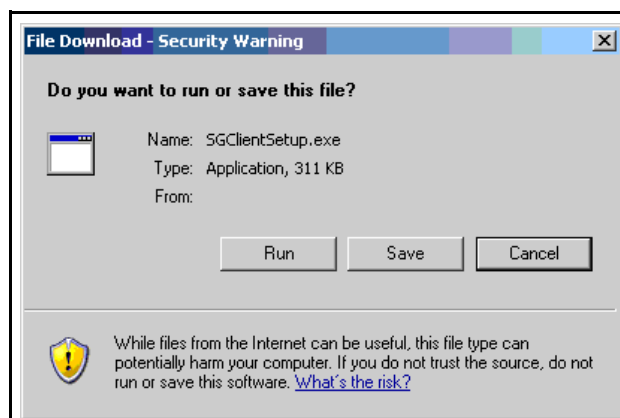
Send users an e-mail with the URL to `SGClientSetup.exe` on the Client Manager.

The URL displays when you select **SG Client > Client Manager** and click the **Client Manager** tab.

#### To install the SG Client using this method:

1. Get the URL or location from which you access `SGClientSetup.exe`.
2. Click the URL in an e-mail or enter it in your browser’s address field.
3. `SGClientSetup.exe` starts the setup application—`SGClientSetup.msi`—that installs the SG Client software.

The following dialog displays if you use Internet Explorer 6:



4. Click **Run**.

The following dialog displays if you use Internet Explorer 6:



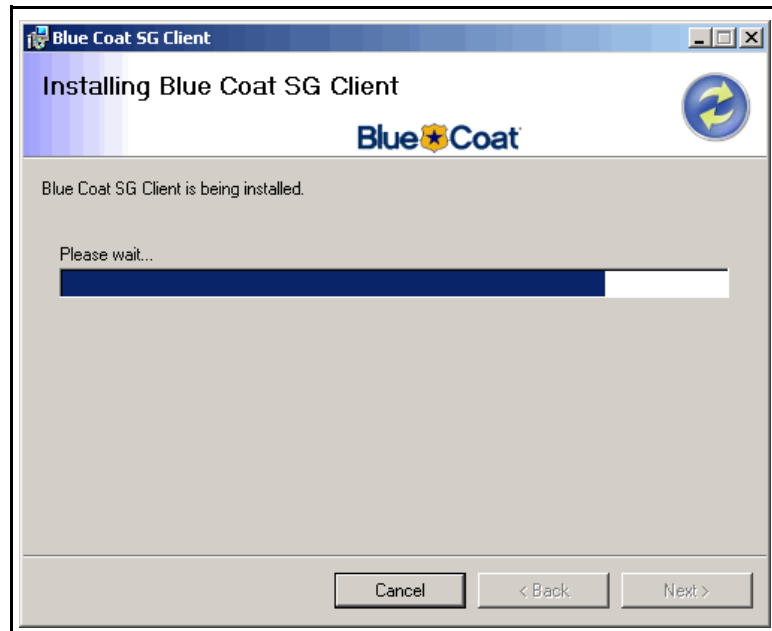
---

**Note:** The preceding dialog displays because `SGClientSetup.exe` is not signed. This is due to `SGClientSetup.exe` being unique to each Client Manager, which in turn makes signing it by a recognized certificate authority difficult.

---

5. Click **Run**.

The SG Client software installation begins and while it is being downloaded, a progress dialog similar to the following displays:



When the installation is complete, a dialog displays two options:

- Click **Now** to reboot your machine immediately.
- Click **Later** to reboot your machine at a later time.

Select this option to save work before you reboot.

## Interactive Manual Installations

### To enable users to manually install the SG Client software:

Provide a location from which the user can download `SGClientSetup.msi` to the client machine; for example, provide the user the URL to the Client Manager.

---

**Important:** Do not rename `SGClientSetup.msi`; doing so causes future updates to fail.

Do not edit `SGClientConfig.xml` on the client machine; doing so causes unpredictable results in future configuration updates.

---

### To install the SG Client using this method:

1. Download `SGClientSetup.msi` to a location on the local file system.
2. Do either of the following:
  - Click **Start > Run**, then enter the command shown in step 3.
  - Open a DOS command prompt window and change to the directory to which you downloaded `SGClientSetup.msi`

3. Enter the following command:

```
path\SGClientSetup.msi BCSI_UPDATEURL=url-to-config.xml
```

where *path* is the absolute file system path to `SGClientSetup.msi` (if necessary), *url-to-config.xml* is the URL to `SGClientConfig.xml` on the Client Manager.

This URL displays when you select **SG Client > Client Manager** and click the **Client Manager** tab as discussed in [“Configuring the Client Manager”](#) on page 151.

For example,

```
SGClientSetup.msi BCSI_UPDATEURL=http://mysg.example.com:8084/
sgclient/SGClientConfig.xml
```

---

**Note:** Other command-line parameters are available. For a complete list, see [“Setting Up Silent Installations and Uninstallations”](#) on page 162.

---

4. The installation proceeds as discussed in steps 12-14 and 5 in [“Interactive Installations from the Client Manager”](#) on page 159.

## Setting Up Silent Installations and Uninstallations

This section discusses how to silently install or uninstall the SG Client.

See one of the following sections:

- ❑ [“Parameters for Silent Installations”](#) on page 163
- ❑ [“Command for Silent Uninstallations”](#) on page 165
- ❑ [“Example Installations and Uninstallations”](#) on page 165

---

**Important:** Do not rename `SGClientSetup.msi`; doing so causes future updates to fail. Do not edit `SGClientConfig.xml` on the client machine; doing so causes unpredictable results in future configuration updates.

---

For information about distributing the SG Client software using Group Object Policy, skip this section and see [“Using Group Policy Object Distribution”](#) on page 168.

## Parameters for Silent Installations

The following table shows command-line parameters to use with `SGClientSetup.msi` for silent installations. For examples, see “[Example Installations and Uninstallations](#)” on page 165.

### *Silent Installation Usage*

```
SGClientSetup.msi [/qr|/qn] BCSI_UPDATEURL=url REINSTALL=ALL
REINSTALLMODE=vamus [AUTOUPDATEDISABLED=0|1]
[AUTOUPDATEPROHIBITED=0|1] [FORCEREBOOT={yes|no} | {y|n}]
[REBOOTTIME=secs] [/l*v logfile]
```

### *Silent Installation Parameters*

The following table shows the meanings of the parameters that can be used for silent installations; for examples, see “[Example Installations and Uninstallations](#)” on page 165:

Table 12-9. Parameters for Silent SG Client Installations

Parameter	Argument	Description
/qr /qn		<p>/qr (interactive, default) enables the user to see and interact with the installer and to cancel the installation.</p> <p>/qn (totally silent) prevents the user from seeing or interacting with the installer and from canceling the installation.</p> <p>Note: Because this is an <code>msiexec</code> command, other options are available. Enter <code>msiexec</code> at a command prompt for more information about other options.</p>
BCSI_UPDATEURL	url	<p>URL to <code>SGClientConfig.xml</code> on the Client Manager, which you can find as discussed in “<a href="#">Configuring the Client Manager</a>” on page 151, entered in the following format:</p> <pre>https://client-manager-host:client-manager-port/sgclient/SGClientConfig.xml</pre>
REINSTALL	ALL	<p>Installs all SG Client components, whether they are already installed or not.</p> <p>ALL is the only supported parameter value in this release.</p>
REINSTALLMODE	vamus	<p>Blue Coat recommends using <code>vamus</code> as the parameter value. Because this is an <code>msiexec</code> command, other options are available. For more information, see the description of this parameter at: <a href="http://msdn2.microsoft.com/en-us/library/aa371182.aspx">http://msdn2.microsoft.com/en-us/library/aa371182.aspx</a></p>

Table 12-9. Parameters for Silent SG Client Installations (Continued)

Parameter	Argument	Description
AUTOUPDATEDISABLED	0   1	<p>0 (default) means the SG Client automatically implements software and configuration updates at the frequency the administrator specified for software update interval in <a href="#">“Configuring General Client Settings”</a> on page 146.</p> <p>1 means the SG Client checks for software and configuration updates and does the following:</p> <ul style="list-style-type: none"> <li>• Implements configuration updates when they are available.</li> <li>• Implements software updates only if the user manually requests an update.</li> </ul> <p>This setting enables you to test the SG Client installation before deploying it in production.</p> <p>In other words, before you deploy the SG Client in your enterprise, you can test it in a controlled manner with a small number of users. Doing so keeps clients from requesting updates immediately after installation.</p> <p>(Users can manually update the software and configuration as discussed in the SG Client on-line help. After the user manually updates the software and configuration, the SG Client software checks for updates at the interval you specified in <a href="#">“Configuring General Client Settings”</a> on page 146.)</p>
AUTOUPDATEPROHIBITED	0   1	<p>0 (default) means the SG Client automatically implements software and configuration updates at the interval the administrator specified for software update interval in <a href="#">“Configuring General Client Settings”</a> on page 146.</p> <p>1 means only the SG Client configuration can be updated (automatically or manually), but the <i>SG Client</i> software <i>cannot</i> be updated. Use this setting if you want to distribute software updates in some way other than the Client Manager.</p> <p>Note: AUTOUPDATEPROHIBITED=1 takes precedence over AUTOUPDATEDISABLED=1.</p>
FORCEREBOOT	yes   no y   n	<p>This setting controls whether or not <b>Now</b> or <b>Later</b> buttons display on the post-installation reboot dialog.</p> <p>yes or y mean the dialog displays without buttons. (However, if REBOOTTIME=0, no dialog displays.)</p> <p>no or n (default) mean a dialog displays with two options: <b>Now</b> and <b>Later</b>, enabling users to either reboot immediately, wait for the timer to expire (see the next parameter), or wait until a later time of their choosing.</p>
REBOOTTIME	secs	<p>Number of seconds after the SG Client installation completes before the user’s machine is rebooted. A value of 0 means there is no timer; to the user, a value of 0 has slightly different meanings, depending on the value of FORCEREBOOT. For more information, see <a href="#">“Example Installations and Uninstallations”</a> on page 165.</p> <p>The default is 0.</p>

Table 12-9. Parameters for Silent SG Client Installations (Continued)

Parameter	Argument	Description
/l*v	logfile	If you want the installation to be logged, enter the absolute file system path and file name of the log file.

## Command for Silent Uninstallations

To silently uninstall the SG Client software, use the following command:

```
msiexec /q /x {4214C5ED-CCED-4360-90C0-69764F3D0854}
```

The string {4214C5ED-CCED-4360-90C0-69764F3D0854} identifies the SG Client installer's MSI product code.

### Note:

- ❑ If you changed the location of the CIFS cache as discussed in [“Changing the Location of the CIFS Cache”](#) on page 180, you must manually remove files from the new location after you uninstall the SG Client software. The SG Client uninstaller removes files only from the default CIFS cache folder.
- ❑ Users who have administrative privileges on their machines can also uninstall the SG Client using the Windows Control Panel's Add or Remove Programs application.

## Example Installations and Uninstallations

This section shows the following examples:

- ❑ [“Example Installations”](#) on page 165
- ❑ [“Example Uninstallation”](#) on page 167

**Important:** Do not rename `SGClientSetup.msi`; doing so causes future updates to fail. Do not edit `SGClientConfig.xml` on the client machine; doing so causes unpredictable results in future configuration updates.

### Example Installations

**Example 1:** Automated, interactive installation with manual software updates possible:

```
SGClientSetup.msi /qr BCSI_UPDATEURL=https://mysg.example.com:8084/sgclient/SGClientConfig.xml REINSTALL=ALL REINSTALLMODE=vamus AUTOUPDATEDISABLED=1 FORCEREBOOT=no REBOOTTIME=30
```

The SG Client configuration downloads from the Client Manager at `https://mysg.example.com:8084`. The user sees the installation in progress and can cancel it.

`AUTOUPDATEDISABLED=1` means that the SG Client does not implement software updates after the initial installation (it will, however, implement configuration updates). This setting enables you to test the SG Client software on a small scale without having to plan for client updates.

(To get software updates manually and thereafter enable automatic updates, click **Check for Updates** on the Advanced tab page in the SG Client dialog as discussed in the SG Client on-line help.)

The `REINSTALL` and `REINSTALLMODE` parameters make sure that all SG Client components install, which is useful in cases where you are recovering from an incomplete or previously unsuccessful installation.

After the installation is complete, the user has the following options:

- Wait 30 seconds for the machine to reboot
- Click **Later** in the dialog to defer rebooting until a later time
- Click **Now** in the dialog to reboot immediately

**Example 2:** Automated, interactive installation with no automatic software updates possible

```
SGClientSetup.msi /qr BCSI_UPDATEURL=https://mysg.example.com:8084/
sgclient/SGClientConfig.xml REINSTALL=ALL REINSTALLMODE=vamus
AUTOUPDATEPROHIBITED=1 FORCEREBOOT=no REBOOTTIME=30
```

The SG Client configuration downloads from the Client Manager at <https://mysg.example.com:8084>. The user sees the installation in progress and can cancel it.

`AUTOUPDATEPROHIBITED=1` means the SG Client cannot check for software updates after the initial installation; however, it will check for and implement configuration updates. Use this setting if you want to distribute software updates in some way other than the Client Manager.

The `REINSTALL` and `REINSTALLMODE` parameters make sure that all SG Client components install, which is useful in cases where you are recovering from an incomplete or previously unsuccessful installation.

After the installation is complete, the user has the following options:

- Wait 30 seconds for the machine to reboot
- Click **Later** in the dialog to defer rebooting until a later time
- Click **Now** in the dialog to reboot immediately

**Example 3:** Automated, interactive installation

```
SGClientSetup.msi /qr BCSI_UPDATEURL=https://mysg.example.com:8084/
sgclient/SGClientConfig.xml REINSTALL=ALL REINSTALLMODE=vamus
FORCEREBOOT=no REBOOTTIME=30
```

The SG Client configuration downloads from the Client Manager at <https://mysg.example.com:8084>. The user sees the installation in progress and can cancel it. The `REINSTALL` and `REINSTALLMODE` parameters make sure that all SG Client components install, which is useful in cases where you are recovering from an incomplete or previously unsuccessful installation.

After the installation is complete, the user has the following options:

- Wait 30 seconds for the machine to reboot
- Click **Later** in the dialog to defer rebooting until a later time
- Click **Now** in the dialog to reboot immediately



**Example 4: Automated, interactive installation without a timer**

```
SGClientSetup.msi /qr BCSI_UPDATEURL=https://mysg.example.com:8084/
sgclient/SGClientConfig.xml REINSTALL=ALL REINSTALLMODE=vamus
FORCEREBOOT=no REBOOTTIME=0
```

The SG Client configuration downloads from the Client Manager at `https://mysg.example.com:8084`. The user sees the installation in progress and can cancel it. The `REINSTALL` and `REINSTALLMODE` parameters make sure that all SG Client components install, which is useful in cases where you are recovering from an incomplete or previously unsuccessful installation.

After the installation is complete, the user has the following options:

- Click **Later** in the dialog to defer rebooting until a later time
- Click **Now** in the dialog to reboot immediately

**Example 5: Totally silent installation, immediate reboot**

```
SGClientSetup.msi /qn BCSI_UPDATEURL=https://mysg.example.com:8084/
sgclient/SGClientConfig.xml REINSTALL=ALL REINSTALLMODE=vamus
FORCEREBOOT=yes REBOOTTIME=0
```

The SG Client configuration downloads from the Client Manager specified at `https://mysg.example.com:8084`. The user does not see the installation in progress and cannot cancel it. The user's machine is rebooted immediately after the installation is complete. The `REINSTALL` and `REINSTALLMODE` parameters make sure that all SG Client components install, which is useful in cases where you are recovering from an incomplete or previously unsuccessful installation.

**Example Uninstallation**

```
msiexec /q /x {4214C5ED-CCED-4360-90C0-69764F3D0854}
```

The string `{4214C5ED-CCED-4360-90C0-69764F3D0854}` identifies the SG Client installer's MSI product code.

## Using Group Policy Object Distribution

This section discusses how to distribute the SG Client software using Windows Group Policy Object (GPO).

**Important:** Only an experienced Windows administrator should attempt to complete the tasks discussed in this section.

### To distribute the SG Client software using GPO:

1. Get an .msi transform tool, such as the Orca database editor.

Orca is a table-editing tool available in the Windows Installer SDK that can be used to edit your .msi files. You can also use similar tools available from other vendors.

---

**Note:** Blue Coat does not recommend a particular transform tool.

---

For more information about Orca, see:

<http://support.microsoft.com/kb/255905/en-us>

The remainder of this section assumes you use Orca. Consult the documentation provided with the transform tool you are using for vendor-specific instructions.

2. Open SGClientSetup.msi.
3. Make the following changes to the Property table:

Table 12-10. SGClientSetup Property Table Changes

Property	Action	Value
BCSI_UPDATEURL	Add row	<p><i>Required for all installations.</i></p> <p>URL to SGClientConfig.xml on the Client Manager, entered in the following format:</p> <p><code>https://client-manager-host:client-manager-port/sgclient/SGClientConfig.xml</code></p>
FORCEREBOOT	Edit value	<p><i>Required for all installations.</i></p> <p>Change the value from <code>n</code> to <code>y</code>. This value causes the user's machine to reboot after the SG Client is downloaded, which is required to use the SG Client.</p>
REINSTALL	Add row	<p>Add this row and set it to <code>all</code> only if you want to update the SG Client software and configuration using GPO.</p> <p>If clients get future SG Client software and configuration updates from the Client Manager, do not add this row.</p> <p>Also see the discussion of AUTOUPDATEPROHIBITED later in Table 12-11.</p>
REINSTALLMODE	Add row	<p>Add this row and change it to <code>vamus</code> only if you want to update the SG Client software and configuration using GPO.</p> <p>If clients will get future SG Client software and configuration updates from the Client Manager, do not add this row.</p> <p>Also see the discussion of AUTOUPDATEPROHIBITED later in Table 12-11.</p>

Table 12-10. SGClientSetup Property Table Changes

Property	Action	Value
AUTOUPDATEDISABLED	Edit	<p>Change the value from 0 to 1 only if you want to update the SG Client software using GPO. (Configuration updates are obtained from the Client Manager whose URL is specified by the <code>BCSI_UPDATEURL</code> parameter discussed earlier in this table.)</p> <p>1 means the SG Client checks for software updates and does the following:</p> <ul style="list-style-type: none"> <li>• Implements configuration updates when they are available.</li> <li>• Implements software updates only if the user manually requests an update.</li> </ul> <p>This setting enables you to test the SG Client installation before deploying it in production.</p>
AUTOUPDATEPROHIBITED	Edit value	<p>Change the value from 0 to 1 only if you want to update the SG Client software using GPO. (Configuration updates are obtained from the Client Manager whose URL is specified by the <code>BCSI_UPDATEURL</code> parameter discussed earlier in this table.)</p> <p>1 means only the SG Client configuration can be updated (automatically or manually), but the SG Client software <i>cannot</i> be updated. Use this setting if you want to distribute software updates in some way other than the Client Manager.</p> <p>Note: <code>AUTOUPDATEPROHIBITED=1</code> takes precedence over <code>AUTOUPDATEDISABLED=1</code>.</p> <p>If clients will get future SG Client software updates from the Client Manager, leave this value at 0.</p>


4. Make the following changes to the `InstallExecuteSequence` table:

Table 12-11. SGClientSetup InstallExecuteSequence Table Changes

Action	Action	Condition
FIX_REINSTALL	Edit condition	<p>This change is required only if you used <code>REINSTALL=all</code> and <code>REINSTALLMODE=vamus</code> parameters.</p> <p>If required, replace the existing condition with the following:</p> <p><code>(NOT Installed) OR (REMOVE="ALL")</code></p> <p>This setting causes the SG Client to install and uninstall properly.</p>
FIX_REINSTALLMODE	Edit condition	<p>This change is required only if you used <code>REINSTALL=all</code> and <code>REINSTALLMODE=vamus</code> parameters.</p> <p>If required, replace the existing condition with the following:</p> <p><code>(NOT Installed) OR (REMOVE="ALL")</code></p> <p>This setting causes the SG Client to install and uninstall properly.</p>

5. Generate the transformation.

## Using the SG Client

After installing the SG Client, click the  icon in the status bar and, from the pop-up menu, click **Help**. The SG Client on-line help system discusses how to use the SG Client software.

## Troubleshooting Tips for Administrators

For administrators to assist SG Client users with diagnosing errors, you need to be familiar with the topics discussed in this section:

- ❑ [“Files and Folders Used by the SG Client”](#) on page 171
- ❑ [“SG Client Logging”](#) on page 172
- ❑ [“About Browser Proxies”](#) on page 173
- ❑ [“ADN Tunnels”](#) on page 173
- ❑ [“Clearing the Object Cache”](#) on page 173
- ❑ [“Client Manager Logging”](#) on page 174
- ❑ [“Advanced Troubleshooting Suggestions”](#) on page 174

## *Files and Folders Used by the SG Client*

The following table summarizes the files and folders used by the SG Client software:

Table 12-12. SG Client Files and Folders

File or Folder Name	Description
<code>system-root-volume\Program Files\Blue Coat\SG Client</code>	Software binaries.
SGClientSetup.log SGClientSetup2.log SGClientUI.log sglog.etl sgdebug.etl sgautoupdate.log	SG Client log files, discussed in more detail in <a href="#">“SG Client Logging”</a> on page 172.
<code>%windir%\system32\sgclient\cifs</code>	Object cache folder, which is the hidden folder in which CIFS objects are cached. For information about clearing the object cache, see <a href="#">“Clearing the Object Cache”</a> on page 173.  Note: Because the object cache is typically large and contains redundant data, you should exclude the object cache from being backed up. If the client machine has to be restored from backup, the object cache is rebuilt when the user performs an action such as opening or copying a file on a remote file system.

## SG Client Logging

The SG Client maintains the following logs in the user's %TMP% folder:

Table 12-13. SG Client Log Files

File Name	Description
SGClientSetup.log	SGClientSetup.exe log; displays errors related to downloading SGClientConfig.xml or running SGClientSetup.exe.
SGClientSetup2.log	SGClientSetup.msi log; displays errors related to installing the SG Client software.

The SG Client maintains the following logs in the user's  
%windir%\system32\sgclient\support folder:

Table 12-14. SG Client Log Files

File Name	Description
sglog.etl	SG Client application log. This file can reach a maximum of 20MB in size, after which the oldest log entries are deleted as new entries are written.
sgdebug.etl	SG Client trace log. This file can reach a maximum of 20MB in size, after which the oldest log entries are deleted as new entries are written.  This log is in a compiled format that is readable only by Blue Coat Engineering.

The SG Client maintains the following log in the SG Client installation folder (for example, C:\Program Files\Blue Coat\SG Client):

Table 12-15. SG Client Log Files

File Name	Description
SGClientUI.log	Logs user interface actions.
sgautoupdate.log	Logs software updates but not configuration updates. Configuration update log messages are contained in sgautoupdate.log.

## About Browser Proxies

For users to download SG Client software and configuration updates, you might need to change proxy settings for SSL traffic. If you do not use a proxy for SSL traffic, you can skip this section.

The following options are available:

- ❑ If users can connect directly to the Client Manager, change the browser's proxy settings to exclude the Client Manager from being proxied.
- ❑ Change the proxy settings to allow connections to the Client Manager listen port (by default, 8084). You chose the Client Manager listen port as discussed in ["Configuring the Client Manager"](#) on page 151.

This method works for all users—even those who cannot connect directly to the Client Manager.

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**Note:** The SG Client uses the Internet Explorer proxy settings to download software and configuration updates, so make sure you change Internet Explorer's proxy settings.

---

## ADN Tunnels

On the General tab page of the SG Client dialog, clicking **View ADN Tunnels** displays detailed information about available tunnels, including whether a tunnel is idle or bypassed.

An *Idle* tunnel is one that is not currently being used but for which connection information is preserved to decrease the amount of time required to use that connection later, if necessary.

A *Bypassed* tunnel indicates an error with the connection to the indicated SG appliance.

## Clearing the Object Cache

To free disk space on the user's system root volume, the user can clear the object cache by clicking **Clear Cache** on the SG Client dialog's General tab page. The object cache is located in the user's %windir%\system32\sgclient\cifs folder, which is a hidden folder.

Clearing the cache affects the performance of file copies, listing directories, and opening files in different applications. Also, clearing the cache while the client is running does *not* delete files that are currently in use.

## Client Manager Logging

The Client Manager logs success or failure events related to users downloading the SG Client software and configuration. Each log should include timestamp, HTTP GET string (including the HTTP return code), and client machine name).

### To get Client Manager logs:

Enter the following URL in your browser's address field:

```
https://host:port/sgclient/log
```

where *host* is the fully qualified host name or IP address of the Client Manager, and *port* is the SG appliance's listen port.

## Advanced Troubleshooting Suggestions

This section discusses advanced troubleshooting tools and procedures for administrators. The tasks discussed in this section should be performed only by administrators, or by users with assistance from administrators.

Following is a brief discussion of each troubleshooting tool:

Tool	Description	Shortcut	For more information
Change the Client Manager URL	Enables you to connect to a Client Manager other than the one you initially downloaded the SG Client from. The typical use is for Blue Coat employees to run demonstrations, trials, and evaluations from different ADN networks.	Advanced tab page, left Control+Shift, click <b>Check for Updates</b>	"Changing the Client Manager URL" on page 175
Data collector	Collects diagnostic information useful to troubleshoot unexpected behavior and connectivity problems.	About tab page, left Control+Shift, click <b>Help</b>	"Using the SG Client Data Collector" on page 176
Diagnostic and configuration utility	Displays routing information for the ADN network, enables you to set SG Client software auto-update options, and enables you to create an SG Client service crash dump.	About tab page, left Control+Shift, click <b>System Info</b>	"Using the SG Client Diagnostics & Configuration Utility" on page 178
Change the location of the object cache files <sup>a</sup>	Change the location of object cache files to a volume that has more space. By default, object cache files are stored on the user's system root volume.	(No shortcut because it is a registry setting)	"Changing the Location of the CIFS Cache" on page 180



## Changing the Client Manager URL

When you download the SG Client or install it manually as discussed in the chapter on the SG Client in the *Advanced Networking* book, you are required to specify a Client Manager URL that is used to:

- ❑ Initially install the SG Client software from the Client Manager
- ❑ Download updates to the SG Client software
- ❑ Download updates to the SG Client configuration (the configuration includes the IP address of the ADN manager and backup manager, from which the SG Client obtains routing information for the ADN network)

You can change the Client Manager URL, for example, to run trials or demonstrations on a different ADN network than the one for which you initially configured the SG Client.

**Note:** If the SG Client was installed with either automatic software updates or automatic configuration updates disabled, those options are not changed when you change the Client Manager URL. Be aware of the following:

- ❑ If automatic software updates are prohibited, you cannot download SG Client software update unless you manually change the auto-update option as discussed in “Using the SG Client Diagnostics & Configuration Utility” on page 178.
- ❑ If automatic configuration updates are prohibited, you must manually check for configuration updates after you connect to the new Client Manager.

For more information, see the discussion of the following installation options in the chapter on the SG Client in the *Advanced Networking* book: `AUTOUPDATEDISABLED` and `AUTOUPDATEPROHIBITED`.

### To change the Client Manager URL:

1. Install the SG Client as discussed in the chapter on the SG Client in the *Advanced Networking* book.
2. Double-click the SG Client icon in the system tray.
3. Click the **Advanced** tab.
4. On the Advanced tab page, hold down left Control+Shift and click **Check for Updates**. The Change SG Client Configuration dialog displays.
5. In the **New Config URL** field, enter the URL to the new Client Manager in the following format:

`https://host-or-ip:port/path/SGClientConfig.xml`

where *host-or-ip* is the Client Manager’s fully-qualified host name or IP address, *port* is the Client Manager’s listen port, and *path* is the path to *SGClientConfig.xml*.

In other words, enter the URL to *SGClientConfig.xml*, which displays on the Client Manager tab page when you select **SG Client > Client Manager**.

For example:

`https://mysg.example.com:8084/sgclient/SGClientConfig.xml`

6. Click **OK**.

Messages display in the Change SG Client Manager dialog as the URL is verified, the SG Client service is stopped, and the service is restarted. After the service is restarted, configuration updates (if any) are downloaded to the SG Client. If automatic configuration updates are disabled, see step 7.

If software updates are ready to download, you are notified before the updates are installed. If automatic software updates are disabled, the SG Client skips this step. To manually enable automatic updates on this machine, see “Using the SG Client Diagnostics & Configuration Utility” on page 178.

When the operation is complete, the Advanced tab page displays the new Client Manager URL.

7. If automatic configuration updates are disabled:

- a. Double-click the SG Client icon in the system tray.
- b. Click the **Advanced** tab.
- c. On the Advanced tab page, click **Check for Updates**.

Configuration updates, if any, are downloaded to the SG Client.

## Using the SG Client Data Collector

The SG Client Data Collector utility collects information that administrators or Blue Coat Support can use to diagnose problems with the SG Client application and network connectivity. The Data Collector gets following information, places it in a temporary directory, and optionally stores it in a .zip file:

- ❑ System information
- ❑ SG Client log files
- ❑ SG Client crash dumps
- ❑ SGClientConfig.xml
- ❑ Information about running processes
- ❑ Network information
- ❑ Other information about the SG Client

### To run the SG Client Data Collector utility:

1. Install the SG Client as discussed in the chapter on the SG Client in the *Advanced Networking* book.
2. Double-click the SG Client icon in the system tray.
3. Click the **About** tab.
4. On the About tab page, hold down left Control+Shift and click **Help**.

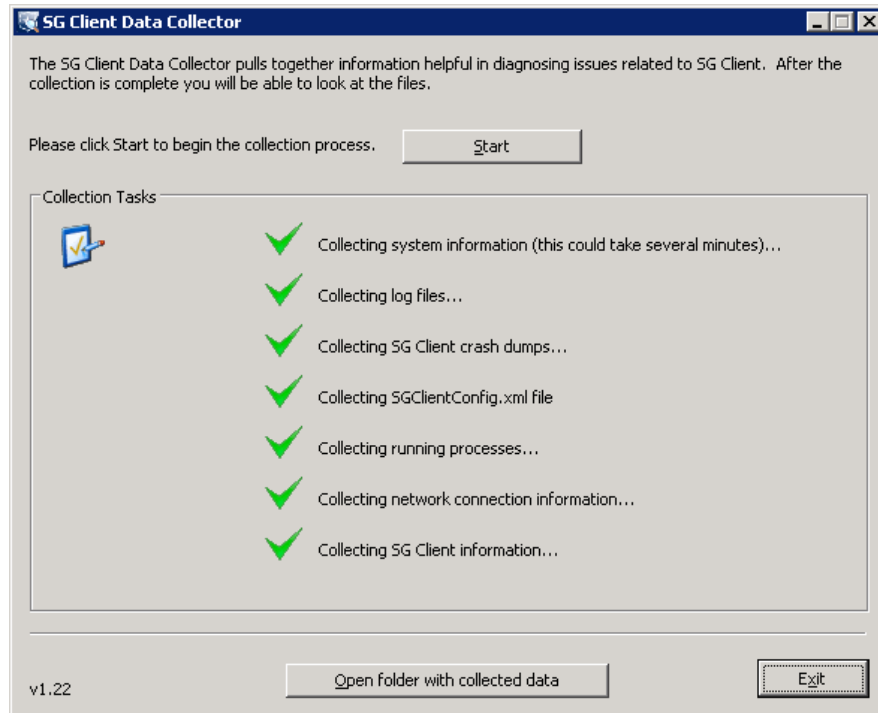
The SG Client Data Collector dialog displays.

5. Click **Start**.

A green check mark displays next to each task as it completes successfully. At any time, click **Stop** to stop the data collection process.

6. When all tasks are complete, the Collection Complete dialog gives you the following options:
  - Click **Save Data** to save the data in a .zip file to a directory you select.
  - Click **Open Folder** to open the temporary folder that contains the collected data files.
  - Click **Close**.
7. Send the data to Blue Coat Support.

After you close the Collection Complete dialog, the SG Client Data Collector dialog displays as follows:



8. You have the following options:
  - Click **Open folder with collected data** to view the files collected by the Data Collector.
  - Click **Exit** to close the SG Client Data Collector dialog.

## Using the SG Client Diagnostics & Configuration Utility

The Diagnostics & Configuration utility enables you to:

- ❑ View ADN network routing information
- ❑ View the list of excluded subnets and included ports defined by the Client Manager
- ❑ Enable or disable automatic software updates
- ❑ Create an SG Client service crash dump

### To run the SG Client Diagnostics & Configuration utility:

1. Install the SG Client as discussed in the chapter on the SG Client in the *Advanced Networking* book.
2. Double-click the SG Client icon in the system tray.
3. Click the **About** tab.
4. On the About tab page, hold down left Control+Shift and click **System Info**.

The Diagnostics & Configuration dialog displays similarly to the following:

**Diagnostics & Configuration**

**SG Client Routing Information**

Subnets:			Excluded Subnets:		Included Ports:
Address	Net Mask	Next Hop	Address	Net Mask	Port(s)
10.2.1.8	255.255.255.248	10.2.24.77	10.2.24.250	255.255.255.255	80
10.2.2.8	255.255.255.248	10.2.24.77			135
10.10.11.0	255.255.255.0	10.254.2.50			139
10.10.22.0	255.255.255.0	10.254.2.50			143
10.10.220.0	255.255.255.0	10.254.2.50			445
172.16.23.0	255.255.255.128	10.254.2.50			1024 - 3000
					8005

Refresh Routing Information

**SG Client Auto Update Configuration**

Use these controls to enable or disable auto update on this machine. ☒ Enable ☐ Disable

**SG Client Service Crash Dump**

Create a diagnostic crash dump file for the SG Client service

## 5. You have the following options:

Task	Procedure
View ADN network and routing information	<p>The SG Client Routing section at the top of the dialog box displays the following information:</p> <ul style="list-style-type: none"> <li>• <b>Subnets:</b> Displays routing information the SG Client obtained from the ADN manager. This information shows which locations are being accelerated.</li> </ul> <p>If a server does not appear to be accelerated (for example, if downloads from that server are slow), look at the routing table to see if the server is published as an accelerated destination. If not, the administrator should configure the concentrator to recognize the server as an accelerated destination.</p> <p>The routing table does not indicate whether a particular location is reachable, however. Look in the SG Client logs to determine whether the locations are reachable.</p> <p>To update routing information, click <b>Refresh Routing Information</b>.</p> <ul style="list-style-type: none"> <li>• <b>Excluded subnets:</b> Displays the list of excluded subnets defined by the Client Manager.</li> <li>• <b>Included ports:</b> Displays the list of included ports defined by the Client Manager.</li> </ul> <p>For more information about excluded subnets and included ports, see the chapter on the SG Client in the <i>Advanced Networking</i> book.</p>
Change automatic update options	<p>Click one of the following to determine whether or not the client can download updated software from the Client Manager:</p> <ul style="list-style-type: none"> <li>• <b>Enabled:</b> Users can download future SG Client software updates on this machine.</li> <li>• <b>Disabled:</b> Users cannot download future SG Client software updates on this machine. Choose this option to distribute software updates some other way (for example, using Windows Group Policy Object (GPO) distribution or Microsoft System Management Server (SMS) distribution).</li> </ul>
Create an SG Client service crash dump file	<p>In the event of problems with the SG Client application (such as crashes or freezes), click to create an SG Client service dump file named <code>sgclientsvc.dmp</code> file in the root directory of the system root volume (for example, <code>C:\</code>).</p> <p>Send the crash dump to Blue Coat Support as part of your service request.</p>

6. When you are finished, click **Close**.

## Changing the Location of the CIFS Cache

This section discusses how to change the location the SG Client stores CIFS cache files. (The SG Client CIFS cache is also referred to as the *object cache*.)

**Note:** The SG Client uninstaller removes files only from the default CIFS cache folder. If you change the location of the CIFS cache, you must manually remove files from the new location after you uninstall the SG Client software.

By default, the CIFS cache is stored in the following folder on the system root volume:

```
%windir%\system32\sgclient\cifs
```

**To optionally locate the files on a different volume (for example, a volume that has more available space):**

1. If the SG Client is already installed, perform the following tasks first:
  - a. Double-click the SG Client icon in the system tray.
  - b. In the SG Client dialog box, click the **General** tab.
  - c. On the General tab page, click **Clear Cache**.  
This deletes or expires all the files in the current CIFS cache.
  - d. Click **Disable SG Client**.
  - e. Click **Close**.
2. Create a registry value named `CacheDirectory` of type `REG_SZ` (that is, `String`) in the following key:  
`HKEY_LOCAL_MACHINE\SOFTWARE\Blue Coat Systems\SG Client`
3. Set the **Value data** of `CacheDirectory` to the location to store the object cache.  
**Note:** If the SG Client is not already installed, create the registry *before* you install the SG Client to avoid the user having to restart the SG Client service. Restarting the service stops ADN acceleration and CIFS protocol acceleration until an ADN tunnel can be re-established after the service starts.
4. If you have not already done so, install the SG Client as discussed in the chapter on the SG Client in the *Advanced Networking* book.
5. Reboot the client machine or restart the SG Client service for the registry key to take effect.  
To restart the SG Client service, right-click on its icon in the system tray. From the pop-up menu, click **Disable SG Client**. Right-click the icon again and, from the pop-up menu, click **Enable SG Client**.
6. Optional. After the service restarts, manually remove any files remaining in the previous CIFS cache directory:  
`%windir%\system32\sgclient\cifs`

## Licensing

- ❑ A new SG appliance has a 60-day trial license that permits you to use it with an unlimited number of clients.
- ❑ After the 60-day trial period, you are required to purchase a permanent license to continue using the SG Client.

The license entitles you to support a certain number of clients in your enterprise; however, the license does not limit the number of ADN tunnels to which clients can have access.

Client machines do not require a license to use the SG Client software; only the Client Manager appliance requires a license.

- ❑ You can upgrade your license to larger user counts.

For information about applying a permanent Client Manager license, see the chapter on licensing in *Volume 1: Getting Started*.





## Chapter 13: SOCKS Gateway Configuration

The Blue Coat implementation of SOCKS includes the following:

- ❑ A SOCKS proxy server that supports both SOCKSv4/4a and SOCKSv5, running on the SG appliance.
- ❑ Support for forwarding through SOCKS gateways.

To configure a SOCKS proxy server on the SG appliance, refer to *Volume 2: Proxies and Proxy Services*. To use SOCKS gateways when forwarding traffic, continue with this chapter.

This chapter contains the following sections:

- ❑ [Section A: "Configuring a SOCKS Gateway"](#) on page 184.
- ❑ [Section B: "Using SOCKS Gateways Directives with Installable Lists"](#) on page 192.

## Section A: Configuring a SOCKS Gateway

## Section A: Configuring a SOCKS Gateway

SOCKS servers provide application level firewall protection for an enterprise.

SOCKS gateways, like ICP and forwarding, can use installable lists for configuration. You can configure the installable list using directives. You can also use the Management Console or the CLI to create a SOCKS gateways configuration. Using the Management Console is the easiest method.

**To configure a SOCKS gateway:**

1. Select **Configuration > Forwarding > SOCKS Gateways > SOCKS Gateways**.
2. Click **New** to create a new SOCKS gateway.

The screenshot shows the 'Add SOCKS Gateway' dialog box. The background window displays a table of SOCKS gateways with columns: Name, Host, Port, and SOCKS Version. One entry is visible: 'test19' with host '10.1.2.3' and port '1080'. The dialog box has the following fields and options:

- SOCKS Gateway** section:
  - Alias:
  - Host:
  - SOCKS port:
  - SOCKS version:
  - Username:
  -
- Load Balancing and Host Affinity** section:
  - Load balancing method:
  - Host affinity methods:
    - HTTP:
    - SSL:
    - Other:
- Buttons:

3. Configure the SOCKS gateway as follows:
  - a. Alias: Give the gateway a meaningful name.

---

**Note:** SOCKS gateway aliases cannot be CPL keywords, such as `no`, `default`, `forward`, or `socks_gateways`.

---

## Section A: Configuring a SOCKS Gateway

- b. **Host:** Add the IP address or the host name of the gateway where traffic is directed. The host name must DNS resolve.
- c. **Port:** The default is 1080.
- d. **SOCKS version:** Select the version that the SOCKS gateway can support from the drop-down list. Version 5 is recommended.
- e. **Username (Optional, and only if you use version 5)** The username of the user on the SOCKS gateway. The username already must exist on the gateway. If you have a username, you must also set the password.
- f. **Set Password:** The plaintext password or encrypted password of the user on the SOCKS gateway. The password must match the gateway's information. The password can be up to 64 bytes long. Passwords that include spaces must be within quotes.

You can enter an encrypted password (up to 64 bytes long) either through the CLI or through installable list directives.

- g. In the **Load Balancing and Host Affinity** section, select the load balancing method from the drop-down list. **Global default** (configured on the **Configuration > Forwarding > Global Defaults** tab), sets the default for all SOCKS gateways on the system. You can also specify the load balancing method for this system: **Least Connections** or **Round Robin**, or you can disable load balancing by selecting **None**.
- h. In the **Host affinity methods** drop-down list, select the method you want to use:
  - **HTTP:** The default is to use the **Global Defaults**. Other choices are **None**, which disables host affinity, **Accelerator Cookie**, which places a cookie in the response to the client, and **Client IP Address**, which uses the client IP address to determine which upstream SOCKS gateway was last used.

By default, SOCKS treats all incoming requests destined to port 80 as HTTP, allowing the usual HTTP policy to be performed on them, including ICAP scanning. If the SOCKS connection is being made to a server on another port, write policy on the SG appliance to match on the server host and port and specify that it is HTTP using SOCKS.

- **SSL:** The default is to use the **Global Defaults**. Other choices are **None**, which disables host affinity, **Accelerator Cookie**, which places a cookie in the response to the client, and **Client IP Address**, which uses the client IP address to determine which group member was last used. In addition, you can select **SSL Session ID**, used in place of a cookie or IP address, which extracts the SSL session ID name from the connection information.
- **Other.** **Other** applies to any traffic that is not HTTP, terminated HTTPS, or intercepted HTTPS. You can attempt load balancing of any of the supported traffic types in forwarding and this host affinity setting can be applied as well. For example, you could load balance a set of TCP tunnels and apply the **Other** host affinity (client IP only).

The default is to use **Global Defaults**. Other choices are **None**, which disables host affinity, and **Client IP Address**, which uses the client IP address to determine which group member was last used.

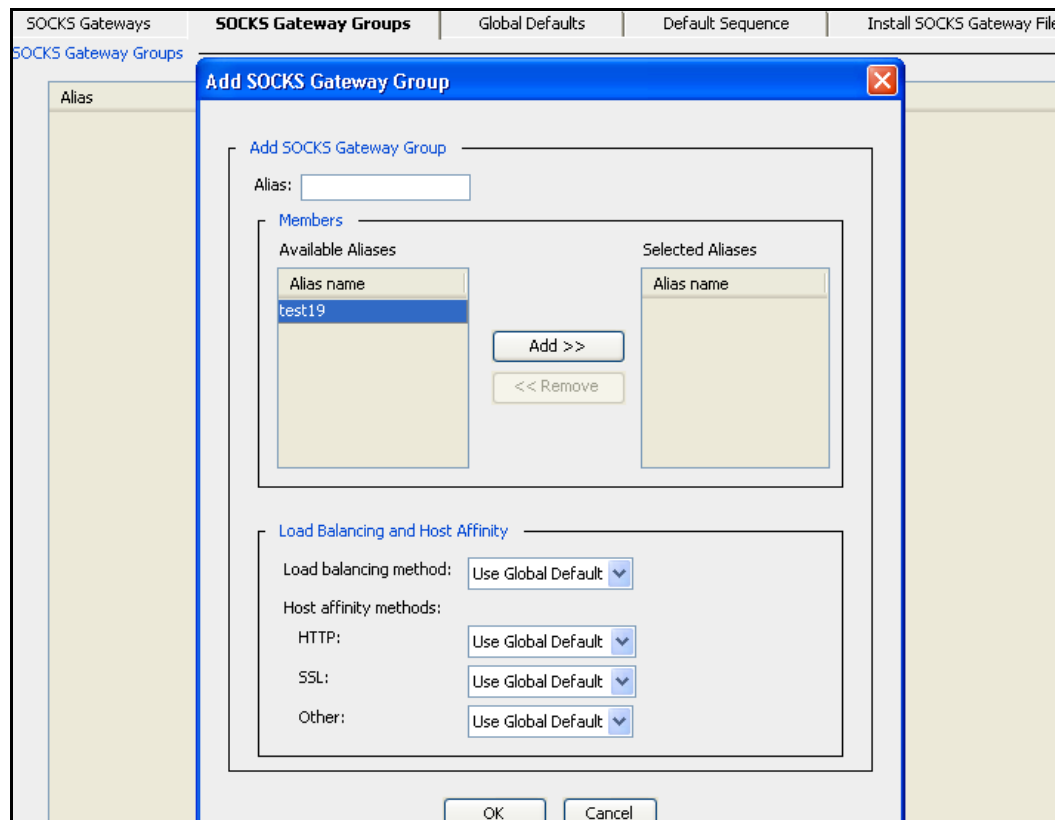
- 4. Click **OK**.
- 5. Click **Apply** to commit the changes to the SG appliance.

## Section A: Configuring a SOCKS Gateway

### To create groups:

An existing gateway can belong to none, one, or more groups as desired (it can only belong once to a single group, however).

1. Select **Configuration > Forwarding > SOCKS Gateways > SOCKS Gateway Groups**.
2. Click **New** to create a new SOCKS gateway group.



3. The Add SOCKS Gateway Group dialog displays, showing the available host aliases. To create an alias group, highlight the hosts and groups you want grouped, and click **Add**.
4. Give the new group a meaningful name.
5. In the **Load Balancing and Host Affinity** section, select the load balancing method from the drop-down list. **Global default** (configured on the **Configuration > Forwarding > SOCKS Gateways > Global Defaults** tab), sets the default for all forwarding hosts on the system. You can also specify the load balancing method for this system: **Least Connections**, **Round Robin**, **Domain Hash**, **URL Hash**, or you can disable load balancing by selecting **None**.
6. In the **Host affinity methods** drop-down lists, select the method you want to use. Refer to the previous procedure for details on methods. You are selecting between the resolved IP addresses of all of the hosts in the group, not the resolved IP addresses of an individual host.

## Section A: Configuring a SOCKS Gateway

- **HTTP:** The default is to use the **Global Defaults**. Other choices are **None**, which disables host affinity, **Accelerator Cookie**, which places a cookie in the response to the client, and **Client IP Address**, which uses the client IP address to determine which group member was last used.
- **SSL:** The default is to use the **Global Defaults**. Other choices are **None**, which disables host affinity, **Accelerator Cookie**, which places a cookie in the response to the client, and **Client IP Address**, which uses the client IP address to determine which group member was last used. In addition, you can select **SSL Session ID**, used in place of a cookie or IP address, which extracts the SSL session ID name from the connection information.
- **Other.** **Other** applies to any traffic that is not HTTP, terminated HTTPS, or intercepted HTTPS. You can attempt load balancing of any of the supported traffic types in forwarding and this host affinity setting can be applied as well. For example, you could load balance a set of TCP tunnels and apply the **Other** host affinity (client IP only).

The default is to use **Global Defaults**. Other choices are **None**, which disables host affinity, and **Client IP Address**, which uses the client IP address to determine which group member was last used.

7. Click **OK**.
8. Click **Apply** to commit the changes to the SG appliance.

## Configuring Global SOCKS Defaults

The global defaults apply to all SOCKS gateways hosts and groups unless the settings are specifically overwritten during host or group configuration.

**To configure global defaults:**

1. Select **Configuration > Forwarding > SOCKS Gateways > Global Defaults**.

The screenshot shows the 'Global Defaults' configuration page. At the top, there are five tabs: 'SOCKS Gateways', 'SOCKS Gateway Groups', 'Global Defaults' (which is active), 'Default Sequence', and 'Install SOCKS Gateway File'. Below the tabs, the 'General Settings' section contains a label 'If no forwarding host is available:' followed by two radio buttons: 'Connect directly (fail open)' and 'Deny the request (fail closed)'. The 'Deny the request (fail closed)' option is selected. The 'Load Balancing and Host Affinity' section contains a label 'Load balancing methods:' followed by two dropdown menus: 'Forwarding hosts' and 'Forwarding groups', both set to 'Round Robin'. Below these are three more dropdown menus under 'Host affinity methods': 'HTTP' set to 'None', 'SSL' set to 'None', and 'Other' set to 'None'. At the bottom of this section, there is a 'Host affinity timeout' field set to '30' with the unit 'minutes'.

2. Determine how you want connections to behave if the health checks fail: **Connect Directly (fail open)** or **Deny the request (fail closed)**. Note that failing open is an insecure option. The default is to fail closed. This option can be overridden by policy, if it exists.

## Section A: Configuring a SOCKS Gateway

---

3. Configure Global Load Balancing and Host Affinity Settings
  - a. Load Balancing methods:
    - SOCKS hosts: Specify the load balancing method for all forwarding hosts unless their configuration specifically overwrites the global settings. You can choose **Least Connections** or **Round Robin**, or you can disable load balancing by selecting **None**. **Round Robin** is specified by default.
    - SOCKS groups: Specify the load balancing method for all forwarding groups unless their configuration specifically overwrites the global settings. You can choose to hash the domain or the full URL. You can also choose **Least Connections**, **Round Robin**, **Domain Hash**, **URL Hash**, and you can disable load balancing by selecting **None**. **Round Robin** is specified by default.
  - b. Configure Global Host Affinity methods:
    - **HTTP**: The default is to use **None**, which disables host affinity. Other choices are **Accelerator Cookie**, which places a cookie in the response to the client, and **Client IP Address**, which uses the client IP address to determine which group member was last used.
    - **SSL**: The default is to use **None**, which disables host affinity. Other choices are **Accelerator Cookie**, which places a cookie in the response to the client, and **Client IP Address**, which uses the client IP address to determine which group member was last used, and **SSL Session ID**, used in place of a cookie or IP address, which extracts the SSL session ID name from the connection information.
    - **Other**: **Other** applies to any traffic that is not HTTP, terminated HTTPS, or intercepted HTTPS. You can attempt load balancing of any of the supported traffic types in forwarding and this host affinity setting can be applied as well. For example, you could load balance a set of TCP tunnels and apply the **Other** host affinity (client IP only).

The default is to use **None**, which disables host affinity. You can also choose **Client IP Address**, which uses the client IP address to determine which group member was last used.
  - c. **Host Affinity Timeout**: This is the amount of time a user's IP address, SSL ID, or cookie remains valid. The default is 30 minutes, meaning that the IP address, SSL ID or cookie must be used once every 30 minutes to restart the timeout period.
4. Click **Apply** to commit the changes to the SG appliance.

## Configuring the Default Sequence

The default sequence defines what SOCKS gateways to use when no policy is present to specify something different. The system uses the first host or group in the sequence that is healthy, just as it does when a sequence is specified through policy. Only one default sequence is allowed. All members must be pre-existing hosts, and no member can be in the group more than once.

## Section A: Configuring a SOCKS Gateway

A default failover sequence allow healthy hosts to take over for an unhealthy host (one that is failing its DNS Resolution or its health check). The sequence specifies the order of failover, with the second host taking over for the first host, the third taking over for the second, and so on.

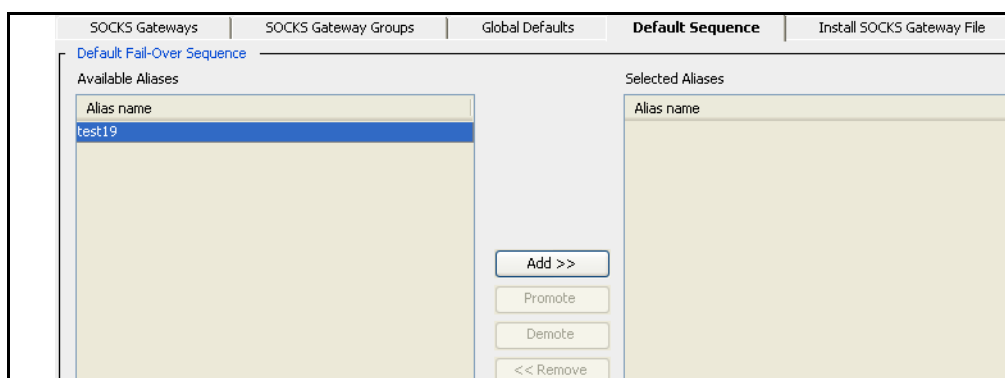
If all hosts are unhealthy, the operation fails either open or closed, depending upon your settings.

This configuration is usually created and managed through policy. If no SOCKS-gateways policy applies, you can create a default sequence through the CLI. This single default sequence consists of a single default host (or group) plus one or more hosts to use if the preceding ones are unhealthy.

### To create the default sequence:

**Note:** Traffic is forwarded to the first member of the list until it fails, then traffic is sent to the second member of list until it fails or the first member becomes healthy again, and so on.

1. Select **Configuration > Forwarding > SOCKS Gateways > Default Sequence**.



2. The available aliases (host and group) display in the **Available Aliases** pane. To select an alias, highlight it and click **Add**.

**Note:** Any host or group in the default sequence is considered in use by policy. As a result, if you try to delete a host or group while it is in the default sequence, you receive an error message. You must remove the host/group from the sequence first, then delete the host or group.

3. You can use the **Promote** and **Demote** buttons to change the order of the hosts and groups in the sequence after you add them to the **Selected Aliases** pane.
4. Click **Apply** to commit the changes to the SG appliance.

### Related CLI Syntax to Configure SOCKS Gateways

```
SGOS#(config) socks-gateways
SGOS#(config socks-gateways) create gateway gateway_alias gateway_host
SOCKS_port [group=group-alias] [version {=4 | =5}] [user=username
{password=password | encrypted-password=encrypted-password}]
SGOS#(config socks-gateways) create group group_name
SGOS#(config socks-gateways) delete all
```

## Section A: Configuring a SOCKS Gateway

```

SGOS#(config socks-gateways) delete gateway gateway_alias
SGOS#(config socks-gateways) delete group group_name
SGOS#(config socks-gateways) destroy-old-passwords
SGOS#(config socks-gateways) edit gateway_alias
 SGOS#(config socks-gateways gateway_alias) encrypted-password
 encrypted_password
 SGOS#(config socks-gateways gateway_alias) host gateway_host
 SGOS#(config socks-gateways gateway_alias) host-affinity http
 {default | none | client-ip-address | accelerator-cookie}
 SGOS#(config socks-gateways gateway_alias) host-affinity ssl
 {default | none | client-ip-address | accelerator-cookie | ssl-
 session-id}
 SGOS#(config socks-gateways gateway_alias) host-affinity other
 {default | none | client-ip-address}
 SGOS#(config socks-gateways gateway_alias) load-balance method
 {default | least-connections | none | round-robin}
 SGOS#(config socks-gateways gateway_alias) no password | user
 SGOS#(config socks-gateways gateway_alias) password password
 SGOS#(config socks-gateways gateway_alias) port socks_port
 SGOS#(config socks-gateways gateway_alias) user username
 SGOS#(config socks-gateways gateway_alias) version 4 | 5
 SGOS#(config socks-gateways gateway_alias) view
SGOS#(config socks-gateways) edit group_alias
 SGOS#(config socks-gateways group_alias) {add | remove}
 gateway_alias
 SGOS#(config socks-gateways group_alias) host-affinity http
 {default | none | client-ip-address | accelerator-cookie}
 SGOS#(config socks-gateways group_alias) host-affinity ssl {default
 | none | client-ip-address | accelerator-cookie | ssl-session-id}
 SGOS#(config socks-gateways group_alias) host-affinity other
 {default | none | client-ip-address}
 SGOS#(config socks-gateways group_alias) load-balance method
 {default | domain-hash | least-connections | none | round-robin |
 url-hash}
 SGOS#(config socks-gateways group_alias) view
SGOS#(config socks-gateways) exit
SGOS#(config socks-gateways) failure-mode {open | closed}
SGOS#(config socks-gateways) host-affinity http {default | none |
client-ip-address | accelerator-cookie} gateway_or_group_alias
-or-
SGOS#(config socks-gateways) host-affinity ssl {default | none |
client-ip-address | accelerator-cookie | ssl-session-id}
gateway_or_group_alias
-or-
SGOS#(config socks-gateways) host-affinity other {default | client-ip-
address | none} gateway_or_group_alias
SGOS#(config socks-gateways) load-balance gateway {default | none |
round-robin | least-connections} gateway_alias
SGOS#(config socks-gateways) load-balance group {default | none |
domain-hash | url-hash | round-robin | least-connections} group_alias

```



## Section A: Configuring a SOCKS Gateway

---

```
SGOS#(config socks-gateways) no path
SGOS#(config socks-gateways) path url
SGOS#(config socks-gateways) sequence {add | demote | promote |
remove} gateway-alias
SGOS#(config socks-gateways) sequence clear
SGOS#(config socks-gateways) view
```

## Statistics

SOCKS gateways statistics are available through the **Statistics > Advanced > SOCKS Gateways** menu item.

## Section B: Using SOCKS Gateways Directives with Installable Lists

## Section B: Using SOCKS Gateways Directives with Installable Lists

To configure a SOCKS gateway, you can use the Management Console (easiest), the CLI, or you can create an installable list and load it on the SG appliance. To use the Management Console, see [Section A: "Configuring a SOCKS Gateway"](#) on page 184. For information on installing the file itself, see ["Creating a SOCKS Gateway Installable List"](#) on page 196.

The SOCKS gateways configuration includes SOCKS directives that:

- ❑ Names the SOCKS gateways, version, and port number
- ❑ Creates the SOCKS gateways groups
- ❑ Provide load balancing and host affinity
- ❑ Specifies the username
- ❑ Specifies the password

Available directives are described in the table below.

Table 13-1. SOCKS Directives

Directive	Meaning
gateway	Specifies the gateway alias and name, SOCKS port, version supported, usernames and password.
group	Creates a forwarding group directive and identifies member of the group.
host_affinity	Directs multiple connections by a single user to the same group member.
load_balance	Manages the load among SOCKS gateways in a group, or among multiple IP addresses of a gateway.
sequence alias_list	Adds a space-separated list of one or more SOCKS gateways and group aliases. (The default sequence is the default forwarding rule, used for all requests lacking policy instructions)
socks_fail	In case connections cannot be made, specifies whether to abort the connection attempt or to connect to the origin content server.

Syntax for the SOCKS directives are:

```
gateway gateway_alias gateway_name SOCKS_port [group=group_alias]
[version={4 | 5}] [user=username] [password=password] [encrypted-
password=encrypted_password]
group=group_alias [gateway_alias_list]
host_affinity http {none | client-ip-address | accelerator-cookie}
[gateway_or_group_alias]
host_affinity ssl {none | client-ip-address | accelerator-cookie |
ssl-session-id} [gateway_or_group_alias]
host_affinity other {none | client-ip-address}
[gateway_or_group_alias]
host_affinity timeout minutes
```

## Section B: Using SOCKS Gateways Directives with Installable Lists

```
load_balance group {none | domain-hash | url-hash | round-robin |
least-connections} [group_alias]
load_balance gateway {none | round-robin | least-connections}
[gateway_alias]
sequence alias_list
socks_fail {open | closed}
```

For more information on SOCKS gateway directives, continue with the next section. For information on:

- ❑ `group` directives, continue with [“Creating SOCKS Gateways Groups Using Directives”](#) on page 194
- ❑ `load_balance` directives, continue with [“Configuring Load Balancing Directives”](#) on page 194
- ❑ `host_affinity` directives, continue with [“Configuring Host Affinity Directives”](#) on page 195
- ❑ `socks_fail` directives, continue with [“Setting Fail Open/Closed”](#) on page 194
- ❑ `sequence` directives, continue with [“Creating a Default Sequence”](#) on page 196

## Configuring SOCKS Gateways Using Directives

SOCKS gateways can be configured using the gateways suboptions in the table below.

Table 13-2. SOCKS Gateways Syntax

Command	Suboptions	Description
gateway		Configures the SOCKS gateway.
	gateway_alias	A meaningful name that is used for policy rules.
	gateway_name	The IP address or name of the gateway where traffic is directed. The gateway name must DNS resolve.
	SOCKS_port	The port number of the SOCKS gateway.
	version={4   5}	The version that the SOCKS gateway can support.
	user=username	(Optional, if you use v5) The username of the user. It already must exist on the gateway.
	password=password	(Optional, if you use v5) The password of the user on the SOCKS gateway. It must match the gateway's information.
	encrypted-password=encrypted_password	(Optional, if you use v5) The encrypted password of the user on the SOCKS gateway. It must match the gateway's information.

### Example

```
gateway Sec_App1 10.25.36.47 1022 version=5 user=username
password=password
```

## Section B: Using SOCKS Gateways Directives with Installable Lists

## Creating SOCKS Gateways Groups Using Directives

The SOCKS gateway `groups` directive has the following syntax:

```
group group_name gateway_alias_1 gateway_alias_2...
```

where `group_name` is the name of the group, and `gateway_alias_1`, `gateway_alias_2`, and so forth are the gateways you are assigning to the SOCKS gateways group.

## Setting Special Parameters

After you configure the SOCKS gateways and groups, you might need to set other special parameters to fine tune gateways. You can configure the following settings:

- ❑ [“Setting Fail Open/Closed”](#)
- ❑ [“Configuring Load Balancing Directives”](#) on page 194
- ❑ [“Configuring Host Affinity Directives”](#) on page 195

### Setting Fail Open/Closed

Using directives, you can determine if the SOCKS gateways fails open or closed or if an operation does not succeed.

The syntax is:

```
socks_fail {open | closed}
```

where the value determines whether the SOCKS gateways should fail open or fail closed if an operation does not succeed. Fail open is a security risk, and fail closed is the default if no setting is specified. This setting can be overridden by policy, using the `SOCKS_gateway.fail_open(yes|no)` property.

#### Examples

```
socks_fail open
```

### Configuring Load Balancing Directives

Load balancing shares the load among a set of IP addresses, whether a group or a gateway with multiple IP addresses.

The syntax is:

```
load_balance group {none | domain-hash | url-hash | round-robin |
least-connections} [group_alias]
load_balance gateway {none | round-robin | least-connections}
[gateway_alias]
```

Table 13-3. Load Balancing Directives

Command	Suboptions	Description
load_balance group	{none   domain-hash   url-hash   round-robin   least-connections} [group_alias]	If you use group for load balancing, you can set the suboption to none or choose another method. If you do not specify a group, the settings apply as the default for all groups.

## Section B: Using SOCKS Gateways Directives with Installable Lists

Table 13-3. Load Balancing Directives

Command	Suboptions	Description
load_balance gateway	{none   round-robin   least-connections} [gateway_alias]	If you use gateway for load balancing, you can set the suboption to none or choose another method. If you do not specify a gateway, the settings apply as the default for all gateways.

*Example*

```
load_balance gateway least_connections
```

## Configuring Host Affinity Directives

Host affinity is the attempt to direct multiple connections by a single user to the same group member.

The syntax is:

```
host_affinity http {none | client-ip-address | accelerator-cookie}
[gateway_or_group_alias]
host_affinity ssl {none | client-ip-address | accelerator-cookie |
ssl-session-id} [gateway_or_group_alias]
host_affinity other {none | client-ip-address}
[gateway_or_group_alias]
host_affinity timeout minutes
```

Table 13-4. Commands to Configure Host Affinity Directives

Command	Suboption	Description
host_affinity http	{accelerator-cookie   client-ip-address   none} [gateway_or_group_alias]	Determines which HTTP host-affinity method to use (accelerator cookie or client-ip-address), or you can specify none. If you do not specify a gateway or group, the settings apply as the default for all gateways or groups.
host_affinity ssl	{accelerator-cookie   client-ip-address   none   ssl-session-id} [gateway_or_group_alias]	Determines which SSL host-affinity method to use (accelerator cookie, client-ip-address, or ssl-session-id), or you can specify none. If you do not specify a gateway or group, the settings apply as the default for all gateways or groups.
host_affinity other	other {none   client-ip-address} [gateway_or_group_alias]	Determines whether TCP tunnel and Telnet is used. Determines whether to use the client-ip-address host-affinity method or specify none. If you do not specify a gateway or group, the settings apply as the default for all gateways or groups.
host_affinity timeout	minutes	Determines how long a user's IP address, SSL ID, or cookie remains valid when idle

## Section B: Using SOCKS Gateways Directives with Installable Lists

---

### Example

```
host_affinity ssl accelerator-cookie 10.25.36.48
host_affinity timeout 5
```

## Creating a Default Sequence

The default sequence is the default SOCKS gateways rule, used for all requests lacking policy instructions. Failover is supported if the sequence (only one is allowed) has more than one member.

---

**Note:** Creating the default sequence through the CLI is a legacy feature. You can set up sequences by using policy alone. The default sequence (if present) is applied only if no applicable command is in policy.

For information on using VPM, refer to *Volume 6: VPM and Advanced Policy*; for information on using CPL, refer to *Volume 10: Content Policy Language Guide*.

---

A default failover sequence works by allowing healthy SOCKS gateways to take over for an unhealthy gateway (one that is failing its DNS resolution or its health check). The sequence specifies the order of failover, with the second gateway taking over for the first gateway, the third taking over for the second, and so on).

If all gateways are unhealthy, the operation fails either open or closed, depending upon your settings.

This configuration is generally created and managed through policy. If no forwarding policy applies, you can create a default sequence through the CLI. This single default sequence consists of a single default gateway (or group) plus one or more gateways to use if the preceding ones are unhealthy.

The syntax is:

```
sequence alias_list
```

where *alias\_list* is a space-separated list of one or more SOCKS gateways and group aliases.

### Example

```
sequence gateway_alias
```

## Creating a SOCKS Gateway Installable List

You can create and install the SOCKS gateway installable list with the following methods:

- ❑ Use the Text Editor, which allows you to enter directives (or copy and paste the contents of an already-created file) directly onto the SG appliance.
- ❑ Create a local file on your local system; the SG appliance can browse to the file and install it.
- ❑ Use a remote URL, where you place an already-created file on an FTP or HTTP server to be downloaded to the SG appliance.

When the SOCKS gateway installable list is created, it overwrites any previous SOCKS gateway configurations on the SG appliance. The installable list remains in effect until it is overwritten by another installable list; it can be modified or overwritten using Management Console or CLI commands.

## Section B: Using SOCKS Gateways Directives with Installable Lists

---

---

**Note:** During the time that a SOCKS gateway installable list is being compiled and installed, SOCKS gateways might not be available. Any transactions that come into the SG appliance during this time might not be forwarded properly.

---

Installation of SOCKS gateway installable-list configuration should be done outside peak traffic times.

**To create a SOCKS gateway installable list:**

1. Select **Configuration > Forwarding > SOCKS Gateways > Install SOCKS Gateway File**.
2. If you use a SOCKS gateway server for the primary or alternate forwarding gateway, you must specify the ID for the Identification (Ident) protocol used by the SOCKS gateway in SOCKS server handshakes. The default is `BLUECOAT SYSTEMS`.
3. From the drop-down list, select the method used to install the SOCKS gateway configuration; click **Install**.
  - **Remote URL:**

Enter the fully-qualified URL, including the filename, where the configuration is located. To view the file before installing it, click **View**. Click **Install**. Examine the installation status that displays; click **OK**.
  - **Local File:**

Click **Browse** to bring up the Local File Browse window. Browse for the file on the local system. Click **Install**. When the installation is complete, a results window opens. View the results, close the window, click **Close**.
  - **Text Editor:**

The current configuration is displayed in installable list format. You can customize it or delete it and create your own. Click **Install**. When the installation is complete, a results window opens. View the results, close the window, click **Close**.
4. Click **Apply** to commit the changes to the SG appliance.

*Related CLI Syntax to specify the SOCKS Gateway Machine ID*

```
SGOS#(config) socks-machine-id machine_ID
```





## Chapter 14: Health Checks

Blue Coat health checks allow you to determine the availability of external networking devices.

This chapter includes the following sections:

- ❑ [Section A: "Overview"](#) on page 200
- ❑ [Section B: "About Blue Coat Health Components"](#) on page 202
- ❑ [Section C: "Configuring Global Defaults"](#) on page 207
- ❑ [Section D: "Forwarding Host and SOCKS Gateways Health Checks"](#) on page 214
- ❑ [Section E: "Editing External Services"](#) on page 218
- ❑ [Section F: "Managing User-Defined Health Checks"](#) on page 221
- ❑ [Section G: "Statistics"](#) on page 227
- ❑ [Section H: "Using Policy"](#) on page 229
- ❑ [Section I: "Related CLI Syntax to Configure Health Checks"](#) on page 230

## Section A: Overview

---

### Section A: Overview

Health checks are tests run on external resources, such as forwarding hosts, SOCKS gateways, and ICAP and Websense off-box services, to determine status. You can use health checks in conjunction with various failover mechanisms to handle a variety of failure scenarios. For example, you can use health checks with forwarding rules to redirect traffic from one server or proxy to another.

If the health check for an individual host fails, the SG appliance can select a healthy host ahead of time or report the failure quickly.

Health checks test for:

- ❑ Network connectivity
- ❑ Target responsiveness
- ❑ Basic functionality of the upstream system or service

Health checks fall into three broad categories:

- ❑ Determining if the IP address can be reached. Health check types that fall into this category are:
  - Forwarding hosts
  - SOCKS gateways
  - Dynamic Real-Time Rating (DRTR) service
- ❑ Determining if a service is responsive. Health check types that fall into this category are:
  - ICAP services
  - Websense off-box services
- ❑ Determining if a group is healthy. Group tests are compilations of individual health checks, and the health of the group is determined by the status of the group members. Health check types that fall into this category are:
  - Forwarding groups
  - SOCKS gateway groups
  - ICAP service groups
  - Websense off-box service groups

---

**Note:** The health check module has been reorganized. For specific information about the differences between health checks for previous versions and SGOS 5.2, refer to the *Blue Coat SGOS 5.x Upgrade Guide*.

---

Health checks always have status. The status of any health check can be referenced in policy as a condition. For more information about using health checks in policy, see [Section H: "Using Policy"](#) on page 229.

## Section A: Overview

---

---

**Note:** You can run an immediate health check from the **Configuration > Health Checks > General > Health Checks** tab by selecting the health check and clicking **Perform health check**. You can also view the health check state on the **Statistics > Health Check** tab, but you cannot change settings in Statistics.

---

A number of health checks are automatically generated, based on:

- ❑ Forwarding configuration
- ❑ SOCKS gateways configuration
- ❑ ICAP configuration
- ❑ Websense off-box configurations
- ❑ Whether DRTR is enabled

You also can create user-defined health checks, including a composite health check that compiles the results of multiple other health check tests.

## Background DNS Resolution

Background testing of the DNS resolutions is done on all resolvable hostnames used in the health check system, including forwarding and SOCKS gateways. That way, the list of IP addresses associated with a hostname stays current. The DNS system is checked whenever the time-to-live (TTL) value of the DNS entry expires.

---

**Note:** If a hostname consists of a dotted IP address, no DNS resolution is done.

---

When a host is resolved by DNS to multiple IP addresses, health checks keep those addresses current through background updates, the timing of which you can configure on the **Configuration > Health Checks > Background DNS** tab. After the test or tests are conducted for each IP address, the results are combined. If the result for any of the resolved IP addresses is healthy, then the host is considered healthy because a healthy connection to that target can be made.

## Querying Health Checks

A network device can query the state of any health check, automatically generated or user-defined, as long as you know the name of the health check to use as part of the URL. The URL is `https://SG_appliance/health_check/test?health_check_name`, where `SG_appliance` is the IP address of the system.

If the health check is:

- ❑ Not found, a 400 (bad request) HTML response is sent
- ❑ Healthy, a 200 response is sent
- ❑ Unhealthy, a 404 response is sent

In the latter two cases, a text string is sent back in the HTML response body more precisely describing the state of health.

## Section B: About Blue Coat Health Components

---

## Section B: About Blue Coat Health Components

Health checks have two components:

- ❑ Health check type: The kind of device or service the specific health check tests. The following types are supported:
  - Forwarding host and forwarding group
  - SOCKS gateway and SOCKS gateway group
  - ICAP service and ICAP service group
  - Websense off-box service and Websense off-box service group
  - DRTR rating service
  - User-defined host and composite
- ❑ Health check tests: The method of determining network connectivity, target responsiveness, and basic functionality.
  - Health checks (external targets)
    - Internet Control Message Protocol (ICMP)
    - TCP
    - SSL
    - HTTP
    - HTTPS
    - ICAP
    - Websense
    - DRTR rating service
  - Health checks (group targets)
    - Groups
    - Composite

---

**Note:** Some health checks (forwarding hosts and SOCKS gateways) can be configured to report the result of some composite health check instead of their own test.

---

Some health check types only have one matching test, while others have a selection. For more information about health check types and tests, see [Table 14-1, “Health Check Tests,”](#) on page 203.

### *Health Check Types*

Most health checks are automatically created and deleted when the underlying entity being checked is created or deleted. When a forwarding host is created, for example, a health check for that host is created. Later, if the forwarding host is deleted, the health check for it is deleted as well. User interaction is not required, except to change or customize the health check behavior if necessary.

## Section B: About Blue Coat Health Components

In addition to the above health checks that are automatically generated, run, and deleted, Blue Coat also supports two kinds of user-defined health checks. These health checks are manually created, configured, and deleted.

- ❑ *Composite* health checks: A method to take the results from a set of health checks (automatically generated or user-defined health checks) and combine the results.
- ❑ *Host* health checks: A method to test a server, using a selection of ICMP, TCP, SSL, HTTP, and HTTPS tests.

---

**Note:** Although a host health check tests an upstream server, it can also be used to test whether a proxy is working correctly. To test HTTP/HTTPS proxy behavior, for example, you can set up a host beyond the proxy, and then use forwarding rules so the health check passes through the proxy to the host, allowing the proxy to be tested.

---

User-defined health checks allow you to test for things that Blue Coat does not test automatically. For example, for a forwarding host, you could do an HTTP test, an HTTPS test, and a TCP test of other ports. Then you can use the composite health check to combine the results of all the tests into one and have that reported as the forwarding host's health.

All health check types are given standardized names. If a health check is created automatically by the Blue Coat appliance, names are based on the name of the target. For example:

- ❑ Forwarding hosts and groups have a prefix of **fwd**
- ❑ SOCKS gateways and gateway groups have a prefix of **socks**
- ❑ External services have prefixes of **icap**, **ws**, and **drtr**
- ❑ User-defined or composite health checks have a prefix of **user**.

## Health Check Tests

Based on the health check type, the SG appliance periodically tests the health status, and thus the availability, of the host. You can configure the time interval between tests. If the health check test is successful, the appliance considers the host available.

The health check tests are described in the table below.

Table 14-1. Health Check Tests

Health Check Test	Description	Used With Health Check Type
Response Times	The minimum, maximum, and average response times are tracked, with their values being cleared whenever the health check changes state.	All

## Section B: About Blue Coat Health Components

Table 14-1. Health Check Tests (Continued)

Health Check Test	Description	Used With Health Check Type
ICMP Test (Layer 3)	<p>The basic connection between the Blue Coat appliance and the origin server is confirmed. The server must recognize ICMP echoing, and any intervening networking equipment must support ICMP. The Blue Coat appliance sends a ping (three ICMP echo requests) to the host.</p> <p>ICMP tests do not support policy for SOCKS gateways or forwarding.</p>	Forwarding hosts, SOCKS gateways, or user-defined hosts
TCP Socket Connection Test (Layer 4)	<p>A TCP test establishes that a TCP layer connection can be established to a port on the host. Then the connection is dropped.</p> <p>TCP tests for a SOCKS gateway do not support policy for SOCKS gateways or forwarding.</p> <p>TCP tests for a forwarding host or a user-defined health check support SOCKS gateways policy but not forwarding policy.</p>	Forwarding hosts, SOCKS gateways, or user-defined hosts
SSL Test	<p>A connection is made to a target and the full SSL handshake is conducted. Then, much as a TCP test, the connection is dropped.</p> <p>For a forwarding host, a terminating HTTPS port must be defined or the test fails.</p> <p>SSL tests for a forwarding host or a user-defined health check support SOCKS gateways policy. The SSL tests do not support forwarding policy.</p> <p>An SSL test executes the SSL layer in policy and obeys any settings that apply to server-side certificates, overriding any settings obtained from a forwarding host.</p>	Forwarding hosts or user-defined hosts

## Section B: About Blue Coat Health Components

Table 14-1. Health Check Tests (Continued)

Health Check Test	Description	Used With Health Check Type
HTTP/HTTPS Tests for Servers and Proxies	<p>HTTP/HTTPS tests execute differently depending on whether the upstream target is a server or a proxy. For a forwarding host, the server or a proxy is defined as part of the forwarding host configuration. For a user-defined health check, the target is always assumed to be a server.</p> <p>For a server:</p> <ul style="list-style-type: none"> <li>• The HTTP test sends an HTTP GET request containing only the URL path to an HTTP port.</li> <li>• The HTTPS test sends an HTTPS GET request containing only the URL path over an SSL connection to a terminating HTTPS port.</li> </ul> <p>If an appropriate port is not available on the target, the test fails.</p> <p>For a proxy:</p> <ul style="list-style-type: none"> <li>• The HTTP test sends an HTTP GET request containing the full URL to an HTTP port.</li> <li>• Since a server is required to terminate HTTPS, the HTTPS test sends an HTTP CONNECT request to the HTTP port.</li> </ul> <p>If an appropriate HTTP port is not available on the proxy, either test fails.</p> <p>An HTTP/HTTPS test requires a full URL for configuration.</p> <p>The HTTP/HTTPS tests for a forwarding host support SOCKS gateway policy but not forwarding policy.</p> <p>The HTTP/HTTPS tests for a user-defined health check support SOCKS gateway and forwarding policy.</p> <p>An HTTPS test executes the SSL layer in policy and obeys any settings that apply to server-side certificates, overriding any settings obtained from a forwarding host.</p>	Forwarding hosts or user-defined hosts.
HTTP/HTTPS Authentication	For HTTP/HTTPS tests, you can test authentication using a configured username and password. The passwords are stored securely in the registry.	Forwarding hosts or user-defined hosts.
HTTP/HTTPS Allowed Responses	For an HTTP or HTTPS test, this is the set of HTTP response codes that indicate success. The default is to accept only a 200 response as successful. You can specify the sets of response codes to be considered successful.	Forwarding hosts or user-defined hosts.
External Services Tests	The tests for external services are specialized tests devised for each particular kind of external service. The health check system conducts external service tests by sending requests to the external services system, which reports back a health check result.	ICAP, Websense off-box, DRTR rating service.

## Section B: About Blue Coat Health Components

Table 14-1. Health Check Tests (Continued)

Health Check Test	Description	Used With Health Check Type
Group	<p>Individual tests that are combined for any of the four different available groups (forwarding, SOCKS gateways, ICAP, and Websense off-box). If any of the members is healthy, then the group as a whole is considered healthy.</p> <p>Note: Blue Coat supports a composite test, used only with composite (user-defined) health checks, that is similar to a group test except that, by default, all members must be healthy for the result to be healthy.</p> <p>These settings are configurable.</p> <p>By default, group health tests are used for two purposes:</p> <ul style="list-style-type: none"><li>• Monitoring and notification</li><li>• Policy</li></ul>	Forwarding groups, SOCKS gateways groups, and ICAP and Websense off-box external service groups.



## Section C: Configuring Global Defaults

In general, all health checks are initially configured to use global defaults.

---

**Note:** The DRTR rating service is initially configured to override two of the default settings. The healthy interval is set to 10800 seconds (3 hours), and a failure trigger is set to 1.

---

### About Health Check Defaults

You can change the defaults on most health checks. These defaults override global defaults, which are set from the **Configuration > Health Checks > General > Default Settings** tab. For information about setting or changing defaults, see [Section D: "Forwarding Host and SOCKS Gateways Health Checks"](#) on page 214.

You can edit health check intervals, thresholds, and notifications for automatically generated health checks, but these health checks are automatically deleted if the health check target is deleted.

You can configure health check intervals, thresholds, and notifications two ways:

- ❑ Setting the global defaults. These settings affect all health checks, unless overridden by explicit settings.
- ❑ Setting explicit values on each health check.

The default health check values are:

- ❑ Ten seconds for healthy and sick *intervals* (an interval is from the completion of one health check to the start of the next health check)
- ❑ One for healthy and sick *thresholds*. A healthy threshold is the number of successful health checks before an entry is considered healthy; a sick threshold is the number of unsuccessful health checks before an entry is considered sick

To configure intervals and thresholds, continue with ["Changing Health Check Default Settings"](#) on page 208.

### Enabling and Disabling Health Checks

You can enable or disable health checks and configure them to report as healthy or unhealthy during the time they are disabled. If a group health check is disabled but reporting healthy, all members of the group are treated as healthy regardless of the status of the members' individual health checks.

---

**Note:** Individual health checks for group members are still active; they can be used apart from the group.

---

Setting a health check as disabled but reporting sick is useful to remove an upstream device for servicing, testing, or replacement. This setting takes the device offline after pre-existing traffic completes. Then the device can be safely disconnected from the network without altering any other configuration.

You cannot enable or disable all health checks at once.

## Section C: Configuring Global Defaults

## Notifications and SNMP Traps

If you configure notifications, e-mail and event log notifications can be sent when a change of health check state occurs. By default, all notifications are disabled. To set notifications, you can change them globally, for all health checks, or explicitly, for specific checks.

You can separately enable notifications of transitions to healthy and transitions to sick. A transition to healthy occurs as soon as the target is sufficiently healthy to be sent a request, even though this might not mean complete health. For example, if you have multiple IP addresses resolved and only one (or a few) of them work, that is healthy enough to be classified as healthy. The health can continue to improve.

In the event log, state changes can be logged as either informational or severe logs. You can enable notifications for each resolved IP address of a target device (if applicable), in addition to the overall health of the device.

An SNMP trap can also be used for notification of health check state changes. It is part of the Blue Coat Management Information Base (MIB) as *blueCoatMgmt 7.2.1*.

To change notifications, continue with [“Configuring Health Check Notifications”](#) on page 211.

## Changing Health Check Default Settings

You can set the default settings for all health checks on the **Configuration > Health Checks > General > Default Settings** tab or you can override the default settings for a health check by going to **Configuration > Health Checks > General > Health Checks** tab, selecting the health check, and clicking **Edit**. Explicit health settings override the global defaults.

### To change default settings:

1. Select **Configuration > Health Checks > General > Default Settings**.

The screenshot shows the 'Default Settings' tab within the 'Health Checks' configuration section. The tab is titled 'Default Settings' and contains several input fields for configuring health check parameters. The 'Healthy interval' is set to 10 seconds, 'Healthy threshold' is 1, 'Sick interval' is 10 seconds, and 'Sick threshold' is 1. There are two unchecked checkboxes: 'Failure trigger threshold' (set to 0) and 'Response time threshold' (set to 0 milliseconds).

Health Checks	Default Settings	Default Notifications
Default Settings		
Healthy interval:	10 seconds	
Healthy threshold:	1	
Sick interval:	10 seconds	
Sick threshold:	1	
<input type="checkbox"/> Failure trigger threshold:	0	
<input type="checkbox"/> Response time threshold:	0 milliseconds	

### Section C: Configuring Global Defaults

---

2. Change the settings as appropriate:
  - a. Specify the healthy interval, in seconds, between health checks. The default is **10**. The healthy interval can be between 1 second and 31536000 seconds (about one year).
  - b. Specify the healthy threshold for the number of successful health checks before an entry is considered healthy. Valid values can be between 1 and 65535. The default is **1**.
  - c. Specify the sick interval, in seconds, between health checks to the server that has been determined to be sick or out of service. The default is **10**. The sick interval can be between 1 second and 31536000 seconds (about 1 year).
  - d. Specify the sick threshold, or the number of failed health checks before an entry is considered sick. Valid values can be between 1 and 65535. The default is **1**.
  - e. Specify the failure threshold for the number of failed connections to the server before a health check is triggered. Valid values can be between 1 and 2147483647. By default, no value is set.

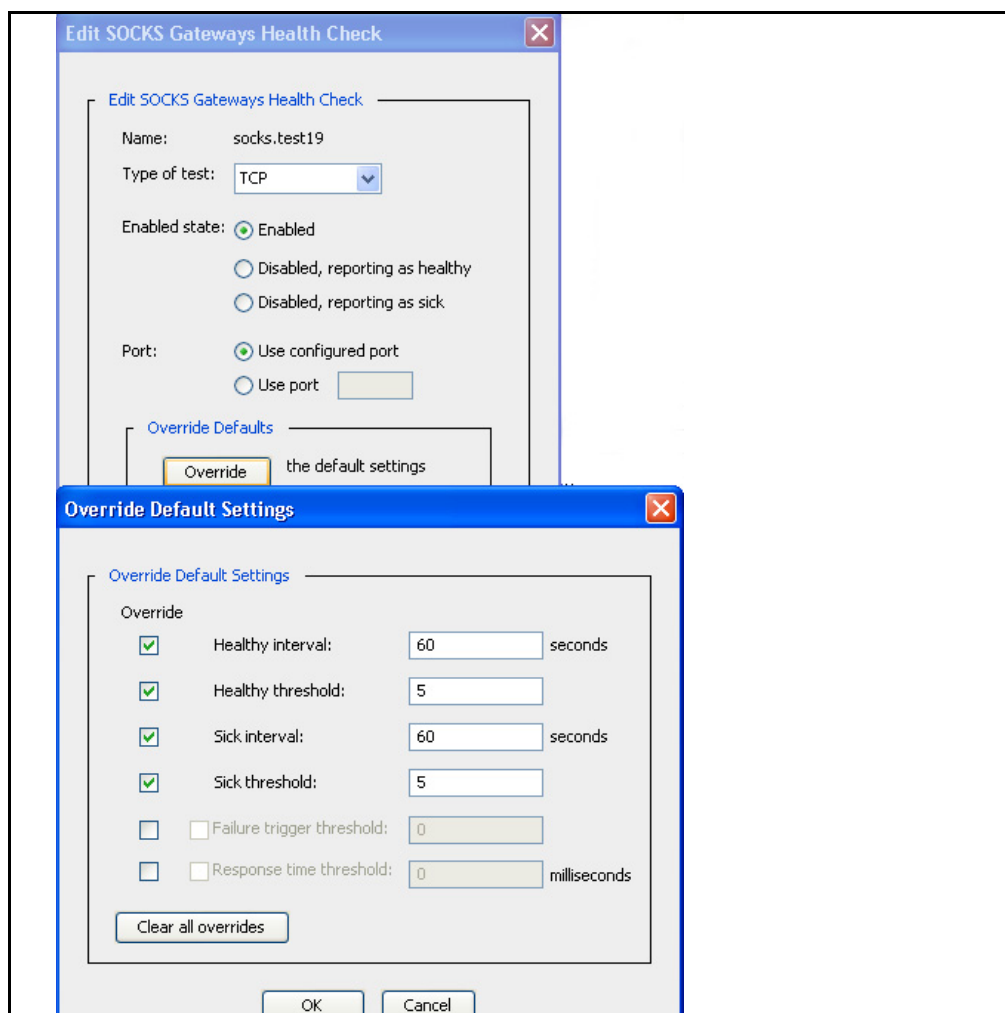
The failures are reported back to the health check as a result of either a connection failure or a response error. The number of these external failures is cleared every time a health check is completed. If the number of failures listed meets or exceeds the threshold and the health check is idle and not actually executing, then the health of the device or service is immediately checked.

- f. Specify the maximum response time threshold, in milliseconds. The threshold time can be between 1 and 65535.
3. Click **OK**.
4. Click **Apply** to commit the changes to the SG appliance.

#### To override default settings:

1. Select **Configuration > Health Checks > General > Health Checks**.
2. Select the test you want to modify.
3. Click **Edit**. The example below uses a SOCKS gateway.

## Section C: Configuring Global Defaults



4. To substitute special values for this test, click **Override the default settings**.
5. Select the check boxes to override. You can cancel your choices by clicking **Clear all overrides**.
  - a. Specify the healthy interval, in seconds, between health checks to the server. The default is **10**. The healthy interval is between 1 second and 31536000 seconds (about one year).
  - b. Specify the healthy threshold for the number of successful health checks before an entry is considered healthy. Valid values are 1-65535. The default is **1**.
  - c. Specify the sick interval, in seconds, between health checks to the server that has been determined to be sick or out of service. The default is **10**. The sick interval is between 1 second and 31536000 seconds (about 1 year).
  - d. Specify the sick threshold, or the number of failed health checks before an entry is considered sick. Valid values are 1-65535. The default is **1**.

## Section C: Configuring Global Defaults

- e. Specify the failure trigger for the number of failed connections to the server before a health check is triggered. Valid values are between 1 and 2147483647.

The failures are reported back to the health check as a result of either a connection failure or a response error. The number of these external failures is cleared every time a health check is completed. If the number of failures listed meets or exceeds the threshold, and the health check is idle and not actually executing, then the health of the device or service is immediately checked.

- f. Specify the maximum response time threshold, in milliseconds. The threshold time can be between 1 and 65535.

6. Click **OK**.
7. Click **Apply** to commit the changes to the SG appliance.

## Configuring Health Check Notifications

By default, notifications of health check events and status are disabled. You can set up health check notifications globally, on the **Configuration > Health Checks > General > Default Notifications** tab, or explicitly by going to the **Configuration > Health Checks > General > Health Checks** tab, selecting the health check, and clicking **Edit**. Explicit health settings override the global defaults.

**To configure health check notifications globally:**

1. Select **Configuration > Health Checks > General > Default Notifications**.

The screenshot shows the 'Default Notifications' configuration page. It has three tabs: 'Health Checks', 'Default Settings', and 'Default Notifications'. The 'Default Notifications' tab is active. The page is divided into three sections: 'E-mail notification', 'Event logging', and 'SNMP traps'. Each section has several checkboxes and dropdown menus.

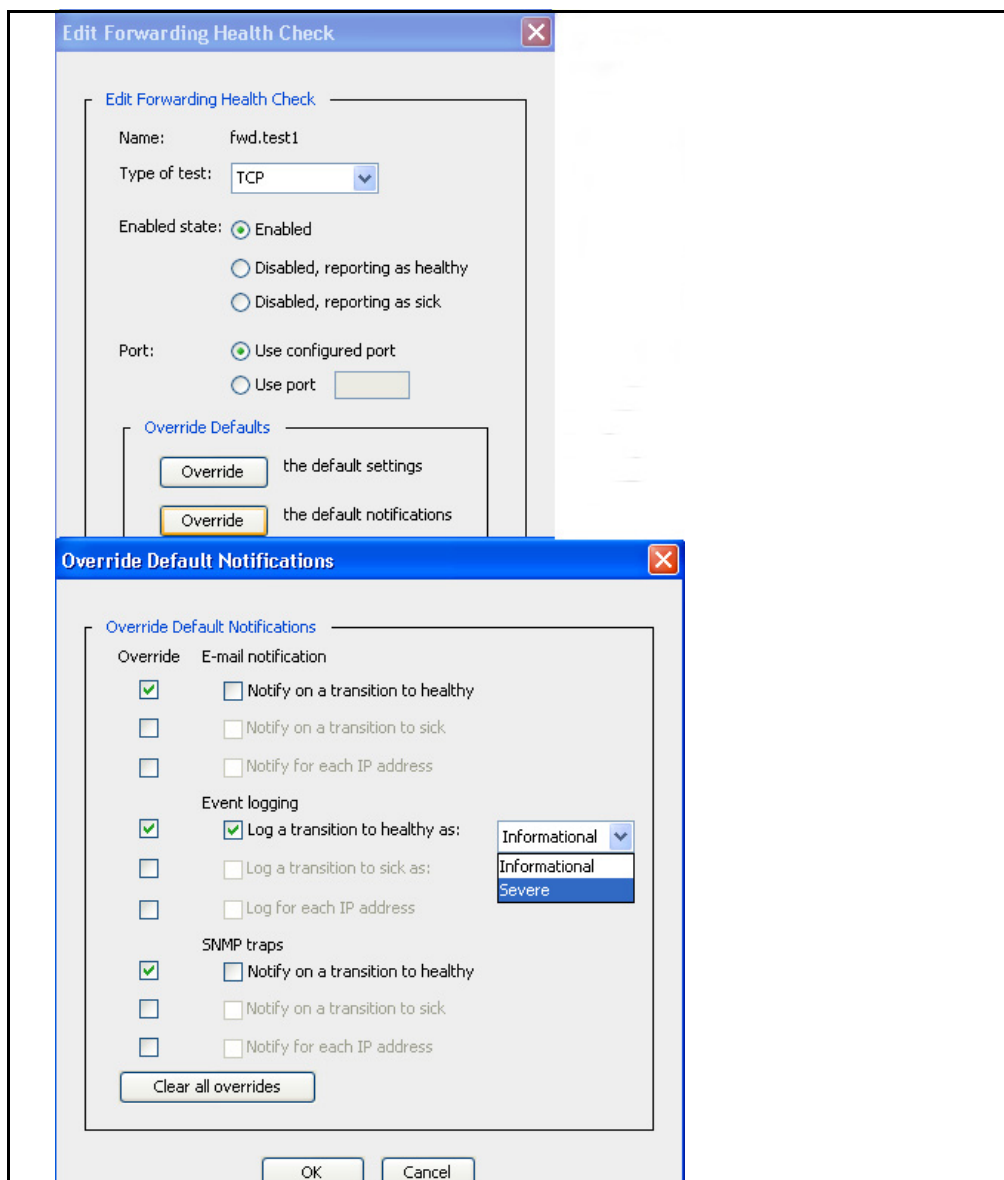
Section	Option	Status
E-mail notification	Notify on a transition to healthy	Checked
	Notify on a transition to sick	Unchecked
	Notify for each IP address	Unchecked
Event logging	Log a transition to healthy as:	Informational
	Log a transition to sick as:	Severe
	Log for each IP address	Unchecked
	Log for each IP address	Unchecked
SNMP traps	Notify on a transition to healthy	Unchecked
	Notify on a transition to sick	Unchecked
	Notify for each IP address	Unchecked

2. Select the check boxes to enable notifications.
  - a. **E-mail notification:** Select the appropriate check boxes to enable the email notifications you require. Recipients are specified in **Maintenance > Event Logging > Mail**.
  - b. **Event logging:** Select the appropriate check boxes to enable the event logging you require. Messages can be logged as either informational or severe.
  - c. **SNMP traps:** Select the situations for which you require SNMP traps to be sent.
3. Click **Apply** to commit the changes to the SG appliance.

## Section C: Configuring Global Defaults

**To override health check notification default settings:**

1. Select **Configuration > Health Checks > General > Health Checks**.
2. Select the test you want to modify.
3. Click **Edit**. The example below uses a forwarding host.
4. To change default notifications for this test, click **Override the default notifications**. By default, notifications are not sent for any health checks.



5. Select the check boxes to override. You can cancel your choices by clicking **Clear all overrides**.

### Section C: Configuring Global Defaults

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- a. **Override E-mail notification:** Select the appropriate check boxes to enable the email notifications you required. Specify recipients in **Maintenance > Event Logging > Mail**.
  - b. **Event logging:** Select the appropriate check boxes to enable the event logging you need. Messages can be logged as either informational or severe.
  - c. **SNMP traps:** Select the situations in which you want SNMP traps to be sent.
  - d. Click **OK**.
  - e. Click **OK**.
6. Click **Apply** to commit the changes to the SG appliance.

## Section D: Forwarding Host and SOCKS Gateways Health Checks

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### Section D: Forwarding Host and SOCKS Gateways Health Checks

Before you can edit forwarding or SOCKS gateways health check types, you must configure forwarding hosts or SOCKS gateways. For information about configuring forwarding, see [Chapter 8: "Configuring the Upstream Network Environment"](#) on page 101; for information about configuring SOCKS gateways, see [Chapter 13: "SOCKS Gateway Configuration"](#) on page 183.

This section discusses managing automatically generated health checks. To create health checks using the user-defined health check type, continue with [Section F: "Managing User-Defined Health Checks"](#) on page 221.

### Forwarding Hosts and SOCKS Gateways Configurations

The forwarding host health check configuration defines whether the target being tested is a server or a proxy, which ports are available, and provides the setting for the server certificate verification.

The SOCKS gateways health check configuration defines the SOCKS port, the version (4 or 5), and possibly a username and password.

#### *Forwarding Hosts Health Checks*

The default for a newly created forwarding host is a TCP health check using the first port defined in the forwarding host's port array (typically the HTTP port). You can change the port setting. The TCP test can support forwarding policy (SOCKS gateways policy). The URL uses the forwarding host hostname, such as `tcp://<gateway-name>:<port>/`.

#### *SOCKS Gateways Health Checks*

The default for a newly created SOCKS gateway is a TCP health check using the SOCKS port in the SOCKS gateways configuration.

#### *Forwarding and SOCKS Gateways Groups Health Checks*

Specific tests are not done for groups. Health check test results are determined from examining and combining the health of the group members.

---

**Note:** You can create groups in the **Configuration > Forwarding > Forwarding Hosts** tab or **Configuration > Forwarding > SOCKS Gateways** tab.

---

By default, if any of the members of the group are healthy, then the group is considered healthy. You can specify the number of group members that must be healthy for the group to be considered healthy.

### Configuring Forwarding and SOCKS Gateways Health Checks

You can edit, but not delete, the automatically generated forwarding tests and groups. You can create, edit, copy, and delete user-defined tests.



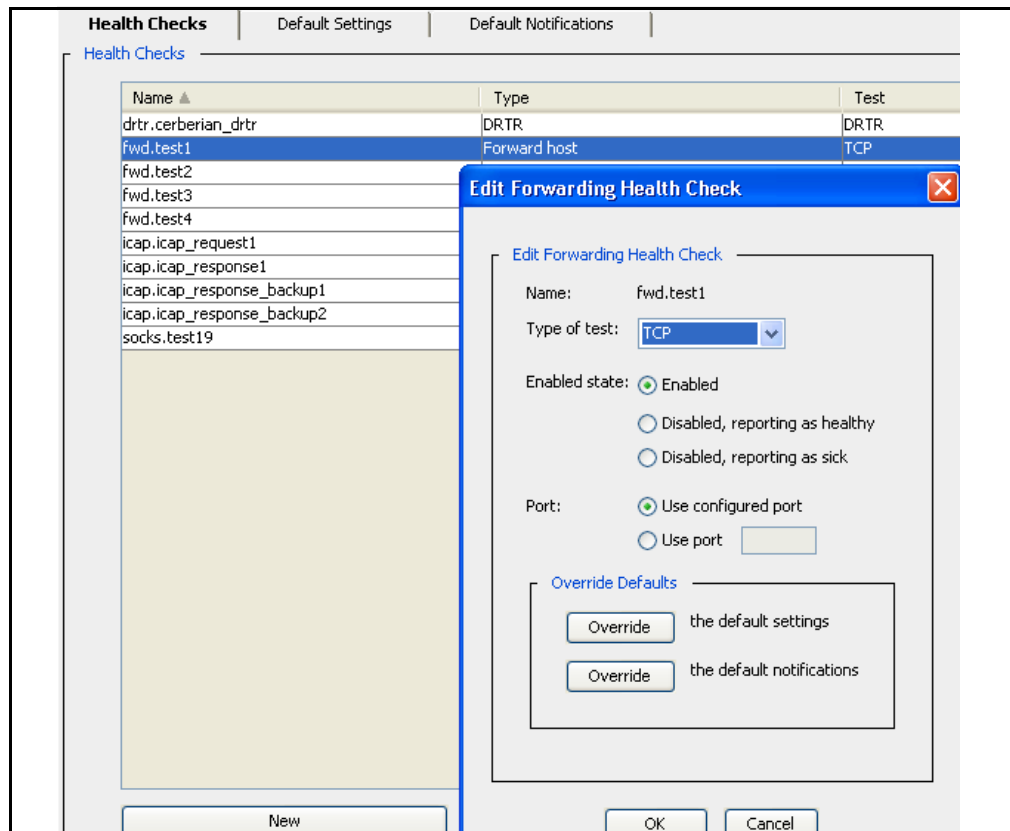
## Editing Automatically Generated Tests for Forwarding and SOCKS Gateways

The settings you can change on automatically generated forwarding hosts, SOCKS gateways, and forwarding and SOCKS gateways group tests are:

- ☐ Enabled state
- ☐ Override default notifications
- ☐ Type of test
- ☐ Settings specific to the type of test
- ☐ Override default settings
- ☐ Minimum number of healthy group members

**To edit automatically generated forwarding and SOCKS gateways tests:**

1. Select **Configuration > Health Checks > General > Health Checks**.
2. Select the forwarding host test or SOCKS gateways test to modify.
3. Click **Edit**.



4. Make the necessary changes:
  - a. Select the **Type of Test** from the drop-down list.
  - b. Select the **Enabled state** radio button as required.

## Section D: Forwarding Host and SOCKS Gateways Health Checks

- c. Select the port setting you require. If you select **Use Port**, enter the new port number.
  - d. To change the default settings for this test, click **Override the default settings**.
    - Select the check boxes to override. Cancel your choices by clicking **Clear all overrides**. For detailed information about configuring healthy and sick intervals and thresholds, see [“Changing Health Check Default Settings”](#) on page 208.
    - Click **OK**.
  - e. To change default notifications, click **Override the default notifications**. By default, no notifications are sent for any health checks.
    - Select the check boxes to override. You can cancel your choices by clicking **Clear all overrides**. For detailed information about configuring notifications, see [“Configuring Health Check Notifications”](#) on page 211.
    - Click **OK**.
  - f. Click **OK**.
5. Click **Apply** to commit the changes to the SG appliance.

### To edit automatically generated forwarding or SOCKS gateway group tests:

**Note:** The only way to add or delete group members to the automatically generated health check tests is to add and remove members from the actual forwarding or SOCKS gateway group. The automatically generated health check is then updated.

1. Select **Configuration > Health Checks > General > Health Checks**.
2. Select the forwarding or SOCKS gateways group health check you need to modify.
3. Click **Edit**.

The screenshot shows the 'Edit Health Check Group' dialog box. The 'Name' field is 'fwd.test2'. The 'Enabled state' section has three radio buttons: 'Enabled' (selected), 'Disabled, reporting as healthy', and 'Disabled, reporting as sick'. The 'Minimum number of members that must be healthy for group to be healthy' is set to '1'. There is an 'Override Defaults' section with an 'Override' button and the text 'the default notifications'. At the bottom are 'OK' and 'Cancel' buttons.

4. Make the necessary changes:
  - a. Select the **Enabled state** radio button as required.

#### Section D: Forwarding Host and SOCKS Gateways Health Checks

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- b. Select the **Minimum number of users that must be healthy for group to be healthy** from the drop-down list.
  - c. To create notification settings, click **Override the default notifications**.
    - Select the check boxes. Cancel your choices by clicking **Clear all overrides**. For detailed information about configuring notifications, see [“Configuring Health Check Notifications”](#) on page 211.
    - Click **OK**.
  - d. Click **OK**.
5. Click **Apply** to commit the changes to the SG appliance.

## Section E: Editing External Services

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### Section E: Editing External Services

External Services include ICAP, Websense off-box, and the DRTR rating service. While external service health checks are created and deleted automatically, the service itself must be created before health checks can be used. For more information about creating ICAP and Websense off-box services, refer to *Volume 7: Managing Content*. The DRTR rating service is automatically created if you use Blue Coat Web Filter (BCWF) and have the rating service enabled.

---

**Note:** The names of the ICAP and Websense off-box services and service groups can be a maximum of 64 characters long, a change from previous releases, which allowed names to be a maximum of 127 characters. If a previously existing name exceeds 64 characters, the service or service group continues to function normally but no corresponding health check type is created.

---

The tests for each of the external services are specialized tests devised for each particular kind of external service. The health check system conducts external service tests by sending requests to the external services system, which reports back a health check result.

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**Note:** You can run a health check on any health check on the **Configuration > Health Checks > General > Health Checks** tab by selecting the health check and clicking **Perform health check**.

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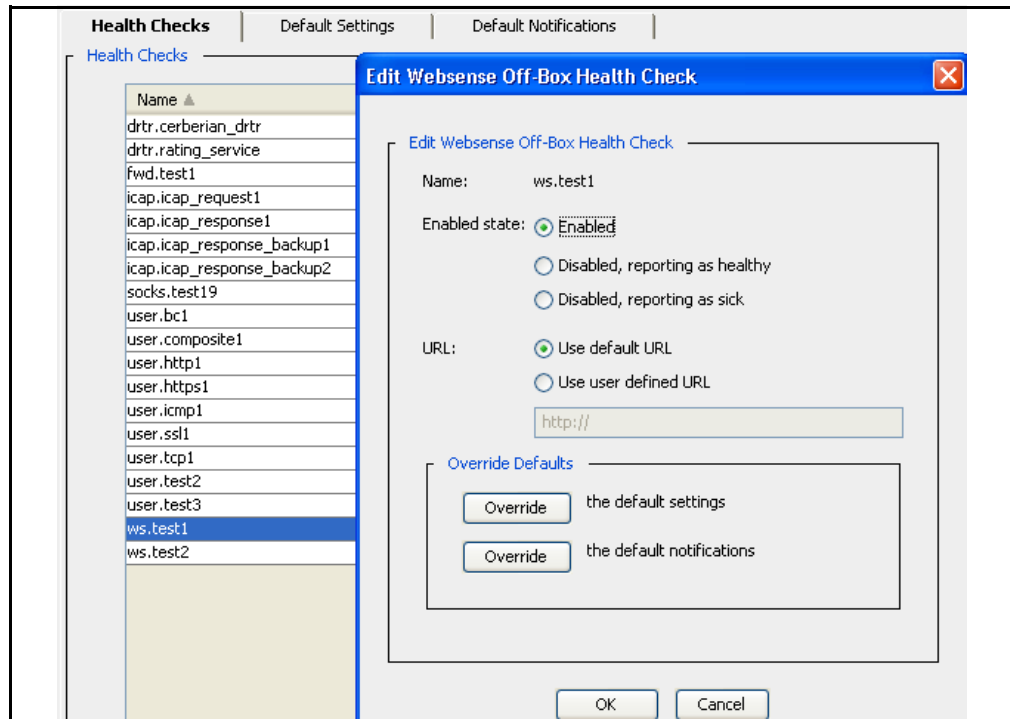
The settings you can change on automatically generated ICAP, Websense off-box, and DRTR rating service tests are:

- ☐ Enabled state
- ☐ Override default settings
- ☐ Override default notifications

**To edit automatically generated external services tests:**

1. Select **Configuration > Health Checks > General > Health Checks**.
2. Select the external service to modify. External services have prefix names of **drtr**, **icap**, and **ws**.
3. Click **Edit**.

## Section E: Editing External Services



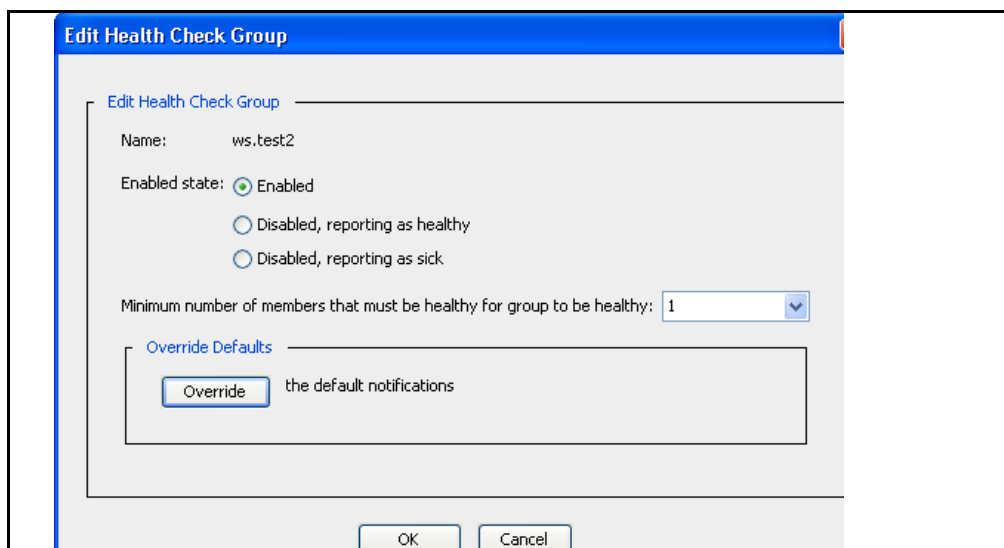
4. Make the necessary changes:
  - a. Change the **Enabled state** radio button as required.
  - b. (Websense only): If you do not want to use the default URL, select the **Use user defined URL** option and enter the test URL to use.
  - c. To change default settings, click **Override the default settings**.
    - Select the check boxes to override. Cancel your choices by clicking **Clear all overrides**. For detailed information about configuring healthy and sick intervals and thresholds, see [“Changing Health Check Default Settings”](#) on page 208.
  - d. To change default notifications, click **Override the default notifications**. By default, no notifications are sent for any health checks.
    - Select the check boxes. Cancel your choices by clicking **Clear all overrides**. For detailed information about configuring notifications, see [“Configuring Health Check Notifications”](#) on page 211.
    - Click **OK**.
  - e. Click **OK**.
5. Click **Apply** to commit the changes to the SG appliance.

## Section E: Editing External Services

**To edit automatically generated Websense off-box or ICAP group tests:**

**Note:** The only way to add or delete group members to the automatically generated health check tests is to add and remove members from the ICAP or Websense off-box services. The automatically generated health check type is then updated.

1. Select **Configuration > Health Checks > General > Health Checks**.
2. Select the external service group health check to modify. Groups are identified in the **Type** column.
3. Click **Edit**.



4. Make the necessary changes:
  - a. Select the **Enabled state** radio button as required.
  - b. Select the **Minimum number of users that must be healthy for group to be healthy** from the drop-down list. The default is that one member of the group must be healthy.
  - c. To create notification settings, click **Override the default notifications**.
    - Select the check boxes. Cancel your choices by clicking **Clear all overrides**. For detailed information about configuring notifications, see [“Configuring Health Check Notifications”](#) on page 211.
    - Click **OK**.
  - d. Click **OK**.
5. Click **Apply** to commit the changes to the SG appliance.

## Section F: Managing User-Defined Health Checks

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### Section F: Managing User-Defined Health Checks

You can manually create and manage ICMP, TCP, HTTP/HTTPS, or SSL health check tests for any upstream TCP/IP device. You can use these user-defined health check types to send notifications of health check state changes. The composite check is made up of any set of checks, including other composite health checks, health checks for user defined hosts, and any automatically generated health checks.

Under most circumstances, you do not need to create user-defined health checks; the automatically generated health checks meet most needs, and you can modify the default sick/healthy parameters, change the default test type, or add notification settings. For information about configuring parameter and notification settings for automatically generated health check types, see [Section C: "Configuring Global Defaults"](#) on page 207.

However, you might need tests to check for things that Blue Coat does not test automatically. For example, you can control traffic based on the apparent health of the Internet. Using user-defined health check types, you can target known Internet sites, accepting that so long as a certain number of the sites are healthy, then the Internet is considered healthy.

---

**Note:** Frequent testing of specific Internet sites by a large number of systems can result in that Internet site objecting to the number of hits.

---

Blue Coat supports two types of user-defined health checks:

- ❑ **Host:** This health check type is for any upstream TCP/IP device. For more information, continue with the next section.
- ❑ **Composite:** This health check type is meant to compile the results of any kind of health check. For more information, continue with ["About User-Defined Composite Health Checks"](#) on page 222.

### About User-Defined Host Health Checks

You can create, configure, and delete user-defined host health checks are health checks. These health checks support everything an automatically generated health check contains, including background DNS resolution monitoring and support for multiple addresses.

User-defined host health check tests can include:

- ❑ **ICMP:** The basic connection between the Blue Coat appliance and the origin server is confirmed. The server must recognize ICMP echoing, and any intervening networking equipment must support ICMP.
- ❑ **TCP:** Establishes that a TCP layer connection can be made to a port on the host. Then the connection is dropped.
- ❑ **SSL:** A connection is made to a target and the full SSL handshake is confirmed. Then the connection is dropped.
- ❑ **HTTP/HTTPS:** An HTTP or HTTPS test is defined by the URL supplied. The port used for this test is as specified in that URL. If no port is explicitly specified in the URL, the port defaults to the standard Internet value of 80 or 443.

## Section F: Managing User-Defined Health Checks

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When configuring user-defined host health check types, keep in mind the following:

- ❑ User-defined host health checks are created and deleted manually.
- ❑ All individual user-defined tests consider the target to be a server.
- ❑ To conduct proxy HTTP/HTTPS tests, a proxy must be defined as a forwarding host, set up between the originating device and the target, and forwarding policy must cause the test to be directed through the proxy.
- ❑ For an ICMP test, a hostname is specified in the health check configuration.
- ❑ The TCP and SSL tests support SOCKS gateway policy, based on a URL of **tcp://<hostname>:<port>/** and **ssl://<hostname>:<port>/**, respectively, using a hostname and port supplied in health check configuration.
- ❑ An HTTP/HTTPS test requires a full URL. The port used for this test is as specified in that URL. If no port is explicitly specified in the URL, the port defaults to the standard value for these protocols of 80 or 443. The server being tested is assumed to support whatever port is indicated.

Forwarding and SOCKS gateway policy is applied based on the URL. The HTTPS or SSL tests use all the server certificate settings in the SSL layer in policy. For a forwarding host, all the sever certificate settings in the SSL layer also apply, and if present, override the forwarding host configuration setting.

---

**Note:** None of the above tests apply to user-defined composite health checks, which only consist of a set of members and a setting to combine the results.

---

### About User-Defined Composite Health Checks

User-defined composite health checks can be used to collect together a set of health checks.

You can define a composite health check that is made up of the results of other existing health checks. The forwarding host and SOCKS gateway health checks can have a test that references the result of some composite health check. The composite health check allows you to combine results of tests of one device or tests of multiple devices.

You can also define how many member health checks must be healthy for the composite result to be considered healthy. By default, all members of composite tests must be healthy for the combination to be healthy.

User-defined composite health checks with no members always appear unhealthy.

---

**Note:** Automatically generated group tests and user-defined composite tests are not the same.

Group tests are automatically generated; they cannot be deleted. Some editing is permitted, but you cannot add or remove members of the group through the health checks module (you must modify the forwarding or SOCKS gateways groups to update the automatically generated group tests).

For a group's test, the default is for the group to be healthy if any member is healthy. For a composite's test, the default is for the group to be healthy if all members are healthy. (The default is configurable.)

---



## Section F: Managing User-Defined Health Checks

## Creating User-Defined Host and Composite Health Checks

You can create user-defined host and composite health checks for arbitrary targets.

**Note:** You cannot create user-defined health checks for external service tests, such as ICAP, Websense off-box, and the DRTR rating service.

The following procedure explains how to create a user-defined host health check. To create a user-defined composite health check, continue with [“To create a user-defined composite health check:”](#) on page 224.

**To create a user-defined host health check:**

1. Select **Configuration > Health Checks > General > Health Checks**.
2. Click **New**.

The screenshot shows the 'User Defined Host Health Check' configuration window. It has a blue title bar and a light gray background. The form contains the following fields and sections:

- Name:** A text input field.
- Type of test:** A dropdown menu currently showing 'HTTPS'.
- Enabled state:** Three radio buttons: 'Enabled' (selected), 'Disabled, reporting as healthy', and 'Disabled, reporting as sick'.
- URL:** A text input field containing 'https://'.
- Authentication:** A section with a checkbox 'Enable basic authentication'. Below it is a 'Username:' label and a text input field, followed by a 'Set Password' button.
- Proxy Authentication:** A section with a checkbox 'Enable basic proxy authentication'. Below it is a 'Username:' label and a text input field, followed by a 'Set Password' button.
- Allowed Response Codes:** A section with a label 'Allowed Response Codes:' and a text input field.
- Override Defaults:** A section with two buttons: 'Override the default settings' and 'Override the default notifications'.

At the bottom right of the dialog are 'OK' and 'Cancel' buttons.

3. Select the type of test to configure from the **Type of test** drop-down list. To configure a composite test, see [“To create a user-defined composite health check:”](#) on page 224.

## Section F: Managing User-Defined Health Checks

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The options you can select vary with the type of health check. The example above uses the HTTP/HTTPS options. Options for other tests are explained in this procedure, as well.

- a. Enter a name for the health check.
- b. Select the **Enabled state** radio button to the required setting.
- c. If you are configuring an SSL or TCP health check, enter the port to use.
- d. If you are configuring an ICMP, SSL, or TCP health check, enter the hostname of the health check's target.
- e. For HTTP/HTTPS only:
  - Enter the URL address of the target.
  - To use Basic user authentication, select the check box and enter the username and password of the target.
  - To use Basic proxy authentication because intermediate proxies might be between you and the target, select the check box and enter the username and password of the target.
  - To manage a list of HTTP/HTTPS response codes that are considered successes, enter the list in the **Allowed Response Code** field, separated by semi-colons. If one of them is received by the health check then the health check considers the HTTP(S) test to have been successful.

---

**Note:** The 200 response code is added by default. The list must always have at least one member.

---

- f. To change the default settings for this test, click **Override the default settings**.
    - Select your override settings. Cancel your choices by clicking **Clear all overrides**. For detailed information about configuring healthy and sick intervals and thresholds, see ["Changing Health Check Default Settings"](#) on page 208.
    - Click **OK**.
  - g. To change the default notifications for this test, click **Override the default notifications**. By default, no notifications are sent for any health checks.
    - Select the check boxes to override. You can cancel your choices by clicking **Clear all overrides**. For detailed information about configuring notifications, see ["Configuring Health Check Notifications"](#) on page 211
    - Click **OK**.
  - h. Click **OK**.
4. Click **Apply** to commit the changes to the SG appliance.

### To create a user-defined composite health check:

1. Select **Configuration > Health Checks > General > Health Checks**.
2. Click **New**.

## Section F: Managing User-Defined Health Checks

3. Make the necessary changes:
  - a. Select **Composite** from the **Type of Test** from the drop-down list.
  - b. Select the **Enabled state** radio button as required.
  - c. Select the **Minimum number of members that must be healthy for the group to be healthy** from the drop-down list. The default is **All**.
  - d. Add the health check members to the composite test from the **Available Aliases** list by selecting the health check to add and clicking **Add** to move the alias to the **Selected Alias** list.
  - e. To change the default notifications for this test, click **Override the default notifications**. By default, no notifications are sent for any health checks.
    - Select the check boxes to override. You can cancel your choices by clicking **Clear all overrides**. For detailed information about configuring notifications, see [“Configuring Health Check Notifications”](#) on page 211
    - Click **OK**.
  - f. Click **OK**.
4. Click **Apply** to commit the changes to the SG appliance.

## Section F: Managing User-Defined Health Checks

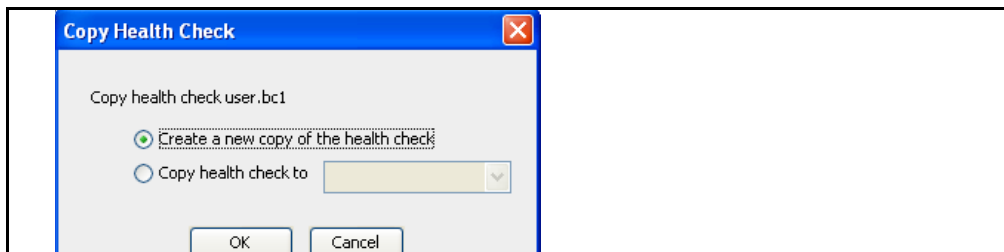
## Copying and Deleting User-Defined Health Checks

Only user-defined health checks can be copied and deleted. Automatically generated health checks cannot be copied or deleted.

- ❑ If the source health check is user-defined host or a composite and the target alias name does not exist:
  - A new health check of the same kind with that alias name is created
  - The new health check has identical configuration settings to the source health check.
- ❑ If the target alias does exist and the target is of the same kind (that is, both are user-defined hosts or both are composite), then the complete configuration is copied from the source to the target.

**To copy or delete user-defined host or composite health checks:**

1. Select **Configuration > Health Checks > General > Health Checks**.
2. Select the user-defined host or composite health check to copy.
3. Click **Copy**.



If the target does not match the source type, the copy operation fails and sends an error message.

## Section G: Statistics

You can view but not edit the health check state from the **Statistics > Health Check** tab. To manage health checks, go to the **Configuration > Health Checks > General** tab.

**To view the health check state:**

Select **Statistics > Health Check**.

Health Check		
Name	Active	Status
drtr.cerberian_drtr	Enabled	Unknown health
drtr.rating_service	Enabled	Unknown health
icap.icap_request1	Enabled	Health check failed
icap.icap_response1	Enabled	Health check failed
icap.icap_response_backup1	Enabled	Health check failed
icap.icap_response_backup2	Enabled	Health check failed
ws.test1	Enabled	Health check failed
ws.test2	Enabled	Health check failed
fwd.group2	Enabled	Health check failed
fwd.host2	Enabled	Functioning properly
fwd.test1	Enabled	Health check failed
socks.test19	Enabled	Health check failed
user.bc1	Enabled	Functioning properly
user.composite1	Enabled	Health check failed
user.http1	Enabled	Functioning properly
user.https1	Enabled	Health check failed
user.icmp1	Enabled	Functioning properly
user.ssl1	Enabled	Health check failed
user.tcp1	Enabled	Functioning properly
user.test2	Enabled	Health check failed
user.test3	Enabled	Health check failed

Table 14-2. Status Messages for Health Checks

Status Message	Description	Health State
<b>Unknown health</b>	Health has not yet been tested successfully.	Healthy
<b>Functioning properly</b>	The target device or service is completely healthy.	Healthy
<b>Functioning with errors</b> (multiple IP addresses)	One or more IP addresses have errors but none are down.	Healthy
<b>Functioning only for some addresses</b> (multiple IP addresses)	One or more IP addresses are down but not all.	Healthy
<b>Functioning but going down</b> (single IP address)	Failures are occurring, but the IP address is not yet down.	Healthy
<b>Health check failed</b>	Device or service cannot be used.	Sick
<b>DNS resolution failed</b>	The hostname cannot be DNS resolved.	Sick

## Section G: Statistics

---

In addition to status messages, you can see whether the health check is enabled. Enabled states are:

- ❑ Enabled
- ❑ Disabled, reporting success
- ❑ Disabled, reporting failure

## Section H: Using Policy

---

### Section H: Using Policy

The results of a health check can be affected through forwarding, SOCKS gateway, or SSL certificate policy. The health check transactions execute the `<forward>` layer and (for SSL or HTTPS tests) the `<ssl>` layer to determine applicable policy.

This allows health check behavior to match as closely as possible that of the SSL traffic that the health check is monitoring.

Health checks cannot be deleted while referenced in policy. If a health check is automatically deleted when its target is deleted, a reference to the health check in policy can block deletion not only of the health check but of its target.

Two policy conditions exist for health checks:

- ❑ `health_check=` This condition tests whether the current transaction is a health check transaction. Optionally, the condition tests whether the transaction is that of a specific health check.
- ❑ `is_healthy.health_check_name=` This condition tests whether the specified health check is healthy.

For more information about using policy, refer to *Volume 6: VPM and Advanced Policy* and *Volume 10: Blue Coat SG Appliance Content Policy Language Guide*.

## Section I: Related CLI Syntax to Configure Health Checks

## Section I: Related CLI Syntax to Configure Health Checks

- ❑ To enter health check mode:

```
SGOS#(config) health-check
SGOS#(config health-check)
```

---

**Note:** For detailed information about using these commands, refer to *Volume 11: Command Line Reference*.

---

- ❑ The following subcommands are available:

```
SGOS#(config health-check) copy source-alias target-alias
SGOS#(config health-check) create {composite alias_name | http
alias_name url | https alias_name url | icmp alias_name hostname | ssl
alias_name hostname [port] | tcp alias_name hostname [port]}
SGOS#(config health-check) default e-mail {healthy {enable | disable} |
report-all-ips {enable | disable} | sick {enable | disable}}
SGOS#(config health-check) default event-log {healthy {enable
| disable} | report-all-ips {enable | disable} | sick {enable |
disable}}
SGOS#(config health-check) default failure-trigger {none | count}
SGOS#(config health-check) default interval {healthy seconds | sick
seconds}
SGOS#(config health-check) default snmp {healthy {enable | disable} |
report-all-ips {enable | disable} | sick {enable | disable}}
SGOS#(config health-check) default threshold {healthy count |
response-time milliseconds | sick count}
SGOS#(config health-check) delete alias_name
SGOS#(config health-check) disable {healthy alias_name | sick
alias_name}
SGOS#(config health-check) edit composite_health_check
(config health-check user.composite_health_check) subcommands
SGOS#(config health-check) edit drtr.test_name
(config health-check drtr.test_name) subcommands
SGOS#(config health-check) edit fwd.group_name
(config health-check fwd.group_name) subcommands
SGOS#(config health-check) edit fwd.host_name
(config health-check fwd.host_name) subcommands
SGOS#(config health-check) edit health_check_name
(config health-check user.health_check_name) subcommands
SGOS#(config health-check) edit icap.test_name
(config health-check icap.test_name) subcommands
SGOS#(config health-check) edit socks.test_name
(config health-check socks.test_name) subcommands
SGOS#(config health-check) edit ws.test_name
(config health-check ws.test_name) subcommands
SGOS#(config health-check) edit ws.group_name
(config health-check ws.group_name) subcommands
SGOS#(config health-check) enable alias_name
SGOS#(config health-check) exit
```



## Section I: Related CLI Syntax to Configure Health Checks

---

```
SGOS#(config health-check) perform-health-check alias_name
SGOS#(config health-check) view {configuration | quick-statistics |
statistics}
```



## Chapter 15: TCP/IP Configuration

Use the TCP/IP configuration options to enhance the performance and security of the SG appliance. Except for IP Forwarding (refer to *Volume 2: Proxies and Proxy Services*), these commands are only available through the CLI.

- ❑ RFC-1323: Enabling RFC-1323 support enhances the high-bandwidth and long-delay operation of the SG appliances over very high-speed paths, ideal for satellite environments.
- ❑ TCP NewReno: Enabling TCP NewReno support improves the fast recovery of the appliances.
- ❑ ICMP Broadcast Echo: Disabling the response to these messages can limit security risks and prevent an attacker from creating a distributed denial of service (DDoS) to legitimate traffic.
- ❑ ICMP Timestamp Echo: Disabling the response to these messages can prevent an attacker from being able to reverse engineer some details of your network infrastructure.
- ❑ TCP Window Size: Configures the amount of unacknowledged TCP data that the SG appliance can receive before sending an acknowledgement.
- ❑ PMTU Discovery: Enabling PMTU Discovery prevents packets from being unable to reach their destination because they are too large.

To view the TCP/IP configuration, see [“Viewing the TCP/IP Configuration”](#) on page 236.

This section discusses

- ❑ [“RFC-1323”](#) on page 233
- ❑ [“TCP NewReno”](#) on page 234
- ❑ [“ICMP Broadcast Echo Support”](#) on page 234
- ❑ [“ICMP Timestamp Echo Support”](#) on page 234
- ❑ [“TCP Window Size”](#) on page 235
- ❑ [“PMTU Discovery”](#) on page 235
- ❑ [“TCP Time Wait”](#) on page 235
- ❑ [“TCP Loss Recovery Mode”](#) on page 236
- ❑ [“Viewing the TCP/IP Configuration”](#) on page 236

### RFC-1323

The RFC-1323 TCP/IP option enables the SG appliance to use a set of extensions to TCP designed to provide efficient operation over large bandwidth-delay-product paths and reliable operation over very high-speed paths, including satellite environments. RFC-1323 support can be configured through the CLI and is enabled by default.

**To enable or disable RFC-1323 support:**

At the (config) command prompt, enter the following command:

```
SGOS#(config) tcp-ip rfc-1323 {enable | disable}
```

## TCP NewReno

NewReno is a modification of the Reno algorithm. TCP NewReno improves TCP performance during fast retransmit and fast recovery when multiple packets are dropped from a single window of data. TCP NewReno support is enabled by default.

**To enable or disable TCP NewReno support:**

At the (config) command prompt, enter the following command:

```
SGOS#(config) tcp-ip tcp-newreno {enable | disable}
```

## ICMP Broadcast Echo Support

Disabling the ICMP broadcast echo command can prevent the SG appliance from participating in a Smurf Attack. A Smurf attack is a type of Denial-of-Service (DoS) attack, where the attacker sends an ICMP echo request packet to an IP broadcast address. This is the same type of packet sent in the ping command, but the destination IP is broadcast instead of unicast. If all the hosts on the network send echo reply packets to the ICMP echo request packets that were sent to the broadcast address, the network is jammed with ICMP echo reply packets, making the network unusable. By disabling ICMP broadcast echo response, the SG appliance does not participate in the Smurf Attack.

This setting is disabled by default.

**To enable or disable ICMP broadcast echo support:**

At the (config) command prompt, enter the following command:

```
SGOS#(config) tcp-ip icmp-bcast-echo {enable | disable}
```

For more information on preventing DDoS attacks, see [Chapter 3: "Attack Detection"](#) on page 53.

## ICMP Timestamp Echo Support

By disabling the ICMP timestamp echo commands, you can prevent an attacker from being able to reverse engineer some details of your network infrastructure.

For example, disabling the ICMP timestamp echo commands prevents an attack that occurs when the SG appliance responds to an ICMP timestamp request by accurately determining the target's clock state, allowing an attacker to more effectively attack certain time-based pseudo-random number generators (PRNGs) and the authentication systems on which they rely.

This setting is disabled by default.

**To enable or disable ICMP Timestamp echo support:**

At the (config) command prompt, enter the following command:

```
SGOS#(config) tcp-ip icmp-timestamp-echo {enable | disable}
```

## TCP Window Size

Adjusting the TCP window-size regulates the amount of unacknowledged data that the SG appliance receives before sending an acknowledgement.

### To configure the TCP window size:

At the (config) command prompt, enter the following command:

```
SGOS#(config) tcp-ip window-size window_size
```

where *window\_size* indicates the number of bytes allowed before acknowledgement (the value must be between 8192 and 4194304).

## PMTU Discovery

PMTU (Path Maximum Transmission Unit) is a mechanism designed to discover the largest packet size sent that is not fragmented anywhere along the path between two communicating appliances that are not directly attached to the same link.

An SG appliance that is not running PMTU might send packets larger than that allowed by the path, resulting in packet fragmentation at intermediate routers. Packet fragmentation affects performance and can cause packet discards in routers that are temporarily overtaxed.

An SG appliance doing PMTU sets the `Do-Not-Fragment` bit in the IP header when transmitting packets. If fragmentation becomes necessary before the packets arrive at the second SG appliance, a router along the path discards the packets and returns an ICMP `Host Unreachable` error message, with the error condition of `Needs-Fragmentation`, to the original SG appliance. The first SG appliance then reduces the PMTU size and re-transmits the transmissions.

The discovery period temporarily ends when the SG appliance estimates the PMTU is low enough that its packets can be delivered without fragmentation or when the SG appliance stops setting the `Do-Not-Fragment` bit.

Following discovery and rediscovery, the size of the packets that are transferred between the two communicating nodes dynamically adjust to a size allowable by the path, which might contain multiple segments of various types of physical networks.

PMTU is disabled by default.

### To configure PMTU discovery:

At the (config) command prompt:

```
SGOS#(config) tcp-ip pmtu-discovery enable | disable
```

## TCP Time Wait

When a TCP connection is closed (such as when a user enters *quit* for an FTP session), the TCP connection remains in the `TIME_WAIT` state for twice the Maximum Segment Lifetime (MSL) before completely removing the connection control block.

The `TIME_WAIT` state allows an end point (one end of the connection) to remove remnant packets from the old connection, eliminating the situation where packets from a previous connection are accepted as valid packets in a new connection.

The MSL defines how long a packet can remain in transit in the network. The value of MSL is not standardized; the default value is assigned according to the specific implementation.

To change the MSL value, enter the following commands at the (config) command prompt:

```
SGOS#(config) tcp-ip tcp-2msl seconds
```

where *seconds* is the length of time you chose for the 2MSL value. Valid values are 1 to 16380 inclusive.

## TCP Loss Recovery Mode

A new TCP algorithm helps to recover throughput efficiently after packet losses occur and also addresses performance problems due to a single packet loss during a large transfer over long delay pipes. The feature is *enhanced* by default.

**To enable the algorithm:**

```
SGOS#(config) tcp-ip tcp-loss-recovery-mode {enhanced | aggressive}
```

**To disable the algorithm:**

```
SGOS#(config) tcp-ip tcp-loss-recovery-mode {normal}
```

## Viewing the TCP/IP Configuration

To view the TCP/IP configuration:

```
SGOS#(config) show tcp-ip
RFC-1323 support: enabled
TCP Newreno support: disabled
IP forwarding: disabled
ICMP bcast echo response: disabled
ICMP timestamp echo response: disabled
Path MTU Discovery: disabled
TCP 2MSL timeout: 120 seconds
TCP window size: 65535 bytes
TCP Loss Recovery Mode: Aggressive
```

## Chapter 16: Virtual IP Addresses

Virtual IP (VIP) addresses are addresses assigned to a system (but not an interface) that are recognized by other systems on the network. Up to 255 VIPs can be configured on each SG appliance. They have several uses:

- ❑ Assign multiple identities to a system on the same or different network, partitioning the box in to separate logical entities for resource sharing or load sharing.
- ❑ Create an HTTPS Console to allow multiple, simultaneous, secure connections to the system.
- ❑ Direct authentication challenges to different realms.
- ❑ Set up failover among multiple SG appliances on the same subnet.

---

**Note:** For information on creating an HTTPS Console, refer to *Volume 2: Proxies and Proxy Services*; for information on using VIPs with authentication realms, refer to *Volume 4: Securing the Blue Coat SG Appliance*; to use VIPs with failover, see [Chapter 7: "Configuring Failover"](#) on page 97.

---

### To create a VIP:

1. Select **Configuration > Network > Advanced > VIPs**.
2. Click **New**.
3. Enter the virtual IP address you want to use. It can be any IP address, except a multicast address. (A multicast address is a group address, not an individual IP address.)

---

**Note:** You cannot create a VIP address that is the IP address used by the origin content server. You must assign a different address on the SG appliance, and use DNS or forwarding to point to the origin content server's real IP address.

---

4. Click **OK**.
  5. Click **Apply** to commit the changes to the SG appliance.
- The VIP address can now be used.

### Related CLI Syntax to manage a VIP

```
SGOS#(config) virtual address ip_address
SGOS#(config) virtual no address ip_address
SGOS#(config) virtual clear
SGOS#(config) show virtual
```





## Chapter 17: WCCP Settings

The SGOS software can be configured to participate in a WCCP (Web Cache Control Protocol) scheme, in which a WCCP-capable router collaborates with a set of WCCP-configured SG appliances to service requests.

### Overview

WCCP is a Cisco®-developed protocol that allows you to establish redirection of the traffic that flows through routers.

The main benefits of using WCCP are:

- ❑ **Scalability.** With no reconfiguration overhead, redirected traffic can be automatically distributed to up to 32 appliances.
- ❑ **Redirection safeguards.** If no appliances are available, redirection stops and the router forwards traffic to the original destination address.

WCCP has two versions, version 1 and version 2, both of which are supported by Blue Coat. However, only one protocol version can be active on the SG appliance at a time. The active WCCP protocol set up in the SG configuration file must match the version running on the WCCP router.

For information on using WCCP Version 1, see [Appendix C: "Using WCCP" on page 267](#).

### Using WCCP and Transparent Redirection

A WCCP-capable router operates in conjunction with the appliances to transparently redirect traffic to a set of caches that participate in the specified WCCP protocol. IP packets are redirected based on fields within each packet. For instance, WCCP version 1 only redirects destination TCP port 80 (default HTTP traffic) IP packets. WCCP version 2 allows you to redirect traffic from other ports and protocols.

Load balancing is achieved through a redirection hash table to determine which SG appliance receives the redirected packet.

### WCCP Version 2

For Cisco routers using WCCP version 2, minimum IOS releases are 12.0(3)T and 12.0(4). Release 12.0(5) and later releases support WCCP versions 1 and 2. Ensure that you use the correct IOS software for the router and that you have a match between the SG configuration WCCP version number and router protocol version number.

WCCP version 2 protocol offers the same capabilities as version 1, along with increased protocol security and multicast protocol broadcasts. Version 2 multicasting allows caches and routers to discover each other through a common multicast service group and matching passwords. In addition, up to 32 WCCP-capable routers can transparently redirect traffic to a set of up to 32 appliances. Version 2 WCCP-capable routers are capable of redirecting IP traffic to a set of appliances based on various fields within those packets.

Version 2 allows routers and caches to participate in multiple, simultaneous service groups. Routers can transparently redirect IP packets based on their formats. For example, one service group could redirect HTTP traffic and another could redirect FTP traffic.

**Note:** Blue Coat recommends that WCCP-compliant caches from different vendors be kept separate and that only one vendor's routers be used in a service group.

One of the caches participating in the WCCP service group is automatically elected to configure the home router's redirection tables. This way, caches can be transparently added and removed from the WCCP service group without requiring operator intervention. WCCP version 2 supports multiple service groups.

The figure below illustrates a WCCP version 2 implementation using multiple routers and appliances. In this scenario, routers 1 through  $n$  and caches 1 through  $m$  participate in the same service group. As in version 1, an appliance from the group is selected to define the redirection hash table in all routers for all caches. All caches periodically communicate with all routers to verify WCCP protocol synchronization and appliance and router availability within the service group. In return, each router responds to caches with information as to what caches and discovered routers are available in the service group.

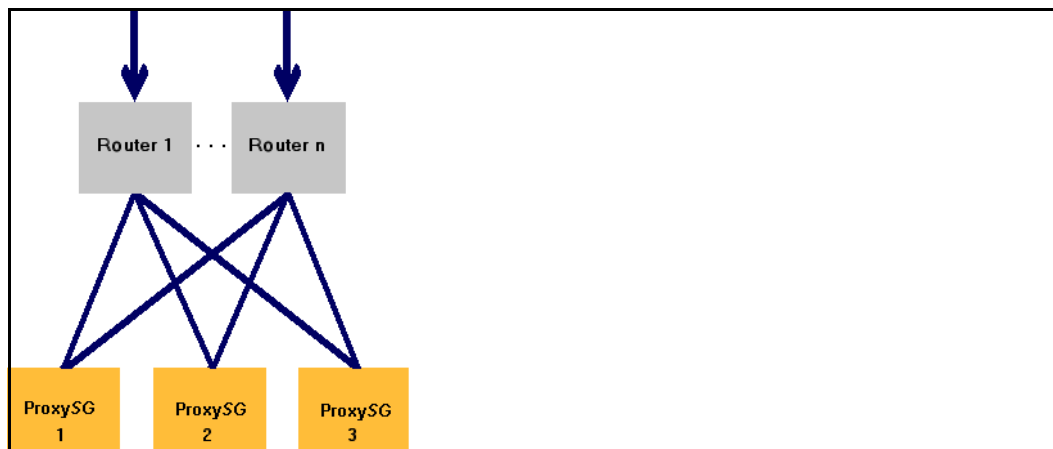


Figure 17-1. A Version 2 Configuration Using Packet Redirection to Multiple Routers and Caches

## Procedure Overview

Two tasks must be completed to get WCCP running:

- ❑ Configuring the router
- ❑ Configuring the SG appliance

### To do initial router configuration:

1. From the router `(config)` mode, tell WCCP which service group you want use. The Web-cache service group redirects port 80 (HTTP) traffic only.  
`Router(config) #ip wccp web-cache`
2. Enter the `(config-if)` submode by telling WCCP which IP address to use.  
`Router(config)# int interface`  
 where *interface* is the adapter interface with an IP address. The prompt changes to configuration interface submode.

3. Enable packet redirection on an outbound (Internet facing) interface.

```
Router(config-if)# ip wccp web-cache redirect out
```

4. Prevent packets received on an adapter interface from being checked for redirection and allow the use of Blue Coat bypass lists.

```
Router(config-if)# ip wccp redirect exclude in
```

For more information on WCCP router configuration, see [“Configuring a WCCP Version 2 Service on the Router” on page 270](#).

#### **To create an SG appliance WCCP configuration file and enable WCCP:**

1. Create a WCCP configuration file through either the SG appliance’s CLI inline commands or through a text editor. Make sure that the home router you enter here is the home router that was named in the router’s configuration. If you do have a mismatch, you must correct it before continuing. See [“Identifying a Home Router/Router ID Mismatch” on page 281](#).

For more information on creating a configuration file, see [“Creating an SG Appliance WCCP Configuration File” on page 241](#).

If you used the `inline` commands, you have completed WCCP configuration for both the router and the SG appliance and you have enabled WCCP on the SG appliance. No further steps are needed.

2. If you used a text editor, copy the file to an HTTP server accessible to the SG appliance.
3. Enable WCCP and download the configuration file to the SG appliance.

```
SGOS#(config) wccp enable
SGOS#(config) wccp path http://205.66.255.10/files/wccp.txt
SGOS#(config) load wccp-settings
```

---

**Note:** You can also use the **Management Console > Configuration > Network > Advanced > WCCP** to install the WCCP configuration file and enable WCCP.

---

The rest of this chapter discusses the SG appliance WCCP configuration file. For detailed information on using WCCP, see [Appendix C: “Using WCCP” on page 267](#).

## **Creating an SG Appliance WCCP Configuration File**

Once you have the router global and adapter interface settings complete, you must create a WCCP configuration file for the SG appliance.

---

**Note:** The appliance does not ship with a default WCCP configuration file.

---

These configurations should include the following:

- ☐ Identify the service group.
- ☐ Identify the queuing priorities for all defined service groups.
- ☐ Identify the protocol.
- ☐ Load balancing caches in a service group.
- ☐ Identify ports.
- ☐ Identify the home router as defined in the router configuration.

- ❑ Identify the packet forwarding method.

Before you can install the WCCP configuration, you must create a WCCP configuration file for the SG appliance. The appliance does not ship with a default WCCP configuration file.

## Understanding Packet Forwarding

By default, Cisco's GRE encapsulation (Generic Routing Encapsulation) is used to forward packets from the WCCP router to the caches. If you have a version 2 WCCP router, you can alternatively use Layer 2 (L2) rewrites to forward packets, which is faster than GRE and saves network bandwidth.

Using GRE, redirected packets are encapsulated in a new IP packet with a GRE header.

Using L2, redirected packets are not encapsulated; the MAC address of the target cache replaces the packet's destination MAC address. This different way of directing packets saves you the overhead of creating the GRE packet at the router and decoding it at the cache. Also, it saves network bandwidth that would otherwise be consumed by the GRE header. The SG appliance also supports the L2 packet return method if the router software does. In this release, the packet return method always matches the packet forward method.

If you want to continue using GRE, you need not change any settings. To use L2 packet redirection, you must add the forwarding option to the SG configuration file.

If WCCP version 2 is supported, the router sends out a list of forwarding mechanisms supported by the router in the first `WCCP2_I_SEE_YOU` message. The cache responds with a `WCCP2_HERE_I_AM` message. If the router does not send the list, the cache aborts its attempt to join the WCCP service group. If the method of forwarding mechanism is not supported by the router, the WCCP2 messages from the cache are ignored.

Caveats for using L2 redirection:

- ❑ You must use WCCP version 2.
- ❑ If a cache is not connected directly to a router, the router does allow the cache to negotiate the rewrite method.
- ❑ The same rewrite method must be used for both packet forwarding and packet return.

## Understanding Cache Load Balancing

If you use WCCP version 2, you can balance the load on the caches in a service group. When a router receives an IP packet for redirection, it hashes fields within the packet to yield an index within the hash table. The packet then is forwarded to the *owner* SG appliance for servicing. The proportion of redirection hash table assigned to each SG appliance can be altered to provide a form of load balancing between caches in a service group.

A hash table is configured by a dynamically elected SG appliance participating in a service group, enabling the simultaneous interception of multiple protocols on multiple ports. You can configure up to 100 dynamic or standard service groups plus standard service groups. A single service can intercept up to eight port numbers.

Each element in this 256-entry hash table refers to an active SG appliance within the service group. By default, each SG appliance is assigned roughly an even percentage of the 256-element redirection hash table. Multiple network cards within an SG appliance can participate in the same service group. To the routers and other caches, each adapter interface appears as a unique cache. Using this strategy, redirected traffic can be better distributed among network interfaces in a cache.

Using Figure 17-2, below, all caches would be assigned  $1/m$  of the redirection hash table, but since Cache 2 and Cache 3 are physically located within the same appliance, that appliance is actually assigned  $2/m$  of the redirection hash table.

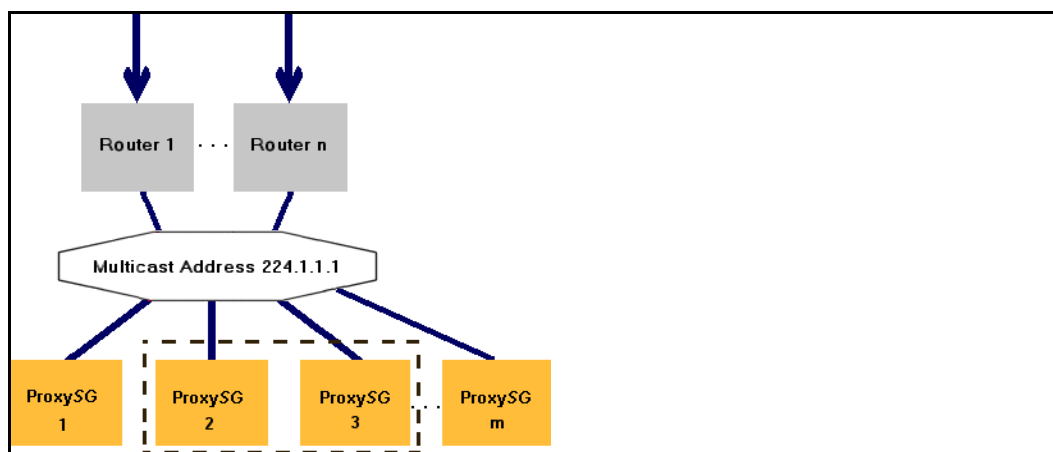


Figure 17-2. A Version 2 Configuration Using Multicast Packet Redirection to Multiple Routers, Multiple Caches, and a Service Group

### Assigning Percentages

You can override the default of each SG appliance being assigned roughly an even percentage; the relative distribution of the redirection hash table can be specified for each cache. Multiple hash-distributions are supported. Also, all, none, or part of a source and/or destination IP address or port number can be used in the hash. Each SG appliance can be assigned a primary-hash-weight value to determine the proportion of the 256-element hash table to be assigned.

If all caches are configured with a 0 primary-hash-weight value (the default) then each SG appliance is assigned an equal proportion of the redirection hash table. However, if any SG appliance is configured with a non-zero primary-hash-weight, each SG appliance is assigned a relative proportion of the table.

For instance, consider a configuration with five caches that use a primary-hash-weight defined as {25, 200, 0, 50, 25}. The total requested weight value is  $25+200+0+50+25=300$  and, therefore, the proportion of the hash table assigned to each SG appliance is  $25/300$ ,  $200/300$ ,  $0/300$ ,  $50/300$ , and  $25/300$ .

Because one cache did not specify a non-zero primary-hash-weight, that cache is assigned any elements within the redirection hash table and, therefore, does not receive any redirected traffic. Also, the hash weight can be specified for each caching member within a SG appliance. In Figure 17-2, Cache 2 and Cache 3 can be assigned different weight values.

### Alternate Hash Table

In some cases, a Web site becomes an Internet *hot spot*, receiving a disproportional number of client traffic relative to other sites. This situation can cause a larger request load on a specific SG appliance because the hash element associated with the popular site receives more activity than other hash elements.

To balance the redirection traffic load among the caches, a service group can be configured to use an alternate hash function when the number of GRE packets forwarded to the cache exceeds a certain number. (If you use L2 forwarding, the SG appliance counts MAC addresses.) Therefore, when a router receives an IP packet that hashes to an element flagged as a hot spot, the alternate hash function is computed. The appliance specified by the new index in the redirection hash table receives the redirected packet.

Each SG appliance can dynamically determine a hot spot within its assigned portion of the redirection hash table.

Alternate hash tables are only used for dynamic service groups that specify alternate-hash flags within their service-flags. The default Web-cache service group cannot use an alternate hash table. Instead, a comparable dynamic service group must be created.

To use hot spot detection, the SG appliance's WCCP configuration file must specify:

```
service-flags source-ip-hash
service-flags destination-port-alternate-hash
```

## Creating a Configuration File

An example of a file using a dynamic service, as opposed to the default Web-cache service, is shown below:

If using the default Web-cache service, the service group settings `priority`, `protocol`, `service flags`, and `ports` are not used.

```
wccp enable
wccp version 2
service-group 9
forwarding-type L2
priority 1
protocol 6
service-flags destination-ip-hash
service-flags ports-defined
ports 80 21 1755 554 80 80 80 80
interface 6
home-router 10.16.18.2
end
```

You can create a configuration file customized for the environment two ways: CLI inline commands or through a text file. In either case, the configuration file must include the information required by the commands below.

Syntax to create a customized configuration file:

```
service-group {web-cache | service-number}
[priority priority-number]
[protocol protocol-number]
[service-flags hash-bit-identifier]
[ports port1 ... port8]
home-router [ip-address | domain-name]
interface [interface-number]
[password string]
[primary-hash-weight interface-number value]
forwarding-type [GRE | L2]
```

Using Optional Negation Syntax, you can create an alternative WCCP configuration file using these negative commands; this is especially helpful when testing and debugging. This functionality enables you to change some of the configuration settings without altering or reloading the main configuration file.

```

[no] service-group {web-cache | service-number}
[priority priority-number]
[protocol protocol-number]
[no] service-flags hash-bit-identifier
[ports port1 ...port8]
home-router [ip-address | domain-name]
[multicast-ttl [ttl_value]]
[no] interface [interface-number]
[password string | no password]
[primary-hash-weight interface-number value]

```

where:

web-cache	Enables the Web cache service group. If using the Web-cache service group for WCCP, the dynamic service group settings (priority, protocol, service flags, and ports) are not applicable.
service-number	The identification number of the dynamic service group being controlled by the router. Services are identified using a value from 0 to 99. The reverse-proxy service is indicated using the value 99.
priority-number	(Applies to a dynamic service group only. A dynamic service group is one identified by a service number.) Establishes queuing priorities for all defined service groups, based on a priority number from 0 through 255, inclusive.
protocol-number	(Applies to a dynamic service group only. A dynamic service group is one identified by a service number.) Number of an Internet protocol. Protocol-number must be an integer in the range 0 through 255, inclusive, representing an IP protocol number.
hash-bit-identifier	<p>(Applies to a dynamic service group only. A dynamic service group is one identified by a service number.) Sets the hash index, for load balancing purposes. The key associated with the hash-bit-identifier you specify is hashed to produce the primary redirection hash table index. For instance, if only the destination-ip-hash flag is set, then the packet destination IP address is used to determine the index. The index is constructed by starting with an initial value of zero and then computing an exclusive OR (XOR) of the fields specified in the hash-bit identifier.</p> <p>If alternative hashing has been enabled, any alternate hash flags are processed in the same way and produce a secondary redirection hash table index. Alternate hash flags end with the suffix “-alternate-hash.”</p> <p>For more information using the hashing table, see <a href="#">“Understanding Cache Load Balancing” on page 242</a>.</p>
source-ip-hash (hash-bit-identifier)	Sets the source IP bit definition within the redirection hash table index.
destination-ip-hash (hash-bit-identifier)	Sets the source IP bit definition within the redirection hash table index.
source-port-hash (hash-bit-identifier)	Sets the source port bit definition within the redirection hash table index.
destination-port-hash (hash-bit-identifier)	Sets the destination port bit definition within the redirection hash table index.
ports-defined (hash-bit-identifier)	Sets the port bit definition within the redirection hash table index.

<code>ports-source</code> ( <i>hash-bit-identifier</i> )	Sets the source port bit definition within the redirection hash table index.
<code>source-ip-alternate-hash</code> ( <i>hash-bit-identifier</i> )	Sets the alternate source IP bit definition within the redirection hash table index.
<code>destination-ip-alternate-hash</code> ( <i>hash-bit-identifier</i> )	Sets the alternate destination IP bit definition within the redirection hash table index.
<code>source-port-alternate-hash</code> ( <i>hash-bit-identifier</i> )	The alternate source port bit definition within the redirection hash table index.
<code>destination-port-alternate-hash</code> ( <i>hash-bit-identifier</i> )	Sets the alternate destination port bit definition within the redirection hash table index.
<code>multicast-ttl</code>	Sets the multicast TTL value per WCCP service group. The value must be set between 1 and 255.  If the multicast TTL value is not set, the default value is 1. If the home-router address is not multicast, this command is non-operational.
<code>port1...port8</code>	(Applies to a dynamic service group only. A dynamic service group is one identified by a <i>service number</i> .) A zero-terminated list of TCP port identifiers.  Note that this must be a list of exactly eight ports.  If the <code>service-flags ports-defined</code> flag is set, packets are matched against the set of ports supplied. If the <code>service-flags ports-source</code> flag is set, the ports are assumed to be source ports. Otherwise, the ports are assumed to be destination ports.
<code>ip-address</code>	Indicates the IP address of your network's home router. For version 2, <i>ip-address</i> can be a multicast address. (Multicast addresses are in the range 224.0.0.0 to 239.255.255.255, inclusive.)  In version 2, multiple IP addresses can be specified for unicast addressing. For multicast addresses, only one IP address can be specified per service group.  If you choose to specify the home router IP address, it is important that the actual home router IP address and the home router IP address specified in this SG configuration file match. If you do not already know the IP address of the home router, you can easily determine it from the router CLI by using the <code>show ip wccp</code> command.
<code>domain-name</code>	Specifies the domain name of your network's home router. Domain-name must be a valid domain name string that successfully resolves on DNS lookup.
<code>interface-number</code>	Specifies the adapter interface number for the service group. You cannot use a colon (0:0 or 0:1, for example).
<code>string</code>	(Applies to a dynamic service group only. A dynamic service group is one identified by a <i>service number</i> .) String can be at least one, and not more than eight, alphanumeric characters long.  The password string specified here must match the password string declared for the router.
<code>interface-number</code>	(When used with the hash identifiers) Specifies the adapter interface to which the weight factor is applied to alter the distribution of the primary hash table.



<i>value</i>	Specifies the weight factor value (0 through 255) that is applied to the adapter interface specified to alter the distribution of the primary hash table.
forwarding-type [GRE L2]	Switches between GRE encapsulation (the default) and L2 MAC address rewrite for forwarding packets. If this command is not present, GRE encapsulation is used.

You can create a configuration file customized for the environment through the CLI inline commands or through a text file. The CLI inline commands enable WCCP on the SG appliance immediately; the drawback is that if any information changes, you must re-create the whole file using the inline command. With a text file, if any information changes, you can change the individual line; the drawback is that you must download the file again from an HTTP server to the SG appliance.

To use CLI commands to create a configuration file, continue with the next procedure. To use a text editor to create a configuration file, continue with [“Creating a Configuration File using a Text File” on page 247](#).

## Creating a Configuration File using CLI Inline Commands

For examples of various types of WCCP configurations, see [Appendix C: “Using WCCP” on page 267](#).

If you choose to configure through the CLI and the `inline` command, refer to the example below:

```
SGOS# configure terminal
SGOS#(config) inline wccp eof
```

where `eof` marks the beginning and end of the inline commands.

For example:

```
SGOS#(config) inline wccp eof
wccp enable
wccp version 2
service-group 9
forwarding-type L2
priority 1
protocol 6
service-flags destination-ip-hash
service-flags ports-defined
ports 80 21 1755 554 80 80 80 80
interface 6
home-router 10.16.18.2
end
eof
```

You created a WCCP configuration file and enabled WCCP on the SG appliance. WCCP setup is complete.

## Creating a Configuration File using a Text File

If you create a configuration file using a text editor, assign the file the extension `.txt`. The following are SG configuration file rules:

- ❑ Only one command (and any associated parameters) is permitted, per line.
- ❑ Comments must begin with a semicolon (;) or a pound sign (#).
- ❑ Comments can begin in any column; however, all characters from the beginning of the comment to the end of the line are considered part of the comment and, therefore, are ignored.

For examples of various types of WCCP configurations, see [Appendix C: "Using WCCP" on page 267](#).

**To create a configuration file using a text editor and load the file on an SG appliance:**

1. Open a text editor.
2. Using the commands described in ["Syntax to create a customized configuration file:" on page 244](#), enter the arguments you need.
3. Copy the configuration file to an HTTP server so that it can be downloaded to the SG appliance.
4. Enable WCCP and download the WCCP configuration file using the following syntax:  
`wccp {enable | disable | no} [path config-file-url] | [version version-number]`

where:

enable	Enables WCCP on the SG appliance.
disable	Disables WCCP on the SG appliance.
no	Indicates that you want to clear the current WCCP configuration settings.
config-file-url	Specifies the SG WCCP configuration file or alternate configuration file.
version-number	Indicates the version of WCCP that your router is configured to use. If <code>version version-number</code> is omitted, it is assumed to be 2.

For example:

```
SGOS#(config) wccp enable
SGOS#(config) wccp path http://205.66.255.10/files/wccp.txt
SGOS#(config) load wccp-settings
```

## Statistics

WCCP Statistics can be viewed by going to **Management Console > Statistics > Advanced** and scrolling down to the WCCP Statistics.

The definitions for the WCCP statistics are defined as:

```
WCCP0 : Current time
WCCP1 : Last stats reset time
WCCP2 : Packets sent
WCCP3 : Bytes sent
WCCP4 : Packet received
WCCP5 : Bytes received
WCCP6 : Bad packets received
WCCP6.1 : Receive error
WCCP6.2 : Unknown type
WCCP6.3 : Total size too small
WCCP6.4 : Header too small
WCCP6.5 : Bad version
WCCP6.6 : Bad security comp
WCCP6.7 : Bad service info comp
WCCP6.8 : Bad query info comp
WCCP6.9 : Unknown group
WCCP6.10 : Unsolicited query
```

WCCP6.11	: Bad router id comp
WCCP6.12	: Bad router view comp
WCCP6.13	: Service group mismatch
WCCP6.14	: Forwarding type mismatch
WCCP6.15	: Assignment type mismatch
WCCP6.16	: Capability mismatch
WCCP7	: Bad security packets
WCCP8	: Internal errors
WCCP8.1	: Failed to send
WCCP8.2	: Add RID for router
WCCP8.3	: Alloc query member
WCCP8.4	: Alloc query timer
WCCP8.5	: Add router to group
WCCP8.6	: Add cache to group
WCCP8.7	: Alloc active caches
WCCP8.8	: Bucket reassignment
WCCP9	: Allocated blocks

### Notes

If you use IP spoofing with WCCP, do the following for best results:

- ❑ The `ip wccp redirect exclude in` command should be applied to the adapter to which the SG appliance is attached.
- ❑ For L2 forwarding, the SG appliance should be directly connected to the router interface.



## Appendix A: Glossary

### A

access control list	Allows or denies specific IP addresses access to a server.
access log	A list of all the requests sent to an appliance. You can read an access log using any of the popular log-reporting programs. When a client uses HTTP streaming, the streaming entry goes to the same access log.
account	A named entity that has purchased the appliance or the Entitlements from Blue Coat.
activation code	A string of approximately 10 characters that is generated and mailed to customers when they purchase the appliance.
active content stripping	Provides a way to identify potentially dangerous mobile or active content and scripts, and strip them out of a response.
active content types	Used in the Visual Policy Manager. Referring to Web Access policies, you can create and name lists of active content types to be stripped from Web pages. You have the additional option of specifying a customized message to be displayed to the user
administration access policy	A policy layer that determines who can access the SG appliance to perform administrative tasks.
administration authentication policy	A policy layer that determines how administrators accessing the SG appliance must authenticate.
Application Delivery Network (ADN)	A WAN that has been optimized for acceleration and compression by Blue Coat. This network can also be secured through the use of appliance certificates. An ADN network is composed of an ADN manager and backup ADN manager, ADN nodes, and a network configuration that matches the environment.
ADN backup manager	Takes over for the ADN manager in the event it becomes unavailable. See <i>ADN manager</i> .
ADN manager	Responsible for publishing the routing table to SG Clients (and to other SG appliances).
ADN optimize attribute	Controls whether to optimize bandwidth usage when connecting upstream using an ADN tunnel.
asx rewrite	Allows you to rewrite URLs and then direct a client's subsequent request to the new URL. One of the main applications of ASX file rewrites is to provide explicit proxy-like support for Windows Media Player 6.4, which cannot set explicit proxy mode for protocols other than HTTP.
audit	A log that provides a record of who accessed what and how.

authenticate-401 attribute	All transparent and explicit requests received on the port always use transparent authentication (cookie or IP, depending on the configuration). This is especially useful to force transparent proxy authentication in some proxy-chaining scenarios
authenticated content	Cached content that requires authentication at the origin content server (OCS). Supported authentication types for cached data include basic authentication and IWA (or NTLM).
authentication	Allows you to verify the identity of a user. In its simplest form, this is done through usernames and passwords. Much more stringent authentication can be employed using digital certificates that have been issued and verified by a Certificate Authority. <i>See also</i> basic authentication, proxy authentication, and SSL authentication.
authentication realm	Authenticates and authorizes users to access SG services using either explicit proxy or transparent proxy mode. These realms integrate third-party vendors, such as LDAP, Windows, and Novell, with the Blue Coat operating system.
authorization	The permissions given to an authenticated user.
<b>B</b>	
bandwidth class	A defined unit of bandwidth allocation.
bandwidth class hierarchy	Bandwidth classes can be grouped together in a class hierarchy, which is a tree structure that specifies the relationship among different classes. You create a hierarchy by creating at least one parent class and assigning other classes to be its children.
bandwidth management	Classify, control, and, if needed, limit the amount of bandwidth used by network traffic flowing in or out of an SG appliance.
basic authentication	The standard authentication for communicating with the target as identified in the URL.
BCAAA	Blue Coat Authentication and Authorization Agent. Allows SGOS 5.x to manage authentication and authorization for IWA, CA eTrust SiteMinder realms, Oracle COREid, Novell, and Windows realms. The agent is installed and configured separately from SGOS 5.x and is available from the Blue Coat Web site.
BCLP	Blue Coat Licensing Portal.
byte-range support	The ability of the SG appliance to respond to byte-range requests (requests with a Range : HTTP header).
<b>C</b>	
cache	<p>An "object store," either hardware or software, that stores information (objects) for later retrieval. The first time the object is requested, it is stored, making subsequent requests for the same information much faster.</p> <p>A cache helps reduce the response time and network bandwidth consumption on future, equivalent requests. The SG appliance serves as a cache by storing content from many users to minimize response time and prevent extraneous network traffic.</p>
cache control	Allows you to configure which content the SG appliance stores.

cache efficiency	A tab found on the Statistics pages of the Management Console that shows the percent of objects served from cache, the percent loaded from the network, and the percent that were non-cacheable.
cache hit	Occurs when the SG appliance receives a request for an object and can serve the request from the cache without a trip to the origin server.
cache miss	Occurs when the appliance receives a request for an object that is not in the cache. The appliance must then fetch the requested object from the origin server. .
cache object	Cache contents includes all objects currently stored by the SG appliance. Cache objects are not cleared when the SG appliance is powered off.
Certificate Authority (CA)	A trusted, third-party organization or company that issues digital certificates used to create digital signatures and public key/private key pairs. The role of the CA is to guarantee that the individuals or company representatives who are granted a unique certificate are who they claim to be.
child class (bandwidth gain)	The child of a parent class is dependent upon that parent class for available bandwidth (they share the bandwidth in proportion to their minimum/maximum bandwidth values and priority levels). A child class with siblings (classes with the same parent class) shares bandwidth with those siblings in the same manner.
client consent certificates	A certificate that indicates acceptance or denial of consent to decrypt an end user's HTTPS request.
client-side transparency	A way of replacing the appliance IP address with the Web server IP address for all port 80 traffic destined to go to the client. This effectively conceals the SG appliance address from the client and conceals the identity of the client from the Web server.
concentrator	An SG appliance, usually located in a data center, that provides access to data center resources, such as file servers.
content filtering	A way of controlling which content is delivered to certain users. SG appliances can filter content based on content categories (such as gambling, games, and so on), type (such as http, ftp, streaming, and mime type), identity (user, group, network), or network conditions. You can filter content using vendor-based filtering or by allowing or denying access to URLs.
<b>D</b>	
default boot system	The system that was successfully started last time. If a system fails to boot, the next most recent system that booted successfully becomes the default boot system.
default proxy listener	<i>See</i> proxy service (d efault).
denial of service (DoS)	<p>A method that hackers use to prevent or deny legitimate users access to a computer, such as a Web server. DoS attacks typically send many request packets to a targeted Internet server, flooding the server's resources and making the system unusable. Any system connected to the Internet and equipped with TCP-based network services is vulnerable to a DoS attack.</p> <p>The SG appliance resists DoS attacks launched by many common DoS tools. With a hardened TCP/IP stack, SG appliance resists common network attacks, including traffic flooding.</p>

destination objects	Used in Visual Policy Manager. These are the objects that define the target location of an entry type.
detect protocol attribute	Detects the protocol being used. Protocols that can be detected include: HTTP, P2P (eDonkey, BitTorrent, FastTrack, Gnutella), SSL, and Endpoint Mapper.
diagnostic reporting	Found in the Statistics pane, the Diagnostics tab allows you to control whether Daily Heartbeats and/or Blue Coat Monitoring are enabled or disabled.
directives	Commands used in installable lists to configure forwarding and SOCKS gateway.
DNS access	A policy layer that determines how the SG appliance processes DNS requests.
domain name system (DNS)	An Internet service that translates domain names into IP addresses. <i>See also</i> private DNS or public DNS.
dynamic bypass	Provides a maintenance-free method for improving performance of the SG appliance by automatically compiling a list of requested URLs that return various kinds of errors.
dynamic real-time rating (DRTR)	Used in conjunction with the Blue Coat Web Filter (BCWF), DRTR (also known as <i>dynamic categorization</i> ) provides real-time analysis and content categorization of requested Web pages to solve the problem of new and previously unknown uncategorized URLs—those not in the database. When a user requests a URL that has not already been categorized by the BCWF database (for example, a brand new Web site), the SG appliance dynamic categorization service analyzes elements of the requested content and assigns a category or categories. The dynamic service is consulted <i>only</i> when the installed BCWF database does not contain category information for an object.

## E

early intercept attribute	Controls whether the proxy responds to client TCP connection requests before connecting to the upstream server. When early intercept is disabled, the proxy delays responding to the client until after it has attempted to contact the server.
ELFF-compatible format	A log type defined by the W3C that is general enough to be used with any protocol.
emulated certificates	Certificates that are presented to the user by SG appliance when intercepting HTTPS requests. Blue Coat emulates the certificate from the server and signs it, copying the subjectName and expiration. The original certificate is used between the SG appliance and the server.
encrypted log	A log is encrypted using an external certificate associated with a private key. Encrypted logs can only be decrypted by someone with access to the private key. The private key is not accessible to the SG appliance.
EULA	End user license agreement.
event logging	Allows you to specify the types of system events logged, the size of the event log, and to configure Syslog monitoring. The appliance can also notify you by email if an event is logged. <i>See also</i> access logging.



explicit proxy	<p>A configuration in which the browser is explicitly configured to communicate with the proxy server for access to content.</p> <p>This is the default for the SG appliance, and requires configuration for both browser and the interface card.</p>
extended log file format (ELFF)	<p>A variant of the common log file format, which has two additional fields at the end of the line—the referer and the user agent fields.</p>
<b>F</b>	
fail open/closed	<p>Failing open or closed applies to forwarding hosts and groups and SOCKS gateways. Fail open or closed applies when health checks are showing sick for each forwarding or SOCKS gateway target in the applicable fail-over sequence. If no systems are healthy, the SG appliance fails open or closed, depending on the configuration. If closed, the connection attempt simply fails.</p> <p>If open, an attempt is made to connect without using any forwarding target (or SOCKS gateway). Fail open is usually a security risk; fail closed is the default if no setting is specified.</p>
filtering	<p>See content filtering.</p>
forward proxy	<p>A proxy server deployed close to the clients and used to access many servers. A forward proxy can be explicit or transparent.</p>
FTP	<p>See Native FTP; Web FTP.</p>
<b>G</b>	
gateway	<p>A device that serves as entrance and exit into a communications network.</p>
<b>H</b>	
hardware serial number	<p>A string that uniquely identifies the appliance; it is assigned to each unit in manufacturing.</p>
health check tests	<p>The method of determining network connectivity, target responsiveness, and basic functionality. The following tests are supported:</p> <ul style="list-style-type: none"> <li>• ICMP</li> <li>• TCP</li> <li>• SSL</li> <li>• HTTP</li> <li>• HTTPS</li> <li>• Group</li> <li>• Composite and reference to a composite result</li> <li>• ICAP</li> <li>• Websense</li> <li>• DRTR rating service</li> </ul>

health check type	<p>The kind of device or service the specific health check tests. The following types are supported:</p> <ul style="list-style-type: none"><li>• Forwarding host and forwarding group</li><li>• SOCKS gateway and SOCKS gateway group</li><li>• CAP service and ICAP service group</li><li>• Websense off-box service and Websense off-box service group</li><li>• DRTR rating service</li><li>• User-defined host and a user-defined composite</li></ul>
heartbeat	<p>Messages sent once every 24 hours that contain the statistical and configuration data for the SG appliance, indicating its health. Heartbeats are commonly sent to system administrators and to Blue Coat. Heartbeats contain no private information, only aggregate statistics useful for pre-emptively diagnosing support issues.</p> <p>The SG appliance sends emergency heartbeats whenever it is rebooted. Emergency heartbeats contain core dump and restart flags in addition to daily heartbeat information.</p>
host affinity	<p>The attempt to direct multiple connections by a single user to the same group member. Host affinity is closely tied to load balancing behavior; both should be configured if load balancing is important.</p>
host affinity timeout	<p>The host affinity timeout determines how long a user remains idle before the connection is closed. The timeout value checks the user's IP address, SSL ID, or cookie in the host affinity table.</p>
inbound traffic (bandwidth gain)	<p>Network packets flowing into the SG appliance. Inbound traffic mainly consists of the following:</p> <ul style="list-style-type: none"><li>• Server inbound: Packets originating at the origin content server (OCS) and sent to the SG appliance to load a Web object.</li><li>• Client inbound: Packets originating at the client and sent to the SG appliance for Web requests.</li></ul>
installable lists	<p>Installable lists, comprised of directives, can be placed onto the SG appliance in one of the following ways:</p> <ul style="list-style-type: none"><li>• Creating the list using the SG text editor</li><li>• Placing the list at an accessible URL</li><li>• Downloading the directives file from the local system</li></ul>
integrated host timeout	<p>An integrated host is an origin content server (OCS) that has been added to the health check list. The host, added through the <code>integrate_new_hosts</code> property, ages out of the integrated host table after being idle for the specified time. The default is 60 minutes.</p>
intervals	<p>Time period from the completion of one health check to the start of the next health check.</p>
IP reflection	<p>Determines how the client IP address is presented to the origin server for explicitly proxied requests. All proxy services contain a <code>reflect-ip</code> attribute, which enables or disables sending of client's IP address instead of the SG's IP address.</p>

**issuer keyring** The keyring used by the SG appliance to sign emulated certificates. The keyring is configured on the appliance and managed through policy.

## L

**licensable component (LC)** (Software) A subcomponent of a license; it is an option that enables or disables a specific feature.

**license** Provides both the right and the ability to use certain software functions within an AV (or SG) appliance. The license key defines and controls the license, which is owned by an account.

**listener** The service that is listening on a specific port. A listener can be identified by any destination IP/subnet and port range. Multiple listeners can be added to each service.

**live content** Also called live broadcast. Used in streaming, it indicates that the content is being delivered fresh.

**LKF** License key file.

**load balancing** A way to share traffic requests among multiple upstream systems or multiple IP addresses on a single host.

**local bypass list** A list you create and maintain on your network. You can use a local bypass list alone or in conjunction with a central bypass list. *See* bypass list.

**local policy file** Written by enterprises (as opposed to the central policy file written by Blue Coat); used to create company- and department-specific advanced policies written in the Blue Coat Policy Language (CPL).

**log facility** A separate log that contains a single logical file and supports a single log format. It also contains the file's configuration and upload schedule information as well as other configurable information such as how often to rotate (switch to a new log) the logs at the destination, any passwords needed, and the point at which the facility can be uploaded.

**log format** The type of log that is used: NCSA/Common, SQUID, ELFF, SurfControl, or Websense.

The proprietary log types each have a corresponding pre-defined log format that has been set up to produce exactly that type of log (these logs cannot be edited). In addition, a number of other ELFF type log formats are also pre-defined (im, main, p2p, ssl, streaming). These can be edited, but they start out with a useful set of log fields for logging particular protocols understood by the SG appliance. It is also possible to create new log formats of type ELFF or Custom which can contain any desired combination of log fields.

**log tail** The access log tail shows the log entries as they get logged. With high traffic on the SG appliance, not all access log entries are necessarily displayed. However, you can view all access log information after uploading the log.

## M

**MACH5** SGOS 5 MACH5 Edition.

Management Console	A graphical Web interface that lets you to manage, configure, monitor, and upgrade the SG appliance from any location. The Management Console consists of a set of Web pages and Java applets stored on the SG appliance. The appliance acts as a Web server on the management port to serve these pages and applets.
management information base (MIB)	Defines the statistics that management systems can collect. A managed device (gateway) has one or more MIBs as well as one or more SNMP agents, which implements the information and management functionality defined by a specific MIB.
maximum object size	The maximum object size stored in the SG appliance. All objects retrieved that are greater than the maximum size are delivered to the client but are not stored in the SG appliance.
MIME/FILE type filtering	Allows organizations to implement Internet policies for both uploaded and downloaded content by MIME or FILE type.
multi-bit rate	The capability of a single stream to deliver multiple bit rates to clients requesting content from appliances from within varying levels of network conditions (such as different connecting bandwidths and traffic).
multicast	Used in streaming; the ability for hundreds or thousands of users to play a single stream.
multicast aliases	Used in streaming; a streaming command that specifies an alias for a multicast URL to receive an .nsc file. The .nsc files allows the multicast session to obtain the information in the control channel
multicast station	Used in streaming; a defined location on the proxy where the Windows Media player can retrieve streams. A multicast station enables multicast transmission of Windows Media content from the cache. The source of the multicast-delivered content can be a unicast-live source, a multicast (live) source, and simulated live (video-on-demand content converted to scheduled live content).
multimedia content services	Used in streaming; multimedia support includes Real Networks, Microsoft Windows Media, Apple QuickTime, MP3, and Flash.
<b>N</b>	
name inputting	Allows an SG appliance to resolve host names based on a partial name specification. When a host name is submitted to the DNS server, the DNS server resolves the name to an IP address. If the host name cannot be resolved, Blue Coat adds the first entry in the name-inputting list to the end of the host name and resubmits it to the DNS server
native FTP	Native FTP involves the client connecting (either explicitly or transparently) using the FTP protocol; the SG appliance then connects upstream through FTP (if necessary).
NCSA common log format	Blue Coat products are compatible with this log type, which contains only basic HTTP access information.
network address translation (NAT)	The process of translating private network (such as intranet) IP addresses to Internet IP addresses and vice versa. This methodology makes it possible to match private IP addresses to Internet IP addresses even when the number of private addresses outnumbers the pool of available Internet addresses.

non-cacheable objects	<p>A number of objects are not cached by the Blue Coat appliance because they are considered non-cacheable. You can add or delete the kinds of objects that the appliance considers non-cacheable. Some of the non-cacheable request types are:</p> <ul style="list-style-type: none"> <li>• Pragma no-cache, requests that specify non-cached objects, such as when you click refresh in the Web browser.</li> <li>• Password provided, requests that include a client password.</li> <li>• Data in request that include additional client data.</li> <li>• Not a GET request.</li> </ul>
.nsc file	<p>Created from the multicast station definition and saved through the browser as a text file encoded in a Microsoft proprietary format. Without an .nsc file, the multicast station definition does not work.</p>
NTP	<p>To manage objects in an appliance, an SG appliance must know the current Universal Time Coordinates (UTC) time. By default, the SG appliance attempts to connect to a Network Time Protocol (NTP) server to acquire the UTC time. SG appliance includes a list of NTP servers available on the Internet, and attempts to connect to them in the order they appear in the NTP server list on the NTP tab.</p>
O	
object (used in caching)	<p>An object is the item that is stored in an appliance. These objects can be frequently accessed content, content that has been placed there by content publishers, or Web pages, among other things.</p>
object (used in Visual Policy Manager)	<p>An object (sometimes referred to as a condition) is any collection or combination of entry types you can create individually (user, group, IP address/subnet, and attribute). To be included in an object, an item must already be created as an individual entry.</p>
object pipelining	<p>This patented algorithm opens as many simultaneous TCP connections as the origin server will allow and retrieves objects in parallel. The objects are then delivered from the appliance straight to the user's desktop as fast as the browser can request them.</p>
origin content server (OCS)	<p>Also called origin server. This is the original source of the content that is being requested. An appliance needs the OCS to acquire data the first time, to check that the content being served is still fresh, and to authenticate users.</p>
outbound traffic (bandwidth gain)	<p>Network packets flowing out of the SG appliance. Outbound traffic mainly consists of the following:</p> <ul style="list-style-type: none"> <li>• Client outbound: Packets sent to the client in response to a Web request.</li> <li>• Server outbound: Packets sent to an OCS or upstream proxy to request a service.</li> </ul>
P	
PAC (Proxy AutoConfiguration) scripts	<p>Originally created by Netscape, PACs are a way to avoid requiring proxy hosts and port numbers to be entered for every protocol. You need only enter the URL. A PAC can be created with the needed information and the local browser can be directed to the PAC for information about proxy hosts and port numbers.</p>
packet capture (PCAP)	<p>Allows filtering on various attributes of the Ethernet frame to limit the amount of data collected. You can capture packets of Ethernet frames going into or leaving an SG appliance.</p>

parent class (bandwidth gain)	A class with at least one child. The parent class must share its bandwidth with its child classes in proportion to the minimum/maximum bandwidth values or priority levels.
passive mode data connections (PASV)	Data connections initiated by an FTP client to an FTP server.
pipelining	<i>See</i> object pipelining.
policies	Groups of rules that let you manage Web access specific to the needs of an enterprise. Policies enhance SG appliance feature areas such as authentication and virus scanning, and let you control end-user Web access in your existing infrastructure. <i>See also</i> refresh policies.
policy-based bypass list	Used in policy. Allows a bypass based on the properties of the client, unlike static and dynamic bypass lists, which allow traffic to bypass the appliance based on destination IP address. <i>See also</i> bypass lists and dynamic bypass.
policy layer	A collection of rules created using Blue Coat CPL or with the VPM.
pragma: no cache (PNC)	A metatag in the header of a request that requires the appliance to forward a request to the origin server. This allows clients to always obtain a fresh copy ( <i>of the request?</i> ).
proxy	<p>Caches content, filters traffic, monitors Internet and intranet resource usage, blocks specific Internet and intranet resources for individuals or groups, and enhances the quality of Internet or intranet user experiences.</p> <p>A proxy can also serve as an intermediary between a Web client and a Web server and can require authentication to allow identity based policy and logging for the client.</p> <p>The rules used to authenticate a client are based on the policies you create on the SG appliance, which can reference an existing security infrastructure—LDAP, RADIUS, IWA, and the like.</p>
Proxy Edition	SGOS 5 Proxy Edition.
proxy service	The proxy service defines the ports, as well as other attributes. that are used by the proxies associated with the service.
proxy service (default)	The default proxy service is a service that intercepts all traffic not otherwise intercepted by other listeners. It only has one listener whose action can be set to bypass or intercept. No new listeners can be added to the default proxy service, and the default listener and service cannot be deleted. Service attributes can be changed.
public key certificate	An electronic document that encapsulates the public key of the certificate sender, identifies this sender, and aids the certificate receiver to verify the identity of the certificate sender. A certificate is often considered valid if it has been digitally signed by a well-known entity, which is called a Certificate Authority (such as VeriSign).
public virtual IP (VIP)	Maps multiple servers to one IP address and then propagates that information to the public DNS servers. Typically, there is a public VIP known to the public Internet that routes the packets internally to the private VIP. This enables you to “hide” your servers from the Internet.

**R**

real-time streaming protocol (RTSP)	A standard method of transferring audio and video and other time-based media over Internet-technology based networks. The protocol is used to stream clips to any RTP-based client.
reflect client IP attribute	Enables the sending of the client's IP address instead of the SG's IP address to the upstream server. If you are using an application delivery network (ADN), this setting is enforced on the concentrator proxy through the Configuration > App. Delivery Network > Tunneling tab.
registration	An event that binds the appliance to an account, that is, it creates the Serial#, Account association.
remote authentication dial-in user service (RADIUS)	Authenticates user identity via passwords for network access.
reverse proxy	A proxy that acts as a front-end to a small number of pre-defined servers, typically to improve performance. Many clients can use it to access the small number of predefined servers.
routing information protocol (RIP)	Designed to select the fastest route to a destination. RIP support is built into Blue Coat appliances.
router hops	The number of jumps a packet takes when traversing the Internet.

**S**

secure shell (SSH)	Also known as Secure Socket Shell. SSH is an interface and protocol that provides strong authentication and enables you to securely access a remote computer. Three utilities—login, ssh, and scp—comprise SSH. Security via SSH is accomplished using a digital certificate and password encryption. Remember that the Blue Coat SG appliance requires SSH1. An SG appliance supports a combined maximum of 16 Telnet and SSH sessions.
serial console	A third-party device that can be connected to one or more Blue Coat appliances. Once connected, you can access and configure the appliance through the serial console, even when you cannot access the appliance directly.
server certificate categories	The hostname in a server certificate can be categorized by BCWF or another content filtering vendor to fit into categories such as banking, finance, sports.
server portals	Doorways that provide controlled access to a Web server or a collection of Web servers. You can configure Blue Coat SG appliances to be server portals by mapping a set of external URLs onto a set of internal URLs.
server-side transparency	The ability for the server to see client IP addresses, which enables accurate client-access records to be kept. When server-side transparency is enabled, the appliance retains client IP addresses for all port 80 traffic to and from the SG appliance. In this scheme, the client IP address is always revealed to the server.
service attributes	Define the parameters, such as explicit or transparent, cipher suite, and certificate verification, that the SG appliance uses for a particular service. .

SG appliance	A Blue Coat security and cache box that can help manage security and content on a network.
sibling class (bandwidth gain)	A bandwidth class with the same parent class as another class.
simple network management protocol (SNMP)	The standard operations and maintenance protocol for the Internet. It uses MIBs, created or customized by Blue Coat, to handle <i>(needs completion)</i> .
simulated live	Used in streaming. Defines playback of one or more video-on-demand files as a scheduled live event, which begins at a specified time. The content can be looped multiple times, or scheduled to start at multiple start times throughout the day.
SmartReporter log type	A proprietary ELFF log type that is compatible with the SmartFilter SmartReporter tool.
SOCKS	A proxy protocol for TCP/IP-based networking applications that allows users transparent access across the firewall. If you are using a SOCKS server for the primary or alternate forwarding gateway, you must specify the appliance's ID for the identification protocol used by the SOCKS gateway. The machine ID should be configured to be the same as the appliance's name.
SOCKS proxy	A generic way to proxy TCP and UDP protocols. The SG appliance supports both SOCKSv4/4a and SOCKSv5; however, because of increased username and password authentication capabilities and compression support, Blue Coat recommends that you use SOCKS v5.
splash page	Custom message page that displays the first time you start the client browser.
split proxy	Employs co-operative processing at the branch and the core to implement functionality that is not possible in a standalone proxy. Examples of split proxies include: <ul style="list-style-type: none"><li>• Mapi Proxy</li><li>• SSL Proxy</li></ul>
SQUID-compatible format	A log type that was designed for cache statistics and is compatible with Blue Coat products.
squid-native log format	The Squid-compatible format contains one line for each request.
SSL authentication	Ensures that communication is with "trusted" sites only. Requires a certificate issued by a trusted third party (Certificate Authority).
SSL interception	Decrypting SSL connections.
SSL proxy	A proxy that can be used for any SSL traffic (HTTPS or not), in either forward or reverse proxy mode.
static route	A manually-configured route that specifies the transmission path a packet must follow, based on the packet's destination address. A static route specifies a transmission path to another network.



statistics	Every Blue Coat appliance keeps statistics of the appliance hardware and the objects it stores. You can review the general summary, the volume, resources allocated, cache efficiency, cached contents, and custom URLs generated by the appliance for various kinds of logs. You can also check the event viewer for every event that occurred since the appliance booted.
stream	A flow of a single type of data, measured in kilobits per second (Kbps). A stream could be the sound track to a music video, for example.
SurfControl log type	A proprietary log type that is compatible with the SurfControl reporter tool. The SurfControl log format includes fully-qualified usernames when an NTLM realm provides authentication. The simple name is used for all other realm types.
syslog	An event-monitoring scheme that is especially popular in Unix environments. Most clients using Syslog have multiple devices sending messages to a single Syslog daemon. This allows viewing a single chronological event log of all of the devices assigned to the Syslog daemon. The Syslog format is: "Date Time Hostname Event."
system cache	The software cache on the appliance. When you clear the cache, all objects in the cache are set to expired. The objects are not immediately removed from memory or disk, but a subsequent request for any object requested is retrieved from the origin content server before it is served.
<b>T</b>	
time-to-live (TTL) value	Used in any situation where an expiration time is needed. For example, you do not want authentication to last beyond the current session and also want a failed command to time out instead of hanging the box forever.
traffic flow (bandwidth gain)	<p>Also referred to as <i>flow</i>. A set of packets belonging to the same TCP/UDP connection that terminate at, originate at, or flow through the SG appliance. A single request from a client involves two separate connections. One of them is from the client to the SG appliance, and the other is from the SG appliance to the OCS. Within each of these connections, traffic flows in two directions—in one direction, packets flow out of the SG appliance (outbound traffic), and in the other direction, packets flow into the SG (inbound traffic). Connections can come from the client or the server. Thus, traffic can be classified into one of four types:</p> <ul style="list-style-type: none"><li>• Server inbound</li><li>• Server outbound</li><li>• Client inbound</li><li>• Client outbound</li></ul> <p>These four traffic flows represent each of the four combinations described above. Each flow represents a single direction from a single connection.</p>
transmission control protocol (TCP)	TCP, when used in conjunction with IP (Internet Protocol) enables users to send data, in the form of message units called packets, between computers over the Internet. TCP is responsible for tracking and handling, and reassembly of the packets; IP is responsible for packet delivery.
transparent proxy	A configuration in which traffic is redirected to the SG appliance without the knowledge of the client browser. No configuration is required on the browser, but network configuration, such as an L4 switch or a WCCP-compliant router, is required.

**trial period** Starting with the first boot, the trial period provides 60 days of free operation. All features are enabled during this time.

## U

**unicast alias** Defines an name on the appliance for a streaming URL. When a client requests the alias content on the appliance, the appliance uses the URL specified in the unicast-alias command to request the content from the origin streaming server.

**universal time coordinates (UTC)** An SG appliance must know the current UTC time. By default, the appliance attempts to connect to a Network Time Protocol (NTP) server to acquire the UTC time. If the SG appliance cannot access any NTP servers, you must manually set the UTC time.

**URL filtering** *See* content filtering.

**URL rewrite rules** Rewrite the URLs of client requests to acquire the streaming content using the new URL. For example, when a client tries to access content on [www.mycompany.com](http://www.mycompany.com), the appliance is actually receiving the content from the server on 10.253.123.123. The client is unaware that [mycompany.com](http://mycompany.com) is not serving the content; however, the appliance access logs indicate the actual server that provides the content.

## W

**WCCP** Web Cache Communication Protocol. Allows you to establish redirection of the traffic that flows through routers.

**Web FTP** Web FTP is used when a client connects in explicit mode using HTTP and accesses an <ftp://> URL. The SG appliance translates the HTTP request into an FTP request for the OCS (if the content is not already cached), and then translates the FTP response with the file contents into an HTTP response for the client.

**Websense log type** A Blue Coat proprietary log type that is compatible with the Websense reporter tool.

## X

**XML responder** HTTP XML service that runs on an external server.

**XML requestor** XML realm.

## Appendix B: Using Policy to Manage Forwarding

After ICP, forwarding, and the SOCKS gateways are configured, use policy to create and manage forwarding rules. Forwarding, ICP, and SOCKS gateway rules should go in the `<Forward>` layer of the Forwarding Policy file or the VPM Policy file (if you use the VPM).

The separate `<Forward>` layer is provided because the URL can undergo URL rewrites before the request is fetched. This rewritten URL is accessed as a `server_url` and decisions about upstream connections are based on the rewritten URL, requiring a separate layer. All policy commands allowed in the `<Forward>` layer are described below.

Table B-1. Policy Commands Allowed in the `<Forward>` Layer

Forwarding	Description
<b>Conditions</b>	
<code>client_address=</code>	Tests the IP address of the client. Can also be used in <code>&lt;Exception&gt;</code> and <code>&lt;Proxy&gt;</code> layers.
<code>client.host=</code>	Tests the hostname of the client (obtained through RDNS). Can also be used in <code>&lt;Admin&gt;</code> , <code>&lt;Proxy&gt;</code> , and <code>&lt;Exception&gt;</code> layers.
<code>client.host.has_name=</code>	Tests the status of the RDNS performed to determine <code>client.host</code> . Can also be used in <code>&lt;Admin&gt;</code> , <code>&lt;Proxy&gt;</code> , and <code>&lt;Exception&gt;</code> layers.
<code>client.protocol=</code>	Tests true if the client transport protocol matches the specification. Can also be used in <code>&lt;Exception&gt;</code> and <code>&lt;Proxy&gt;</code> layers.
<code>date[.utc]=</code>	Tests true if the current time is within the <code>startdate..enddate</code> range, inclusive. Can be used in all layers.
<code>day=</code>	Tests if the day of the month is in the specified range or an exact match. Can be used in all layers.
<code>has_client=</code>	<code>has_client=</code> is used to test whether or not the current transaction has a client. This can be used to guard triggers that depend on client identity.
<code>hour[.utc]=</code>	Tests if the time of day is in the specified range or an exact match. Can be used in all layers.
<code>im.client=</code>	Tests the type of IM client in use. Can also be used in <code>&lt;Proxy&gt;</code> , <code>&lt;Exception&gt;</code> , and <code>&lt;Cache&gt;</code> layers.
<code>im.message.reflected=</code>	Tests whether IM reflection occurred. Can also be used in <code>&lt;Proxy&gt;</code> and <code>&lt;Cache&gt;</code> layers.
<code>minute[.utc]=month[.utc]=</code>	Tests if the minute of the hour is in the specified range or an exact match. Can be used in all layers.

Table B-1. Policy Commands Allowed in the &lt;Forward&gt; Layer (Continued)

Forwarding	Description
proxy.address=	Tests the IP address of the network interface card (NIC) on which the request arrives. Can also be used in <Admin> and <Proxy> layers.
proxy.card=	Tests the ordinal number of the network interface card (NIC) used by a request. Can also be used in <Admin> and <Proxy> layers.
proxy.port=	Tests if the IP port used by a request is within the specified range or an exact match. Can also be used in <Admin> and <Proxy> layers.
server_url[.case_sensitive .no_lookup]=	Tests if a portion of the requested URL exactly matches the specified pattern.
server_url.address=	Tests if the host IP address of the requested URL matches the specified IP address, IP subnet, or subnet definition.
server_url.domain[.case_sensitive .no_lookup]=	Tests if the requested URL, including the domain-suffix portion, matches the specified pattern.
server_url.extension[.case_sensitive]=	Tests if the filename extension at the end of the path matches the specified string.
server_url.host.has_name=	Tests whether the server URL has a resolved DNS hostname.
server_url.host[.exact .substring .prefix .suffix .regex][.no_lookup]=	Tests if the host component of the requested URL matches the IP address or domain name.
server_url.host.is_numeric=	This is true if the URL host was specified as an IP address.
server_url.host.no_name=	This is true if no domain name can be found for the URL host.
server_url.host.regex=	Tests if the specified regular expression matches a substring of the domain name component of the requested URL.
server_url.is_absolute=	Tests whether the server URL is expressed in absolute form.
server_url.path[.exact .substring .prefix .suffix .regex .case_sensitive]=	Tests if a prefix of the complete path component of the requested URL, as well as any query component, matches the specified string.
server_url.path.regex=	Tests if the regex matches a substring of the path component of the request URL.
server_url.port=	Tests if the port number of the requested URL is within the specified range or an exact match.
server_url.query.regex=	Tests if the regex matches a substring of the query string component of the request URL.
server_url.regex=	Tests if the requested URL matches the specified pattern.
server_url.scheme=	Tests if the scheme of the requested URL matches the specified string.
socks=	This condition is true whenever the session for the current transaction involves SOCKS to the client.

Table B-1. Policy Commands Allowed in the &lt;Forward&gt; Layer (Continued)

Forwarding	Description
<code>socks.version=</code>	Switches between SOCKS 4/4a and 5. Can also be used in <Exception> and <Proxy> layers.
<code>streaming.client=</code>	<code>yes</code>   <code>no</code> . Tests the user agent of a Windows, Real Media, or QuickTime player.
<code>time[.utc]=</code>	Tests if the time of day is in the specified range or an exact match. Can be used in all layers.
<code>tunneled=</code>	<code>yes</code>   <code>no</code> . Tests TCP tunneled requests, HTTP CONNECT requests, and unaccelerated SOCKS requests
<code>weekday[.utc]=</code>	Tests if the day of the week is in the specified range or an exact match. Can be used in all layers.
<code>year[.utc]=</code>	Tests if the year is in the specified range or an exact match. Can be used in all layers.
<b>Properties</b>	
<code>access_server()</code>	Determines whether the client can receive streaming content directly from the OCS. Set to <code>no</code> to serve only cached content.
<code>ftp.transport()</code>	Determines the upstream transport mechanism. This setting is not definitive. It depends on the capabilities of the selected forwarding host.
<code>forward()</code>	Determines forwarding behavior. There is a box-wide configuration setting ( <code>config&gt;forwarding&gt;failure-mode</code> ) for the forward failure mode. The optional specific settings can be used to override the default.
<code>forward.fail_open()</code>	Controls whether the SG appliance terminates or continues to process the request if the specified forwarding host or any designated backup or default cannot be contacted.
<code>http.refresh.recv.timeout()</code>	Sets the socket timeout for receiving bytes from the upstream host when performing refreshes. Can also be used in <Cache> layers.
<code>http.server.connect_attempts()</code>	Sets the number of attempts to connect performed per-address when connecting to the upstream host.
<code>http.server.recv.timeout()</code>	Sets the socket timeout for receiving bytes from the upstream host. Can also be used in <Proxy> layers.
<code>icp()</code>	Determines when to consult ICP. The default is <code>yes</code> if ICP hosts are configured and if no forwarding host or SOCKS gateway is identified as an upstream target.
<code>im.transport()</code>	Sets the type of upstream connection to make for IM traffic.
<code>integrate_new_hosts()</code>	Determines whether to add new host addresses to health checks and load balancing. The default is <code>no</code> . If it is set to <code>yes</code> , any new host addresses encountered during DNS resolution of forwarding hosts are added to health checks and load balancing.

Table B-1. Policy Commands Allowed in the &lt;Forward&gt; Layer (Continued)

Forwarding	Description
<code>reflect_ip()</code>	Determines how the client IP address is presented to the origin server for explicitly proxied requests. Can also be used in <Proxy> layers.
<code>socks_gateway()</code>	The <code>socks_gateway()</code> property determines the gateway and the behavior of the request if the gateway cannot be contacted. There is a box-wide configuration setting for the SOCKS failure mode. The optional specific settings can be used to override the default.
<code>socks_gateway.fail_open()</code>	Controls whether the SG appliance terminates or continues to process the request if the specified SOCKS gateway or any designated backup or default cannot be contacted.
<code>streaming.transport()</code>	Determines the upstream transport mechanism. This setting is not definitive. The ability to use <code>streaming.transport()</code> depends on the capabilities of the selected forwarding host.
<code>trace.request()</code>	Determines whether detailed trace output is generated for the current request. The default value is <code>no</code> , which produces no output
<code>trace.rules()</code>	Determines whether trace output is generated that shows each policy rule that <i>fired</i> . The default value of <code>no</code> suppresses output.
<code>trace.destination()</code>	Used to change the default path to the trace output file. By default, policy evaluation trace output is written to an object in the cache accessible using a console URL of the following form: <code>http://SG_ip_address:8081/Policy/Trace/path</code>
Actions	
<code>notify_email()</code>	Sends an e-mail notification to the list of recipients specified in the Event Log mail configuration. Can be used in all layers.
<code>notify_snmp()</code>	The SNMP trap is sent when the transaction terminates. Can be used in all layers.
<code>log_message</code>	Writes the specified string to the event log.
Definitions	
<code>define server_url.domain condition name</code>	Binds a user-defined label to a set of domain suffix patterns for use in a <code>condition= expression</code> .

## Appendix C: Using WCCP

This appendix discusses how to configure an SG appliance to participate in a Web Cache Communication Protocol (WCCP) scheme, when a WCCP-capable router collaborates with a set of WCCP-configured appliances to service requests. If you are already familiar with WCCP version 2 and want to get your router and SG appliance up and running right away, see the [“Quick Start” on page 269](#).

### Overview

WCCP is a Cisco®-developed protocol that allows you to establish redirection of the traffic that flows through routers.

#### WCCP Version 1

In WCCP version 1, the WCCP-configured home router transparently redirects TCP port 80 packets to a maximum of 32 appliances. (An SG appliance is seen as a cache in WCCP protocol.)

One of the caches participating in the WCCP service group is automatically elected to configure the home router's redirection tables. This way, caches can be transparently added and removed from the WCCP service group without requiring operator intervention. WCCP version 1 supports only a single service group.

Each applicable client IP packet received by the home router is transparently redirected to a cache. An SG appliance from the group is selected to define the home router's redirection hash table for all caches. All caches periodically communicate with the home router to verify WCCP protocol synchronization and SG availability within the service group. In return, the home router responds to each cache with information as to which appliances are available in the service group.

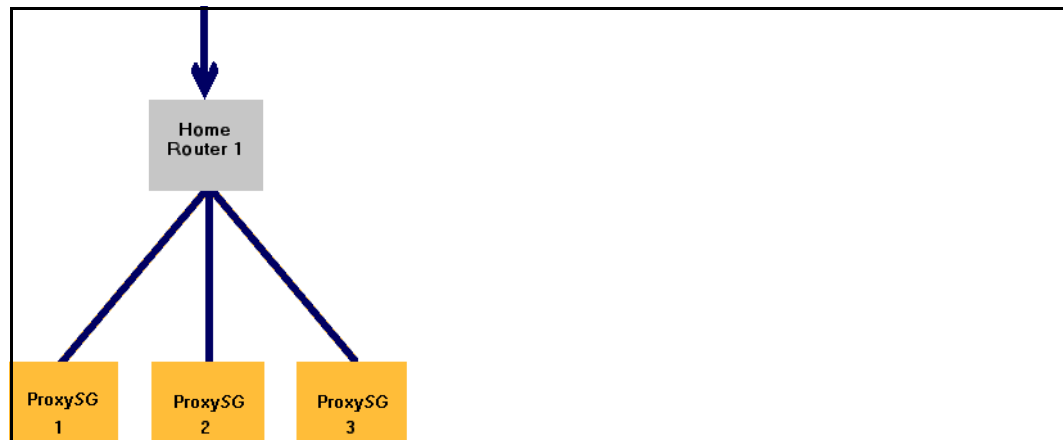


Figure C-1. A Typical WCCP Version 1 Configuration

The following are WCCP version 1 caveats:

- ❑ The home router IP must be configured on all participating interfaces and must match the home router address configured on the SG appliance.
- ❑ The adapter connected to the SG appliance must be Ethernet or Fast Ethernet.

- ❑ For Cisco routers using WCCP version 1, minimum IOS releases are 11.1(18)CA and 11.2(13)P. Note that releases prior to IOS 12.0(3)T only support WCCP version 1. Ensure that you are using the correct IOS software for the router and that the SG configuration protocol version number and router protocol version number match.

For more information on WCCP Version 1, refer to the Cisco Web site. The rest of this appendix discusses WCCP version 2 only.

## WCCP Version 2

For Cisco routers using WCCP version 2, minimum IOS releases are 12.0(3)T and 12.0(4). Release 12.0(5) and later releases support WCCP versions 1 and 2. Ensure that you use the correct IOS software for the router and that you have a match between the SG configuration WCCP version number and router protocol version number.

WCCP version 2 protocol offers the same capabilities as version 1, along with increased protocol security and multicast protocol broadcasts. Version 2 multicasting allows caches and routers to discover each other through a common multicast service group and matching passwords. In addition, up to 32 WCCP-capable routers can transparently redirect traffic to a set of up to 32 appliances. Version 2 WCCP-capable routers are capable of redirecting IP traffic to a set of appliances based on various fields within those packets.

Version 2 allows routers and caches to participate in multiple, simultaneous service groups. Routers can transparently redirect IP packets based on their formats. For example, one service group could redirect HTTP traffic and another could redirect FTP traffic.

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**Note:** Blue Coat recommends that WCCP-compliant caches from different vendors be kept separate and that only one vendor's routers be used in a service group.

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One of the caches participating in the WCCP service group is automatically elected to configure the home router's redirection tables. This way, caches can be transparently added and removed from the WCCP service group without requiring operator intervention. WCCP version 2 supports multiple service groups.

The figure below illustrates a WCCP version 2 implementation using multiple routers and Appliances. In this scenario, routers 1 through  $n$  and caches 1 through  $m$  participate in the same service group. As in version 1, an appliance from the group is selected to define the redirection hash table in all routers for all caches. All caches periodically communicate with all routers to verify WCCP protocol synchronization and appliance and router availability within the service group. In return, each router responds to caches with information as to what caches and discovered routers are available in the service group.



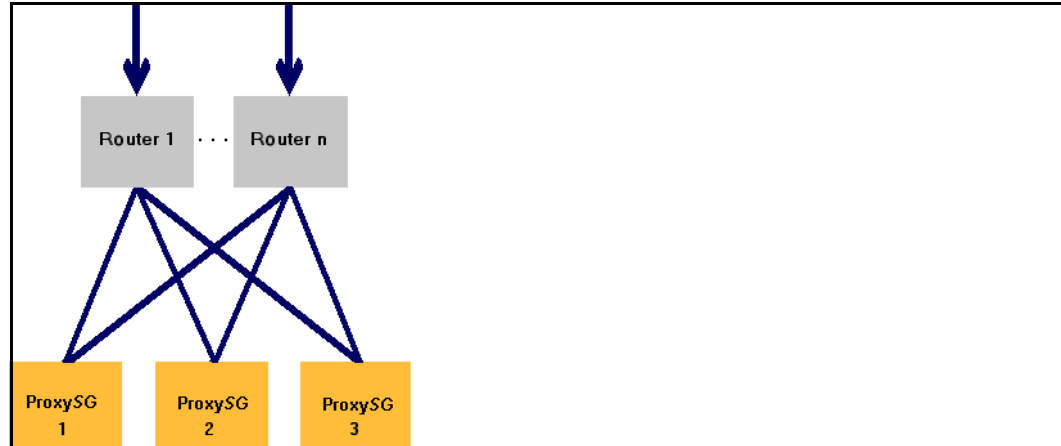


Figure C-2. A Version 2 Configuration Using Packet Redirection to Multiple Routers and Caches

## Quick Start

Two tasks must be completed to get WCCP running: configuring the router and configuring the SG appliance. If you have a standard router and SG configuration, use the Quick Start below. Otherwise, begin with the instructions in the procedure "To do initial router configuration:", below, and ["To create an SG appliance WCCP configuration file and enable WCCP:"](#) on page 269.

If you require a more complicated configuration, start with ["Examples"](#) on page 276.

### To do initial router configuration:

1. From the router (`config`) mode, tell WCCP which service group you want use. The Web-cache service group redirects port 80 (HTTP) traffic only.  

```
Router(config) #ip wccp web-cache
```
2. Enter the (`config-if`) submode by telling WCCP which IP address to use.  

```
Router(config)# int interface
```

where *interface* is the adapter interface with an IP address. The prompt changes to configuration interface submode.
3. Enable packet redirection on an outbound (Internet facing) interface.  

```
Router(config-if) # ip wccp web-cache redirect out
```
4. Prevent packets received on an adapter interface from being checked for redirection and allow the use of Blue Coat bypass lists.  

```
Router(config-if) # ip wccp redirect exclude in
```

For more information on WCCP router configuration, see ["Configuring a WCCP Version 2 Service on the Router"](#) on page 270.

### To create an SG appliance WCCP configuration file and enable WCCP:

1. Create a WCCP configuration file through either the SG appliance's CLI inline commands or through a text editor. Make sure that the home router you enter here is the home router that was named in the router's configuration. If you do have a mismatch, you must correct it before continuing. See ["Identifying a Home Router/Router ID Mismatch"](#) on page 281.

For more information on creating a configuration file, see ["Examples"](#) on page 276.

If you used the `inline` commands, you have completed WCCP configuration for both the router and the SG appliance and you have enabled WCCP on the SG appliance. No further steps are needed.

2. If you used a text editor, copy the file to an HTTP server accessible to the SG appliance.
3. Enable WCCP and download the configuration file to the SG appliance.

```
SGOS#(config) wccp enable
SGOS#(config) wccp path http://205.66.255.10/files/wccp.txt
SGOS#(config) load wccp-settings
```

For detailed information on creating and installing a WCCP configuration file for an SG appliance, see [Chapter 17: "WCCP Settings" on page 239](#)

## Configuring a WCCP Version 2 Service on the Router

Configuring a router requires that you work with two different types of configuration commands:

- ❑ Creating a service group (which uses global settings).
- ❑ Configuring the Internet-Connected Interface (which uses interface settings).

Define service group settings before defining adapter interface settings.

### Setting up a Service Group

Services are of two types:

- ❑ Well known services (web-cache for port 80—HTTP— redirection)
- ❑ The `web-cache` service group is supported by both Cisco and Blue Coat.
- ❑ Dynamic services (which can be used for other services, such as FTP, RTSP redirection, and reverse proxy).
- ❑ Dynamic service uses identifiers ranging from 0-99 to name the service group.

WCCP global settings allow you to name the service group and then define the characteristics for that service group. Even if you use the pre-defined Web-cache service group, you should:

- ❑ configure a multicast group address
- ❑ create and identify a redirection access list and associate it with a service group
- ❑ create and identify a cache bypass list and associate it with a service group
- ❑ create password authentication for messages sent by the service group to the router

Syntax for configuring a service group (global settings):

```
ip wccp {web-cache | service-number} [group-address group_address]
[redirect-list access-list] [group-list access-list] [password
password]
```

where:

<code>web-cache</code>	Enables port 80 (HTTP) service.
<code>service-number</code>	The identification number of the cache service group being controlled by the router. Services are identified using a value from 0 to 99. The reverse-proxy service is indicated using the value 99, although any value can be used for reverse proxy.

<code>group-address</code> <i>groupaddress</i>	(Optional) If no redirect list is defined (the default), all traffic is redirected. The group address option directs the router to use a specified multicast IP address to coalesce the “I See You” responses to the “Here I Am” messages that it has received on this address. The <code>group-address</code> argument requires a multicast address used by the router to determine which cache engine receives redirected messages. The response is sent to the group address, as well. If no group address is defined (the default), all “Here I Am” messages are responded to with a unicast reply.
<code>redirect-list</code> <i>access-list</i>	(Optional) Directs the router to use an access list to control traffic redirected to the defined service group. The access-list parameter specifies either a number from 1 to 99 identifying a predefined standard or extended access list number, or a name (up to 64 characters long) identifying an existing standard or extended access list. The access list itself specifies which traffic can be redirected.
<code>group-list</code> <i>access-list</i>	(Optional) If no group list is defined (the default), all caches might participate in the service group. The <code>group-list</code> option directs the router to use an access list to determine which caches are allowed to participate in the service group. The access-list parameter specifies either a number from 1 to 99 identifying a predefined standard or extended access list number or a name (up to 64 characters long) identifying an existing standard or extended access list. The access list itself specifies which caches are permitted to participate in the service group.
<code>password</code> <i>password</i>	(Optional) By default, password authentication is not configured and authentication is disabled. The password option increases authentication security to messages received from the service group specified by the service-number. Messages that do not pass authentication are discarded. The password can be up to eight characters long. If you specify a password in the router configuration, you must also configure the same password separately on each cache.

## Naming a Service Group and Enabling WCCP

WCCP version 2 is enabled when you name a WCCP service group. (Version 1 requires a specific `enable` command.) The service group can already exist, such as `web-cache`, or it could be a new group, such as 36.

### To name a service group and enable WCCP:

From the router (`config`) mode, enter the following command:

```
Router#(config) ip wccp web-cache
-or-
Router#(config) ip wccp 36
```

## Configuring a Global Multicast Group Address

Benefits of using a multicast address include reduced WCCP protocol traffic and the ability to easily add and remove caches and routers from a service group without having to reconfigure all service group members. Multicast addresses fall within the range of 224.0.0.0 to 239.255.255.255.

Use the following syntax to configure a global multicast group address for multicast cache discovery.

```
ip wccp {web-cache | service-number} [group-address group_address]
```

### To configure a multicast address:

From the router (`config`) mode, name the group that uses the multicast address, provide the address, then tell the router which adapter interface is used:

```
Router(config)# ip wccp 36 group-address 225.1.1.1
Router(config)# interface ethernet 0
Router(config-if)# end
```

## Creating a Redirection Access List and Associating it with a Service Group

Redirection access lists can contain commands redirecting packets from one network or cache to another. The lists also can be used to determine which caches participate in which service groups.

The two lists, although similar, have different purposes, and are applied to the router differently. The redirection lists are applied with the `redirect-list` option. The cache bypass lists are applied with the `group-list` argument. Both lists can be identified with either a name or a number.

Use the following syntax to create a redirection access list. This is partial syntax for this command. Access lists are very complicated; refer to the Cisco Web site for complete syntax.

```
access-list acl_ID [deny | permit] protocol {[source_addr source_mask]
| [local_addr local_mask]}
```

where:

<i>acl_ID</i>	Names the access list you are creating. You can use either a name or number.
<i>deny</i>	Indicates that you do not want to allow a packet to traverse the Cisco router. By default, the router firewall denies all inbound or outbound packets unless you specifically permit access.
<i>permit</i>	Selects a packet to traverse the PIX firewall. By default, the router firewall denies all inbound or outbound packets unless you specifically permit access.
<i>protocol</i>	Identifies, by name or number, an IP protocol. This parameter can be one of the keywords <code>icmp</code> , <code>ip</code> , <code>tcp</code> , or <code>udp</code> , or an integer in the range 1 to 254 representing an IP protocol number. To match any Internet protocol, including ICMP, TCP, and UDP, use the keyword <code>ip</code> .
<i>source_addr</i>	Indicates the address of the network or host from which the packet is being sent. Use the keyword <code>any</code> as an abbreviation for an address of 0.0.0.0.
<i>source_mask</i>	Specifies the netmask bits (mask) to be applied to <i>source_addr</i> , if the source address is for a network mask. Use the keyword <code>any</code> as an abbreviation for a mask of 0.0.0.0.
<i>local_addr</i>	Indicates the address of the network or host local to the PIX firewall. The <i>local_addr</i> is the address after NAT has been performed. Use the keyword <code>host</code> , followed by address, as an abbreviation for a mask of 255.255.255.255.
<i>local_mask</i>	Specifies the netmask bits (mask) to be applied to <i>local_addr</i> , if the local address is a network mask. Use the keyword <code>host</code> followed by address as an abbreviation for a mask of 255.255.255.255.

### To create a redirection access list or a cache bypass list:

From the router (config) prompt, name an access list and assign rules to it.

```
Router(config)# access-list 100 deny ip any host 126.10.10.10
Router(config)# access-list 100 permit ip any any
Router#
```

- ❑ The commands above gave the access list a name of 100.
- ❑ Denied packets from any protocol to be sent from any host on the 126.10.10.10 network.

- ❑ Permitted packets from any protocol to be sent from any other network.

#### To associate a redirection access list with a specific service group:

1. Create a redirection access list.
2. Associate the access list with a specified service group.

```
ip wccp {web-cache | service-number} [redirect-list access-list]
Router(config)# interface ethernet 0/0
Router(config-if)# ip wccp web-cache redirect-list 100
Router(config-if)# end
Router#
```

#### To associate a cache bypass access list with a specific service group:

1. Create a redirection access list, using the syntax discussed above.
2. Associate the access list with a specified service group.

```
ip wccp {web-cache | service-number} [group-list access-list]
Router(config)# interface ethernet 0
Router(config-if)# ip wccp web-cache group-list 120
Router(config-if)# end
Router#
```

## Configuring the Internet-Connected Interface

WCCP interface settings allow you to configure the Internet-connected adapter interface that redirects Web traffic to the content engine.

Using the interface commands allows you to:

- ❑ Enable and prevent packet redirection
- ❑ Enable reception of multicast packets for service group member routers

Syntax for configuring an Internet-connected adapter interface (interface settings):

```
ip wccp [{web-cache | service-number} redirect out | group-listen] |
redirect exclude in
```

where:

web-cache	Enables the Web cache service group.
service-number	The identification number of the cache service group being controlled by the router. Services are identified using a value from 0 to 99. The reverse-proxy service is indicated using the value 99.
redirect out	Enables packet redirection on an outbound (Internet facing) adapter interface.
group-listen	On a router that is a member of a service group, enables the reception of pre-defined IP multicast packets.
redirect exclude in	Prevents packets received on an adapter interface from being checked for redirection. If the cache <i>service-group</i> is located on a separate router interface, the possibility exists that bypass filters could be enabled on the cache.

## Using Packet Redirection

WCCP communication among the routers and the appliances can be done by either directly addressing protocol packets to each router's and cache's IP address (as illustrated in Figure C-1 on page 267) or by sending these packets to a common multicast address as illustrated in Figure C-3, below:

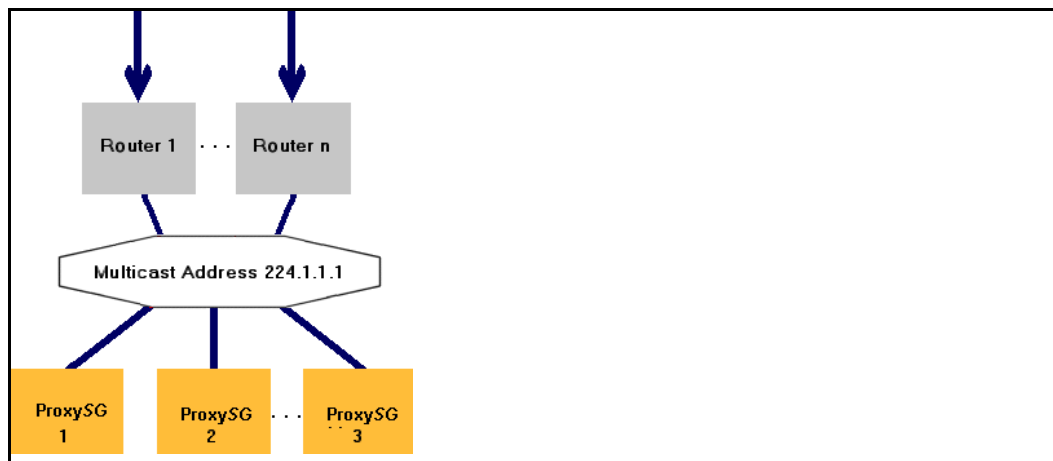


Figure C-3. A Version 2 Configuration Using Multicast Packet Redirection

You can configure redirection on inbound or outbound interfaces.

### To configure redirection on the outbound interfaces:

Use the following syntax to configure redirection on the outbound adapter interface.

```
ip wccp {web-cache | service-number} redirect out
```

From the router (config) prompt, enter the following:

```
Router(config)# interface ethernet 0
Router(config-if)# ip wccp web-cache redirect out
Router(config-if)# end
```

### To exclude packet redirection on an inbound adapter interface:

Use the following command to prevent packets received on an adapter interface from being checked for redirection.

```
ip wccp redirect exclude in
```

The following example shows how to exclude Blue Coat adapter interface (xx, in this case) and allow use of Blue Coat bypass lists:

From the router (config) prompt, enter the following:

```
Router(config)# int xx
Router(config-if)# ip wccp redirect exclude in
Router(config-if)# end
```

## Enabling Reception of Multicast Packets

Benefits of using a multicast address include reduced WCCP protocol traffic and the ability to easily add and remove caches and routers from a service group without having to reconfigure all service group members. You (optionally) set up a multicast group address in "Configuring a Global Multicast Group Address". In the following procedure, you enable the reception of the pre-defined IP multicast packets to routers that are members of the group.

Multicast addresses fall within the range 224.0.0.0 to 239.255.255.255.

Use the following syntax to configure for multicast discovery of the cache(s).

```
ip wccp {web-cache | service-number} group-listen
```

The following example configures the router to use the WCCP 36 service group to redirect port 80 destination traffic. WCCP protocol traffic uses multicast address 225.1.1.1.

Adapter interface "Ethernet 0" is used to receive the multicast WCCP traffic.

```
Router(config)# ip wccp 36 group-address 225.1.1.1
Router(config)# interface ethernet 0
Router(config-if)# ip wccp web-cache group-listen
Router(config-if)# end
```

## Saving and Viewing Changes

Once you have made all the changes, you must permanently save them to disk. If not, the changes are lost at the next reboot of the router.

### To save router configuration:

```
Router# write memory
```

### To display all current WCCP configuration settings:

Use the following syntax to verify the settings in the new router configuration and to ensure that the appropriate cache engines are visible to the router.

```
show ip wccp {web-cache | service-number} [view | detail]
```

where

view	(Optional) Lists all members of the identified service group and whether they have been detected.
detail	(Optional) Displays IP and protocol version information about the router. Displays IP, protocol version, state, initial and assigned hash, hash allotment, redirected packet, and connection time information about the associated cache engine (SG appliance).

For example:

```
Router# show ip wccp web-cache view
```

```
Global WCCP Information:
Service Name: web-cache:
Number of Cache Engines:1
Number of Routers:1
Total Packets Redirected:186
Redirect Access-list:120
Total Packets Denied Redirect:57
Total Packets Unassigned:-none-
Group Access-list:0
Total Messaged Denied to Group:0
Total Authentication Failures:0
```

```
WCCP Router Informed of:
 86.135.77.10
186.135.77.20
```

```
WCCP Cache Engines Visible:
```

```
186.135.77.11
186.135.77.12
```

```
WCCP Cache Engines Not Visible:
-none-
```

## Examples

This section provides detailed examples of both the router and SG configurations for:

- ❑ Standard HTTP redirection
- ❑ Standard HTTP redirection and a multicast address
- ❑ Standard HTTP redirection and a security password
- ❑ Standard transparent FTP
- ❑ A service group and alternate hashing

For information and examples about using WCCP, refer to [http://www.cisco.com/univercd/cc/td/doc/product/software/ios121/121cgcr/fun\\_r/frprt3/frd3005.htm](http://www.cisco.com/univercd/cc/td/doc/product/software/ios121/121cgcr/fun_r/frprt3/frd3005.htm).

## Displaying the Router's Known Caches

Use the router `show` command to display information about the appliances that are known to the router.

```
Router# show ip wccp web-caches
WCCP Web-Cache information:
IP Address:192.168.51.102
Protocol Version:0.3
State:Usable
Initial Hash
Info:FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF
FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF
Assigned Hash:
Info:FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF
FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF
Hash Allotment:256 (100.00%)
Packets Redirected:0
Connect Time:00:00:31
Router# exit
```

## Standard HTTP Redirection

The web-cache service group enables HTTP traffic redirection on port 80.

### Router Configuration

The following example enables standard HTTP traffic redirection on a WCCP version 2-capable Cisco router.

```
Router(config)# ip wccp web-cache
Router(config)# interface ethernet 0/0
Router(config-if)# ip wccp web-cache redirect out
Router(config-if)# end
```



## SG Configuration

To enable the Web-cache service group within the SG appliance, the following configuration file could be loaded.

```
Enable WCCP to allow WCCP protocol communication between
the ProxySG Appliance and the home router.
wccp enable
By default, the WCCP version 2 protocol is assumed. An
explicit "wccp version 2" command could be specified here.
service-group web-cache
Specify the address for the router.
home-router 90.0.0.90
Network interface 0 will participate.
interface 0
end
```

## *Standard HTTP Redirection and a Multicast Address*

Configuring a multicast address on a WCCP-capable router provides reduced WCCP protocol traffic and the ability to easily add and remove caches and routers from a service group without having to reconfigure all service group members.

## Router Configuration

The following example enables the standard HTTP traffic redirection on a WCCP version 2-capable Cisco router. In this case, WCCP protocol traffic is directed to the multicast address 226.1.1.1.

```
Router(config)# ip wccp web-cache group-address 226.1.1.1
Router(config)# interface ethernet 0/0
Router(config-if)# ip wccp web-cache group-listen
Router(config-if)# ip wccp web-cache redirect out
Router(config-if)# end
```

## SG Configuration

To enable the standard Web-cache service group within the SG appliance, the following configuration file should be loaded. In this example, both network interfaces 0 and 1 participate within the service group. Both interfaces send and receive WCCP protocol packets by way of the multicast address.

```
Enable WCCP to allow WCCP protocol communication between
the ProxySG Appliance and the home router.
wccp enable
By default, the WCCP version 2 protocol is assumed. An
explicit "wccp version 2" command could be specified here.
service-group web-cache
Specify the multicast address.
home-router 239.192.5.3
Network interface 0 will participate.
interface 0
Network interface 1 will also participate.
interface 1
end
```

## *Standard HTTP Redirection Using a Security Password*

A simple eight-character password is configured within the router. This password must match the password configured within the SG appliance.

## Router Configuration

The following example enables standard HTTP traffic redirection on a WCCP version 2-capable Cisco router.

```
Router(config)# ip wccp web-cache password 29gy8c2
Router(config)# interface ethernet 0
Router(config-if)# ip wccp web-cache redirect out
Router(config-if)# end
```

## SG Configuration

To enable the standard WCCP version 2 service group within the SG appliance, the following configuration file could be loaded.

```
Enable WCCP to allow WCCP protocol communication between
the ProxySG Appliance and the home router.
wccp enable
By default, the WCCP version 2 protocol is assumed. An
explicit "wccp version 2" command could be specified
here.
service-group web-cache
Specify the address for the router.
home-router 90.0.0.90
Network interface 0 will participate.
interface 0
password 29gy8c2
end
```

## Standard Transparent FTP

In WCCP version 1, only HTTP traffic on port 80 could be redirected. In WCCP version 2, you can create a numbered service group that redirects other protocols on other ports.

You set the service group on the router, and tell the SG appliance which ports should be redirected.

## Router Configuration

In this configuration, you create a new service group that you are dedicating to FTP redirects.

```
Enables the service group that redirects ports besides 80.
Router(config)# ip wccp 10
Enables a service group that allows user-defined
ports to be redirected.
Router(config)# int e0
Router(config-if)# ip wccp 10 redirect out
```

## SG Configuration

In this configuration, you take the service group created by the router and assign the characteristics to the group.

```
SGOS#(config) inline wccp eof
wccp enable
service-group 10
interface 0
home-router 10.1.1.1
protocol 6
```

```
priority 1
service-flags ports-defined
service-flags destination-port-hash
ports 20 21 80 80 80 80 80 80
eof
```

## Reverse Proxy Service Group

This service group redirects IP packets for TCP destination port 80 traffic by hashing the source IP address.

### Router Configuration

The following example enables the special SG service group on a WCCP-capable router.

```
Router(config)# ip wccp 99
Router(config)# interface ethernet 0/0
Router(config-if)# ip wccp 99 redirect out
Router(config-if)# end
```

### SG Configuration

To configure the special SG service group on the appliance, a dynamic service group must be created as illustrated by the following example.

```
Enable WCCP to allow WCCP protocol communication between
the ProxySG Appliance and the home router.
wccp enable
By default, the WCCP version 2 protocol is assumed. An
explicit "wccp version 2" command could be specified here.
Service Group 99 is specially identified within the router
as representing the ProxySG Appliance service.
service-group 99
Specify the address for the router.
home-router 90.0.0.90
Network interface 0 will participate.
interface 0
Specify the TCP protocol.
protocol 6
The hash should be based on the source IP address.
service-flags source-ip-hash
end
```

## Service Group with Alternate Hashing

You can create a special service group on a WCCP-capable router that uses alternate hashing when hot spots are detected. This service group redirects IP packets by hashing the source IP address.

### Router Configuration

In this configuration, you create a new service group that you are dedicating to Website hot spots.

```
Router(config)# ip wccp 5
Router(config)# interface ethernet 0/0
Router(config-if)# ip wccp 5 redirect out
Router(config-if)# end
```

## SG Configuration

To configure this special service group on the SG appliance, a dynamic service group must be created.

```
Enable WCCP to allow WCCP protocol communication between
the ProxySG Appliance and the home router.
wccp enable
By default, the WCCP version 2 protocol is assumed. An
explicit "wccp version 2" command could be specified here.
Service Group 5 is created to redirect standard HTTP
traffic and use an alternate hash function based on the
source IP address, if necessary.
service-group 5
Specify the address for router 1.
home-router 90.0.0.90
Specify the address for router 2.
home-router 90.0.1.5
Network interface 0 will participate.
interface 0
Specify the TCP protocol.
protocol 6
The following two flags specify that a hash function based
on the destination IP address should be applied first. If
a hot-spot is detected, then an alternate hash
function using the source IP address should be used.
service-flags destination-ip-hash
service-flags source-ip-alternate-hash
end
```

## Troubleshooting: Home Router

If you install WCCP settings and then later upgrade the Cisco IOS software or change network configuration by adding a device with a higher IP address, the change might result in a different home router IP assignment. WCCP might or might not work under these conditions, and performance might decrease. If you upgrade the router software or change the network configuration, verify that the actual home router IP address and home router IP address in the WCCP configuration match.

**To verify the home router IP address matches the home router IP address listed in the WCCP configuration:**

1. From the router CLI, view the WCCP configuration:

```
Router#(config) show ip wccp
```

The home router information appears, similar to the example below:

```
Global WCCP information:
Router information:
Home router Identifier:195.200.10.230
Protocol Version:2.0
```

2. From the Blue Coat SG appliance, verify that the home router IP address specified in the SG WCCP configuration file is the same as the actual home router IP address discovered through the router CLI command. The following is an SG WCCP configuration file showing the same home router IP as in the example above:

```
SGOS# show wccp config
;WCCP Settings
;Version 1.3
wccp enable
wccp version 2
service-group web-cache
interface 1
home-router 195.200.10.230
end
```

In this case, the two home router identifiers match.

### *Identifying a Home Router/Router ID Mismatch*

The following is some helpful information for resolving a home-router/Router ID mismatch that results in the router crashing the SG appliance. This situation can occur when the router interface is set to a higher IP address than the home-router and WCCP messages show w/bad rcv\_id.

WCCP version 1 does not care what home router the cache had configured. So if you upgrade from WCCP version 1 to WCCP version 2, the router might pick a different IP address than was configured as a home router in the cache.

This means that a mismatch can occur after an upgrade.

### **SG Configuration**

Use the `show wccp statistics` command to identify the configured home router and the highest router IP.

```
SGOS#(config) show wccp statistics
Service Group ident. :512,1,9, 1,6,18,
1755,554,20,21,80,80,80
Home Routers :10.2.3.224 <<=====Configured Home Router IP
Hotspots announced :0
Assignment state :idle
Designated Cache :10.2.3.228 <<=====Blue Coat IP
Announcement key # :2
Cache view change # :13 <<===== # times cache view changed
Router View Changed :0
Recent hit count :0
Primary hit count :0
Alternate hit count :0
Instance IP address :10.2.3.228 <<=====Blue Coat IP
Sequence info :10.2.3.231,636
Query response info:
Active :1
Primary hash weight :0
Hotspot information :0,0,0,0
Total assign weight :0
Router IP address :10.2.3.231 <<=====Router ID/Highest IP on
Router
Receive # :636
Change # :4
Activation time :Wed, Jan 30 2002 00:17:58 UTC
Last I-See-You time :Wed, Jan 30 2002 01:08:58 UTC
```

```
Active caches :10.2.3.228
Assignment key :10.2.3.228,2
Router state :active
Cache :10.2.3.228,L,D
Active :1
```

Notice that .231 is highest IP on router and is automatically selected as the home router, even though .224 is the configured home router IP.

You can also use the `show wccp configuration` command if you already know the highest IP and just want to know what the SG appliance identifies as the home-router.

```
SGOS#(config) show wccp configuration
;WCCP Settings
;Version 1.3
wccp enable
wccp version 2
service-group 9
interface 0
home-router 10.2.3.224
protocol 6
priority 1
service-flags ports-defined
service-flags destination-ip-hash
ports 1755 554 20 21 80 80 80 80
```

## Router Configuration

The configuration below reveals that two interfaces are active on the router, and that one of the IP addresses is higher than the home router configured in the SG configuration file. The higher IP address takes over duties as the home router, causing a mismatch between the router and the SG appliance.

```
Router# show conf
Using 689 out of 129016 bytes
version 12.1
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
hostname NachoL3
enable secret 5 1r6nJ$dr58AZ.ZDg6RKA6MYeGRb.
enable password nacho

ip subnet-zero
no ip routing
ip wccp 9

interface FastEthernet0/0
ip address 10.2.3.224 255.255.255.0
ip wccp 9 redirect out
no ip route-cache
no ip mroute-cache
speed 100
half-duplex
!
interface FastEthernet0/1
ip address 10.2.3.231 255.255.255.0
no ip route-cache
no ip mroute-cache
speed 100
half-duplex
```

## *Correcting a Home Router Mismatch*

The home router must have the same IP address on both the router and the SG appliance. Every time a higher IP address is introduced to the router, the higher address becomes the home router.

On a WCCP router, the `Router Identifier` parameter is dynamically assigned. It cannot be manually configured.

### **To set the correct home router IP address on the SG appliance:**

You cannot edit a WCCP configuration file created by the SGOS inline commands. You must recreate the configuration file. For more information on creating a WCCP configuration file using CLI commands on an SG appliance, see [“Creating a Configuration File using CLI Inline Commands” on page 247](#).

If you created a text file and downloaded it, you can edit the file and then download it again to the SG appliance. For more information for editing the WCCP text file and downloading it, see [“Creating a Configuration File using a Text File” on page 247](#).





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