Defining IPS Signatures

You can use Security Manager to configure IPS signatures for dedicated IPS appliances and service modules or Cisco IOS IPS devices. When configuring signatures for Cisco IOS IPS, keep in mind that the router cannot use as many signatures as a dedicated appliance or service module.

This chapter contains the following topics:

Understanding Signatures

Network intrusions are attacks on, or other misuses of, network resources. Cisco IPS sensors and Cisco IOS IPS devices use a signature-based technology to detect network intrusions. A signature specifies the types of network intrusions that you want the sensor to detect and report. As sensors scan network packets, they use signatures to detect known types of attacks, such as denial of service (DoS) attacks, and respond with actions that you define.

On a basic level, signature-based intrusion detection technology can be compared to virus-checking programs. Cisco IPS contains a set of signatures that the sensor compares with network activity. When a match is found, the sensor takes some action, such as logging the event or sending an alarm to the Security Manager Event Viewer.

Signatures can produce false positives, because certain normal network activity can be construed as malicious. For example, some network applications or operating systems may send out numerous ICMP messages, which a signature-based detection system might interpret as an attempt by an attacker to map out a network segment. You can minimize false positives by editing your signature parameters (tuning your signatures).

To configure a sensor to monitor network traffic for a particular signature, you must enable the signature. By default, the most critical signatures are enabled when you install the signature update. When an attack is detected that matches an enabled signature, the sensor generates an alert, which is stored in the event store of the sensor. The alerts, as well as other events, may be retrieved from the event store by web-based clients such as Event Viewer. By default the sensor logs all Informational alerts or higher.

Some signatures have subsignatures, that is, the signature is divided into subcategories. When you configure a subsignature, changes made to the parameters of one subsignature apply only to that subsignature. For example, if you edit signature 3050 subsignature 1 and change the severity, the severity change applies to only subsignature 1 and not to 3050 2, 3050 3, and 3050 4.

Cisco IPS contains over 10,000 built-in default signatures. You cannot rename or delete signatures from the list of built-in signatures, but you can retire signatures to remove them from the sensing engine. You can later activate retired signatures; however, this process requires the sensing engines to rebuild their configuration, which takes time and could delay the processing of traffic. You can tune built-in signatures by adjusting several signature parameters. Built-in signatures that have been modified are called tuned signatures.

Note We recommend that you retire any signatures that you are not using. This improves sensor performance.

You can create signatures, which are called custom signatures. Custom signature IDs begin at 60000. You can configure them for several things, such as matching of strings on UDP connections, tracking of network floods, and scans. Each signature is created using a signature engine specifically designed for the type of traffic being monitored.

For more about signatures, see:

- Obtaining Detailed Information About a Signature, page 39-2
- Understanding Signature Inheritance, page 39-3

Related Topics

- Configuring Signatures, page 39-4
- Chapter 42, "Configuring Global Correlation"

Obtaining Detailed Information About a Signature

You can find detailed information about each signature from the Cisco Security Intelligence Operations web site. The web site includes a wealth of information and best practice recommendations for network security, and you can set up IntelliShield alerts. There is education on advanced security topics to help you protect your network, prioritize remediation, and structure your systems to reduce organizational risk.

When you edit the Signatures policy in Security Manager (see Signatures Page, page 39-4), the signature ID is linked directly into the Cisco Security Intelligence Operations database of IPS signatures. Clicking a signature ID opens a page containing information about the signature, including a description, the vulnerabilities on which the signature is based, when the signature was created, and so forth. You can search this database yourself at http://tools.cisco.com/security/center/search.x?search=Signature. (The database was formerly called the Cisco Network Security Database or NSDB.)

If you do not have access to Cisco.com, then the signature ID is linked to a local copy of the signature database information. Security Manager detects whether you have access to Cisco.com and makes the appropriate link for you without your having to set a preference.

The database includes information only for built-in, default signatures. You cannot find information about custom (user-defined) signatures.

Beginning with Security Manager 4.4, the Signatures Page (IPS > Signatures > Signatures) contains an Explanation tab and a Related Threats tab for each signature. These tabs display detailed information in a separate window on the Signatures page. For example, the Explanation tab displays Description, Signature ID, and so forth; the Related Threats tab displays vulnerabilities for other software that you may be using, and so forth.

Tip If this window is not visible to you, expand it with the up arrow button in the bottom-left corner of the Signatures page. To hide this window, collapse it with the corresponding down arrow, also in the bottom-left corner of the Signatures page. You can resize this window with standard controls.

Understanding Signature Inheritance

Signature inheritance for IPS devices is different than for any other Security Manager rules-based policy. Inheritance refers to the capability of Security Manager to enforce hierarchical lists of first-match, rule-based policies such as access rules. Signature inheritance is different because for IPS devices, Security Manager allows inheritance on a per-signature basis.

This example shows what is meant by inheritance on a per-signature basis:

Step 1 In Policy View, select **IPS > Signatures > Signatures**.

Step 2 Create a policy named test1.

Step 3 Create a second policy, named test2.

Step 4 Right-click **test 2** and select **Inherit Signatures**. The Inherit Rules—test 2 dialog box appears.

Step 5 Select **test1** and click the **OK** button.

Step 6 Select **test1** and edit a signature. Note the edit that you made and save your change.

Step 7 Select **test2** and select the signature that you just edited. Observe that test2 inherited the editing that you did on test1.

IPS Signature Purge

Beginning with Security Manager 4.1, old signature versions (defined as being older than the lowest signature level deployed) are purged during a periodic purge operation, the purpose of which is to optimize the database.

Note As a result of the purge operation, you may notice the deletion of some of your unused tuning contexts.

Some of the purged signatures may be restored during your next download of IPS signature packages from Cisco.com.

IPS signature purge is disabled by default. To enable IPS signature purge,

Step 1 Stop the Cisco Security Manager Daemon Manager: At the command prompt, enter **net stop crmdmgtd**.

Step 2 Navigate to *NMSROOT*\MDC\ips\etc\sensorupdate.properties file, where *NMSROOT* is the path to the Security Manager installation directory. The default is C:\Program Files\CSCOpx.

Step 3 In sensorupdate.properties, change purgeUnusedSignautesEntriesinDB:false to purgeUnusedSignautesEntriesinDB:true.

Step 4 Re-start the Cisco Security Manager Daemon Manager: At the command prompt, enter **net start crmdmgtd**.

IPS signature purge now runs at midnight every day.

Configuring Signatures

The Signatures policy is where you configure signatures for Cisco IPS sensors and Cisco IOS IPS devices.

This section contains the following topics:

Signatures Page

Use the Signatures page to display the signature summary table, in which you can add, edit, and delete IPS signatures. From this page you can tune the active signature set in a policy by enabling or disabling signatures. You can also use this page to unload signatures from the engine.

Beginning with Version 4.6, Security Manager enables you to apply a signature threat profile to one or more signature policies, starting from IPS device version 7.3(1). A signature threat profile is a predefined signature template that includes customized tunings. These tunings adjust the signature coverage and response actions to enable the sensor to make better choices in various deployment and threat scenarios. This Signatures page displays the threat profile and its version, that has been applied to the policy. Click the **To Change** button to select a threat profile to apply to the policy. For more information, see Apply Signature Threat Profiles, page 39-9. To see the signatures that belong to a threat profile, filter the Source column to contain the text **Threat Profile**. For information about how to filter tables, see Filtering Tables, page 1-48

If you download a particular signature package that does not contain one or more of the threat profiles already created in shared signature policy, Security Manager displays the warning message "**Currently applied threat profile is not applicable to this signature version**" on the shared signature Policy View. Similarly on the Device View, Security Manager displays the same warning message if you try to apply the shared signature policy to an unsupported device.

Since threat profile updates cannot be performed separately, you must update the current signature version of the device if you want to update its threat profile version. Note that any update made to a threat profile version modifies the signatures associated with the threat profiles, but retains any user-defined signature tuning already performed by the user.

Note Threat profiles are not supported in IOS-IPS.

Tips

- Enabled and disabled signatures are indicated by the "Enabled" checkbox for a particular signature. In previous releases of Security Manager, disabled signatures were indicated by hash marks covering the table row. When you deploy the configuration, disabled signatures are removed from the device. For more information, see Enabling and Disabling Signatures, page 39-14.
- For many columns, you can right-click the column and edit the property directly. Your edits apply to all rows that you have selected. If you select more than one row, the options that you can select are limited to those that are valid for all selected rows. The contents of the right-click menu differ on the basis of the cell that you right-click. For more information on the available commands, see Signature Shortcut Menu, page 39-10.
- To show or hide a column, right-click the table heading row on the signature summary table and then click **Show Columns**. By default, all columns are shown.

Note Beginning with Version 4.5, Security Manager has a Notes column for each signature; this feature enables you to add a note so that you can revisit particular signatures later to see what you or other users have added for a signature or an event. This feature is helpful for network administrators in monitoring noisy signatures or signatures that need particular attention. However, the Notes column may not appear by default after you restore a Security Manager database. To show the Notes column, right-click the table heading row on the signature summary table, then click **Show Columns**, and finally click **Notes**. You may discover this situation during installation of Security Manager if you back up and restore the database; however, this situation will not occur during inline upgrades.

Navigation Path

- (Device view) Select **IPS > Signatures > Signatures** from the Policy selector.
- (Policy view, IPS appliances and service modules) Select **IPS > Signatures > Signatures**, then select an existing policy or create a new one.
- (Policy view, Cisco IOS IPS devices) Select **IPS (Router) > Signatures**, then select an existing policy or create a new one.

Related Topics

- Filtering Tables, page 1-48
- Table Columns and Column Heading Features, page 1-49
- Understanding Signatures, page 39-1
- Understanding Signature Inheritance, page 39-3
- Enabling and Disabling Signatures, page 39-14
- Cloning Signatures, page 39-21
- Editing Signature Parameters (Tuning Signatures), page 39-23
- Configuring Event Action Filters, page 40-4
- Chapter 40, “Configuring Event Action Rules”

Field Reference

Table 39-1 Signature Policy

Element	Description
ID	The signature ID, which is the unique numerical value assigned to this signature. This value lets the sensor identify a particular signature. Click the ID number to open a page in your web browser with detailed information about the signature, as explained in Obtaining Detailed Information About a Signature, page 39-2.
Sub	The subsignature ID, which is the unique numerical value assigned to this subsignature. A Subsignature ID identifies a more granular version of a broad signature.
Name	The name assigned to the signature.
Enabled	A checkbox indicating whether the signature is enabled or disabled in this policy. A signature must be enabled for the sensor to protect against the traffic specified by the signature.
Severity	The severity level that the signature reports: High, Medium, Low, or Informational.
Fidelity	The weight associated with how well this signature might perform in the absence of specific knowledge of the target.

Table 39-1 Signature Policy (continued)

Element	Description
Notes	Enables you to add a note so that you can revisit particular signatures later to see what you or other users have added for a signature or an event. This feature is helpful for network administrators in monitoring noisy signatures or signatures that need particular attention. Notes are not saved to the device during deployment to the device. Notes as described here are a Security Manager GUI feature only and are disregarded during deployment to the device, as they are not part of any IPS policy in Security Manager. Notes are not part of any IPS policy, so assignment or inheritance of a shared signature policy will have no effect on Notes. Right-clicking a signature and adding notes will not prompt for activity/ticket creation. However, adding notes by double-clicking a signature or clicking the Edit button will prompt for activity/ticket creation because this involves signature policy modification. Notes cannot be added to signatures as part of a signature update operation. Other parameters can be edited, though. Notes cannot be searched by the Global Search feature. The Notes column will not display the Notes text. Only an icon will be displayed. You must double-click the icon to display the Notes text. If you use the "Export to File" button, then in the resultant .csv file, the Notes column will display only Y or N, and in this way signifies that those signatures were annotated. The actual text will not be exported. Notes cannot be edited. All added notes are appended to the existing notes as a new note entry. You can of course delete the note and add the updated note afresh. To add a note, right-click the row for a particular signature and then click **Add Note**. After you add the note, click **Save** and then close the Notes dialog box. After you close the Notes dialog box, the row for a particular signature will display a "Note" icon. To add a note to more than one signature, select the signatures you want (Shift-click or Ctrl-click in Windows) and proceed as you would for one particular signature. Notes can be local or shared. If you add a note to a device with only local policies, you can add, edit, and delete only local notes. If you add a note to a device with a shared policy assigned, you can add, edit, and delete both local and shared notes—check the **Share this Note** option. However, you can add notes only to *that particular device* (i.e., local override of notes) even if a shared policy is assigned. **Tip** If you have a shared policy assigned to a device and want to add the notes only to that device for a particular signature without affecting the shared policy, then you need to add the notes without choosing the **Share this Note** option in Device View. **Tip** You can also work with notes in the Edit Signature dialog box. Refer to Edit Button later in this table.

Table 39-1 Signature Policy (continued)

Element	Description
Base RR	The base risk rating value of the signature.
Actions	The actions the sensor takes when this signature fires.
Source	The lowest policy in the inheritance hierarchy that overrides the settings for a signature. Values can be: • Default—The signature uses the default Cisco-defined settings. • Local—The signature is defined specifically for the selected device (Device view only.) • Policy name—The lowest shared policy in the inheritance hierarchy. You can see policy names in Policy view, or in Device view if you assign a shared signature policy to the device.
Retired	The conditions under which the signature is retired, if any. A retired signature is removed from the signature engine. You can activate a retired signature to place it back in the signature engine. **Timesaver** Use the retired field to unload disabled signatures on your IOS-IPS device to achieve the most favorable memory consumption of that device. If the engine level of a signature policy is less than E-4, the Retired field has two possible values: false and true. False means that the signature is not retired; true means that the signature is retired. If the engine level of a signature policy is equal to E-4, the Retired field has four possible values: • **false**—The signature is not retired. • **low-mem-retired**—The signature should be retired on low-memory platforms. A low-memory device is one that has 2 GB RAM or less. • **med-mem-retired**—The signature should be retired on both low-end and medium platforms. A medium-memory device is one that has 4 GB RAM or less, but more than 2 GB RAM. (Any device with more than 4 GB RAM is considered a high-memory platform.) • **true**—The signature is retired on all platforms. When you select low-mem-retired or med-mem-retired, Security Manager configures the device with those signatures. Whether the signature is actually retired on the device depends on amount of memory installed on the device; the device makes the decision on which signatures are actually retired. **Tip** The term *engine level* used here is not the same as the term *engine* in the row above.
Engine	The engine that parses and inspects the traffic specified by this signature.
View Update Level button (Device view only.)	Click this button view the signature update level for this device. For more information, see Viewing Signature Update Levels, page 39-13.

Table 39-1 Signature Policy (continued)

Element	Description
Export to File button	Click this button to export the signature summary for the current device to a comma-separated values (CSV) file. You are prompted to select the folder on the Security Manager server and to specify a file name.
Add button	Click this button to add a custom signature. For more information, see the following topics: • Adding Custom Signatures, page 39-19 • Edit Signature or Add Custom Signature Dialog Boxes, page 39-15
Edit button	Click this button to edit the selected signature. You can edit one signature at a time. For more information, see the following topics: • Editing Signatures, page 39-14 • Edit Signature or Add Custom Signature Dialog Boxes, page 39-15
Delete button	Click this button to delete the selected custom signatures. You cannot delete Cisco-defined signatures. If you do not want to deploy a Cisco-defined signature, you can retire it or disable it.

Apply Signature Threat Profiles

Use the Apply Threat Profile dialog box to select a signature threat profile from the available profiles and apply to the policy. Applying a threat profile modifies only the **Enabled** and **Retired** fields on the Signatures Page, page 39-4. After you have applied a particular threat profile to a policy, the corresponding signature tunings are merged with the existing signatures on the Signatures page. To see the signatures that belong to a threat profile, on the Signatures page, filter the Source column to contain the text **Threat Profile**. For information about how to filter tables, see Filtering Tables, page 1-48

Select any of the following threat profiles that are currently provided by Cisco:

- SCADA—Select this threat profile template if you are using the Cisco IPS device primarily to protect industrial control systems. In addition to signatures in the default set, SCADA signature template includes specialized signatures for general SCADA protocol detections and specific identifiers that address tools and environments common to most device controlled environments.
- Edge—Select this threat profile template if you are using the Cisco IPS device primarily for securing an internet connection. In addition to signatures in the default set, Edge signature template includes additional signatures that provide broader protection for desktop operating systems, web browsers, web technologies, and common desktop applications.
- Web_Applications—Select this threat profile template if you are using the Cisco IPS device primarily for protecting web server farms. In addition to signatures in the default set, Web_Applications signature template includes additional signatures that provide broader protection for web servers, web development tools and frameworks, content management systems, load balancers, and databases.
- Data Center—Select this threat profile template if you are using the Cisco IPS device primarily for protecting data centers. In addition to signatures in the default set, Data Center signature template includes additional signatures that provide broader protection for server operating systems, web servers, application servers, databases, content management systems, messaging servers and virtualization systems.

Note Any signature tuning performed by the user on Local signatures (signatures defined for a selected device and for which the source policy is Local) will be preserved over the threat profile. For Default signatures, the threat profile tunings will be preserved.

Navigation Path

- (Device view) Select **IPS > Signatures > Signatures** from the Policy selector.
- (Policy view, IPS devices) Select **IPS > Signatures > Signatures**, then select an existing policy or create a new one.

Field Reference

Table 39-2 Threat Profile Details

Element	Description
Signature ID	The signature ID, which is the unique numerical value assigned to this signature. This value lets the sensor identify a particular signature.
Sub Signature ID	The sub signature ID, which is the unique numerical value assigned to this sub signature. A sub signature ID identifies a more granular version of a broad signature.
Enabled	Indicates whether the signature is enabled or disabled in this threat profile. A signature must be enabled for the sensor to protect against the traffic specified by the signature.
Retired	Indicates whether the signature is retired or active in this threat profile.
Has Conflict	Indicates whether a signature with tunings from the applied threat profile also has tunings performed by the user. Signatures that are tuned by the user and by the applied threat profile are flagged as True in the Has Conflict column. If there is no conflict between the applied threat profile and user tunings for a signature, the Has Conflict column for that signature shows False. **Note** Any signature tuning performed by the user on Local signatures (signatures defined for a selected device and for which the source policy is Local) will be preserved over the threat profile. For Default signatures, the threat profile tunings will be preserved.

Signature Shortcut Menu

Right-clicking inside the signature summary table in the Signatures policy displays a shortcut menu for performing various functions on the selected signatures. Some commands appear only if you select a single signature, while some commands can be used on more than one signature at a time; your changes apply to all selected signatures. For more information about the Signatures policy, see Signatures Page, page 39-4.

Additionally, the available commands differ depending on which cell you right click. Some commands are available when right-clicking any cell, while others are specific to a single cell.

Tip When you use a right-click command to change the value in a cell of a Default signature, the signature is converted to a Local signature in Device view or a shared-policy-specific signature in Policy view.

The following table explains the available commands.

Table 39-3 Signature Shortcut Menu

Menu Command	Description
Commands Available for All Cells	
Add Row	Adds a custom signature. For more information, see the following topics: • Adding Custom Signatures, page 39-19 • Edit Signature or Add Custom Signature Dialog Boxes, page 39-15
Edit Row	Edits the selected signature. You can edit one signature at a time. For more information, see the following topics: • Editing Signatures, page 39-14 • Edit Signature or Add Custom Signature Dialog Boxes, page 39-15
Delete Row	Deletes the selected custom signatures. You cannot delete Cisco-defined signatures. If you do not want to deploy a Cisco-defined signature, you can retire it or disable it.
Clone	Creates a new custom signature that contains the same properties as the selected signature. For more information, see Cloning Signatures, page 39-21.
Enable, Disable	Places the signature in the enabled or disabled state, respectively. Disabled signatures appear with crosshatching over them. For more information, see Enabling and Disabling Signatures, page 39-14.
Show Events Show MARS Events	Enables navigation to the Event Viewer or Cisco Security MARS application to view the realtime or historical events detected by the selected signature. For more information, see Viewing Events for an IPS Signature, page 69-56 and Viewing CS-MARS Events for an IPS Signature, page 72-44.
Action Cell Commands	
Add to Actions	Adds an action to the current list of actions for the selected signature.
Delete from Actions	Deletes an action from the current list of actions for the selected signature.
Replace Actions With	Replace the current set of actions for the selected signature with the single action selected. If you want to select more than one action, select **More** from the submenu, then use Ctrl+click to select the desired actions.
Edit Actions	Opens the Edit Actions dialog box, where you can select the desired actions for the signature. Your selection replaces the current list of actions for the signature. For more information, see Edit, Add, Replace Action Dialog Boxes, page 39-12.

Table 39-3 Signature Shortcut Menu (continued)

Menu Command	Description
Severity Cell Commands	
• High • Medium • Low • Informational	Changes the severity level of the signature to the level you select.
Fidelity Cell Commands	
Edit Fidelity	Changes the fidelity rating of the signature, which is the weight associated with how well this signature might perform in the absence of specific knowledge of the target.
Retired Cell Commands	
• Retire • Activate • Retire on Low Memory • Retire on Medium Memory	Changes the retired status of the signature to the selected status. For more information about the retired status categories, see Edit Signature or Add Custom Signature Dialog Boxes, page 39-15.

Edit, Add, Replace Action Dialog Boxes

Use the Edit, Add, or Replace Action dialog boxes to change the actions defined for a signature. These dialog boxes are available only when you edit the Action cell using the right click menu as explained in Signature Shortcut Menu, page 39-10. The behavior differs depending on the dialog box name:

- Add Actions—The actions that you select are added to those already defined in the signature. To open this dialog box, right-click the Actions cell of a signature and select **Add to Actions > More**.
- Replace Actions—The actions that you select completely replace those defined in the signature. To open this dialog box, right-click the Actions cell of a signature and select **Replace Actions With > More**.
- Edit Actions—The actions that you select completely replace those defined in the signature. To open this dialog box, right-click the Actions cell of a signature and select **Edit Actions**.

For an explanation of the available actions, see Understanding IPS Event Actions, page 40-2. You can select multiple actions using Ctrl+click.

Note When you open dialog box, the list of actions that you see varies. The list of actions depends upon whether you right-click in only one signature row in the Actions column or select more than one signature row before right-clicking in the Actions column. If you right-click in only one signature row in the Actions column, the list of actions is that of the engine for that signature. If you select more than one signature row before right-clicking in the Actions column, the list of actions is that which is available for each affected engine. (It is the list of common actions, not the union of actions.)

Edit Fidelity Dialog Box

Use the Edit Fidelity dialog box to make changes in the Fidelity Rating for a particular signature. The Fidelity Rating, or Signature Fidelity Rating (SFR), identifies the weight associated with how well this signature might perform in the absence of specific knowledge of the target. This rating can be any number from 0 to 100, with 100 indicating the most confidence in the signature.

Navigation Path

In the Signatures policy, right-click the Fidelity cell in a signature and select Edit Fidelity. For information on opening the Signatures policy, see Signatures Page, page 39-4. For more information on the signature shortcut menu, see Signature Shortcut Menu, page 39-10.

Viewing Signature Update Levels

In Device view, you can determine the current signature update packages applied to the device in Security Manager and compare it to the one deployed on the device.

Differences between the applied and deployed update levels can occur when:

- The device is updated outside of Security Manager.
- An update is applied to the policy in Security Manager but not yet published to the device.
- During initial Security Manager deployment before the devices are under Security Manager control.

To view the signature update level, select the **IPS > Signatures > Signatures** policy for an IPS device in Device view. Then, click the **View Update Level** button to open the Update Level dialog box.

The following table describes the information displayed in the dialog box.

Table 39-4 Update Level Dialog Box

Element	Description
Applied Level	This column displays the patch level that is applied to this device in Security Manager.
Deployed Level	This column displays the patch level that is currently running on the selected device.
Major Update	Identifies the major update level.
Minor Update	Identifies the minor update level.
Service Pack	Identifies the service pack level.
Patch	Identifies the patch level.
Engine	Identifies the engine level.
Signature Update	Identifies the signature update level. **Note** This field is the only field on this page that applies to the IOS IPS devices; all of the other fields are exclusive to IPS devices.
Revert button	If you mistakenly modify Applied Level, allows you to discard that new Applied Level; clicking **Revert** syncs the Applied Level to the Deployed Level. **Tip** A warning dialog appears before performing Revert. Also, a warning dialog appears asking you to submit the activity.

Enabling and Disabling Signatures

You can enable and disable individual signatures. Your change takes effect when you redeploy the configuration to the device.

If a signature is disabled, it appears in the table overlain with hash marks. When you deploy the configuration, disabled signatures are removed from the device.

Disabling signatures is useful when you want to reduce the number of signatures used by a device, or if you want to temporarily stop using a custom signature without deleting it. You can later reenable a signature that you disabled.

Note You can enable a signature that is retired, but it then is not used to scan traffic, because it is not in the signature micro-engine. If you want a sensor to scan network traffic for a particular signature, you must enable it and not retire it. The AIP-SSC-5 does not support enabling a signature that is retired.

Step 1 Do one of the following:

- (Device view) Select **IPS > Signatures > Signatures** from the Policy selector.
- (Policy view, IPS appliances and service modules) Select **IPS > Signatures > Signatures**, then select an existing policy or create a new one.
- (Policy view, Cisco IOS IPS devices) Select **IPS (Router) > Signatures**, then select an existing policy or create a new one.

The Signature page appears; see Signatures Page, page 39-4.

Step 2 Right-click the signature whose enabled status you want to change and select **Enable** or **Disable**, as appropriate.

Editing Signatures

You can edit signatures to change their behavior. For example, you can change the action that should be taken when a signature fires, or the severity and fidelity ratings used to calculate the risk rating of the signature.

Some signatures have special requirements. For example, to configure a sensor to detect ACL violation signatures, you must first configure one or more Cisco IOS routers to log ACL violations. Then, you must configure those routers to communicate with the sensor. Finally, you must configure the sensor to accept syslog traffic from those routers.

Tip This procedure describes how to edit an entire signature. You can also selectively edit individual properties of a signature using the right-click menu in the Signatures policy. For information on the available commands, see Signature Shortcut Menu, page 39-10.

Related Topics

- Understanding Signatures, page 39-1
- Understanding IPS Event Actions, page 40-2
- Enabling and Disabling Signatures, page 39-14

- Cloning Signatures, page 39-21
- Configuring Event Action Filters, page 40-4
- Chapter 40, "Configuring Event Action Rules"

Step 1 Do one of the following:

- (Device view) Select **IPS > Signatures > Signatures** from the Policy selector.
- (Policy view, IPS appliances and service modules) Select **IPS > Signatures > Signatures**, then select an existing policy or create a new one.
- (Policy view, Cisco IOS IPS devices) Select **IPS (Router) > Signatures**, then select an existing policy or create a new one.

The Signature page appears; see Signatures Page, page 39-4.

Step 2 Right-click the signature you want to edit and select **Edit Row**. You can also select the signature and click the Edit Row (pencil) button beneath the signatures table. The Edit Signature dialog box opens.

Tip Use the filter fields above the table to help you find the desired signature. For information on filtering tables, see Filtering Tables, page 1-48.

Step 3 Make the desired changes to the signature. For specific details about each option, see Edit Signature or Add Custom Signature Dialog Boxes, page 39-15.

When editing signatures, keep the following in mind:

- You cannot edit a Default signature. Default signatures are the Cisco-defined version of a signature. Before you can edit a Default signature, you must convert it either to a Local signature (one defined specifically on the selected device) or a shared-policy-specific signature (one defined in a shared policy). You must select either Local or the shared policy name from the Source Policy field before you can change any field on the Edit Signature dialog box.
- You cannot change every characteristic of a signature. For example, you cannot change the signature or subsignature IDs. These fields are read-only.
- If you want to change the detailed parameters of a signature, follow the procedure described in Editing Signature Parameters (Tuning Signatures), page 39-23.

Step 4 Click **OK** to save your changes.

Edit Signature or Add Custom Signature Dialog Boxes

The Edit Signature and Add Custom Signature dialog boxes are essentially the same. Most of the fields are identical, although there are some layout differences. Use these dialog boxes as follows:

- Use the Edit Signature dialog box to edit the characteristics of a non-default signature (you can only view the characteristics of a default signature in read-only mode).

  You cannot edit default signatures. To make any changes to a signature, you must select something other than Default in the Source Policy field at the top of the dialog box.

- Use the Add Custom Signature dialog box to create a custom signature. In the Add Custom Signature dialog box, you enter a name and then select an existing engine from a drop-down list. The signature ID and subsignature ID are assigned by Security Manager. After you finish selecting the remaining parameters, the new signature is added to the Signatures page in the appropriate numerical location, and it is selected.

Note Beginning with Security Manager 4.4, you can specify a signature ID and a subsignature ID while adding a custom signature. If you specify a signatureID/subsignature ID combination that already exists, you will receive an error message.

Navigation Path

From the Signatures page:

- To edit a signature, right-click the policy you want to edit and select **Edit Row**.
- To add a custom signature, click the **Add Row (+)** button beneath the table, or right-click any row and select **Add Row**.

For information on opening the Signature page, see Signatures Page, page 39-4.

Related Topics

- Edit, Add, Replace Action Dialog Boxes, page 39-12
- Edit Signature Parameters Dialog Box, page 39-24
- Engine Options, page 39-20

Field Reference

Table 39-5 Edit Signature or Add Custom Signature Dialog Boxes

Element	Description
Source Policy (Edit signature only.)	The policy in which you are editing the signature: • Default—The default Cisco-defined signature, which you cannot edit. You must select something other than Default to edit the signature. • Local—The signature is a local signature defined specifically for the selected device. This option is not available in Policy view. • Policy name (variable)—The name of a shared policy. In Device view, a policy name is available only if you assign a shared policy to the device. In Policy view, this is the name of the policy you are editing. Select the policy name to edit the signature and to have your edits reflected on all devices that are assigned the shared policy.
Name (Add only.)	The name of the signature. You cannot change the name after you create the signature. If you want to change the name, you must create a clone of the signature.
SigID (Add only.)	The signature ID that you specify while adding a custom signature. The allowed range of values is 60000 - 65000.

Table 39-5 Edit Signature or Add Custom Signature Dialog Boxes (continued)

Element	Description
SubSigID (Add only.)	The subsignature ID that you specify while adding a custom signature. The allowed range of values is 0 - 255.
Inheritance Mandatory (Edit signature only.)	When selected, forces any policy that inherits from this policy to use the signature settings defined.
Enabled	Whether the signature is enabled.
Severity	The severity level that the signature will report: High, Medium, Low, or Informational.
Fidelity Rating	The weight associated with how well this signature might perform in the absence of specific knowledge of the target.
Actions	The actions that the sensor will take when this signature fires. For a complete list of actions, see the Understanding IPS Event Actions, page 40-2. Use Ctrl+click to select multiple actions.
Base Risk Rating Risk Rating (Fields have slightly different names when adding or editing signatures.)	The base risk rating value of the signature, which is calculated by multiplying the fidelity rating and the severity factor and dividing them by 100 (Fidelity Rating x Severity Factor /100). This value is read only; you cannot directly change it. To change the value, alter the Severity and Fidelity fields. The Severity Factor has the following values based on what you select in the Severity field: • High = 100 • Medium = 75 • Low = 50 • Informational = 25
Engine (Read-only when editing; read-write when adding custom signatures.)	The engine that parses and inspects the traffic specified by this signature. For a description of the engines, see Engine Options, page 39-20. When adding a custom signature, you must select the appropriate engine. For detailed information about each engine, and the parameters available, see the "Signature Engines" section in the *Installing and Using Cisco Intrusion Prevention System Device Manager* document for the IPS Software release you are using. **Tip** The term *engine* used here is not the same as the term *engine level* used in the row below.

Table 39-5 Edit Signature or Add Custom Signature Dialog Boxes (continued)

Element	Description
Retired	The conditions under which the signature is retired, if any. A retired signature is removed from the signature engine. You can activate a retired signature to place it back in the signature engine. **Timesaver** Use the retired field to unload disabled signatures on your IOS-IPS device to achieve the most favorable memory consumption of that device. If the engine level of a signature policy is less than E-4, the Retired field has two possible values: false and true. False means that the signature is not retired; true means that the signature is retired. If the engine level of a signature policy is equal to E-4, the Retired field has four possible values: • **false**—The signature is not retired. • **low-mem-retired**—The signature should be retired on low-memory platforms. A low-memory device is one that has 2 MB RAM or less. • **med-mem-retired**—The signature should be retired on both low-end and medium platforms. A medium-memory device is one that has 4 MB RAM or less, but more than 2 MB RAM. (Any device with more than 4 MB RAM is considered a high-memory platform.) • **true**—The signature is retired on all platforms. When you select low-mem-retired or med-mem-retired, Security Manager configures the device with those signatures. Whether the signature is actually retired on the device depends on amount of memory installed on the device; the device makes the decision on which signatures are actually retired. **Tip** The term *engine level* used here is not the same as the term *engine* in the row above.
Obsolete (Edit signature only.)	Identifies whether the signature is obsolete. An obsolete signature is removed from the signature engine. It cannot be re-activated.
Restore Defaults button (Non-custom signatures only. Edit signature only.)	Click this button to revert to default values for this signature as defined by Cisco.
Edit Parameters button	Click this button to edit the detailed parameters for this signature using the Edit Signature Parameters dialog box. For more information, see the following topics: • Edit Signature Parameters Dialog Box, page 39-24 • Editing Signature Parameters (Tuning Signatures), page 39-23

Adding Custom Signatures

If you want to look for traffic patterns that are not identified by the built-in signatures, you can create your own custom signatures to define the traffic patterns.

Even if a built-in signature covers the traffic pattern, you might want to create a custom signature to edit the detailed signature parameters without altering the default signature. If you are creating a custom signature that is similar to an existing signature, the easiest way to do it is to clone the signature as described in Cloning Signatures, page 39-21.

When adding a custom signature to some IPS devices, you can use regular expressions. For more information on the importance of proper syntax when using regular expressions, refer to Regular Expressions in Custom Signatures, page 39-22

Note The AIP-SSC-5 does not support custom signatures.

Step 1 Do one of the following:

- (Device view) Select **IPS > Signatures > Signatures** from the Policy selector.
- (Policy view, IPS appliances and service modules) Select **IPS > Signatures > Signatures**, then select an existing policy or create a new one.
- (Policy view, Cisco IOS IPS devices) Select **IPS (Router) > Signatures**, then select an existing policy or create a new one.

The Signature page appears; see Signatures Page, page 39-4.

Step 2 Click the **Add Row (+)** button beneath the signature table to open the Add Custom Signature dialog box.

Step 3 Configure the desired settings. For specific details about each option, see Edit Signature or Add Custom Signature Dialog Boxes, page 39-15.

When creating signatures, keep the following in mind:

- You cannot change the signature name after you define the signature. If you later want to change the name, you must clone the signature and change it while creating the clone.
- Select the appropriate signature engine for the signature. For a description of the signature engines, see Engine Options, page 39-20. You cannot change the engine after you create the signature; if you select the wrong engine and click OK to save the signature, you must start over and create an entirely new signature.
- The default is to create an enabled signature, but you can deselect the Enabled check box to initially create a disabled signature. You might want to disable the signature if you have not finished editing its parameters.
- Follow the procedure described in Editing Signature Parameters (Tuning Signatures), page 39-23 to define the detailed signature parameters. You must select the desired engine before you edit the parameters, because many of the parameters are determined by the signature engine.

  Whether you can save the signature before configuring parameters differs based on the engine that you select. At minimum, you must click **Edit Parameters** to open the Edit Signature Parameters dialog box, and then click **OK** in the Edit Signature Parameters dialog box, before you can save the signature definition. However, to create a meaningful signature, you will need to configure the parameters to identify the desired traffic pattern.

Step 4 Click **OK** to save your changes.

The custom signature is added to the end of the table and given the next available signature ID starting at 60000.

Note Beginning with Security Manager 4.4, you can specify a signature ID and a subsignature ID while adding a custom signature. If you specify a signatureID/subsignature ID combination that already exists, you will receive an error message.

Engine Options

The following list identifies the options you can specifying in the Engine field of the Edit Signature Parameters dialog box. For detailed information about each engine, and the parameters available, see the "Signature Engines" section in the *Installing and Using Cisco Intrusion Prevention System Device Manager* document for the IPS Software release you are using.

- AIC FTP—Inspects FTP traffic and lets you control the commands being issued.
- AIC HTTP—Provides granular control over HTTP sessions to prevent abuse of the HTTP protocol.
- Atomic ARP—Inspects Layer-2 ARP protocol. The Atomic ARP engine is different because most engines are based on Layer-3-IP.
- atomic-ip—Inspects IP protocol packets and associated Layer-4 transport protocols.
- Atomic IPv6—Detects IOS vulnerabilities that are stimulated by malformed IPv6 traffic.
- Flood Host—Detects ICMP and UDP floods directed at hosts.
- Flood Net—Detects ICMP and UDP floods directed at networks.
- Meta—Defines events that occur in a related manner within a sliding time interval. This engine processes events rather than packets.
- multi-string—Defines signatures that inspect Layer 4 transport protocol (ICMP, TCP, and UDP) payloads using multiple string matches for one signature. You can specify a series of regular expression patterns that must be matched to fire the signature.
- normalizer—Configures how the IP and TCP normalizer functions and provides configuration for signature events related to the IP and TCP normalizer. Allows you to enforce RFC compliance.
- service-dns—Inspects DNS (TCP and UDP) traffic.
- service-ftp—Inspects FTP traffic.
- Service Generic—Decodes custom service and payload.

  The Service Generic engine allows programmatic signatures to be issued in a config-file-only signature update. It has a simple machine and assembly language that is defined in the configuration file. It runs the machine code (distilled from the assembly language) through its virtual machine, which processes the instructions and pulls the important pieces of information out of the packet and runs them through the comparisons and operations specified in the machine code. It is intended as a rapid signature response engine to supplement the String and State engines.

  You cannot use the Service Generic engine to create custom signatures.

  Note Due to the proprietary nature of this complex language, we do not recommend that you edit the Service Generic engine signature parameters. Change only the severity and event action for these signatures.

- Service Generic Advanced—Generically analyzes network protocols.
- Service H225—Inspects VoIP traffic.
- service-http—Inspects HTTP traffic. The WEBPORTS variable defines inspection port for HTTP traffic.
- Service IDENT—Inspects IDENT (client and server) traffic.
- Service MSRPC—Inspects MSRPC traffic.
- Service MSSQL—Inspects Microsoft SQL traffic.
- Service NTP—Inspects NTP traffic.
- service-rpc—Inspects RPC traffic.
- Service SMB—Inspects SMB traffic.
- Service SMB Advanced—Processes Microsoft SMB and Microsoft RPC over SMB packets.
- Service SNMP—Inspects SNMP traffic.
- Service SSH—Inspects SSH traffic.
- Service TNS—Inspects TNS traffic.
- state—Stateful searches of strings in protocols such as SMTP.
- string-icmp—Searches on Regex strings based on ICMP protocol.
- string-tcp—Searches on Regex strings based on TCP protocol.
- string-udp—Searches on Regex strings based on UDP protocol.
- Sweep—Analyzes sweeps of ports, hosts, and services, from a single host (ICMP and TCP), from destination ports (TCP and UDP), and multiple ports with RPC requests between two nodes.
- Sweep Other TCP—Analyzes TCP flag combinations from reconnaissance scans that are trying to get information about a single host. The signatures look for flags A, B, and C. When all three are seen, an alert is fired.
- Traffic ICMP—Analyzes nonstandard protocols, such as TFN2K, LOKI, and DDOS. There are only two signatures with configurable parameters.
- Traffic Anomaly—Analyzes TCP, UDP, and other traffic for worm-infested hosts.
- Trojan Bo2k—Analyzes traffic from the nonstandard protocol BO2K. There are no user-configurable parameters in this engine.
- Trojan Tfn2k—Analyzes traffic from the nonstandard protocol TFN2K. There are no user-configurable parameters in this engine.
- Trojan UDP—Analyzes traffic from the UDP protocol. There are no user-configurable parameters in this engine.

Cloning Signatures

If you want to create a custom signature that is similar to an existing signature, you can create a clone, or copy, of the signature. You can then edit the parameters to make the clone perform according to your requirements.

For example, you might want to create a clone of a Cisco-defined signature to customize it to your needs. You might find this preferable to converting the Cisco signature to a Local or shared policy signature and directly editing its parameters.

To clone a signature, follow these steps:

Step 1 Do one of the following:

- (Device view) Select **IPS > Signatures > Signatures** from the Policy selector.
- (Policy view, IPS appliances and service modules) Select **IPS > Signatures > Signatures**, then select an existing policy or create a new one.
- (Policy view, Cisco IOS IPS devices) Select **IPS (Router) > Signatures**, then select an existing policy or create a new one.

The Signature page appears; see Signatures Page, page 39-4.

Step 2 Right-click the signature that you want to clone and select **Clone**.

Security Manager takes some time to make the copy, and might warn you that some attributes are read-only and cannot be copied. If you receive a warning, click **OK**. The Add Custom Signature dialog box then appears.

Step 3 Edit the properties of the cloned signature, as described in Adding Custom Signatures, page 39-19.

Step 4 Click **OK**. The clone appears in the summary table on the Signatures page as the last signature.

Cloned signatures are enabled and active by default.

Regular Expressions in Custom Signatures

You can use regular expressions when adding a custom signature to some IPS devices.

Regardless of the type of IPS device or the particular characteristics of the custom signature, incorrect syntax in a regular expression will cause device deployment to fail after adding the custom signature.

Regular expressions may contain many control characters or regex notations which are used to describe the regex pattern itself. If you intend to use them as literal characters in the regular expression itself, they should be escaped with the "\" escape character. If you intend to use them for their real meaning, on the other hand, you should be careful to conform to proper regular expression syntax.

Example of regular expression that will cause deployment failure: !@#$%^&*()_+{}|:"<>?

Example of regular expression that will be deployed successfully: !@#$%\^&*\(\)_+\{\}|:\"<>\?

Using regular expressions in custom IPS signatures is described in this example:

Step 1 Add a Cisco ASA 5500 Series IPS Security Services Processor (e.g., 5525-X).

Step 2 Add a custom signature with a string-XL engine (e.g., string-xl-tcp) to the IPS device.

Step 3 Click Edit Parameter and create a regular expression for the custom signature.

Step 4 Deploy the IPS device.

Step 5 Deployment will fail if incorrect syntax for regular expressions used, but deployment will succeed if correct syntax is used.

Editing Signature Parameters (Tuning Signatures)

If you cannot alter the behavior of a signature to fit your needs using the Event Action Filters and Overrides policies, or by changing the actions associated with a signature, you might need to fine-tune the signature parameters. You should considered editing parameters to be your last option, however, because these parameters can be complex and frequently require that you have a deep understanding of packet characteristics.

The reason you would want to edit parameters is to reduce false positives and false negatives:

- A *false positive* occurs when legitimate network activity, such as virus scanning, is interpreted and reported as an attack. This happens when network activity meets criteria that were specified to identify an attack before the attack occurred. You can decrease the number false positives by tuning your sensor configurations.
- A *false negative* occurs when an attack was not detected. Tuning your sensor configurations will help you decrease the number of false negatives.

Tip You cannot edit the parameters of a default signature. Before editing the parameters of a default signature, you must convert the signature to a local- or shared-policy signature. In some cases, such as regular expression editing, you must clone the signature and convert it to a custom signature.

This procedure describes how to edit signature parameters to tune a signature.

Related Topics

- Editing Signatures, page 39-14
- Understanding Signatures, page 39-1
- Configuring Event Action Filters, page 40-4
- Configuring Event Action Overrides, page 40-13

Step 1 Do one of the following:

- (Device view) Select **IPS > Signatures > Signatures** from the Policy selector.
- (Policy view, IPS appliances and service modules) Select **IPS > Signatures > Signatures**, then select an existing policy or create a new one.
- (Policy view, Cisco IOS IPS devices) Select **IPS (Router) > Signatures**, then select an existing policy or create a new one.

The Signature page appears; see Signatures Page, page 39-4.

Step 2 Right-click the signature whose parameters you want to edit and select **Edit Row**. The Edit Signature dialog box appears (see Edit Signature or Add Custom Signature Dialog Boxes, page 39-15).

Step 3 If the Source Policy field shows Default, you must change it to Local or to the name of a shared policy before you can edit the parameters. The Local option is available in Device view only, and makes your changes apply to the device you are editing and to no other devices. If you select the name of a shared policy, your changes apply to all devices that are assigned the policy.

Step 4 Click **Edit Parameters**. The Edit Signature Parameters dialog box appears.

The Edit Signature Parameters dialog box contains a folder tree structure, with the parameter names in the left side tree, and the values of the parameters shown on the right side.

Values that you can change contain a little box in the name; this is a check box. An empty check box indicates that the default value is being used for the parameter. Check the check box to configure that parameter. Click the value field to change the parameter. A green check indicates that a user-defined value is being used. Click the green check to change the value back to the default. (Editing the field typically adds a check mark to the box.)

To change a parameter, click in the associated filed in the right side. The behavior of clicking on a parameter differs based on the parameter type:

- Read-only parameters—Many parameters are read-only and cannot be changed, such as signature ID. Clicking these parameters typically has no effect, although parameter lists will open a dialog box (such as the Obsoletes list).
- Text or Numeric parameters—When you click a parameter that requires that you type in a value, whether alphanumeric or numeric, the field becomes an edit box. Type in the desired value and either press enter or click outside the edit box.
- Predefined value parameters—Many parameters have a small set of possible values, such as Yes/No. When you click these parameters, you activate a drop-down list. Select the desired option and click outside the field.
- List parameters—Some parameters contain a list of items. These parameters are represented by a pencil icon in the parameter value along with a word, such as Set or List. When you click in the field, a dialog box opens where you can configure the list associated with the item. The Meta engine component list is an example; for more information, see Editing the Component List for Meta Engine Signatures, page 39-29.
- Variable parameters—Some parameters allow you to select policy objects to identify the contents of the parameters. For example, you can select port list objects to identify ports in some signature engines. When you click these parameters, an edit box with a Select button appears. You can type the items directly into the edit box, including the name of the policy object, or click **Select** to select the policy object from a list or to create a new object.

For more information about the Edit Signature Parameters dialog box, see Edit Signature Parameters Dialog Box, page 39-24.

Step 5 Change the settings as desired, then click **OK** to save your changes. You are returned to the Edit Signature dialog box.

Step 6 Click **OK** in the Edit Signature dialog box to save your changes to the signature.

Tip If you decide that your edits did not have the desired effect, or you suspect that you made a mistake, you can click the **Restore Defaults** button in the Edit Signature dialog box to erase your changes. You can then start over.

Edit Signature Parameters Dialog Box

Use the Edit Signature Parameters dialog box to edit (also called tune) the built-in micro-engine parameters for a particular signature. Different engines have different parameters, so the appearance of the Edit Signature Parameters dialog box varies. For more information about editing signature parameters, see Editing Signature Parameters (Tuning Signatures), page 39-23.

The Edit Signature Parameters dialog box contains a folder tree structure, with the parameter names in the left side tree, and the values of the parameters shown on the right side.

Values that you can change contain a little box in the name; this is a check box. An empty check box indicates that the default value is being used for the parameter. Check the check box to configure that parameter. Click the value field to change the parameter. A green check indicates that a user-defined value is being used. Click the green check to change the value back to the default. (Editing the field typically adds a check mark to the box.)

To change a parameter, click in the associated filed in the right side. The behavior of clicking on a parameter differs based on the parameter type:

- Read-only parameters—Many parameters are read-only and cannot be changed, such as signature ID. Clicking these parameters typically has no effect, although parameter lists will open a dialog box (such as the Obsoletes list).
- Text or Numeric parameters—When you click a parameter that requires that you type in a value, whether alphanumeric or numeric, the field becomes an edit box. Type in the desired value and either press enter or click outside the edit box.
- Predefined value parameters—Many parameters have a small set of possible values, such as Yes/No. When you click these parameters, you activate a drop-down list. Select the desired option and click outside the field.
- List parameters—Some parameters contain a list of items. These parameters are represented by a pencil icon in the parameter value along with a word, such as Set or List. When you click in the field, a dialog box opens where you can configure the list associated with the item. The Meta engine component list is an example; for more information, see Editing the Component List for Meta Engine Signatures, page 39-29.
- Variable parameters—Some parameters allow you to select policy objects to identify the contents of the parameters. For example, you can select port list objects to identify ports in some signature engines. When you click these parameters, an edit box with a Select button appears. You can type the items directly into the edit box, including the name of the policy object, or click **Select** to select the policy object from a list or to create a new object.

Navigation Path

From the Edit Signature or Add Custom Signature dialog boxes, click the **Edit Parameters** button. For information on opening these dialog boxes, see Edit Signature or Add Custom Signature Dialog Boxes, page 39-15.

Tip If the button is not active, you must first select Local or the name of a shared policy from the Source Policy field, or clone the signature to create a custom policy. The Local option is available in Device view only, and makes your changes apply to the device you are editing and to no other devices. If you select the name of a shared policy, your changes apply to all devices that are assigned the policy.

Field Reference

Table 39-6 Edit Signature Parameters Dialog Box

Elements	Description
Tuning Context (Policy view only)	Displays the information needed by Security Manager to uniquely describe how the signature parameters were edited (tuned) for a particular signature policy. The Tuning Context field is a character string that contains the following items: • **Context**—The identification given by the Security Manager server for the unique definition of this micro-engine. • **SigLevel (IPS) or Version (IOS IPS)**—For IPS policies, the range of signature update levels to which this definition of the signature micro-engine applies. For IOS IPS, this is the IOS IPS version. • **Engine**—The name of the IPS engine. **Tip** As an example, the Tuning Context field could contain the following character string: Context:9, SigLevel:302-449, Engine:atomic-ip. For any particular signature policy, the Tuning Context field can contain one or many tuning contexts: • The tuning context with the highest signature level is pre-pended with "Reference context." • If you modify the shared policy that is pre-pended with "Reference context," Security Manager may ask you if you want to copy the policy to other applicable contexts. (A particular device may appear in more than one context.) • If you choose to copy the policy to other applicable contexts, an error message informs you if some parameters cannot be copied. **Note** Beginning with Security Manager 4.1, old signature versions (defined as being older than the lowest signature level deployed) are purged during a periodic purge operation, the purpose of which is to optimize the database. As a result, you may notice the deletion of some of your unused tuning contexts.
Signature ID	The unique numerical value assigned to this signature. This value lets the sensor identify a particular signature. The value is 1000 to 65000.
SubSignature ID	The unique numerical value assigned to this subsignature. The subsignature ID identifies a more granular version of a broad signature. The value is 0 to 255.
Promiscuous Delta	Modifies the seriousness of an alert when operating in promiscuous mode. The value is subtracted from an alert's overall risk rating. The promiscuous delta is ignored when operating in inline mode. The value can be 0 to 30.

Table 39-6 Edit Signature Parameters Dialog Box (continued)

Elements	Description
Sig Description	A description of the signature to help you distinguish this signature from other signatures: • Alert Notes—Additional information about this signature that will be included in the alert message. • User Comments—Your comments about the signature. • Alarm Traits—Traits you want to document about this signature. The value is 0 to 65535. The default is 0. • Release—The release in which the signature was most recently updated. • Signature Creation Date—The date on which the signature was created. • Signature Type—The type of signature: Anomaly, Component, Exploit, Vulnerability, or Other.
Engine	The engine that parses and inspects the traffic specified by this signature. The engine determines which parameters are available in the Engines folder. For a description of the engines, see Engine Options, page 39-20. For detailed information about each engine, and the parameters available, see the "Signature Engines" section in the *Installing and Using Cisco Intrusion Prevention System Device Manager* document for the IPS Software release you are using. **Tip** Many engines include the Fragment Status parameter, which lets you identify whether packet fragments should be inspected. You can elect to not inspect fragments, to inspect fragments, or to apply the signature to any packet status.
Event Counter	How the sensor counts events. For example, you can specify that you want the sensor to send an alert only if the same signature fires 5 times for the same address set. Configure the following values: • Event Count—The number of times an event must occur before an alert is generated. The value is 1 to 65535. The default is 1. • Event Count Key—The storage type used to count events for this signature. Choose attacker address, attacker address and victim port, attacker and victim addresses, attacker and victim addresses and ports, or victim address. The default is attacker address. • Specify Alert Interval—Whether you want to specify the time between alerts for resetting the event count, Yes or No. If you select Yes, enter the time in seconds from 2 to 1000.

Table 39-6 Edit Signature Parameters Dialog Box (continued)

Elements	Description
Alert Frequency	How often the sensor alerts you when this signature is firing. Specify the following parameters for this signature. These parameters are explained below. • Summary Mode • Summary Interval • Summary Key • Specify Global Summary Threshold
Summary Mode (Alert Frequency group)	The mode of alert summarization. There are four modes: Fire All, Fire Once, Summarize, and Global Summarize. The summary mode is changed dynamically to adapt to the current alert volume. For example, you can configure the signature to Fire All, but after a certain threshold is reached, it starts summarizing. Your selection of summary mode controls which other parameters are available in the Summary Mode group. • Fire All—Fires an alert on all events. • Fire Once—Fires an alert only once. • Summarize—Summarizes alerts. • Global Summarize—Summarizes an alert so that it only fires once regardless of how many attackers or victims. **Note** When multiple contexts from an ASA device are contained in one virtual sensor, the summary alerts contain the context name of the last context that was summarized. Thus, the summary is the result of all alerts of this type from all contexts that are being summarized.
Specify Summary Threshold (Summary Mode group.)	When you select Fire All, you can select whether you want to configure the summary threshold settings that will be used if the device dynamically changes to summary mode. If you select Yes, you can configure the summary interval, key, or global summary thresholds.
Summary Interval (Summary Mode group.)	The time in seconds used in each summary alert. The value is 1 to 65535. The default is 15.
Summary Key (Summary Mode group.)	The storage type used to summarize alerts. Choose Attacker address, Attacker address and victim port, Attacker and victim addresses, Attacker and victim addresses and ports, or Victim address. The default is Attacker address.
Specify Global Summary Threshold (Summary Mode group.)	Whether to specify the threshold number of events to take the alert into global summary, Yes or No. If you select Yes, enter the threshold number of events, from 1 to 65535. The default is 240.

Table 39-6 Edit Signature Parameters Dialog Box (continued)

Elements	Description
Status	The status of the signature. The Obsoletes list shows the signatures that are obsoleted by this signature; click the pencil icon to open the list. In many cases, this information is read-only. If you can modify the list, click Set in the parameter field to open the list, where you can add the obsoleted signature IDs.
Vulnerable OS List	The list of operating systems that this attack targets.
MARS Category	The category in Cisco Security MARS to which this signature belongs. This metadata is used to color the events generated in such a way as to provide MARS with the data that it needs to process this signature relative to the event categories that it studies.
Expand All button	Expands all categories and subcategories.
Collapse All button	Collapses all fields to the category.

Editing the Component List for Meta Engine Signatures

Use the Edit Signature Parameter—Component List dialog box to edit the component list for a meta engine signature.

The Meta engine defines events that occur in a related manner within a sliding time interval. This engine processes events rather than packets. As signature events are generated, the Meta engine inspects them to determine if they match any or several Meta definitions. The Meta engine generates a signature event after all requirements for the event are met.

All signature events are handed off to the Meta engine by the Signature Event Action Processor. The Signature Event Action Processor hands off the event after processing the minimum hits option. Summarization and event action are processed after the Meta engine has processed the component events.

The Meta engine is different from other engines in that it takes alerts as input where most engines take packets as input. Thus, in a Meta engine signature, you must identify the signatures that the Meta signature should be looking for. This list of signatures is contained in the Component list.

The Component list is part of the signature parameters. To edit the parameters, follow the procedure described in Editing Signature Parameters (Tuning Signatures), page 39-23. When you open the Edit Signature Parameters dialog box for a signature that uses the Meta engine, look for the **Engine > Component List** parameter. The parameter value contains a pencil icon and the word List. Click **List** to open the Edit Signature Parameter—Component List dialog box.

The dialog box is divided into two lists, an Inactive list (on the left) and an active list (on the right). The active list defines the signatures that the Meta engine signature is looking for.

To modify the components list:

- **Add new components**—Click the **Add Entry (+)** button to the left of the inactive list. The Add Signature Parameter—List Entry dialog box opens. Configure the following values:
  - **Entry Key**—A name for the component.
  - **Component Sig ID**—The signature ID of the signature you are looking for.
  - **Component SubSig ID**—The subsignature ID; enter 0 if there are no subsignatures.

  - **Component Count**—The number of times this signature must fire before the Meta signature is triggered.
  - **Is a Not Component**—This field lets you create negative entries; thus, you can identify a list where some signatures must fire, and some signatures must not fire. Select **No** for signatures that must fire, and **Yes** for signatures that must not fire.

  When you click **OK** in the Add Signature Parameter—List Entry dialog box, the new component is added to the inactive list. Select it and click the >> button to move it to the active list. Then, use the Up and Down arrow buttons to position the component in the active component list; a third button is available to reset the order to the previously saved order.

- **Edit an existing component**—Select the component (in either list) and click the **Edit Entry (pencil)** button that is between the lists. The Edit Signature Parameter—List Entry dialog box opens. The parameters are the same as for adding a new entry, except that you cannot change the component name.
- **Delete a component**—Select the component in the inactive list and click the **Delete Entry (trash can)** button that is to the left of the inactive list. If you want to delete an active component, you must first select it in the active list and click the << button to move it to the inactive list.
- **Restore defaults**—If you want to restore the default values of a component, select it and click **Restore**.

Obsoletes Dialog Box

Use the Obsoletes dialog box to identify obsolete signatures associated with a particular signature. In many cases, this information is read-only. In some cases, it is read-write; for example, you can edit the list for IOS IPS signature policies for Local or shared-policy-specific signatures.

If you can edit the list:

- Click the **Add Entry (+)** button to add the signature and subsignature ID of a signature that is made obsolete by the signature you are editing.
- Select an entry and click the **Delete Entry (trash can)** button to remove it from the list of obsoleted signatures.

Navigation Path

The Obsoletes list is part of the signature parameters. To edit the parameters, follow the procedure described in Editing Signature Parameters (Tuning Signatures), page 39-23. When you open the Edit Signature Parameters dialog box, look for the **Status > Obsoletes** parameter. The parameter value contains a pencil icon and the word Set (when the parameter is not read-only). Click the pencil or word to open the Obsoletes dialog box.

Configuring Signature Settings

Use the Signature Settings page to define settings for IPS appliances and service modules (but not Cisco IOS IPS devices). These settings define the following policies:

- **Application policy**—Enable or disable HTTP, determine and specify the maximum number of HTTP requests, specify AIC web ports, and enable or disable FTP.
- **Fragment reassembly policy**—Configure the sensor to reassemble a datagram that has been fragmented over more than one packet by selecting the IP reassembly mode.

- **Stream reassembly policy**—Configure the sensor to monitor only TCP sessions that have been established by a complete three-way handshake by specifying whether a TCP handshake is required and by selecting the TCP reassembly mode.
- **IP logging policy**—Configure the sensor to generate an IP session log when the sensor detects an attack by determining and selecting the maximum allowable number of log packets, the IP log time and the maximum allowable size of the IP log.

Tip All of these settings have default values, so configure this policy only if you need to use a non-default value.

To configure the Signature Settings policy, do one of the following:

- (Device view) Select **IPS > Signatures > Settings** from the Policy selector.
- (Policy view) Select **IPS > Signatures > Settings**, then select an existing policy or create a new one.

You can then configure the options that are explained in the following table.

Table 39-7 Signature Settings Page

Element	Description
Enable HTTP	Enables protection for web services. Select **Yes** to require the sensor to inspect HTTP traffic for compliance with the RFC.
Max HTTP Requests	The maximum number of outstanding HTTP requests per connection.
AIC Web Ports	The ports on which to look for AIC traffic. Enter a comma-separated list of port numbers or port list objects that define the ports. You can click **Select** to select a port list object from a list or to create a new object.
Enable FTP	Enables protection for FTP services. Select **Yes** to require the sensor to inspect FTP traffic.
IP Reassembly Mode	The method the sensor uses to reassemble the fragments, based on the operating system.
TCP Handshake Required	Whether the sensor should only track sessions for which the three-way handshake is completed.
TCP Reassembly Mode	The mode the sensor should use to reassemble TCP sessions with the following options: • Asymmetric—May only be seeing one direction of bidirectional traffic flow. **Note** Asymmetric mode lets the sensor synchronize state with the flow and maintain inspection for those engines that do not require both directions. Asymmetric mode lowers security because full protection requires both sides of traffic to be seen. • Loose—Use in environments where packets might be dropped. • Strict—If a packet is missed for any reason, all packets after the missed packet are not processed.
Max IP Log Packets	The number of packets you want logged.
IP Log Time	The duration you want the sensor to log, from 1 to 60 minutes. The default is 30 minutes.

Table 39-7 Signature Settings Page (continued)

Element	Description
Max IP Log Bytes	The maximum number of bytes you want logged.