CHAPTER 4

Configuring SSL Initiation

Note The information in this chapter applies to both the ACE module and the ACE appliance unless otherwise noted. The features in this chapter apply to IPv4 and IPv6 unless otherwise noted.

This chapter describes how to configure a context on the Cisco ACE Application Control Engine as an SSL client for SSL initiation.

This chapter contains the following major sections:

Note To verify that the SSL connection from a server to the ACE was properly initiated, you can monitor the handshake counters in the **show stats crypto client** command output (see Chapter 6, Displaying SSL Information and Statistics). The handshake counters increment for successful connections. For example, the SSLv3 Full Handshakes counter indicates that the handshake completed successfully and the SSLv3 Resumed Handshakes counter indicates that the handshake resumed successfully by using a session ID. When traffic is flowing, those numbers should increment. If there are failures, then the alerts sent and received counters should also increment.

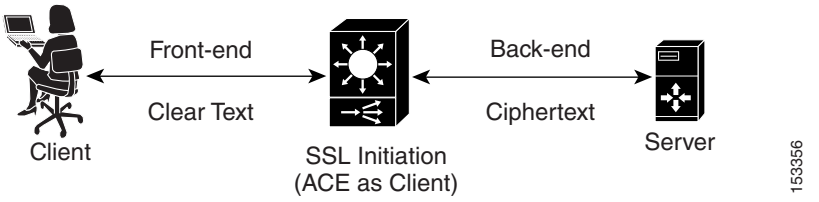
SSL Initiation Overview

SSL initiation occurs when an ACE, acting as an SSL proxy client, initiates and maintains an SSL connection between itself and an SSL server. In this particular application, the ACE receives clear text from an HTTP client, and encrypts and transmits the data as ciphertext to the SSL server. On the reverse side, the ACE decrypts the ciphertext that it receives from the SSL server and sends the data to the client as clear text.

Figure 4-1 shows the following network connections in which the ACE initiates the SSL connection with the SSL server:

- Client to ACE—HTTP connection between the ACE and the client
- ACE to server—SSL connection between a server and the ACE acting as an SSL proxy client

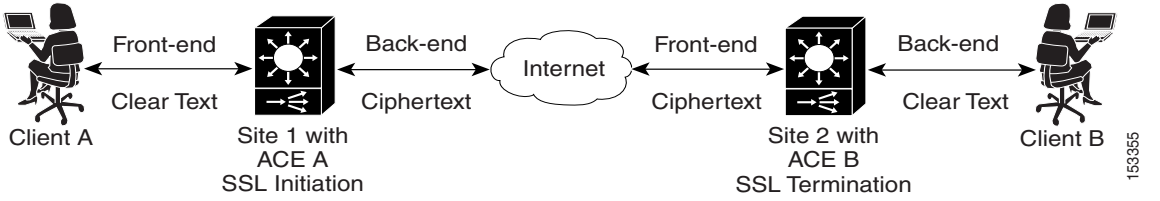
Figure 4-1 SSL Initiation with an SSL Server



SSL initiation allows you to send clear text between devices within a site for maximum speed, while sending ciphertext through the Internet between sites or to an SSL server for maximum security. For each SSL server or ACE (acting as an SSL proxy server) to which you want to establish an SSL connection from a clear text connection, you must configure an SSL initiation policy service on the ACE that maps to that SSL server or other ACE.

Figure 4-2 shows an SSL initiation flow with another ACE configured for SSL termination. In this case, ACE B acts as a virtual front-end SSL server.

Figure 4-2 SSL Initiation with a Second ACE Running SSL Termination

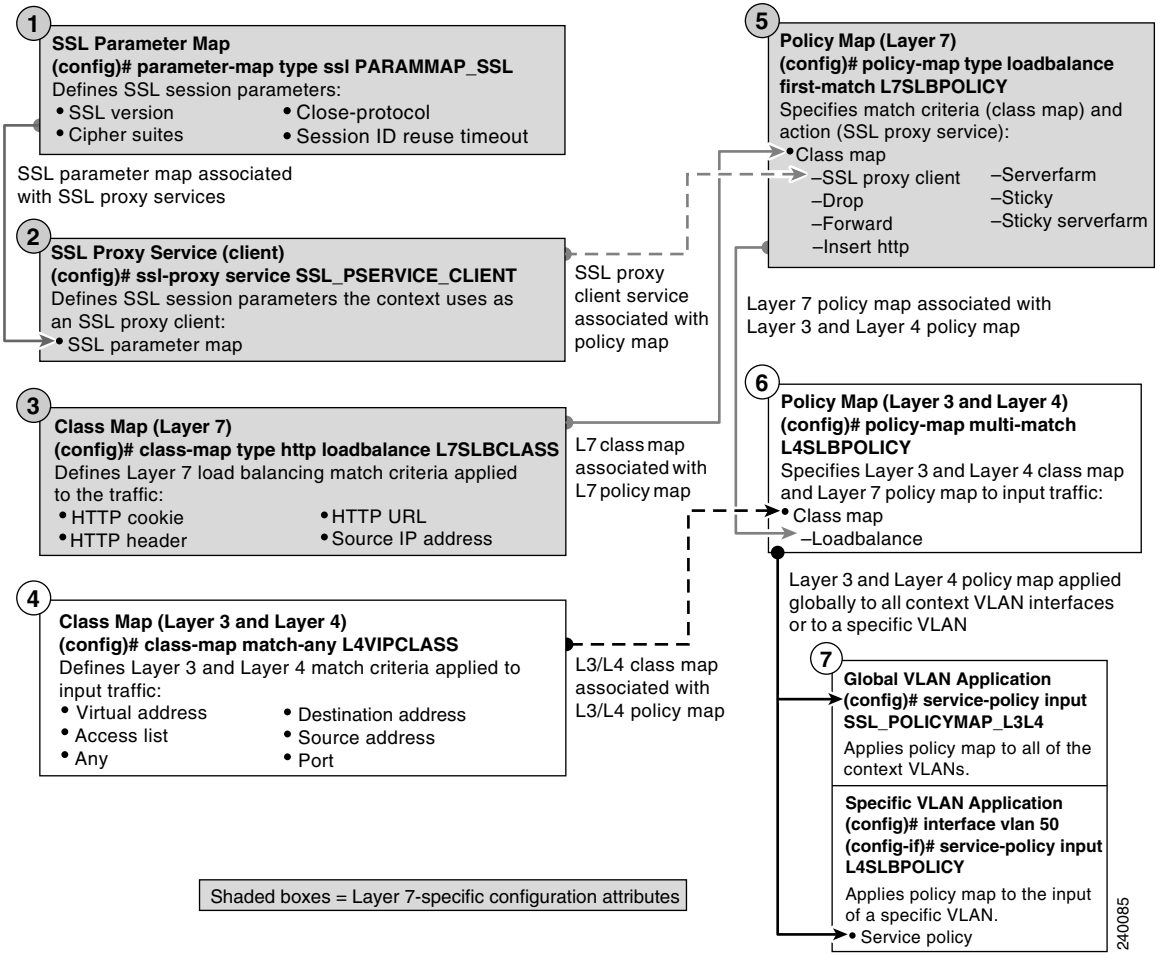


The ACE uses a combination of parameter maps, SSL proxy services, and class maps to build the policy maps that determine the flow of information among the client, the ACE, and the SSL server. For SSL initiation, you configure the ACE so that it is recognized as an SSL client by an SSL server. To accomplish this, you configure the following policy map types:

- Layer 7 policy map—This policy map contains an association with a Layer 7 class map and an SSL proxy client service. The class map acts as a traffic filter and looks for traffic that matches the server load-balancing (SLB) criteria that you specify. For SSL initiation, the match criteria is in the form of HTTP load-balancing attributes, such as an HTTP cookie or URL. The SSL proxy client service defines the SSL parameters that the ACE uses during the handshake and subsequent SSL session.
- Layer 3 and Layer 4 policy map—You associate the Layer 7 policy map with a Layer 3 and Layer 4 policy map. The ACE applies the Layer 3 and Layer 4 policy map to the context traffic first to determine if the traffic contains specific Layer 3 and Layer 4 match criteria, such as a particular destination, source, or virtual IP address. You specify the match criteria in the Layer 3 and Layer 4 class map that you create and associate with this policy map. When a match is found, the ACE applies the associated Layer 7 policy map to the traffic.

Figure 4-3 provides a basic overview of the process required to build and apply the two types of policy maps that the ACE uses for SSL initiation. The figure also shows how you associate the various components of the policy map configurations with each other.

Figure 4-3 Basic SSL Initiation Configuration Flow Diagram



ACE SSL Initiation Configuration Prerequisites

Before configuring your ACE for SSL operation, you must first configure it for server load balancing (SLB). During the SLB configuration process, you create the following configuration objects:

- Layer 7 class map
- Layer 3 and Layer 4 class map
- Layer 7 policy map
- Layer 3 and Layer 4 policy map

After configuring SLB, modify the existing SLB class maps and policy maps with the SSL configuration requirements described in this guide for SSL initiation.

To configure your ACE for SLB, see the *Server Load-Balancing Guide, Cisco ACE Application Control Engine*.

SSL Initiation Configuration Quick Start

Figure 4-1 provides a quick overview of the steps required to configure the ACE for SSL initiation. Each step includes the CLI command or a reference to the procedure required to complete the task. For a complete description of each feature and all the options associated with the CLI commands, see the sections following Table 4-1.

Note The following quick start does not include the procedures for creating a parameter map as shown in Figure 4-3. The ACE uses the default parameter map settings as described in Table 4-2.

Table 4-1 SSL Initiation Configuration Quick Start

Task and Command Example

1. If you are operating in multiple contexts, observe the CLI prompt to verify that you are operating in the desired context. If necessary, log directly in to, or change to, the correct context.
 	
`host1/Admin# changeto C1`
`host1/C1#`
 	
The rest of the examples in this table use the Admin context. For details on creating contexts, see the *Virtualization Guide, Cisco ACE Application Control Engine*.

2. Enter configuration mode.
 	
`host1/Admin# config`
`host1/Admin(config)#`

3. Create an SSL proxy client service to associate with the Layer 7 policy map. For the purposes of this Quick Start, you do not define any parameters of the proxy client service; associating this generic proxy client service with the policy map is all that is required to configure the ACE to perform as an SSL client.
 	
`host1/Admin(config)# ssl-proxy service SSL_PSERVICE_CLIENT`
`host1/Admin(config-ssl-proxy)# exit`

4. Create a Layer 7 class map and configure it with the required load-balancing match criteria.
 	
`host1/Admin(config)# class-map type http loadbalance L7SLBCLASS`
`host1/Admin(config-cmap-http-lb)# match url XYZ.ORG`
`host1/Admin(config-cmap-http-lb)# exit`
`host1/Admin(config)#`

Table 4-1 SSL Initiation Configuration Quick Start (continued)

Task and Command Example

5. Create a Layer 3 and Layer 4 class map and configure it with the required input traffic match criteria.
`host1/Admin(config)# class-map match-any L4VIPCLASS`
`host1/Admin(config-cmap)# match virtual-address 2001:DB8:1::2/64`
or
`host1/Admin(config-cmap)# match virtual-address 192.168.12.2 255.255.255.0`
`host1/Admin(config-cmap)# exit`
`host1/Admin(config)#`

6. Create a Layer 7 policy map and associate the Layer 7 class map created in Step 4 with it.
`host1/Admin(config)# policy-map type loadbalance first-match L7SLBPOLICY`
`host1/Admin(config-pmap-lb)# class L7SLBCLASS`
`host1/Admin(config-pmap-lb-c)#`

7. Associate the SSL proxy client service created in Step 3 with the Layer 7 policy map.
`host1/Admin(config-pmap-lb-c)# ssl-proxy client SSL_PSERVICE_CLIENT`
`host1/Admin(config-pmap-lb-c)# exit`
`host1/Admin(config-pmap-lb)# exit`
`host1/Admin(config)#`

8. Create a Layer 3 and Layer 4 policy map and associate the Layer 3 and Layer 4 class map created in Step 5 with it.
`host1/Admin(config)# policy-map multi-match L4SLBPOLICY`
`host1/Admin(config-pmap)# class CLASSMAP_L3`
`host1/Admin(config-pmap-c)#`

9. Associate the load-balancing Layer 7 policy map created in Step 6 with the Layer 3 and Layer 4 policy map.
`host1/Admin(config-pmap-c)# loadbalance L7SLBPOLICY`
`host1/Admin(config-pmap-c)# exit`
`host1/Admin(config-pmap)# exit`
`host1/Admin(config)#`

Table 4-1 SSL Initiation Configuration Quick Start (continued)

Task and Command Example

10. Apply the Layer 3 and Layer 4 policy map to the input traffic of the desired interface as follows:
 	
Apply the policy map globally to all VLANs in the context.
 	
`host1/Admin(config)# service-policy input L4SLBPOLICY`
 	
Apply the policy map to a specific VLAN within the context.
 	
`host1/Admin(config)# interface vlan 50`
`host1/Admin(config-if)# service-policy input L4SLBPOLICY`

11. Display the running configuration to verify that the information that you just added is configured properly. `host1/Admin(config-if)# do show running-config`
12. (Optional) Save the configuration changes to flash memory by copying the running configuration to the startup configuration. `host1/Admin(config-if)# do copy running-config startup-config`

Creating and Defining an SSL Parameter Map

An SSL parameter map defines the SSL session parameters that the ACE applies to an SSL proxy service. Creating an SSL parameter map allows you to apply the same SSL session parameters to different proxy services. Table 4-2 describes each SSL session parameter with its default value.

Table 4-2 SSL Session Parameters of an SSL Parameter Map

SSL Session Parameter	Description	Default Value/Behavior
Cipher suites	Defines the cipher suites that the ACE supports during the SSL handshake (see Table 4-3 for a list of available cipher suites the ACE supports)	The ACE supports all of the available cipher suites
Authentication-failure ignore	Enables the ACE to ignore expired or invalid server certificates and to continue setting up the back-end connection in an SSL initiation configuration.	The ACE terminates the SSL handshake when a certificate failure is encountered.
CDP-errors ignore	When the **crl best-effort** command is configured on the ACE, this parameter allows the ACE to ignore authentication failures due to CDP errors.	Disabled
Close-protocol	Defines how the ACE executes close-notify messages	**none**—The ACE sends a close notify alert message to the client/server when closing a session but has no expectation of receiving one back from the client/server
Purpose-check disabled	When this command is configured, this parameter disables the ACE from performing purpose checking on certificates during authentication.	Enabled

Table 4-2 SSL Session Parameters of an SSL Parameter Map (continued)

SSL Session Parameter	Description	Default Value/Behavior
Rehandshake	Enables rehandshake, allowing the ACE to send an SSL HelloRequest message to its peer to restart SSL handshake negotiation	Disabled
Version	Defines the SSL and TLS versions that the ACE supports during the SSL handshake	The ACE supports versions SSL3 and TLS1
Session cache timeout	Defines the amount of time that the SSL session ID remains valid before the ACE requires a new SSL handshake to establish a new SSL session	Disabled
Expired CRL	Defines whether the ACE rejects all incoming client certificates if the CRL is expired.	Disabled

Note If you want an SSL proxy service to use the default values for the SSL session parameters, you do not need to create an SSL parameter map or associate one with the proxy service. When you do not associate a parameter map with the SSL proxy service, the ACE automatically applies the default values for the session parameters listed in Table 4-2 to the proxy service.

The parameter map SSL configuration mode includes the **queue-delay timeout** command. The queue delay applies only to encrypted data that the ACE sends to the client. For this reason, this timer has no effect on SSL initiation connections handled by the ACE.

You can create an SSL parameter map by using the **parameter-map type ssl** command in configuration mode.

The syntax of this command is as follows:

parameter-map type ssl *parammap_name*

The *parammap_name* argument is the name of the SSL parameter map. Enter an unquoted alphanumeric string with no spaces and a maximum of 64 characters.

For example, to create the SSL parameter map PARAMMAP_SSL, enter:

```
host1/Admin(config)# parameter-map type ssl PARAMMAP_SSL
```

After you create an SSL proxy parameter map, the CLI enters parameter map SSL configuration mode.

```
host1/Admin(config-parammap-ssl)#
```

If you exit out of the parameter map SSL configuration mode without defining any of its SSL session parameters, the ACE configures the parameter map with the default values listed in Table 4-2.

To delete an existing SSL parameter map, enter:

```
host1/Admin(config)# no parameter-map type ssl PARAMMAP_SSL
```

This section contains the following topics:

- Defining a Description of the SSL Parameter Map
- Adding a Cipher Suite
- Ignoring Expired or Invalid Server Certificates
- Configuring the ACE to Ignore Authentication Failures Due to CDP Errors
- Defining the Close-Protocol Behavior
- Disabling Purpose Checking on the Certificates
- Enabling SSL Session Rehandshake
- Defining the SSL and TLS Versions
- Configuring the SSL Session Cache Timeout
- Rejecting Expired CRL Server Certificates

Defining a Description of the SSL Parameter Map

You can provide a brief summary of the SSL parameter map by using the **description** command in SSL parameter map configuration mode. The syntax of this command is as follows:

description *text*

For the *text* argument, enter an unquoted text string with a maximum of 240 alphanumeric characters including spaces.

For example, to specify a description of an SSL parameter map, enter the following command:

```
host1/Admin(config)# parameter-map type ssl PARAMMAP_SSL
host1/Admin(config-parammap-conn)# description SSL parameter map
```

To remove the description from the SSL parameter map, enter:

```
host1/Admin(config-parammap-conn)# no description
```

Adding a Cipher Suite

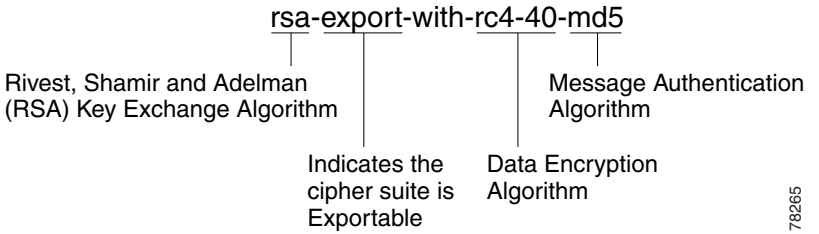
The SSL protocol supports a variety of different cryptographic algorithms, or ciphers, for use in operations such as the following:

- Authenticating the server and client to each other
- Transmitting certificates
- Establishing session keys

Clients and servers may support different cipher suites, or sets of ciphers, depending on various factors, such as the version of SSL that they support, company policies regarding acceptable encryption strength, and government restrictions on export of SSL-enabled software. Among its other functions, the SSL handshake protocol determines how the server and client negotiate which cipher suite they will use to authenticate each other, transmit certificates, and establish session keys.

As shown in Figure 4-4, a cipher suite consists of the following three algorithms: key exchange algorithm, data encryption algorithm, and message authentication (hash) algorithm.

Figure 4-4 Cipher Suite Algorithms



Note Exportable cipher suites are those cipher suites that are not as strong as some of the other cipher suites (for example, 3DES or RC4 with 128-bit encryption) as defined by U.S. export restrictions on software products. Exportable cipher suites may be exported to most countries from the United States and provide the strongest encryption available for exportable products.

You can define each of the cipher suites that you want the ACE to support during a secure session by using the **cipher** command in ssl parameter-map configuration mode. The cipher suite that you choose depends on your environment and security requirements and must correlate to the certificates and keys that you have loaded on the ACE.

Note By default, the ACE supports all of the cipher suites listed in Table 4-3. The default setting works only when you do not configure the SSL parameter map with any specific ciphers. To return to using the all cipher suites setting, you must delete each specifically defined cipher from the parameter map by using the **no** form of the command.

The syntax of this command is as follows:

cipher *cipher_name* [**priority** *cipher_priority*]

The keywords and arguments are as follows:

- *cipher_name*—Name of the cipher suite that you want the ACE to support. Table 4-3 lists the cipher suites that the ACE supports. Enter one of the supported cipher suites from the table.
- **priority**—Assigns a priority level to the cipher suite. The priority level represents the preference ranking of the cipher suite, with 10 being the most preferred and 1 being the least preferred. By default, all configured cipher suites have a priority level of 1. When negotiating which cipher suite to use, the ACE selects from the client list based on the cipher suite configured with the highest priority level. A higher priority level will bias towards the specified cipher suite. For SSL termination applications, the ACE uses the priority level to match cipher suites in the client's ClientHello handshake message. For SSL initiation applications, the priority level represents the order in which the ACE places the cipher suites in its ClientHello handshake message to the server.
- *cipher_priority*—Priority level of the cipher suite. Enter a value of 1 to 10. The default priority value is 1.

For example, to add the cipher suite rsa_with_aes_128_cbc_sha and assign it a priority 2 level, enter:

```
host1/Admin(config)# parameter-map type ssl PARAMMAP_SSL
host1/Admin(config-parammap-ssl)# cipher rsa_with_aes_128_cbc_sha
priority 2
```

Repeat the **cipher** command for each cipher suite that you want to include in the SSL parameter map.

To delete a cipher suite from the SSL parameter map, enter:

```
host1/Admin(config-parammap-ssl)# no cipher rsa_with_aes_128_cbc_sha
```

Table 4-3 lists the available cipher suites that the ACE supports and indicates which of the supported cipher suites are exportable from the ACE. The table also lists the authentication certificate and encryption key required by each cipher suite.

If you use the default setting in which the ACE supports all of the ciphers suites listed in Table 4-3, the ACE sends the cipher suites to its peer in the same order as they appear in the table, starting with RSA_WITH_RC4_128_MD5.

Caution Cipher suites with "export" in the title indicate that they are intended for use outside of the domestic United States and have encryption algorithms with limited key sizes.

Table 4-3 SSL Cipher Suites Supported by the ACE

Cipher Suite	Exportable	Authentication Certificate Used	Key Exchange Algorithm Used
RSA_WITH_RC4_128_MD5	No	RSA certificate	RSA key exchange
RSA_WITH_RC4_128_SHA	No	RSA certificate	RSA key exchange
RSA_WITH_DES_CBC_SHA	No	RSA certificate	RSA key exchange
RSA_WITH_3DES_EDE_CBC_SHA	No	RSA certificate	RSA key exchange
RSA_EXPORT_WITH_RC4_40_MD5	Yes	RSA certificate	RSA key exchange
RSA_EXPORT_WITH_DES40_CBC_SHA	Yes	RSA certificate	RSA key exchange
RSA_EXPORT1024_WITH_RC4_56_MD5	Yes	RSA certificate	RSA key exchange
RSA_EXPORT1024_WITH_DES_CBC_SHA	Yes	RSA certificate	RSA key exchange
RSA_EXPORT1024_WITH_RC4_56_SHA	Yes	RSA certificate	RSA key exchange
RSA_WITH_AES_128_CBC_SHA	No	RSA certificate	RSA key exchange
RSA_WITH_AES_256_CBC_SHA	No	RSA certificate	RSA key exchange

Ignoring Expired or Invalid Server Certificates

You can enable the ACE to ignore expired or invalid server certificates and to continue setting up the back-end connection in an SSL initiation configuration by using the **authentication-failure ignore** command in parameter map SSL configuration mode. This command allows the ACE to ignore the following nonfatal errors with respect to server certificates:

- Certificate not yet valid
- Certificate has expired
- Unable to get issuer certificate
- Certificate revoked

The syntax of this command is as follows:

authentication-failure ignore

For example, to ignore expired or invalid server certificates, enter:

```
host1/Admin(config)# parameter-map type ssl SSL_PARAMMAP_SSL
host1/Admin(config-parammap-ssl)# authentication-failure ignore
```

To return to the default setting of disabled, use the **no** form of the command:

```
host1/Admin(config-parammap-ssl)# no authentication-failure ignore
```

Configuring the ACE to Ignore Authentication Failures Due to CDP Errors

By default, when you configure the **crl best-effort** command for server certificate revocation, if the ACE detects CRL distribution point (CDP) errors in the presented certificates or errors that occur during a CRL download, the ACE rejects the SSL connection.

The **cdp-errors ignore** command allows you to configure an SSL parameter map to ignore CDP or download errors when the **crl best-effort** command is configured. When you configure the **cdp-errors ignore** command, the ACE allows SSL connections if it detects CDP errors in the presented certificates or it could not download a valid certificate revocation list (CRL) from valid CDPs on the certificates.

The syntax for this command in parameter map SSL configuration mode is as follows:

cdp-errors ignore

For example, to configure the ACE to ignore CDP errors, enter:

```
host1/Admin(config)# parameter-map type ssl PARAMMAP_SSL
host1/Admin(config-parammap-ssl)# cdp-errors ignore
```

To reset the default behavior where the ACE rejects an SSL connection when CDP errors occur, use the **no** form of the **cdp-errors ignore** command. For example, enter:

```
host1/Admin(config-parammap-ssl)# no cdp-errors ignore
```

To display the number of times that the ACE ignored CDP errors in the presented SSL certificate and allowed the SSL connection, use the **show crypto cdp-errors** command. This command displays the output of the Best Effort CDP Errors Ignored field.

Defining the Close-Protocol Behavior

You can configure how the ACE handles the sending of close-notify messages by using the **close-protocol** command in the ssl parameter-map configuration mode.

The syntax for this command is as follows:

close-protocol {**disabled** | **none**}

The keywords are as follows:

- **disabled**—Specifies that the ACE does not send a close notify alert message to the client/server when closing a session with no expectation of receiving one back from the client/server.
- **none**—Specifies that the ACE sends a close notify alert message to the client/server when closing a session but has no expectation of receiving one back from the client/server.

For example, to set close-protocol to disabled, enter:

```
host1/Admin(config)# parameter-map type ssl PARAMMAP_SSL
host1/Admin(config-parammap-ssl)# close-protocol disabled
```

To configure the **close-protocol** command to the default setting to send a close notify alert message to the client/server, enter:

```
host1/Admin(config-parammap-ssl)# no close-protocol
```

Disabling Purpose Checking on the Certificates

By default, during server authentication of a chain of certificates, the ACE performs a purpose check on the basicContraint field for the following:

- The server certificate has a CA FALSE setting.
- The intermediate certificates have the CA TRUE setting.

If the field does not have these settings, the certificate fails authentication.

If you decide that it is unnecessary for the ACE to perform purpose checking during the authentication of the certificates, you can disable it by using the **purpose-check disabled** command in the parameter map SSL configuration mode.

The syntax of this command is as follows:

purpose-check disabled

For example, to disable purpose checking, enter:

```
host1/Admin(config)# parameter-map type ssl SSL_PARAMMAP_SSL
host1/Admin(config-parammap-ssl)# purpose-check disabled
```

To reenable the default setting of performing a purpose checking, use the **no** form of the command:

```
host1/Admin(config-parammap-ssl)# no purpose-check disabled
```

Enabling SSL Session Rehandshake

The SSL session rehandshake enables the ACE to send the SSL HelloRequest message to a client to restart SSL handshake negotiation. The rehandshake is useful when you want to ensure security by reestablishing the SSL session.

By default, SSL rehandshake is disabled. To enable the SSL session rehandshake function during a session, use the **rehandshake enable** command in the parameter map SSL configuration mode.

The syntax of this command is:

rehandshake enable

For example, to enable the SSL rehandshake function, enter:

```
host1/Admin(config)# parameter-map type ssl PARAMMAP_SSL
host1/Admin(config-parammap-ssl)# rehandshake enable
```

To disable the rehandshake function, enter:

```
host1/Admin(config-parammap-ssl)# no rehandshake enable
```

To display the status of the rehandshake enable command, use the **show parameter-map** command.

Defining the SSL and TLS Versions

You can specify the version of the security protocol that the ACE supports during the SSL handshake with its peer by using the **version** command in parameter map SSL configuration mode.

The syntax of this command is as follows:

version {**all** | **ssl3** | **tls1**}

The keywords are as follows:

- **all**—(Default) The ACE supports both SSL Version 3.0 and TLS Version 1.0.
- **ssl3**—The ACE supports only SSL Version 3.0.
- **tls1**—The ACE supports only TLS Version 1.0.

For example, to specify SSL Version 3.0 for the parameter map, enter:

```
host1/Admin(config)# parameter-map type ssl PARAMMAP_SSL
host1/Admin(config-parammap-ssl)# version ssl3
```

To remove a security protocol version from the SSL proxy parameter map, enter:

```
host1/Admin(config-parammap-ssl)# no version tls1
```

Configuring the SSL Session Cache Timeout

An SSL session ID is created every time that the client and the ACE perform a full SSL key exchange and establish a new master secret key. To quicken the SSL negotiation process between the client and the ACE, the SSL session ID reuse feature allows the ACE to reuse the secret key information in the session cache. On subsequent connections with the client, the ACE reuses the key stored in the cache from the last negotiated session.

By default, SSL session ID reuse is disabled on the ACE. You can enable session ID reuse by setting a session cache timeout value for the total amount of time that the SSL session ID remains valid before the ACE requires a full SSL handshake to establish a new session.

You can set the session cache timeout by using the **session-cache timeout** command in parameter map SSL configuration mode. The syntax of this command is as follows:

session-cache timeout *seconds*

The *seconds* argument is the time in seconds that the ACE reuses the key stored in cache before removing the session IDs. Enter an integer from 0 to 72000 (20 hours). By default, session ID reuse is disabled. A value of 0 causes the ACE to remove the session IDs from the cache when the cache is full and to implement the least-recently used (LRU) timeout policy.

For example, to set the session cache timeout to 600 seconds, enter:

```
host1/Admin(config-parammap-ssl)# session-cache timeout 600
```

To disable the timer and allow the SSL full handshake to occur for each new connection with the ACE, enter:

```
host1/Admin(config-parammap-ssl)# no session-cache timeout
```

To clear the session cache information for the context, use the **clear crypto session-cache** command. The syntax of this command is as follows:

clear crypto session-cache [**all**]

The **all** optional keyword clears all session cache information for all contexts. This option is available in the Admin context only.

Rejecting Expired CRL Server Certificates

When you configure Certificate Revocation Lists (CRLs) on the ACE for server authentication, as described in the "Using CRLs During Server Authentication" section, the CRLs contain an update field that specifies the date when a new version would be available. By default, the ACE does not use CRLs that contain an update field with an expired date and, thus, does not reject incoming server certificates using the CRL.

To configure the ACE to consider a server certificate as revoked when the CRL in use has expired, use the **expired-crl reject** command in parameter map SSL configuration mode. The syntax of this command is as follows:

expired-crl reject

For example, enter:

```
host1/Admin(config-parammap-ssl)# expired-crl reject
```

To reset the default behavior of the ACE of not considering a server certificate as revoked after the CRL in use has expired, enter:

```
host1/Admin(config-parammap-ssl)# no expired-crl reject
```

Creating and Defining an SSL Proxy Service

The SSL proxy service defines the SSL parameter map that the ACE uses during the SSL handshake. For SSL initiation, you configure the ACE with an SSL proxy *client* service because the ACE acts as an SSL client.

Note You do not need to import or associate keys and certificates in an SSL initiation configuration.

You can create an SSL proxy client service by using the **ssl-proxy service** command in configuration mode.

The syntax of this command is as follows:

ssl-proxy service *pservice_name*

The *pservice_name* argument is the name of the SSL proxy client service. Enter an unquoted alphanumeric string with no spaces and a maximum of 64 characters.

For example, to create the SSL proxy client service PSERVICE_CLIENT, enter:

```
host1/Admin(config)# ssl-proxy service PSERVICE_CLIENT
```

After you create an SSL proxy client service, the CLI enters into SSL proxy configuration mode.

```
host1/Admin(config-ssl-proxy)#
```

To delete an existing SSL proxy client service, enter:

```
host1/Admin(config)# no ssl-proxy PSERVICE_CLIENT
```

This section contains the following topics:

Associating an SSL Parameter Map with the SSL Proxy Client Service

You can associate an SSL parameter map with the SSL proxy client service by using the **ssl advanced-options** command in SSL proxy configuration mode.

The syntax of this command is as follows:

ssl advanced-options *parammap_name*

The *parammap_name* argument is the name of an existing SSL parameter map (see the "Creating and Defining an SSL Parameter Map" section). Enter an unquoted alphanumeric string with no spaces and a maximum of 64 characters.

For example, to associate the parameter map PARAMMAP_SSL with the SSL proxy service, enter:

```
host1/Admin(config)# ssl-proxy service PSERVICE_CLIENT
host1/Admin(config-ssl-proxy)# ssl advanced-options PARAMMAP_SSL
```

To remove the association of an SSL parameter map with the SSL proxy service, enter:

```
host1/Admin(config-ssl-proxy)# no ssl advanced-options PARAMMAP_SSL
```

Configuring an Authentication Group for Server Authentication

By default, server authentication is always enabled in an SSL initiation configuration. The server must send a certificate to the ACE. The ACE authenticates the certificate by verifying that it is a server certificate and that it has not expired. However, the ACE does not check that the certificate has been

signed by an approved CA. If the server certificate has expired, the ACE rejects the backend connection by sending a reset (RST) to the server. Otherwise, the ACE sets up the SSL connection with the server normally.

You can override this behavior by using the **authentication-failure ignore** command in parameter map SSL configuration mode. For details about this command, see the "Ignoring Expired or Invalid Server Certificates" section.

An authentication group consists of certificates that are trusted as certificate signers (see the "Configuring a Group of Certificates for Authentication" section in Chapter 2, Managing Certificates and Keys). When you assign an authentication group to an SSL-proxy server in an SSL initiation configuration, the ACE checks the server certificate with the certificates in the group, which includes checking the issuer and the signature of the server certificate.

To use an authentication group for server authentication on this SSL-proxy service, use the **authgroup** command in SSL proxy configuration mode. The syntax of the **authgroup** command is as follows:

authgroup *group_name*

The *group_name* argument is the name of an existing certificate authentication group. Enter an unquoted alphanumeric string with no spaces and a maximum of 64 characters.

Note When you enable server authentication, a significant performance decrease of the ACE may occur.

For example, to specify the certificate authentication group AUTH-CERT1, enter:

```
host1/Admin(config-ssl-proxy)# authgroup AUTH-CERT1
```

To delete a certificate authentication group from the SSL proxy service, enter:

```
host1/Admin(config-ssl-proxy)# no authgroup AUTH-CERT1
```

Using CRLs During Server Authentication

By default, the ACE does not use certificate revocation lists (CRLs) during server authentication. The ACE supports CRL downloads through HTTP or LDAP. You can configure the SSL proxy service to use a CRL in one of the following ways:

- The ACE can scan each server certificate for the service to determine if it contains a CRL Distribution Point (CDP) pointing to a CRL in the certificate extension and then retrieve the CRL from that location if the CDP is valid. If the CDP has an http:// or ldap:// based URL, it uses the URL to download the CRL to the ACE.
- You can manually configure the download location of the CRL from which the ACE retrieves it (see the "Configuring the Download Location for CRLs" section).

Note By default, the ACE does not reject server certificates when the CRL in use has passed its update date. To configure the ACE to reject certificates when the CRL is expired, use the **expired-crl reject** command. For more information, see the "Rejecting Expired CRL Server Certificates" section.

When attempting to download a CRL when best-effort CRLs are configured, the following apply:

- The ACE considers only the first four CDPs in the certificate or configured on the ACE. For the CDPs obtained from the certificate, the ACE only considers valid and complete CDPs for the downloading of the CRLs. If a CDP leads to the successful downloading of the CRL, ACE does not consider the subsequent CDPs for CRL downloads.
- If none of the first four CDPs are valid to proceed with the downloading of the CRL, the ACE considers the certificate as revoked unless you configured the **authentication-failure ignore** command in parameter map SSL configuration mode.
- If the ACE fails to download a CRL after trying four valid CDPs, the ACE aborts its initiated SSL connection unless you configured the **authentication-failure ignore** command in parameter map SSL configuration mode.

- If the ACE detects CDP errors in the presented certificates or errors that occur during a CRL download, the ACE rejects the SSL connection unless you configured the **cdp-errors ignore** command in parameter map SSL configuration mode
- The ACE skips malformed CDPs and processes subsequent CDPs. To display CDP error statistics including the number of malformed CDPs, use the **show crypto cdp-errors** command.

For detailed CRL download statistics, see the "Displaying CRL Information" section in Chapter 6, "Displaying SSL Information and Statistics."

You can determine which CRL information to use for server authentication by using the **crl** command in SSL proxy configuration mode. The syntax of this command is as follows:

crl {*crl_name* | **best-effort**}

The argument and keyword are as follows:

- *crl_name*—Name that you assigned to the CRL when you downloaded it with the configuration mode **crypto crl** command. See the "Configuring the Download Location for CRLs" section.
- **best-effort**—Specifies that the ACE scans each server certificate to determine if it contains a CDP pointing to a CRL in the certificate extension and then retrieves the CRLs from that location, if the CDP is valid.

For example, to enable the CRL1 CRL for server authentication on an SSL proxy service, enter the following command:

```
host1/Admin(config-ssl-proxy)# crl CRL1
```

To scan the client certificate for CRL information, enter:

```
host1/Admin(config-ssl-proxy)# crl best-effort
```

When the ACE accepts a server certificate in the downloaded CRL database, a successful SSL connection to an SSL real server increments the following **show stats crypto client** counters:

- Total SSL server authentications
- SSL static CRL lookups

When the ACE accepts a server certificate on a best-effort-CRL-enabled connection and the certificate is not found in the downloaded CRL database, a successful SSL connection to an SSL real server increments the following **show stats crypto client** counters:

- Total SSL server authentications
- SSL best effort CRL lookups

After the certificate is validated and cached in the ACE, subsequent SSL connections without session reuse to the same SSL server increments the following **show stats crypto client** counters:

- Total SSL server authentications
- SSL best effort CRL lookups
- SSL CRL lookup cache hits
- SSL authentication cache hits

If a valid non-expired CRL is cached in the ACE, no CRL lookups are performed and the following **show stats crypto client** counters will not increment together by the same connection:

- SSL best effort CRL lookups
- SSL CRL lookup cache hits

When the SSL connection to the SSL real server fails because of a revoked server certificate, the following **show stats crypto client** counters increment:

- SSL alert CERTIFICATE_REVOKED sent
- Total SSL server authentications
- Failed SSL server authentications
- SSL best effort CRL lookups or SSL static CRL lookups

To disable the use of a downloaded CRL during server authentication, enter the following command:

```
host1/Admin(config-ssl-proxy)# no crl CRL1
```

To disable the use of server certificates for CRL information during server authentication, enter the following command:

```
host1/Admin(config-ssl-proxy)# no crl best-effort
```

Configuring the Download Location for CRLs

You can configure the load location that the ACE uses to download the CRL on the SSL proxy service for server authentication. If the service is not configured on a policy map or the policy map is not active, the ACE does not download the CRL. The ACE downloads the CRL under the following conditions:

- When you first configure the CRL and apply it to an active Layer 4 policy map as an action (see the "Associating an SSL Proxy Server Service with the Policy Map" section in Chapter 3, "Configuring SSL Termination").
- When you reload the ACE.
- When the NextUpdate arrives, as provided within the CRL itself, the ACE reads this information and updates the CRL based on it. The ACE downloads the updated CRL upon the next server authentication request.

You can configure a maximum of eight CRLs per context. After you configure the CRL, assign it to an SSL proxy service for server authentication (see the "Using CRLs During Server Authentication" section).

The ACE translates the hostnames within the CRLs to IP addresses using a Domain Name System (DNS) client that you configure. For details about configuring a DNS client, see the "Configuring a DNS Client" section.

To configure a downloaded CRL, use the **crypto crl** command in configuration mode. The syntax of this command is as follows:

crypto crl *crl_name url*

The arguments are as follows:

- *crl_name*—Name that you want to assign to the CRL. Enter an unquoted alphanumeric string with a maximum of 64 characters.
- *url*—URL where the ACE retrieves the CRL; the CDP. Enter the URL full path including the CRL filename in an unquoted alphanumeric string with a maximum of 255 characters.Both HTTP and LDAP URLs are supported. Start the URL with the http:// prefix or the ldap:// prefix.

  The ldap:/// prefix is not considered a valid LDAP CRL link in the CDP portion of the server certificate. Valid formats for LDAP URLs are as follows:

  - ldap://10.10.10.1:389/dc=cisco,dc=com?o=bu?certificateRevocationList
  - ldap://10.10.10.1/dc=cisco,dc=com?o=bu?certificateRevocationList

- ldap://ldapsrv.cisco.com/dc=cisco,dc=com?o=bu?certificateRevocationList
- ldap://ldapsrv.cisco.com:389/dc=cisco,dc=com?o=bu?certificateRevocationList

To use a question mark (?) character as part of the URL, press Ctrl-v before entering it. Otherwise the ACE interprets the question mark as a help command.

Note The hostname in ldap:// links are resolved using DNS configurations. LDAP uses TCP port 389. If the LDAP server that publishes the CRL listens on a non-standard LDAP port, then a non-standard LDAP port needs to be configured in the CDP.

For example, to configure a CRL that you want to name CRL1 from http://crl.verisign.com/class1.crl, enter:

```
host1/Admin(config)# crypto crl CRL1
http://crl.verisign.com/class1.crl
```

To remove the CRL, enter:

```
host1/Admin(config)# no crypto crl CRL1
```

Configuring Signature Verification on a CRL

You can configure signature verification on a Certificate Revocation List (CRL) to determine that it is from a trusted certificate authority by using the **crypto crlparams** command in Exec command mode. The syntax of this command is as follows:

crypto crlparams *crl_name* **cacert** *ca_cert_filename*

The arguments are as follows:

- *crl_name*—Name of an existing CRL.
- *ca_cert_filename*—Name of the CA certificate file used for signature verification.

For example, to configure signature verification on a CRL, enter:

```
host1/Admin(config)# crypto crlparams CRL1 cacert MYCERT.PEM
```

To remove signature verification from a CRL, enter:

```
host1/Admin(config)# no crypto crlparams CRL1
```

Creating a Layer 7 Class Map for SSL Initiation

The Layer 7 class map that you associate with a policy map acts as a filter for traffic that matches the server load balancing (SLB) criteria that you specify. For SSL initiation, the match criteria is in the form of the following HTTP load-balancing attributes:

- Cookie
- HTTP header
- URL
- Source IP address

You can create a Layer 7 class map by using the **class-map type http loadbalance** command in configuration mode. For details on configuring a Layer 7 class map, see the *Server Load-Balancing Guide, Cisco ACE Application Control Engine*.

Creating a Layer 7 Policy Map for SSL Initiation

A Layer 7 policy map enables server load balancing on the ACE. This policy map contains an association with a Layer 7 class map and an SSL proxy client service. To use a Layer 7 SLB policy map, you first create the policy map and then define the **match** statements and policy actions. Because Layer 7 policy maps are child policies, you must associate a Layer 7 policy map with the appropriate Layer 3 and Layer 4 policy map to provide an entry point for Layer 7 SLB traffic classification. You cannot directly apply a Layer 7 policy map to an interface; you can apply only a Layer 3 and Layer 4 policy map to an interface or globally to all interfaces in a context.

This section contains the following topics:

Creating a Layer 7 Policy Map

You can create a Layer 7 SLB policy map by using the **policy-map** command in configuration mode.

The syntax of this command is as follows:

policy-map type loadbalance first-match *map_name*

The keywords and arguments are as follows:

- **type loadbalance—**Specifies a load-balancing policy map.
- **first-match**—Defines the execution for the Layer 7 load-balancing policy map. The ACE executes only the action specified against the first-matching classification.
- *map_name*—Identifier assigned to the policy map. Enter an unquoted text string with no spaces and a maximum of 64 alphanumeric characters.

For example, to create the policy map L7SLBPOLICY, enter:

```
host1/Admin(config)# policy-map type loadbalance first-match
L7SLBPOLICY
```

After you create a Layer 7 policy map, the CLI enters policy map load-balancing configuration mode.

```
host1/Admin(config-pmap-lb)#
```

To delete an existing policy map, enter:

```
host1/Admin(config)# no policy-map L7SLBPOLICY
```

Associating a Layer 7 Class Map with the Layer 7 Policy Map

You can associate a class map with the policy map by using the **class** command in policy map load-balancing configuration mode.

The syntax of this command is as follows:

class {*name1* | **class-default**} [**insert-before** *name2*]

The keywords, arguments, and options are as follows:

- *name1*—Name of a previously defined traffic class, configured with the **class-map** command, to associate traffic with the traffic policy. Enter an unquoted text string with no spaces and a maximum of 64 alphanumeric characters.
- **class-default**—Specifies the reserved, well-known class map created by the ACE. You cannot delete or modify this class. All traffic that fails to meet the other matching criteria in the named class map belongs to the default traffic class. If no specified classification matches the traffic, then the ACE performs the action specified using the **class class-default** command. The **class-default** class map has an implicit **match any** statement in it that enables it to match all traffic.
- **insert-before** *name2*—(Optional) Places the current class map ahead of an existing class map or match statement specified by the *name2* argument in the policy-map configuration. The ACE does not save the sequence reordering as part of the configuration.

For example, to associate the class map L7SLBCLASS with the policy map, enter:

```
host1/Admin(config-pmap-lb)# class L7SLBCLASS
```

After you associate a class map with the policy map, the CLI enters into policy map load-balancing class configuration mode.

```
host1/Admin(config-pmap-lb-c)#
```

The following example shows how to use the **insert-before** option to define the position of a class map in the policy map:

```
host1/Admin(config-pmap-lb)# class L7SLBCLASS insert-before HTTP_CLASS
host1/Admin(config-pmap-lb-c)#
```

The following example shows how to use the **class class-default** command:

```
host1/Admin(config-pmap-lb)# class class-default
```

```
host1/Admin(config-pmap-lb-c)#
```

To remove the association of a class map with the policy map, enter:

```
(config-pmap-lb)# no class L7SLBCLASS
```

Specifying Layer 7 SLB Policy Actions

After you associate a Layer 7 SLB class map with a Layer 7 SLB policy map or specify inline **match** commands, you need to specify one or more of the following actions that the ACE should take when network traffic matches a class map or inline **match** command:

- Discard requests
- Forward Requests without load balancing
- Enable HTTP header information
- Enable load balancing to a server farm
- Configure a sticky server farm
- Specify the IP differentiated services code point of packets
- Associate an SSL proxy service

This section describes the process of associating an SSL proxy service with the policy map. For details on configuring additional policy actions, see the *Server Load-Balancing Guide, Cisco ACE Application Control Engine*.

You can associate an SSL proxy client service with the policy map by using the **ssl-proxy** command in policy map load-balancing class configuration mode.

The syntax of this command is as follows:

ssl-proxy client *name*

The *name* argument is the identifier of an existing SSL proxy client service. Enter an unquoted text string with no spaces and a maximum of 64 alphanumeric characters.

For example, to associate the SSL client proxy service PSERVICE_CLIENT with the class map, enter:

```
host1/Admin(config)# policy-map type loadbalance first-match
L7SLBPOLICY
host1/Admin(config-pmap-lb)# class L7SLBCLASS
```

```
host1/Admin(config-pmap-lb-c)# ssl-proxy client PSERVICE_CLIENT
```

To remove the association of the SSL client proxy service to the class map, enter:

```
host1/Admin(config-pmap-lb-c)# no ssl-proxy client PSERVICE_CLIENT
```

Creating a Layer 3 and Layer 4 Class Map for SSL Initiation

The Layer 3 and Layer 4 class map that you associate with a Layer 3 and Layer 4 policy map acts as a filter for traffic that matches the criteria that you specify. For SSL initiation, you can define the match criteria based on one or more of the following traffic characteristics:

- Access list
- Virtual IP address
- Source IP address and subnet mask
- Destination IP address and subnet mask
- TCP/UDP port number or port range

You can create a Layer 3 and Layer 4 class map by using the **class-map** command in the configuration mode. For details on creating and configuring a Layer 3 and Layer 4 class map, see the *Server Load-Balancing Guide, Cisco ACE Application Control Engine*.

Creating a Layer 3 and Layer 4 Policy Map for SSL Initiation

The Layer 3 and Layer 4 policy map that you create for SSL initiation contains an association with the Layer 7 policy map that the ACE uses for load balancing. Because you can apply only a Layer 3 and Layer 4 policy map directly to a context interface, you need to associate the Layer 7 policy map with the Layer 3 and Layer 4 policy map.

This section contains the following topics:

Creating a Layer 3 and Layer 4 Policy Map

You can create a Layer 3 and Layer 4 policy map by using the **policy-map** command in configuration mode.

The syntax of this command is as follows:

policy-map multi-match *policy_name*

The *policy_name* argument is the name that you assign to the policy map. Enter an unquoted text string with no spaces and a maximum of 64 alphanumeric characters.

For example, to create the policy map L4SLBPOLICY, enter:

```
host1/Admin(config)# policy-map multi-match L4SLBPOLICY
```

After you create a policy map, the CLI enters into policy map configuration mode.

```
host1/Admin(config-pmap)#
```

To delete an existing policy map, enter:

```
host1/Admin(config)# no policy-map L4SLBPOLICY
```

For information on associating an SSL class map with the policy map, see the "Associating a Layer 7 Class Map with the Layer 7 Policy Map" section.

Associating the Layer 3 and Layer 4 Class Map with the Policy Map

You can associate the Layer 3 and Layer 4 class map with the policy map by using the **class** command in policy map configuration mode.

The syntax of this command is as follows:

class *class-map*

The *class-map* argument is the name of an existing class map. Enter an unquoted text string with no spaces and a maximum of 64 alphanumeric characters.

For example, to associate the class map L4SLBCLASS with the policy map, enter:

```
host1/Admin(config)# policy-map multi-match L4SLBPOLICY
host1/Admin(config-pmap)# class L4SLBCLASS
```

After you associate a class map with the policy map, the CLI enters policy map class configuration mode.

```
host1/Admin(config-pmap-c)#
```

To remove the association of a class map to the policy map, enter:

```
host1/Admin(config-pmap)# no class L4SLBCLASS
```

Associating a Layer 7 Policy Map with the Class Map

You can associate a Layer 7 policy map with the Layer 3 and Layer 4 class map by using the **loadbalance** command in policy map class configuration mode. This association nests the Layer 7 policy map within the Layer 3 and Layer 4 policy map that the ACE applies directly to the traffic.

The syntax of this command is as follows:

loadbalance policy *policymap*

The **policy** *policymap* keyword and argument specify the name of an existing Layer 7 policy map. Enter an unquoted text string with no spaces and a maximum of 64 alphanumeric characters.

For example, to associate the Layer 7 policy map L7SLBPOLICY with the class map, enter:

```
host1/Admin(config)# policy-map multi-match L4SLBPOLICY
host1/Admin(config-pmap)# class L4SLBCLASS
host1/Admin(config-pmap-c)# loadbalance policy L7SLBPOLICY
```

To remove the association of the Layer 7 policy map with the class map, enter:

```
host1/Admin(config-pmap-c)# no loadbalance policy L7SLBPOLICY
```

Applying the Policy Map to the VLANs

This section describes how to apply the Layer 3 and Layer 4 policy map to the VLAN traffic. The ACE allows you to apply the policy globally to all VLANs within the current context or to a specific VLAN in the context.

This section contains the following topics:

- Applying the Policy Map Globally
- Applying the Policy Map to a Specific VLAN

Applying the Policy Map Globally

You can globally apply the policy map to all of the VLANs in the context by using the **service-policy** command in configuration mode.

The syntax of this command is as follows:

service-policy input *policy_name*

The *policy_name* argument is the name of an existing policy map. Enter an unquoted text string with no spaces and a maximum of 64 alphanumeric characters.

For example, to globally apply the policy map L4SLBPOLICY to all of the context VLANs, enter:

```
host1/Admin(config)# service-policy input L4SLBPOLICY
```

To globally remove a policy map from all VLANs, enter:

```
host1/Admin(config)# no service-policy input L4SLBPOLICY
```

Applying the Policy Map to a Specific VLAN

To apply a policy map to a specific VLAN interface, you must enter interface configuration mode by using the **interface** command in configuration mode.

The syntax of this command is as follows:

interface vlan *vlan*

The *vlan* argument is the context VLAN number. Enter an integer from 2 to 4094.

For example, to enter into interface configuration mode for VLAN 10, enter:

```
host1/Admin(config)# interface vlan 10
host1/Admin(config-if)#
```

You can apply the policy map to the interface by using the **service-policy** command in interface configuration mode.

The syntax of this command is as follows:

service-policy input *policy-name*

The *policy-name* argument is the name of an existing policy map. Enter an unquoted text string with no spaces and a maximum of 64 alphanumeric characters.

For example, to apply the policy map L4SLBPOLICY to VLAN 10, enter:

```
host1/Admin(config)# interface vlan 10
host1/Admin(config-if)# service-policy input L4SLBPOLICY
```

To remove the policy from the interface, enter:

```
host1/Admin(config-if)# no service-policy input L4SLBPOLICY
```

Example of an SSL Initiation Configuration

The following example illustrates a running configuration of the ACE acting as a SSL proxy client, initiating and maintaining an SSL connection between itself and an SSL server. The ACE receives clear text from an HTTP client, and then encrypts and transmits the data as cipher text to the SSL server. On the reverse

side, the ACE decrypts the cipher text that it receives from the SSL server and sends the data to the client as clear text. The SSL initiation configuration appears in bold in the example.

IPv6 Example

```
access-list ACL1 line 10 extended permit ip anyv6 anyv6

probe http GEN-HTTP
  port 80
  interval 50
  faildetect 5
  expect status 200 200

serverfarm host SFARM1
  description SERVER FARM 1 FOR SSL INITIATION
  probe GEN_HTTP
  rserver SERVER1 443
    inservice
  rserver SERVER2 443
    inservice
  rserver SERVER3 443
    inservice
  rserver SERVER4 443
    inservice

serverfarm host SFARM2
  description SERVER FARM 2 FOR SSL TERMINATION
  probe GEN_HTTP
  rserver SERVER5 443
    inservice
  rserver SERVER6 443
    inservice
  rserver SERVER7 443
    inservice
  rserver SERVER8 443
    inservice

parameter-map type http PARAMMAP_HTTP
  server-conn reuse
  case-insensitive
  persistence-rebalance
parameter-map type ssl PARAMMAP_SSL_INITIATION
  cipher RSA_WITH_RC4_128_MD5
  cipher RSA_WITH_RC4_128_SHA
  cipher RSA_WITH_DES_CBC_SHA
  cipher RSA_WITH_3DES_EDE_CBC_SHA
  cipher RSA_WITH_AES_128_CBC_SHA
```

```
  cipher RSA_WITH_AES_256_CBC_SHA
  cipher RSA_EXPORT_WITH_RC4_40_MD5
  cipher RSA_EXPORT1024_WITH_RC4_56_MD5
  cipher RSA_EXPORT_WITH_DES40_CBC_SHA
  cipher RSA_EXPORT1024_WITH_DES_CBC_SHA
  cipher RSA_EXPORT1024_WITH_RC4_56_SHA
  version all
parameter-map type connection TCP_PARAM
  syn-data drop
  exceed-mss allow

ssl-proxy service SSL_PSRVICE_CLIENT
  ssl advanced-options PARAMMAP_SSL_INITIATION

class-map type http loadbalance match-all L7_SERVER_CLASS
  description Sticky for SSL Testing
  2 match http url .*.jpg
  3 match source-address 2001:DB8:130::1/64
class-map type http loadbalance match-all L7_SLB-HTTP_CLASS
  2 match http url .*
  3 match source-address 2001:DB8:130::1/64
class-map match-all L4_SSL-INIT_CLASS
  description SSL Initiation VIP
  2 match virtual-address 2001:DB8:130::C tcp eq www
policy-map type loadbalance first-match L7_SSL-INIT_POLICY
  class L7_SERVER_CLASS
    serverfarm SFARM1
    insert-http SRC_IP header-value "%is"
    insert-http I_AM header-value "SSL_INIT"
    insert-http SRC_Port header-value "%ps"
    insert-http DEST_IP header-value "%id"
    insert-http DEST_Port header-value "%pd"
    ssl-proxy client SSL_PSERVICE_CLIENT
  class L7_SLB-HTTP_CLASS
    serverfarm SFARM2
    insert-http SRC_IP header-value "%is"
    insert-http I_AM header-value "SSL_INIT"
    insert-http DEST_Port header-value "%pd"
    insert-http DEST_IP header-value "%id"
    insert-http SRC_Port header-value "%ps"
    ssl-proxy client SSL_PSERVICE_CLIENT
policy-map multi-match L4_SSL-VIP_POLICY
  class L4_SSL-INIT_CLASS
    loadbalance vip inservice
    loadbalance policy L7_SSL-INIT_POLICY
    loadbalance vip icmp-reply active
    appl-parameter http advanced-options PARAMMAP_HTTP
    connection advanced-options TCP_PARAM
```

```
interface vlan 120
  description Upstream VLAN_120 - Clients and VIPs
  ip address 2001:DB8:120::1 255.255.255.0
  fragment chain 20
  fragment min-mtu 68
  access-group input ACL1
  nat-pool 1 192.168.120.70 192.168.120.80 netmask 255.255.255.0 pat
  service-policy input L4_SSL-VIP_POLICY
  no shutdown
ip route 2001:DB8:1::1/64 2001:DB8:120::200
```

IPv4 Example

```
access-list ACL1 line 10 extended permit ip any any

probe http GEN-HTTP
  port 80
  interval 50
  faildetect 5
  expect status 200 200

serverfarm host SFARM1
  description SERVER FARM 1 FOR SSL INITIATION
  probe GEN_HTTP
  rserver SERVER1 443
    inservice
  rserver SERVER2 443
    inservice
  rserver SERVER3 443
    inservice
  rserver SERVER4 443
    inservice

serverfarm host SFARM2
  description SERVER FARM 2 FOR SSL TERMINATION
  probe GEN_HTTP
  rserver SERVER5 443
    inservice
  rserver SERVER6 443
    inservice
  rserver SERVER7 443
    inservice
  rserver SERVER8 443
    inservice

parameter-map type http PARAMMAP_HTTP
  server-conn reuse
```

```
  case-insensitive
  persistence-rebalance
parameter-map type ssl PARAMMAP_SSL_INITIATION
  cipher RSA_WITH_RC4_128_MD5
  cipher RSA_WITH_RC4_128_SHA
  cipher RSA_WITH_DES_CBC_SHA
  cipher RSA_WITH_3DES_EDE_CBC_SHA
  cipher RSA_WITH_AES_128_CBC_SHA
  cipher RSA_WITH_AES_256_CBC_SHA
  cipher RSA_EXPORT_WITH_RC4_40_MD5
  cipher RSA_EXPORT1024_WITH_RC4_56_MD5
  cipher RSA_EXPORT_WITH_DES40_CBC_SHA
  cipher RSA_EXPORT1024_WITH_DES_CBC_SHA
  cipher RSA_EXPORT1024_WITH_RC4_56_SHA
  version all
parameter-map type connection TCP_PARAM
  syn-data drop
  exceed-mss allow

ssl-proxy service SSL_PSRVICE_CLIENT
  ssl advanced-options PARAMMAP_SSL_INITIATION

class-map type http loadbalance match-all L7_SERVER_CLASS
  description Sticky for SSL Testing
  2 match http url .*.jpg
  3 match source-address 192.168.130.0 255.255.255.0
class-map type http loadbalance match-all L7_SLB-HTTP_CLASS
  2 match http url .*
  3 match source-address 192.168.130.0 255.255.255.0
class-map match-all L4_SSL-INIT_CLASS
  description SSL Initiation VIP
  2 match virtual-address 192.168.130.12 tcp eq www
policy-map type loadbalance first-match L7_SSL-INIT_POLICY
  class L7_SERVER_CLASS
    serverfarm SFARM1
    insert-http SRC_IP header-value "%is"
    insert-http I_AM header-value "SSL_INIT"
    insert-http SRC_Port header-value "%ps"
    insert-http DEST_IP header-value "%id"
    insert-http DEST_Port header-value "%pd"
    ssl-proxy client SSL_PSERVICE_CLIENT
  class L7_SLB-HTTP_CLASS
    serverfarm SFARM2
    insert-http SRC_IP header-value "%is"
    insert-http I_AM header-value "SSL_INIT"
    insert-http DEST_Port header-value "%pd"
    insert-http DEST_IP header-value "%id"
    insert-http SRC_Port header-value "%ps"
```

```
    ssl-proxy client SSL_PSERVICE_CLIENT
policy-map multi-match L4_SSL-VIP_POLICY
  class L4_SSL-INIT_CLASS
    loadbalance vip inservice
    loadbalance policy L7_SSL-INIT_POLICY
    loadbalance vip icmp-reply active
    appl-parameter http advanced-options PARAMMAP_HTTP
    connection advanced-options TCP_PARAM

interface vlan 120
  description Upstream VLAN_120 - Clients and VIPs
  ip address 192.168.120.1 255.255.255.0
  fragment chain 20
  fragment min-mtu 68
  access-group input ACL1
  nat-pool 1 192.168.120.70 192.168.120.80 netmask 255.255.255.0 pat
  service-policy input L4_SSL-VIP_POLICY
  no shutdown
ip route 10.1.0.0 255.255.255.0 192.168.120.254
```