# BIG-IP® Network Firewall: Policies and Implementations

Version 11.5.1

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# Chapter 1

# About the Network Firewall


- *What is the BIG-IP Network Firewall?*

# What is the BIG-IP Network Firewall?

The BIG-IP® Network Firewall provides policy-based access control to and from address and port pairs, inside and outside of your network. Using a combination of contexts, the network firewall can apply rules in a number of different ways, including: at a global level, on a per-virtual server level, for a self IP address, or for the management port. Firewall rules can be combined in a firewall policy, which can contain multiple context and address pairs, and is applied directly to a virtual server.

By default, the Network Firewall is configured in *ADC mode*, a default allow configuration, in which all traffic is allowed through the firewall, and any traffic you want to block must be explicitly specified.

The system is configured in this mode by default so all traffic on your system continues to pass after you provision the Advanced Firewall Manager™. You should create appropriate firewall rules to allow necessary traffic to pass before you switch the Advanced Firewall Manager to Firewall mode. In *Firewall mode*, a default deny configuration, all traffic is blocked through the firewall, and any traffic you want to allow through the firewall must be explicitly specified.

## About firewall modes

The BIG-IP® Network Firewall provides policy-based access control to and from address and port pairs, inside and outside of your network. By default, the network firewall is configured in ADC mode, which is a *default allow* configuration, in which all traffic is allowed to virtual servers and self IPs on the system, and any traffic you want to block must be explicitly specified. This applies only to the virtual server and self IP levels on the system.

***Important:*** *Even though the system is in a default allow configuration, if a packet does not match any rule in any context on the firewall, the Global Drop rule drops the traffic.*

***Note:*** *The Global Drop rule does not drop traffic to the management port. Management port rules must be specifically configured and applied.*

## Configuring the Network Firewall in ADC mode

If you have changed the firewall setting to Firewall mode, you can configure the BIG-IP® Network Firewall back to ADC mode.

***Note:*** *The firewall is configured in ADC mode, by default.*

1. On the Main tab, click **Security** > **Options** > **Network Firewall**.
   The Firewall Options screen opens.
2. From the **Virtual Server & Self IP Contexts** list, select the default action **Accept** for the self IP and virtual server contexts.
3. Click **Update**.
   The virtual server and self IP contexts for the firewall are changed.

## Configuring the Network Firewall to drop traffic that is not specifically allowed

You can configure the BIG-IP® Network Firewall to deny all traffic not explicitly allowed. In Advanced Firewall Manager™ this is called *Firewall mode*, and this is also referred to as a *default deny* policy. Firewall mode applies a default deny policy to all self IPs and virtual servers.

1. On the Main tab, click **Security** > **Options** > **Network Firewall**.
   The Firewall Options screen opens.
2. From the **Virtual Server & Self IP Contexts** list, select the default action **Drop** for the self IP and virtual server contexts.
3. Click **Update**.
   The default virtual server and self IP firewall context is changed.

If you are using ConfigSync to synchronize two or more devices, and you set the default action to Drop or Reject, you must apply the built-in firewall rules `_sys_self_allow_defaults` or `_sys_self_allow_management` to the specific self IPs that are used to support those services. To do this, add a new rule with the **Self IP** context, select the self IP, and select the **Rule List** rule type. Finally, select the preconfigured rules from the list of rule lists.

# Chapter 2

# About Firewall Rules and Rule Lists


- *About firewall rules*
- *About firewall rule lists*

## About firewall rules

The BIG-IP® Network Firewall uses rules to specify traffic handling actions. A rule includes:

**Context**
The category of object to which the rule applies. Rules can be global and apply to all addresses on the BIG-IP that match the rule, or they can be specific, applying only to a specific virtual server, self IP address, route domain, or the management port.

**Rule or Rule List**
Specifies whether the configuration applies to this specific rule, or to a group of rules.

**Source Address**
One or more addresses, geographic locations, or address lists to which the rule applies. The source address refers to the packet's source.

**Source Port**
The ports or lists of ports on the system to which the rule applies. The source packet refers to the packet's source.

**VLAN**
Specifies VLANs to which the rule applies. The VLAN source refers to the packet's source.

**Destination Address**
One or more addresses, geographic locations, or address lists to which the rule applies. The destination address refers to the packet's destination.

**Destination Port**
The ports or lists of ports to which the rule applies. The destination port refers to the packet's destination.

**Protocol**
The protocol to which the rule applies. The firewall configuration allows you to select one specific protocol from a list of more than 250 protocols. The list is separated into a set of common protocols, and a longer set of other protocols. To apply a rule to more than one protocol, select **Any**.

**Schedule**
Specifies a schedule for the firewall rule. You configure schedules to define days and times when the firewall rule is made active.

**Action**
Specifies the action (accept, accept decisively, drop, or reject) for the firewall rule.

**Logging**
Specifies whether logging is enabled or disabled for the firewall rule.

## Firewall actions

These listed actions are available in a firewall rule.

Firewall actions are processed within a context. If traffic matches a firewall rule within a given context, that action is applied to the traffic, and the traffic is processed again at the next context.

| Firewall action | Description |
|---|---|
| Accept | Allows packets with the specified source, destination, and protocol to pass through the current firewall context. Packets that match the rule, and are `accepted`, traverse the system as if the firewall is not present. |
| Accept Decisively | Allows packets with the specified source, destination, and protocol to pass through the firewall. Packets that match the rule, and are `accepted decisively`, traverse the system as if the firewall is not present, and are not processed by rules in any further context after the `accept decisively` action applies. If you want a packet to be accepted in one context, and not to be processed in any remaining context or by the default firewall rules, specify the `accept decisively` action. For example, if you want to allow all packets from Network A to reach every server behind your firewall, you can specify a rule that accepts decisively at the global context, from that Network A, to any port and address. Then, you can specify that all traffic is blocked at a specific virtual server, using the virtual server context. Because traffic from Network A is accepted decisively at the global context, that traffic still traverses the virtual server. |
| Drop | Drops packets with the specified source, destination, and protocol. Dropping a packet is a silent action with no notification to the source or destination systems. Dropping the packet causes the connection to be retried until the retry threshold is reached. |
| Reject | Rejects packets with the specified source, destination, and protocol. Rejecting a packet is a more graceful way to deny a packet, as it sends a destination unreachable message to the sender. For example, if the protocol is TCP, a TCP RST message is sent. One benefit of using Reject is that the sending application is notified, after only one attempt, that the connection cannot be established. |

## About Network Firewall contexts

With the BIG-IP® Network Firewall, you use a context to configure the level of specificity of a firewall rule or policy. For example, you might make a global context rule to block ICMP ping messages, and you might make a virtual server context rule to allow only a specific network to access an application.

Context is processed in this order:

1. Global
2. Route domain
3. Virtual server/self IP
4. Management port*
5. Global drop*

The firewall processes policies and rules in order, progressing from the global context, to the route domain context, and then to either the virtual server or self IP context. Management port rules are processed separately, and are not processed after previous rules. Rules can be viewed in one list, and viewed and reorganized separately within each context. You can enforce a firewall policy on any context except the management port. You can also stage a firewall policy in any context except management.

---

***Important:*** *You cannot configure or change the Global Drop context. The Global Drop context is the final context for all traffic, except Management port traffic. Note that even though it is a global context, it is not processed first, like the main global context, but last. If a packet matches no rule in any previous context, the Global Drop rule drops the traffic. Management port traffic is not affected by the Global Drop rule, or by global rules in general. Management port rules must be specifically configured and applied.*

---

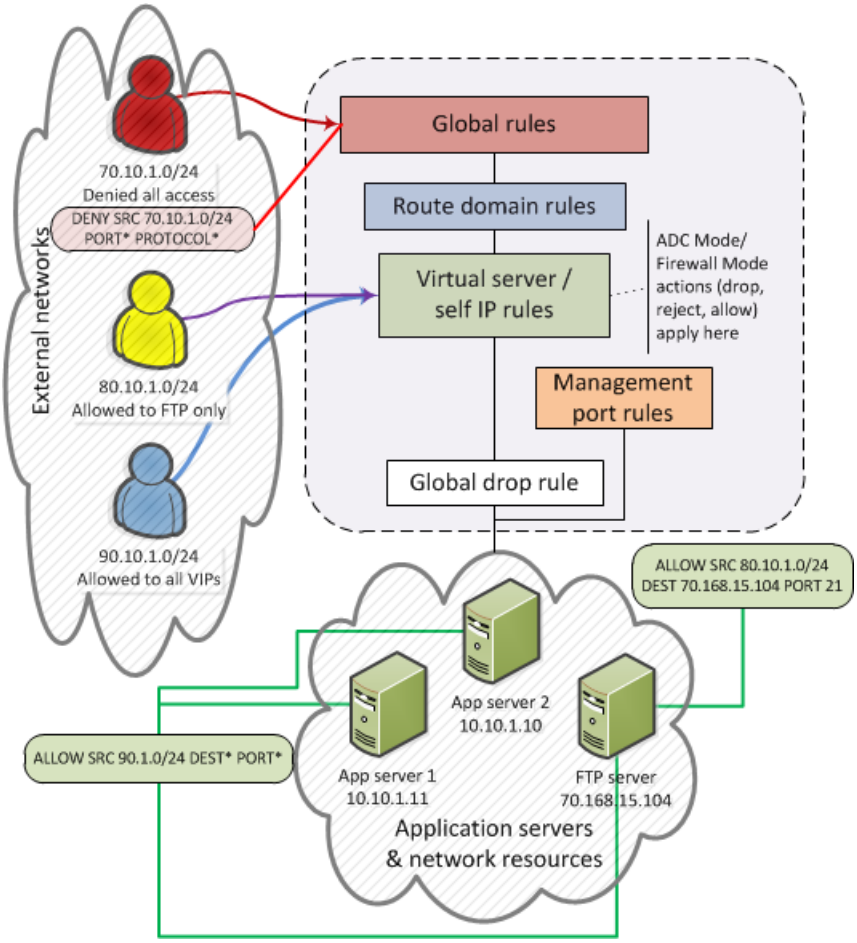


**Figure 1: Firewall context processing hierarchy example**

## Firewall context descriptions

When you create a firewall rule, you can select one of these listed contexts. Rules for each context form their own list and are processed both in the context hierarchy, and in the order within each context list.

| Firewall context | Description |
|---|---|
| Global | A global policy or global inline rules are collected in this firewall context. Global rules apply to all traffic that traverses the firewall, and global rules are checked first. |
| Route Domain | A route domain policy or route domain inline rules are collected in this context. Route domain rules apply to a specific route domain defined on the server. Route domain rules are checked after global rules. If you have not configured a route domain, you can apply route domain rules to Route Domain 0, which is effectively the same as the global rule context; however, if you configure another route domain after this, Route Domain 0 is no longer usable as a global context. |
| Virtual Server | A virtual server policy or virtual server inline rules are collected in this context. Virtual server rules apply to the selected existing virtual server only. Virtual server rules are checked after route domain rules. |
| Self IP | A self IP policy or self IP inline rules apply to a specified self IP address on the device. Self IP rules are checked after route domain rules. |

| Firewall context | Description |
|---|---|
| Management Port | The management port context collects firewall rules that apply to the management port on the BIG-IP® device. Management port rules are checked independently of any other rules. |
| Global Drop | The Global Drop rule drops all traffic that does not match any rule in a previous context,excluding Management Port traffic, which is processed independently. |

## Creating a network firewall inline rule

If you are going to specify address lists or port lists with this rule, you must create these lists before creating the firewall rule, or add them after you save the rule.

Create a network firewall rule to manage access from an IP or web network address to a specified network location, server, or address behind a BIG-IP® system.

---

***Note:*** *You cannot add rules created with this task to a rule list at a later time. You must create rules for a rule list from within the rule list.*

---

1. On the Main tab, click **Security** > **Network Firewall** > **Active Rules**.
   The Active Rules screen opens.
2. In the Rules area, click **Add** to add a firewall rule to the list.
3. From the **Context** list, select the context for the firewall rule.

   For a firewall rule in a rule list, or a firewall rule or rule list in a policy, the context is predefined and cannot be changed.
4. From the **Type** list, select whether you are creating a standalone network firewall rule or creating the rule from a predefined rule list.

   If you create a firewall rule from a predefined rule list, only the **Name**, **Description**, and **State** options apply, and you must select or create a rule list to include.
5. From the **Order** list, select an order modifier.

   You can add the rule before or after an existing rule, or you can add it first or last in the rule list. Rules are added in the last position by default.
6. In the **Name** and **Description** fields, type the name and an optional description.
7. From the **State** list, select the rule state.
   - Select **Enabled** to apply the firewall rule to the given context and addresses.
   - Select **Disabled** to set the firewall rule to not apply at all.
   - Select **Scheduled** to apply the firewall rule according to the selected schedule.
8. From the **Schedule** list, select the schedule for the firewall rule.

   This schedule is applied when the firewall rule state is set to **Scheduled**.
9. From the **Protocol** list, select the protocol to which the firewall rule applies.
   - Select **Any** to apply the firewall rule to any protocol.
   - Select the protocol name to apply the rule to a single protocol.

---

***Important:*** *ICMP is handled by the BIG-IP system at the global or route domain level. Because of this, ICMP messages receive a response before they reach the virtual server context. You cannot create an inline rule for ICMP or ICMPv6 on a Self IP context. You can apply a rule list to a self IP that includes*

*a rule for ICMP or ICMPv6; however, such a rule will be ignored. To apply firewall actions to the ICMP protocol, create a rule with the* `global` *or* `route domain` *context. ICMP rules are evaluated only for ICMP forwarding requests, and not for the IP addresses of the BIG-IP system itself.*

***Note:*** *Note that you must select a protocol if you specify ports.*

**10.** From the Source **Address/Region** list, select the type of source address to which this rule applies.

- Select **Any** to have the rule apply to any packet source IP address.
- Select **Specify** and click **Address** to specify one or more packet source IP addresses to which the rule applies. When selected, you can type single IP addresses into the **Address** field, then click **Add** to add them to the address list.
- Select **Specify** and click **Address List** to select a predefined list of packet source addresses to which the rule applies. To use an address list with this rule, select the address list and click the **Add** button. Similarly, to remove the list from this rule, select the list and click the **Delete** button.
- Select **Specify** and click **Address Range** to specify a contiguous range of packet source IP addresses to which the rule applies. When selected, you can type a start and end IP address in the fields, then click **Add** to add the IP address range to the address list.
- Select **Specify** and click **Country/Region** to identify the geographic origin of packet sources, and to apply rules based on selected geographic locations. When selected, a field appears in which you can select a country. For many countries, an extra field appears after you select the country, in which you can select a state or province. If you do not select a specific state or province, the entire country is selected. After you select a geographic location, click **Add** to add it to the Source address list.

**11.** From the Source **Port** list, select the type of packet source ports to which this rule applies.

- Select **Any** to have the rule apply to any packet source port.
- Select **Specify** and click **Port** to specify one or more packet source ports to which the rule applies. When selected, you can type single port numbers into the **Port** field, then click **Add** to add them to the port list.
- Select **Specify** and click **Port Range** to specify a list of contiguous packet source port numbers to which the rule applies. When selected, you can type the start and end ports into the fields, then click **Add** to add the ports to the port list.
- Select **Specify** and click **Port List** to select a predefined list of packet source ports to which the rule applies. To use a port list with this rule, select the port list and click the **Add** button. Similarly, to remove the list from this rule, select the list and click the **Delete** button.

**12.** From the Source **VLAN/Tunnel** list, select the VLAN on which this rule applies.

- Select **Any** to have the rule apply to traffic on any VLAN through which traffic enters the firewall.
- Select **Specify** to specify one or more VLANs on the firewall to which the rule applies. To use a VLAN with this rule, move the VLAN from the **Available** list to the **Selected** list by clicking the **<<** button. Similarly, to remove the VLAN from this rule, click the **>>** button to move the VLAN from the **Selected** list to the **Available** list.

**13.** From the Destination **Address/Region** list, select the type of packet destination address to which this rule applies.

- Select **Any** to have the rule apply to any IP packet destination address.
- Select **Specify** and click **Address** to specify one or more packet destination IP addresses to which the rule applies. When selected, you can type single IP addresses into the **Address** field, then click **Add** to add them to the address list.
- Select **Specify** and click **Address List** to select a predefined list of packet destination addresses to which the rule applies. To use an address list with this rule, select the address list and click the **Add** button. Similarly, to remove the list from this rule, select the list and click the **Delete** button.

- Select **Specify** and click **Address Range** to specify a contiguous range of packet destination IP addresses to which the rule applies. When selected, you can type a start and end IP address in the fields, then click **Add** to add the IP address range to the address list.
- Select **Specify** and click **Country/Region** to identify the geographic packet destination, and to apply rules based on specific geographic locations. When selected, a field appears in which you can select a country. For many countries, an extra field appears after you select the country, in which you can select a state or province. If you do not select a specific state or province, the entire country is selected. After you select a geographic location, click **Add** to add it to the Destination address list.

**14.** From the Destination **Port** list, select the type of packet destination ports to which this rule applies.

- Select **Any** to have the rule apply to any port inside the firewall.
- Select **Specify** and click **Port** to specify one or more packet destination ports to which the rule applies. When selected, you can type single port numbers into the **Port** field, then click **Add** to add them to the port list.
- Select **Specify** and click **Port Range** to specify a list of contiguous packet destination port numbers to which the rule applies. When selected, you can type the start and end ports into the fields, then click **Add** to add the ports to the port list.
- Select **Specify** and click **Port List** to select a predefined list of packet destination ports to which the rule applies. To use a port list with this rule, select the port list and click the **Add** button. Similarly, to remove the list from this rule, select the list and click the **Delete** button.

**15.** Optionally, from the **iRule** list, select an iRule to start if the rule matches traffic.

**16.** From the **Action** list, select the firewall action for traffic originating from the specified source address on the specified protocol. Choose from one of the these actions:

| Option | Description |
|---|---|
| **Accept** | Allows packets with the specified source, destination, and protocol to pass through the firewall. Packets that match the rule, and are accepted, traverse the system as if the firewall is not present. |
| **Accept Decisively** | Allows packets with the specified source, destination, and protocol to pass through the firewall, and does not require any further processing by any of the further firewalls. Packets that match the rule, and are accepted, traverse the system as if the firewall is not present. |
| **Drop** | Drops packets with the specified source, destination, and protocol. Dropping a packet is a silent action with no notification to the source or destination systems. Dropping the packet causes the connection to be retried until the retry threshold is reached. |
| **Reject** | Rejects packets with the specified source, destination, and protocol. When a packet is rejected the firewall sends a destination unreachable message to the sender. |

**17.** From the **Logging** list, enable or disable logging for the firewall rule.

**18.** Click **Finished**.
The list screen and the new item are displayed.

The new firewall rule is created.

## About firewall rule lists

The BIG-IP® Network Firewall uses rule lists to collect multiple rules. Rule lists function differently depending on how you create them with Advanced Firewall Manager™ (AFM™).

**If you create a rule list with Security > Network Firewall > Rule Lists > Create:**

This type of rule list is defined with a name and optional description. Once you create a rule list of this type, you can create and add one or more individual firewall rules to it. You can only add firewall rules by creating them from within the rule list. This type of rule list cannot be used on its own, but must be selected in an Active Rules list, or in a Policy Rules list.

**If you create a rule list with Security > Network Firewall > Active Rules > Add and select the Type as Rule List:**

This type of rule list is defined with a name and optional description. You can specify a context (Global, Route Domain, Virtual Server, or Self IP). However, you cannot add individual rules to this rule list. Instead, you select a single rule list you have already created, or one of the predefined rule lists. This type of rule list is used to activate a rule list in the configuration.

**If you create a rule list with Security > Network Firewall > Policies > *policy_name* > Add and select the Type as Rule List:**

This type of rule list is defined with a name and optional description. You cannot specify a context as the context is determined by the policy. You cannot add individual rules to this rule list. Instead, you select a single rule list you have already created, or one of the predefined rule lists. This type of rule list is used to activate a rule list in a policy.

## Creating a network firewall rule list

Create a network firewall rule list, to which you can add firewall rules.

1. On the Main tab, click **Security** > **Network Firewall** > **Rule Lists**.
   The Rule Lists screen opens.
2. Click the **Create** button to create a new rule list.
3. In the **Name** and **Description** fields, type the name and an optional description.
4. Click **Finished**.
   The list screen and the new item are displayed.

The firewall rule list appears in the list.

Add firewall rules to the rule list to define source, destination, and firewall actions.

### Adding a network firewall rule to a rule list

Before you add a firewall rule to a rule list, you must create a rule list.

Use this procedure to add a firewall rule to a rule list.

1. On the Main tab, click **Security** > **Network Firewall** > **Rule Lists**.
   The Rule Lists screen opens.
2. In the list, click the name of a rule list you previously created.
   The Rule List properties screen opens.
3. In the Rules area, click **Add** to add a firewall rule to the list.
4. In the **Name** and **Description** fields, type the name and an optional description.
5. From the **State** list, select the rule state.
   - Select **Enabled** to apply the firewall rule to the given context and addresses.
   - Select **Disabled** to set the firewall rule to not apply at all.
   - Select **Scheduled** to apply the firewall rule according to the selected schedule.
6. From the **Schedule** list, select the schedule for the firewall rule.

This schedule is applied when the firewall rule state is set to **Scheduled**.

7. From the Source **Address/Region** list, select the type of source address to which this rule applies.
   - Select **Any** to have the rule apply to any packet source IP address.
   - Select **Specify** and click **Address** to specify one or more packet source IP addresses to which the rule applies. When selected, you can type single IP addresses into the **Address** field, then click **Add** to add them to the address list.
   - Select **Specify** and click **Address List** to select a predefined list of packet source addresses to which the rule applies. To use an address list with this rule, select the address list and click the **Add** button. Similarly, to remove the list from this rule, select the list and click the **Delete** button.
   - Select **Specify** and click **Address Range** to specify a contiguous range of packet source IP addresses to which the rule applies. When selected, you can type a start and end IP address in the fields, then click **Add** to add the IP address range to the address list.
   - Select **Specify** and click **Country/Region** to identify the geographic origin of packet sources, and to apply rules based on selected geographic locations. When selected, a field appears in which you can select a country. For many countries, an extra field appears after you select the country, in which you can select a state or province. If you do not select a specific state or province, the entire country is selected. After you select a geographic location, click **Add** to add it to the Source address list.

8. From the Source **Port** list, select the type of packet source ports to which this rule applies.
   - Select **Any** to have the rule apply to any packet source port.
   - Select **Specify** and click **Port** to specify one or more packet source ports to which the rule applies. When selected, you can type single port numbers into the **Port** field, then click **Add** to add them to the port list.
   - Select **Specify** and click **Port Range** to specify a list of contiguous packet source port numbers to which the rule applies. When selected, you can type the start and end ports into the fields, then click **Add** to add the ports to the port list.
   - Select **Specify** and click **Port List** to select a predefined list of packet source ports to which the rule applies. To use a port list with this rule, select the port list and click the **Add** button. Similarly, to remove the list from this rule, select the list and click the **Delete** button.

9. From the Source **VLAN/Tunnel** list, select the VLAN on which this rule applies.
   - Select **Any** to have the rule apply to traffic on any VLAN through which traffic enters the firewall.
   - Select **Specify** to specify one or more VLANs on the firewall to which the rule applies. To use a VLAN with this rule, move the VLAN from the **Available** list to the **Selected** list by clicking the **<<** button. Similarly, to remove the VLAN from this rule, click the **>>** button to move the VLAN from the **Selected** list to the **Available** list.

10. From the Destination **Address/Region** list, select the type of packet destination address to which this rule applies.
    - Select **Any** to have the rule apply to any IP packet destination address.
    - Select **Specify** and click **Address** to specify one or more packet destination IP addresses to which the rule applies. When selected, you can type single IP addresses into the **Address** field, then click **Add** to add them to the address list.
    - Select **Specify** and click **Address List** to select a predefined list of packet destination addresses to which the rule applies. To use an address list with this rule, select the address list and click the **Add** button. Similarly, to remove the list from this rule, select the list and click the **Delete** button.
    - Select **Specify** and click **Address Range** to specify a contiguous range of packet destination IP addresses to which the rule applies. When selected, you can type a start and end IP address in the fields, then click **Add** to add the IP address range to the address list.
    - Select **Specify** and click **Country/Region** to identify the geographic packet destination, and to apply rules based on specific geographic locations. When selected, a field appears in which you can select a country. For many countries, an extra field appears after you select the country, in which you can

select a state or province. If you do not select a specific state or province, the entire country is selected. After you select a geographic location, click **Add** to add it to the Destination address list.

**11.** From the Destination **Port** list, select the type of packet destination ports to which this rule applies.

- Select **Any** to have the rule apply to any port inside the firewall.
- Select **Specify** and click **Port** to specify one or more packet destination ports to which the rule applies. When selected, you can type single port numbers into the **Port** field, then click **Add** to add them to the port list.
- Select **Specify** and click **Port Range** to specify a list of contiguous packet destination port numbers to which the rule applies. When selected, you can type the start and end ports into the fields, then click **Add** to add the ports to the port list.
- Select **Specify** and click **Port List** to select a predefined list of packet destination ports to which the rule applies. To use a port list with this rule, select the port list and click the **Add** button. Similarly, to remove the list from this rule, select the list and click the **Delete** button.

**12.** From the **Protocol** list, select the protocol to which the firewall rule applies.

- Select **Any** to apply the firewall rule to any protocol.
- Select the protocol name to apply the rule to a single protocol.

***Important:*** *ICMP is handled by the BIG-IP system at the global or route domain level. Because of this, ICMP messages receive a response before they reach the virtual server context. You cannot create an inline rule for ICMP or ICMPv6 on a Self IP context. You can apply a rule list to a self IP that includes a rule for ICMP or ICMPv6; however, such a rule will be ignored. To apply firewall actions to the ICMP protocol, create a rule with the* `global` *or* `route domain` *context. ICMP rules are evaluated only for ICMP forwarding requests, and not for the IP addresses of the BIG-IP system itself.*

***Note:*** *Note that you must select a protocol if you specify ports.*

**13.** Optionally, from the **iRule** list, select an iRule to start if the rule matches traffic.

**14.** From the **Action** list, select the firewall action for traffic originating from the specified source address on the specified protocol. Choose from one of the these actions:

| Option | Description |
|---|---|
| **Accept** | Allows packets with the specified source, destination, and protocol to pass through the firewall. Packets that match the rule, and are accepted, traverse the system as if the firewall is not present. |
| **Accept Decisively** | Allows packets with the specified source, destination, and protocol to pass through the firewall, and does not require any further processing by any of the further firewalls. Packets that match the rule, and are accepted, traverse the system as if the firewall is not present. |
| **Drop** | Drops packets with the specified source, destination, and protocol. Dropping a packet is a silent action with no notification to the source or destination systems. Dropping the packet causes the connection to be retried until the retry threshold is reached. |
| **Reject** | Rejects packets with the specified source, destination, and protocol. When a packet is rejected the firewall sends a destination unreachable message to the sender. |

**15.** From the **Logging** list, enable or disable logging for the firewall rule.

**16.** Click **Finished**.
The list screen and the new item are displayed.

A new firewall rule is created, and appears in the Rules list.

### Activating a rule list in active rules or in a policy

The rule list created from the active rules page, or from a policy, is a container in which you can select and activate one of the rule lists that you created with **Security** > **Network Firewall** > **Rule Lists** > **Create**, or one of the predefined system rule lists.

1. From the **Context** list, select the context for the firewall rule.

   For a firewall rule in a rule list, or a firewall rule or rule list in a policy, the context is predefined and cannot be changed.
2. In the **Name** and **Description** fields, type the name and an optional description.
3. From the **Rule List** list, select a rule list to activate in the policy or configuration.
4. From the **State** list, select the rule state.
   - Select **Enabled** to apply the firewall rule to the given context and addresses.
   - Select **Disabled** to set the firewall rule to not apply at all.
   - Select **Scheduled** to apply the firewall rule according to the selected schedule.
5. Click **Finished**.
   The list screen and the new item are displayed.

The firewall rule list you selected is activated in the Active Rules list or policy.

# Chapter 3

# About Firewall Rule Addresses and Ports


- *About firewall rule addresses and ports*
- *About address lists*
- *About port lists*

## About firewall rule addresses and ports

In a network firewall rule, you have several options for defining addresses and ports. You can use one or more of these options to configure the ports and addresses to which a firewall rule applies.

***Note:*** *You can use any combination of inline addresses, ports, address lists, and port lists in a firewall rule.*

#### Any (address or port)

In both **Source** and **Destination** address and port fields, you can select **Any**. This specifies that the firewall rule applies to any address or port.

#### Inline addresses

An inline address is an IP address that you add directly to the network firewall rule, in either the **Source** or **Destination Address** field. You can specify a single IP address, multiple IP addresses, a contiguous range of IP addresses, or you can identify addresses based on their geographic location. IP addresses can be either IPv4 or IPv6, depending on your network configuration.

#### Address Lists

An address list is a preconfigured list of IP addresses that you add directly to the BIG-IP® system. You can then select this list of addresses to use in either the **Source** or **Destination Address** field. An address list can also contain other address lists, and geographic locations.

#### Inline ports

An inline port is a port that you add directly to the network firewall rule, in either the **Source** or **Destination Port** field. You can add a single port, or a contiguous port range.

#### Port lists

A port list is a preconfigured list of ports that you add directly to the BIG-IP system. You can then select this list of ports to use in either the **Source** or **Destination Port** field. You can also add port lists to other port lists.

## About address lists

An address list is simply a collection of addresses saved on the server, including IP addresses, IP address ranges, geographic locations, and other (nested) address lists. You can define one or more address lists, and you can select one or more address lists in a firewall rule. Firewall address lists can be used in addition to inline addresses that are specified within a particular rule.

### Creating an address list

Create an address list to apply to a firewall rule, in order to match IP addresses.

1. On the Main tab, click **Security** > **Network Firewall** > **Address Lists**.
   The Address Lists screen opens.
2. Click **Create** to create a new address list.
3. In the **Name** and **Description** fields, type the name and an optional description.
4. In the Addresses area, add and remove addresses.

- To add an address, type the address and click **Add**.
- To remove an address, select the address in the Addresses list and click **Delete**.
- To edit an address, select the address in the list and click **Edit**. The address is removed from the Addresses list and appears in the editing field. Make your changes to the address, and click **Add**.

Addresses can be IP addresses, IP address ranges, geographic locations, other address lists, or any combination of these.

5. Click **Finished**.
   The list screen and the new item are displayed.

## About port lists

A *port list* is simply a collection of ports saved on the server. A port list can also contain other port lists. You can define one or more port lists, and you can specify one or more port lists in a firewall rule. Firewall port lists can be used in addition to inline ports, specified within a particular firewall rule or policy.

### Creating a port list

Create a port list to apply to a firewall rule, in order to match ports.

1. On the Main tab, click **Security** > **Network Firewall** > **Port Lists**.
   The Port Lists screen opens.
2. Click **Create** to create a new port list.
3. In the **Name** and **Description** fields, type the name and an optional description.
4. In the Ports area, add and remove ports.
   - To add a single port, select **Single Port**, then type the port number, and click **Add**.
   - To add a contiguous range of ports, select **Port Range**, then type the start and end port in the fields. Click **Add** to add the range of ports to the port list.
   - To add an existing port list to the current port list, select **Port List**, then select the predefined port list. Click **Add** to add the existing port list to the current port list.
   - To remove a port or port list, select the port or port list in the Ports area and click **Delete**.
   - To edit a port entry, select the port or port range in the list and click **Edit**. The port or port range is removed from the Ports list and appears in the editing field. Make your changes to the port or port range, and click **Add**.
5. Click **Finished**.
   The list screen and the new item are displayed.

# Chapter 4

# About Network Firewall Schedules


- *About Network Firewall schedules*

# About Network Firewall schedules

With a Network Firewall schedule, you can configure date ranges, days of the week, and time ranges for when a firewall rule is applied.

A schedule must be selected in a firewall rule or rule list, to apply to that firewall rule or rule list. The firewall rule or rule list must also be set to the Scheduled state.

When you configure a schedule for a rule list, the rules within the rule list can only be enabled when the rule list is enabled by the schedule. This means that even if the individual rules in a rule list have schedules, the rules are not enabled by their schedules unless the rule list is also enabled by the rule list schedule.

## Creating a schedule

Create a schedule to define the times, dates, and days of the week for when a firewall rule is applied.

1. On the Main tab, click **Security** > **Network Firewall** > **Schedules**.
   The Schedules screen opens.
2. Click **Create** to create a new firewall schedule.
3. In the **Name** and **Description** fields, type the name and an optional description.
4. In the **Date Range** area, define the range of dates over which the schedule applies.
   - Select **Indefinite** to have the schedule apply immediately, and run indefinitely. This makes the schedule active until you change the date range, or delete the schedule.
   - Select **Until** to have the schedule apply immediately, and define an end date and ending time. This makes the schedule active now, and disables it when the end date and ending time is reached. Click in the field to choose an end date from a popup calendar, and set the ending time with the sliders.
   - Select **After** to have the schedule apply after the specified date and starting time, and run indefinitely. This makes the schedule active starting on the selected date and time, until you change the start date, or delete the schedule. Click in the field to choose a start date from a pop-up calendar, and set the starting time with the sliders.
   - Select **Between** to apply the schedule starting on the specified start date and starting time, and ending on the specified end date and ending time. Click in the fields to choose the start and end dates from a pop-up calendar, and set the starting and ending time with the sliders.
5. In the Time Range area, define the times over which the firewall rule applies.
   - Select **All Day** to have the schedule apply all day, for every day specified in the date range.
   - Select **Between** to apply the schedule starting at the specified time, and ending at the specified time each day. Select the start and end hours and minutes from the popup screen, or click **Now** to set the current time.

   ***Note:*** *Specify the hours according to a 24-hour clock. For example, you can specify 3:00 PM with the setting* `15`.
6. In the Days Valid area, select the days of the week when the schedule is valid. Select check boxes for days of the week when the rule applies, and clear check boxes for days of the week when the schedule does not apply.
7. Click **Finished**.
   The list screen and the new item are displayed.

# Chapter 5

# About IP Address Intelligence in the Network Firewall


- *About IP intelligence policies in the network firewall*
- *About IP intelligence blacklist classes*
- *About IP intelligence feed lists*
- *Configuring a policy to check addresses against IP intelligence*

## About IP intelligence policies in the network firewall

In the network firewall, you can configure policies to check traffic against an IP intelligence database. Such traffic can be handled automatically if it originates from known-bad or questionable IP addresses. In addition, you can configure policies to automatically query *feed lists* that specify blacklist and whitelist IP address entries, and configure actions for those entries. You can control the actions for each IP intelligence category by specifying such actions in a policy. Furthermore, you can configure policies to apply default actions to feed lists, and apply such policies at the global context, to a virtual server, or on a route domain.

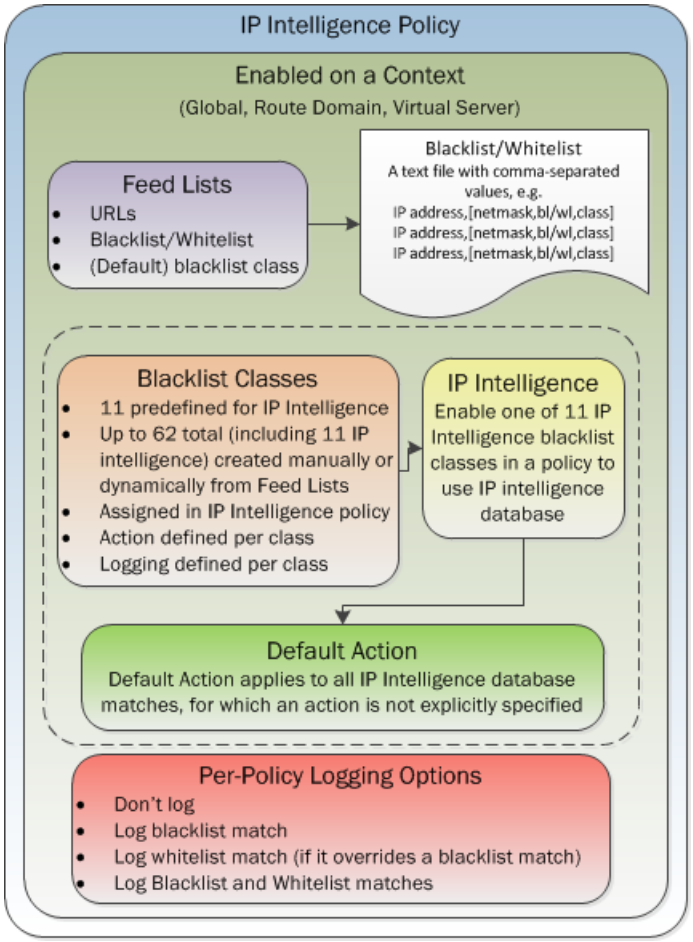


**Figure 2: IP Intelligence Policy container, and included elements**

### Enabling IP address intelligence

The requirements for using IP address intelligence are:

- The system must have an IP Intelligence license.
- The system must have an Internet connection either directly or through an HTTP proxy server.
- The system must have DNS configured (go to **System** > **Configuration** > **Device** > **DNS**).

***Important:*** *IP address intelligence is enabled by default. You only need to enable it if it was previously disabled.*

To enable IP address intelligence on the BIG-IP® system, you enable auto-update to connect the system to the IP intelligence database.

1. Log in to the command line for the BIG-IP® system.
2. To determine whether IP intelligence is enabled, type the following command: `tmsh list sys db iprep.autoupdate`
   If the value of the `iprep.autoupdate` variable is `disable`, IP intelligence is not enabled. If it is `enable`, your task is complete.
3. At the prompt, type `tmsh modify sys db iprep.autoupdate value enable`
   The system downloads the IP intelligence database and stores it in the binary file, `/var/IpRep/F5IpRep.dat`. It is updated every 5 minutes.
4. If the BIG-IP system is behind a firewall, make sure that the BIG-IP system has external access to `vector.brightcloud.com` using port `443`.

   That is the IP Intelligence server from which the system gets IP Intelligence information.
5. (Optional) If the BIG-IP system connects to the Internet using a forward proxy server, set these system database variables.
   a) Type `tmsh modify sys db proxy.host value` *`hostname`* to specify the host name of the proxy server.
   b) Type `tmsh modify sys db proxy.port value` *`port_number`* to specify the port number of the proxy server.
   c) Type `tmsh modify sys db proxy.username value` *`username`* to specify the user name to log in to the proxy server.
   d) Type `tmsh modify sys db proxy.password value` *`password`* to specify the password to log in to the proxy server.

The IP address intelligence feature remains enabled unless you disable it with the command `tmsh modify sys db iprep.autoupdate value disable`.

You can configure IP intelligence for Advanced Firewall Manager by assigning IP intelligence policies to the global, route domain, or virtual server context.

## IP address intelligence categories

Along with the IP address, the IP intelligence database stores the category that explains the reason that the IP address is considered untrustworthy.

| Category Name | Description |
|---|---|
| Botnets | IP addresses of computers that are infected with malicious software (Botnet Command and Control channels, and infected zombie machines) and are controlled as a group by a Bot master, and are now part of a botnet. Hackers can exploit botnets to send spam messages, launch various attacks, or cause target systems to behave in other unpredictable ways. |
| Cloud Provider Networks | IP addresses and networks that are used by cloud providers. |
| Denial-of-Service | IP addresses that have launched denial-of-service (DoS) attacks, distributed denial-of-service (DDoS) attacks, anomalous SYN flood attacks, or anomalous traffic detection. These attacks are usually requests for legitimate services, but occur at such a fast rate that targeted systems cannot respond quickly enough and become bogged down or unable to service legitimate clients. |

| Category Name | Description |
|---|---|
| Illegal Web sites | IP addresses that contain criminally obscene or potentially criminal internet copyright and intellectual property violations. |
| Infected Sources | Active IP addresses that issue HTTP requests with a low reputation index score, or that are known malicious web sites offering or distributing malware, shell code, rootkits, worms, or viruses. |
| Phishing | IP addresses that host phishing sites, and other kinds of fraud activities, such as ad click fraud or gaming fraud. |
| Proxy/Anonymous Proxies | IP addresses that are associated with web proxies that shield the originator's IP address (such as proxy and anonymization services). This category also includes TOR anonymizer addresses. |
| Scanners | IP addresses that are involved in reconnaissance, such as probes, host scan, domain scan, and password brute force, typically to identify vulnerabilities for later exploits. |
| Spam Sources | IP addresses that are known to distribute large amounts of spam email by tunneling spam messages through proxy, anomalous SMTP activities, and forum spam activities. |
| Web Attacks | IP addresses involved in cross site scripting, iFrame injection, SQL injection, cross domain injection, or domain password brute force. |
| Windows Exploits | Active IP addresses that have exercised various exploits against Windows resources by offering or distributing malware, shell code, rootkits, worms, or viruses using browsers, programs, downloaded files, scripts, or operating system vulnerabilities. |

## About IP intelligence blacklist classes

*Blacklist classes* are categories you can use to differentiate between types of blacklisted URLs. You can specify up to 62 blacklist classes, including 11 that are predefined on the system. A blacklist class definition consists only of a name and description. You can specify actions and logging options for each blacklist class you create, and for predefined classes, in an IP intelligence policy. The 11 predefined blacklist classes are automatically available for selection in an IP intelligence policy.

### Creating a blacklist class

You can create a blacklist class to configure policy-based responses to specific types of addresses. Then you can specify an address as belonging to a blacklist class so you can see the types of classes that are triggered in the logs, and so you can provide unique responses on a per-class basis.

1. On the Main tab, click **Security** > **Network Firewall** > **IP Intelligence** > **Blacklist Classes**.
   The Blacklist Classes screen opens.
2. Click **Create** to create a new IP Intelligence blacklist class.
3. In the **Name** field, type a name for the blacklist class.
4. In the **Description** field, type a description for the blacklist class.
5. Click **Finished**.
   The list screen and the new item are displayed.

# About IP intelligence feed lists

A *feed list* retrieves blacklists and whitelists from specified URLs. You can use a feed list to dynamically update blacklists and whitelists.

A feed list can retrieve multiple feeds from FTP, HTTP, or HTTPS addresses. You can specify whether a feed is a blacklist or whitelist, and the default class for the feed list. You can also configure a polling interval.

After a blacklist or whitelist is defined in a feed list, you add the feed list to an IP Intelligence policy. The list is then used by the policy to retrieve feeds and dynamically adjust the blacklist and whitelist policy.

## Feed list settings

Feed lists dynamically define IP addresses that have been blacklisted or whitelisted. The IP Intelligence policy uses feed lists to dynamically filter traffic.

A feed list defines the feeds that dynamically update the IP address intelligence database for your systems.

| Feed List setting | Description |
|---|---|
| URL | Select **FTP**, **HTTP**, or **HTTPS**, then specify the URL for the feed. Feeds are typically text files. An example for a local file might be `http://172.10.1.23/feed.txt` . |
| List Type | **Whitelist** or **Blacklist**. Specifies the default classification for all URLs in the feed for which a class is not specified. |
| Blacklist Class | Specifies a default class for the list. This is the default blacklist class for all blacklist URLs in the feed for which a class is not specified. On the BIG-IP® system, you can specify a total of 62 classes; however, 9 classes are used by the IP Intelligence database. |
| Poll Interval | Specifies how often the feed URL is polled for new feeds. |
| Username | The user name to access the feed list file, if required. |
| Password | The password to access the feed list file, if required. |
| Feed URLs | In this area you can add, replace, or delete feed URLs from the feed list. |

A feed is a simple comma-separated value (CSV) file. The file contains four comma-separated values per line.

| Position | Value | Definition |
|---|---|---|
| 1 | IP Address | The IP address to be blacklisted or whitelisted. This is the only field that is required in each entry in the file. All other entries are optional.<br><br>***Important:*** *Note that if you append a route domain with a percentage sign and the route domain number, the route domain is not used.* |

| Position | Value | Definition |
|---|---|---|
| 2 | Network Mask | (Optional) The Network Mask for the IP address, as a CIDR (e.g., 24 for 255.255.255.0). This field is optional. |
| 3 | Whitelist/Blacklist | (Optional) Whether the IP address is a whitelist or blacklist address. You can type `wl`, `bl`, `whitelist`, or `blacklist`, with any capitalization. Leave this field blank to take the default specified for the feed. |
| 4 | Class | (Optional) Type the class name for the entry. Leave this field blank to take the default specified for the feed. |

In this feed file example, only the first entry specifies a value for every field. The third and fourth entries, 213.155.14.161 and 10.0.5.20, will be set to blacklist or whitelist depending on the setting for the feed. 213.155.14.161 is specified with a category of `botnet`; however, if the default setting for the feed is a whitelist, this is ignored. Note that when an IP address has both a blacklist and a whitelist entry from the configuration, the whitelist entry takes precedence.

```
1.214.221.242,,bl,spam_sources
67.195.160.76,,wl,
213.155.14.161,,,botnet
10.0.5.20,,,
10.0.0.13,,bl,
```

## Creating a feed list

You can add whitelist and blacklist IP addresses to your configuration automatically by setting up feeds and capturing them with a feed list.

1. On the Main tab, click **Security** > **Network Firewall** > **IP Intelligence** > **Feed Lists**.
   The Feed Lists screen opens.
2. Click **Create** to create a new IP Intelligence feed list.
3. In the **Name** field, type a name for the feed list.
4. Configure Feed URLs with an HTTP, HTTPS, or FTP URL, the list type, the blacklist class, and the polling interval. Specify a username and password, if required to access the feed list.

   A feed URL includes the actual URL to the text file, and information about the defaults for that file. Within the feed file, however, any URL can be configured to be a whitelist or blacklist entry, and assigned to a blacklist class.
5. Click the **Add** button to add a feed URL to the feed list.
6. Click **Finished**.
   The list screen and the new item are displayed.

## Configuring a policy to check addresses against IP intelligence

You can verify IP addresses against the preconfigured IP Intelligence database, and against IPs from your own feed lists, by creating an IP Intelligence policy.

1. On the Main tab, click **Security** > **Network Firewall** > **IP Intelligence** > **Policies**.
   The IP Intelligence Policies screen opens.
2. Click **Create** to create a new IP Intelligence policy.
3. In the **Name** field, type a name for the IP intelligence policy.
4. To add feed lists to the policy, click on the name of an available feed list, and click the **<<** button to add it to the Selected list.
5. Set the default action for the policy to Accept or Reject.
   - Select **Accept** to allow packets from uncategorized addresses on the feed list.
   - Select **Reject** to drop and send a reject message for packets from uncategorized addresses on the feed list.

   The default action applies to addresses that are not assigned a blacklist class in the feed list. The IP Intelligence feature uses the action specified in a feed list entry, when available.
6. Set the default log action.
   - **Disabled** does not log matches.
   - **Log Black List Class Matches** logs IP addresses that match blacklist classes.
   - **Log White List Overrides** logs only whitelist matches that override blacklist matches.
   - **Log Black List Class Matches and White List Overrides** logs all black list matches, and all whitelist matches that override blacklist matches.

   ***Note:*** *Whitelist matches always override blacklist matches.*
7. To configure matching actions and logging for custom blacklist classes, add Blacklist Classes in the Blacklist Matching Policy area. Select a class from the list of predefined and user-defined blacklist classes, and set the default action and default logging action for the class, then click **Add** to add the blacklist class to the policy.

   ***Note:*** *The default action for a blacklist class is always **Reject**.*
8. For each class, you can select a default action.
   - Select **Accept** to allow packets from sources of the specified type, as identified by the IP address intelligence database.
   - Select **Reject** to drop and send a reject message for packets from sources of the specified type, as identified by the IP address intelligence database.
9. Set the default log action for the blacklist class.
   - **Disabled** does not log matches.
   - **Log Matches** logs IP addresses that match blacklist classes.
   - **Log Overrides** logs only whitelist matches that override blacklist matches.
   - **Log Matches and Overrides** logs all black list matches, and all whitelist matches that override blacklist matches.

   ***Note:*** *Whitelist matches always override blacklist matches.*

10. Click **Finished**.
    The list screen and the new item are displayed.

## Assigning a global IP Intelligence policy

You can assign an IP Intelligence policy globally, to apply blacklist and whitelist matching actions and logging to all traffic.

1. On the Main tab, click **Security** > **Network Firewall** > **IP Intelligence** > **Policies**.
   The IP Intelligence Policies screen opens.
2. From the **Global Policy** list, select the IP Intelligence policy to apply to all traffic on the BIG-IP system.
3. Click **Update**.
   The list screen and the updated item are displayed.

The specified IP Intelligence policy is applied to all traffic.

## Assigning an IP Intelligence policy to a virtual server

You can assign an IP Intelligence policy to a virtual server, to apply blacklist and whitelist matching actions and logging to traffic on that virtual server only.

1. On the Main tab, click **Local Traffic** > **Virtual Servers**.
   The Virtual Server List screen opens.
2. Click the name of the virtual server you want to modify.
3. From the **Security** menu, choose **Policies**.
4. Next to **IP Intelligence**, select **Enabled**, then select the IP intelligence policy to apply to traffic on the virtual server.
5. Click **Update**.
   The list screen and the updated item are displayed.

The specified IP Intelligence policy is applied to traffic on the selected virtual server.

## Assigning an IP Intelligence policy to a route domain

You can assign an IP Intelligence policy to a route domain, to apply blacklist and whitelist matching actions and logging to route domain traffic.

1. On the Main tab, click **Network** > **Route Domains**.
   The Route Domain List screen opens.
2. In the Name column, click the name of the relevant route domain.
3. From the **IP Intelligence Policy** list, select an IP Intelligence policy to enforce on this route domain.
4. Click **Update**.
   The system displays the list of route domains on the BIG-IP system.

The specified IP Intelligence policy is applied to traffic on the route domain.

# Chapter 6

# About Local Logging with the Network Firewall


- *Overview: Configuring local Network Firewall event logging*
- *Task summary*
- *Implementation result*

## Overview: Configuring local Network Firewall event logging

You can configure the BIG-IP® system to log detailed information about BIG-IP system Network Firewall events and store those logs on the BIG-IP system.

***Important:*** *The BIG-IP system Advanced Firewall Manager™ (AFM™) must be licensed and provisioned before you can configure Network Firewall event logging.*

## Task summary

Perform these tasks to configure Network Firewall logging locally on the BIG-IP® system.

***Note:*** *Enabling logging and storing the logs locally impacts BIG-IP system performance.*

*Creating a local Network Firewall Logging profile*
*Configuring an LTM virtual server for Network Firewall event logging*
*Viewing Network Firewall event logs locally on the BIG-IP system*
*Creating a Network Firewall rule from a firewall log entry*
*Disabling logging*

### Creating a local Network Firewall Logging profile

Create a custom Logging profile to log BIG-IP® system Network Firewall events locally on the BIG-IP system.

1. On the Main tab, click **Security** > **Event Logs** > **Logging Profiles**.
   The Logging Profiles list screen opens.
2. Click **Create**.
   The New Logging Profile screen opens.
3. In the **Profile Name** field, type a unique name for the profile.
4. Select the **Network Firewall** check box.
5. In the Network Firewall area, from the **Publisher** list, select **local-db-publisher**.
6. For the **Log Rule Matches** setting, select how the BIG-IP system logs packets that match ACL rules. You can select any or all of the options.

| Option | Description |
|---|---|
| **Option** | Enables or disables logging of packets that match ACL rules configured with: |
| **Accept** | `action=Accept` |
| **Drop** | `action=Drop` |
| **Reject** | `action=Reject` |

7. Select the **Log IP Errors** check box, to enable logging of IP error packets.
8. Select the **Log TCP Errors** check box, to enable logging of TCP error packets.

9. Select the **Log TCP Events** check box, to enable logging of open and close of TCP sessions.
10. In the IP Intelligence area, from the **Publisher** list, select **local-db-publisher**.

***Note:*** *The IP Address Intelligence feature must be enabled and licensed.*

11. Enable the **Log Translation Fields** setting to log both the original IP address and the NAT-translated IP address for Network Firewall log events.
12. Click **Finished**.

Assign this custom Network Firewall Logging profile to a virtual server.

## Configuring an LTM virtual server for Network Firewall event logging

Ensure that at least one log publisher exists on the BIG-IP® system.

Assign a custom Network Firewall Logging profile to a virtual server when you want the BIG-IP system to log Network Firewall events on the traffic that the virtual server processes.

***Note:*** *This task applies only to LTM®-provisioned systems.*

1. On the Main tab, click **Local Traffic** > **Virtual Servers**.
   The Virtual Server List screen opens.
2. Click the name of the virtual server you want to modify.
3. On the menu bar, click **Security** > **Policies**.
   The screen displays Policy settings and Inline Rules settings.
4. From the **Log Profile** list, select **Enabled**. Then, for the **Profile** setting, move the profiles that log specific events to specific locations from the **Available** list to the **Selected** list.

***Note:*** *If you don't have a custom profile configured, select the predefined logging profile* ***global-network*** *to log Advanced Firewall Manager™ events. Note that to log global, self IP, and route domain contexts, you must enable a Publisher in the* ***global-network*** *profile.*

5. Click **Update** to save the changes.

## Viewing Network Firewall event logs locally on the BIG-IP system

Ensure that the BIG-IP® system is configured to log the types of events you want to view, and to store the log messages locally on the BIG-IP system.

When the BIG-IP system is configured to log events locally, you can view those events using the Configuration utility.

1. On the Main tab, click **Security** > **Event Logs** > **Network** > **Firewall**.
   The Network Firewall event log displays.
2. To search for specific events, click **Custom Search**. Drag the event data that you want to search for from the Event Log table into the Custom Search table, and then click **Search**.

## Creating a Network Firewall rule from a firewall log entry

You must be logging network firewall traffic to create a rule from the network firewall logs.

You can create a rule from the local log, from an enforced or staged rule or policy. You might use this to change the action taken on specific traffic that is matched by a more general rule. You can also use this to replicate a rule and change some parameter, such as the source or destination ports. Note that the rule you create from a log entry already has some information specified, such as source and destination address and ports, protocol, and VLAN. You can change any of this information as required.

1. On the Main tab, click **Security** > **Event Logs** > **Network** > **Firewall**.
   The Network Firewall event log displays.
2. Select the search parameters to show the desired log results, then click **Search**.
3. Select a log entry, and click **Create Rule**.
4. From the **Context** list, select the context for the firewall rule.

   For a firewall rule in a rule list, or a firewall rule or rule list in a policy, the context is predefined and cannot be changed.
5. In the **Name** and **Description** fields, type the name and an optional description.
6. From the **Type** list, select whether you are creating a standalone network firewall rule or creating the rule from a predefined rule list.

   If you create a firewall rule from a predefined rule list, only the **Name**, **Description**, and **State** options apply, and you must select or create a rule list to include.
7. From the **State** list, select the rule state.
   - Select **Enabled** to apply the firewall rule to the given context and addresses.
   - Select **Disabled** to set the firewall rule to not apply at all.
   - Select **Scheduled** to apply the firewall rule according to the selected schedule.
8. From the **Schedule** list, select the schedule for the firewall rule.

   This schedule is applied when the firewall rule state is set to **Scheduled**.
9. From the **Protocol** list, select the protocol to which the firewall rule applies.
   - Select **Any** to apply the firewall rule to any protocol.
   - Select the protocol name to apply the rule to a single protocol.

   ***Important:*** *ICMP is handled by the BIG-IP system at the global or route domain level. Because of this, ICMP messages receive a response before they reach the virtual server context. You cannot create an inline rule for ICMP or ICMPv6 on a Self IP context. You can apply a rule list to a self IP that includes a rule for ICMP or ICMPv6; however, such a rule will be ignored. To apply firewall actions to the ICMP protocol, create a rule with the* `global` *or* `route domain` *context. ICMP rules are evaluated only for ICMP forwarding requests, and not for the IP addresses of the BIG-IP system itself.*

   ***Note:*** *Note that you must select a protocol if you specify ports.*
10. From the Source **Address/Region** list, select the type of source address to which this rule applies.
    - Select **Any** to have the rule apply to any packet source IP address.
    - Select **Specify** and click **Address** to specify one or more packet source IP addresses to which the rule applies. When selected, you can type single IP addresses into the **Address** field, then click **Add** to add them to the address list.

- Select **Specify** and click **Address List** to select a predefined list of packet source addresses to which the rule applies. To use an address list with this rule, select the address list and click the **Add** button. Similarly, to remove the list from this rule, select the list and click the **Delete** button.
- Select **Specify** and click **Address Range** to specify a contiguous range of packet source IP addresses to which the rule applies. When selected, you can type a start and end IP address in the fields, then click **Add** to add the IP address range to the address list.
- Select **Specify** and click **Country/Region** to identify the geographic origin of packet sources, and to apply rules based on selected geographic locations. When selected, a field appears in which you can select a country. For many countries, an extra field appears after you select the country, in which you can select a state or province. If you do not select a specific state or province, the entire country is selected. After you select a geographic location, click **Add** to add it to the Source address list.

**11.** From the Source **Port** list, select the type of packet source ports to which this rule applies.

- Select **Any** to have the rule apply to any packet source port.
- Select **Specify** and click **Port** to specify one or more packet source ports to which the rule applies. When selected, you can type single port numbers into the **Port** field, then click **Add** to add them to the port list.
- Select **Specify** and click **Port Range** to specify a list of contiguous packet source port numbers to which the rule applies. When selected, you can type the start and end ports into the fields, then click **Add** to add the ports to the port list.
- Select **Specify** and click **Port List** to select a predefined list of packet source ports to which the rule applies. To use a port list with this rule, select the port list and click the **Add** button. Similarly, to remove the list from this rule, select the list and click the **Delete** button.

**12.** From the Source **VLAN/Tunnel** list, select the VLAN on which this rule applies.

- Select **Any** to have the rule apply to traffic on any VLAN through which traffic enters the firewall.
- Select **Specify** to specify one or more VLANs on the firewall to which the rule applies. To use a VLAN with this rule, move the VLAN from the **Available** list to the **Selected** list by clicking the **<<** button. Similarly, to remove the VLAN from this rule, click the **>>** button to move the VLAN from the **Selected** list to the **Available** list.

**13.** From the Destination **Address/Region** list, select the type of packet destination address to which this rule applies.

- Select **Any** to have the rule apply to any IP packet destination address.
- Select **Specify** and click **Address** to specify one or more packet destination IP addresses to which the rule applies. When selected, you can type single IP addresses into the **Address** field, then click **Add** to add them to the address list.
- Select **Specify** and click **Address List** to select a predefined list of packet destination addresses to which the rule applies. To use an address list with this rule, select the address list and click the **Add** button. Similarly, to remove the list from this rule, select the list and click the **Delete** button.
- Select **Specify** and click **Address Range** to specify a contiguous range of packet destination IP addresses to which the rule applies. When selected, you can type a start and end IP address in the fields, then click **Add** to add the IP address range to the address list.
- Select **Specify** and click **Country/Region** to identify the geographic packet destination, and to apply rules based on specific geographic locations. When selected, a field appears in which you can select a country. For many countries, an extra field appears after you select the country, in which you can select a state or province. If you do not select a specific state or province, the entire country is selected. After you select a geographic location, click **Add** to add it to the Destination address list.

**14.** From the Destination **Port** list, select the type of packet destination ports to which this rule applies.

- Select **Any** to have the rule apply to any port inside the firewall.

- Select **Specify** and click **Port** to specify one or more packet destination ports to which the rule applies. When selected, you can type single port numbers into the **Port** field, then click **Add** to add them to the port list.
- Select **Specify** and click **Port Range** to specify a list of contiguous packet destination port numbers to which the rule applies. When selected, you can type the start and end ports into the fields, then click **Add** to add the ports to the port list.
- Select **Specify** and click **Port List** to select a predefined list of packet destination ports to which the rule applies. To use a port list with this rule, select the port list and click the **Add** button. Similarly, to remove the list from this rule, select the list and click the **Delete** button.

15. Optionally, from the **iRule** list, select an iRule to start if the rule matches traffic.
16. From the **Action** list, select the firewall action for traffic originating from the specified source address on the specified protocol. Choose from one of the these actions:

| Option | Description |
|---|---|
| **Accept** | Allows packets with the specified source, destination, and protocol to pass through the firewall. Packets that match the rule, and are accepted, traverse the system as if the firewall is not present. |
| **Accept Decisively** | Allows packets with the specified source, destination, and protocol to pass through the firewall, and does not require any further processing by any of the further firewalls. Packets that match the rule, and are accepted, traverse the system as if the firewall is not present. |
| **Drop** | Drops packets with the specified source, destination, and protocol. Dropping a packet is a silent action with no notification to the source or destination systems. Dropping the packet causes the connection to be retried until the retry threshold is reached. |
| **Reject** | Rejects packets with the specified source, destination, and protocol. When a packet is rejected the firewall sends a destination unreachable message to the sender. |

17. From the **Logging** list, enable or disable logging for the firewall rule.
18. Click **Finished**.
    The list screen and the new item are displayed.

The new firewall policy rule is created from the log entry.

*Task summary*

*Viewing Network Firewall event logs locally on the BIG-IP system*

*Disabling logging*

## Disabling logging

Disable Network Firewall, Protocol Security, or DoS Protection event logging when you no longer want the BIG-IP® system to log specific events on the traffic handled by specific resources.

---

***Note:*** *You can disable and re-enable logging for a specific resource based on your network administration needs.*

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1. On the Main tab, click **Local Traffic** > **Virtual Servers**.
   The Virtual Server List screen opens.
2. Click the name of the virtual server you want to modify.
3. On the menu bar, click **Security** > **Policies**.

The screen displays Policy settings and Inline Rules settings.

4. From the **Log Profile** list, select **Disabled**.
5. Click **Update** to save the changes.

The BIG-IP system does not log the events specified in this profile for the resources to which this profile is assigned.

*Task summary*

## Implementation result

You now have an implementation in which the BIG-IP® system logs specific Network Firewall events and stores the logs in a local database on the BIG-IP system.

# Chapter 7

# About Remote High-Speed Logging with the Network Firewall


- *Overview: Configuring remote high-speed Network Firewall event logging*
- *Implementation result*

## Overview: Configuring remote high-speed Network Firewall event logging

You can configure the BIG-IP® system to log information about the BIG-IP system Network Firewall events and send the log messages to remote high-speed log servers.

***Important:*** *The BIG-IP system Advanced Firewall Manager™ (AFM™) must be licensed and provisioned before you can configure Network Firewall event logging.*

When configuring remote high-speed logging of Network Firewall events, it is helpful to understand the objects you need to create and why, as described here:

| Object to create in implementation | Reason |
|---|---|
| Pool of remote log servers | Create a pool of remote log servers to which the BIG-IP system can send log messages. |
| Destination (unformatted) | Create a log destination of Remote High-Speed Log type that specifies a pool of remote log servers. |
| Destination (formatted) | If your remote log servers are the ArcSight, Splunk, IPFIX, or Remote Syslog type, create an additional log destination to format the logs in the required format and forward the logs to a remote high-speed log destination. |
| Publisher | Create a log publisher to send logs to a set of specified log destinations. |
| Logging profile | Create a custom Logging profile to enable logging of user-specified data at a user-specified level, and associate a log publisher with the profile. |
| LTM® virtual server | Associate a custom Logging profile with a virtual server to define how the BIG-IP system logs security events on the traffic that the virtual server processes. |

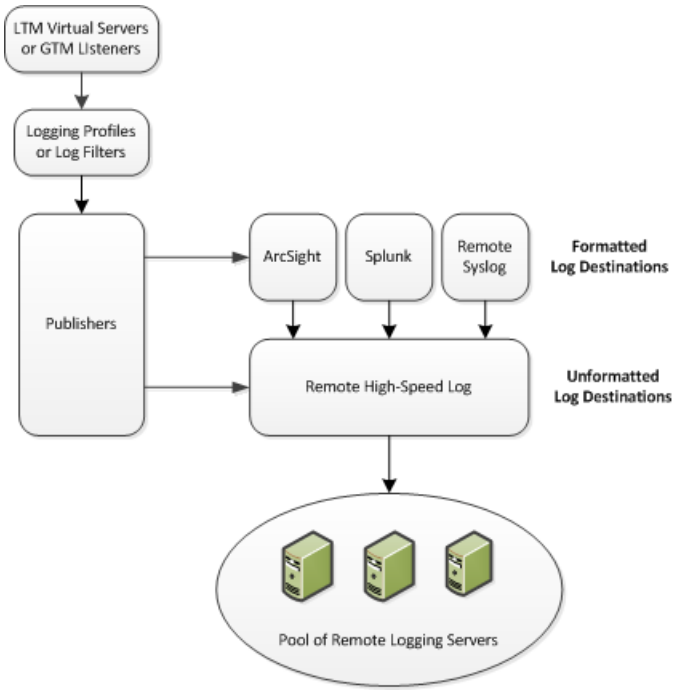


**Figure 3: Association of remote high-speed logging configuration objects**

### Task summary

Perform these tasks to configure remote high-speed network firewall logging on the BIG-IP® system.

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***Note:*** *Enabling remote high-speed logging impacts BIG-IP system performance.*

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*Creating a pool of remote logging servers*
*Creating a remote high-speed log destination*
*Creating a formatted remote high-speed log destination*
*Creating a publisher*
*Creating a custom Network Firewall Logging profile*
*Configuring an LTM virtual server for Network Firewall event logging*
*Disabling logging*

## Creating a pool of remote logging servers

Before creating a pool of log servers, gather the IP addresses of the servers that you want to include in the pool. Ensure that the remote log servers are configured to listen to and receive log messages from the BIG-IP® system.

Create a pool of remote log servers to which the BIG-IP system can send log messages.

1. On the Main tab, click **DNS** > **Delivery** > **Load Balancing** > **Pools** or **Local Traffic** > **Pools**.
   The Pool List screen opens.
2. Click **Create**.
   The New Pool screen opens.
3. In the **Name** field, type a unique name for the pool.
4. Using the **New Members** setting, add the IP address for each remote logging server that you want to include in the pool:

a) Type an IP address in the **Address** field, or select a node address from the **Node List**.
b) Type a service number in the **Service Port** field, or select a service name from the list.

***Note:*** *Typical remote logging servers require port* `514`.

c) Click **Add**.

5. Click **Finished**.

## Creating a remote high-speed log destination

Before creating a remote high-speed log destination, ensure that at least one pool of remote log servers exists on the BIG-IP® system.

Create a log destination of the **Remote High-Speed Log** type to specify that log messages are sent to a pool of remote log servers.

1. On the Main tab, click **System** > **Logs** > **Configuration** > **Log Destinations**.
   The Log Destinations screen opens.
2. Click **Create**.
3. In the **Name** field, type a unique, identifiable name for this destination.
4. From the **Type** list, select **Remote High-Speed Log**.

***Important:*** *If you use log servers such as Remote Syslog, Splunk, or ArcSight, which require data be sent to the servers in a specific format, you must create an additional log destination of the required type, and associate it with a log destination of the* ***Remote High-Speed Log*** *type. With this configuration, the BIG-IP system can send data to the servers in the required format.*

   The BIG-IP system is configured to send an unformatted string of text to the log servers.
5. From the **Pool Name** list, select the pool of remote log servers to which you want the BIG-IP system to send log messages.
6. From the **Protocol** list, select the protocol used by the high-speed logging pool members.
7. Click **Finished**.

## Creating a formatted remote high-speed log destination

Ensure that at least one remote high-speed log destination exists on the BIG-IP® system.

Create a formatted logging destination to specify that log messages are sent to a pool of remote log servers, such as Remote Syslog, Splunk, or ArcSight servers.

1. On the Main tab, click **System** > **Logs** > **Configuration** > **Log Destinations**.
   The Log Destinations screen opens.
2. Click **Create**.
3. In the **Name** field, type a unique, identifiable name for this destination.
4. From the **Type** list, select a formatted logging destination, such as **IPFIX**, **Remote Syslog**, **Splunk**, or **ArcSight**.

***Important:*** *ArcSight formatting is only available for logs coming from Advanced Firewall Manager (AFM), Application Security Manager (ASM™), and the Secure Web Gateway component of Access Policy Manager® (APM®). IPFIX is not available for Secure Web Gateway.*

The BIG-IP system is configured to send a formatted string of text to the log servers.

5. If you selected **Remote Syslog**, from the **Syslog Format** list, select a format for the logs, and then from the **High-Speed Log Destination** list, select the destination that points to a pool of remote Syslog servers to which you want the BIG-IP system to send log messages.
6. If you selected **Splunk** or **IPFIX**, from the **Forward To** list, select the destination that points to a pool of high-speed log servers to which you want the BIG-IP system to send log messages.
7. Click **Finished**.

## Creating a publisher

Ensure that at least one destination associated with a pool of remote log servers exists on the BIG-IP® system.

Create a publisher to specify where the BIG-IP system sends log messages for specific resources.

1. On the Main tab, click **System** > **Logs** > **Configuration** > **Log Publishers**.
   The Log Publishers screen opens.
2. Click **Create**.
3. In the **Name** field, type a unique, identifiable name for this publisher.
4. For the **Destinations** setting, select a destination from the **Available** list, and click **<<** to move the destination to the **Selected** list.

***Note:*** *If you are using a formatted destination, select the destination that matches your log servers, such as Remote Syslog, Splunk, or ArcSight.*

5. Click **Finished**.

## Creating a custom Network Firewall Logging profile

Create a custom Logging profile to log messages about BIG-IP® system Network Firewall events.

1. On the Main tab, click **Security** > **Event Logs** > **Logging Profiles**.
   The Logging Profiles list screen opens.
2. Click **Create**.
   The New Logging Profile screen opens.
3. In the **Name** field, type a unique name for the profile.
4. Select the **Network Firewall** check box.
5. In the Network Firewall area, from the **Publisher** list, select the publisher the BIG-IP system uses to log Network Firewall events.
6. For the **Log Rule Matches** setting, select how the BIG-IP system logs packets that match ACL rules. You can select any or all of the options.

| Option | Description |
|---|---|
| **Option** | Enables or disables logging of packets that match ACL rules configured with: |

| Option | Description |
|---|---|
| **Accept** | `action=Accept` |
| **Drop** | `action=Drop` |
| **Reject** | `action=Reject` |

7. Select the **Log IP Errors** check box, to enable logging of IP error packets.
8. Select the **Log TCP Errors** check box, to enable logging of TCP error packets.
9. Select the **Log TCP Events** check box, to enable logging of open and close of TCP sessions.
10. From the **Storage Format** list, select how the BIG-IP system formats the log. Your choices are:

| Option | Description |
|---|---|
| **None** | Specifies the default format type in which the BIG-IP system logs messages to a remote Syslog server, for example:<br>`"management_ip_address","bigip_hostname","context_type", "context_name","src_ip","dest_ip","src_port", "dest_port","vlan","protocol","route_domain", "acl_rule_name","action","drop_reason` |
| **Field-List** | This option allows you to:<br>• Select from a list, the fields to be included in the log.<br>• Specify the order the fields display in the log.<br>• Specify the delimiter that separates the content in the log. The default delimiter is the comma character. |
| **User-Defined** | This option allows you to:<br>• Select from a list, the fields to be included in the log.<br>• Cut and paste, in a string of text, the order the fields display in the log. |

11. In the IP Intelligence area, from the **Publisher** list, select the publisher that the BIG-IP system uses to log source IP addresses, which according to an IP Address Intelligence database have a bad reputation, and the name of the bad reputation category.

***Note:*** *The IP Address Intelligence feature must be enabled and licensed.*

12. Click **Finished**.

Assign this custom network firewall Logging profile to a virtual server.

## Configuring an LTM virtual server for Network Firewall event logging

Ensure that at least one log publisher exists on the BIG-IP® system.

Assign a custom Network Firewall Logging profile to a virtual server when you want the BIG-IP system to log Network Firewall events on the traffic that the virtual server processes.

***Note:*** *This task applies only to LTM®-provisioned systems.*

1. On the Main tab, click **Local Traffic** > **Virtual Servers**.
   The Virtual Server List screen opens.
2. Click the name of the virtual server you want to modify.

3. On the menu bar, click **Security** > **Policies**.
   The screen displays Policy settings and Inline Rules settings.
4. From the **Log Profile** list, select **Enabled**. Then, for the **Profile** setting, move the profiles that log specific events to specific locations from the **Available** list to the **Selected** list.

   ***Note:*** *If you don't have a custom profile configured, select the predefined logging profile* ***global-network*** *to log Advanced Firewall Manager™ events. Note that to log global, self IP, and route domain contexts, you must enable a Publisher in the* ***global-network*** *profile.*
5. Click **Update** to save the changes.

## Disabling logging

Disable Network Firewall, Protocol Security, or DoS Protection event logging when you no longer want the BIG-IP® system to log specific events on the traffic handled by specific resources.

***Note:*** *You can disable and re-enable logging for a specific resource based on your network administration needs.*

1. On the Main tab, click **Local Traffic** > **Virtual Servers**.
   The Virtual Server List screen opens.
2. Click the name of the virtual server you want to modify.
3. On the menu bar, click **Security** > **Policies**.
   The screen displays Policy settings and Inline Rules settings.
4. From the **Log Profile** list, select **Disabled**.
5. Click **Update** to save the changes.

The BIG-IP system does not log the events specified in this profile for the resources to which this profile is assigned.

*Task summary*

# Implementation result

You now have an implementation in which the BIG-IP® system logs specific Network Firewall events and sends the logs to a remote log server.

Chapter

# 8

# About Logging Network Firewall Events to IPFIX Collectors


- *Overview: Configuring IPFIX logging for AFM*
- *Implementation result*

## Overview: Configuring IPFIX logging for AFM

You can configure the BIG-IP® system to log information about Advanced Firewall Manager™ (AFM™) processes and send the log messages to remote IPFIX collectors.

The BIG-IP system supports logging of AFM events over the IPFIX protocol. IPFIX logs are raw, binary-encoded strings with their fields and field lengths defined by IPFIX templates. *IPFIX collectors* are external devices that can receive IPFIX templates and use them to interpret IPFIX logs.

The configuration process involves creating and connecting the following configuration objects:

| Object to create in implementation | Reason |
|---|---|
| Pool of IPFIX collectors | Create a pool of IPFIX collectors to which the BIG-IP system can send IPFIX log messages. |
| Destination | Create a log destination to format the logs in IPFIX templates, and forward the logs to the local-syslog database. |
| Publisher | Create a log publisher to send logs to a set of specified log destinations. |

### Task summary

Perform these tasks to configure IPFIX logging of AFM processes on the BIG-IP® system.

***Note:*** *Enabling IPFIX logging impacts BIG-IP system performance.*

*Creating a pool of IPFIX collectors*
*Creating an IPFIX log destination*
*Creating a publisher*
*Creating a custom Network Firewall Logging profile*

## Creating a pool of IPFIX collectors

You must have one or more external IPFIX collectors to receive IPFIX logs of your CGNAT mappings, before you can group the collectors into an LTM® pool.

Before creating a pool of IPFIX collectors, gather the IP addresses of the collectors that you want to include in the pool. Ensure that the remote IPFIX collectors are configured to listen to and receive log messages from the BIG-IP® system.

These are the steps for creating a pool of IPFIX collectors. The BIG-IP system can send IPFIX log messages to this pool.

1. On the Main tab, click **Local Traffic** > **Pools**.
   The Pool List screen opens.
2. Click **Create**.
   The New Pool screen opens.
3. In the **Name** field, type a unique name for the pool.
4. Using the **New Members** setting, add the IP address for each IPFIX collector that you want to include in the pool:

a) Type the collector's IP address in the **Address** field, or select a node address from the **Node List**.
b) Type a port number in the **Service Port** field.

   By default, IPFIX collectors listen on UDP or TCP port `4739` and Netflow V9 devices listen on port `2055`, though the port is configurable at each collector.

c) Click **Add**.

5. Click **Finished**.

## Creating an IPFIX log destination

A log destination of the **IPFIX** type specifies that log messages are sent to a pool of IPFIX collectors.

1. On the Main tab, click **System** > **Logs** > **Configuration** > **Log Destinations**.
   The Log Destinations screen opens.
2. Click **Create**.
3. In the **Name** field, type a unique, identifiable name for this destination.
4. From the **Type** list, select **IPFIX**.
5. From the **Protocol** list, select **IPFIX** or **Netflow V9**, depending on the type of collectors you have in the pool.
6. From the **Pool Name** list, select an LTM® pool of IPFIX collectors.
7. From the **Transport Profile** list, select **TCP**, **UDP**, or any customized profile derived from TCP or UDP.
8. Type the **Template Retransmit Interval**, the time between transmissions of IPFIX templates to the pool of collectors.

   An *IPFIX template* defines the field types and byte lengths of the binary IPFIX log messages. The logging destination sends the template for a given log type (for example, NAT44 messages) before sending any of those logs, so that the IPFIX collector can read the logs of that type. The logging destination assigns a template ID to each template, and places the template ID into each log that uses that template.

   The log destination periodically retransmits all of its IPFIX templates. The retransmissions are helpful for UDP connections, which are lossy, and they are also helpful for debugging a TCP connection.

9. The **Template Delete Delay** is the time that the BIG-IP device should pause between deleting an obsolete template and using its template ID. This feature is not currently implemented.
10. Click **Finished**.

## Creating a publisher

A publisher specifies where the BIG-IP® system sends log messages for IPFIX logs.

1. On the Main tab, click **System** > **Logs** > **Configuration** > **Log Publishers**.
   The Log Publishers screen opens.
2. Click **Create**.
3. In the **Name** field, type a unique, identifiable name for this publisher.
4. Use the Log Destinations area to select an existing IPFIX destination (perhaps along with other destinations for your logs): click any destination name in the **Available** list, and click **<<** to move it to the **Selected** list.

5. Click **Finished**.

## Creating a custom Network Firewall Logging profile

Create a custom Logging profile to log messages about BIG-IP® system Network Firewall events.

1. On the Main tab, click **Security** > **Event Logs** > **Logging Profiles**.
   The Logging Profiles list screen opens.
2. Click **Create**.
   The New Logging Profile screen opens.
3. In the **Name** field, type a unique name for the profile.
4. Select the **Network Firewall** check box.
5. In the Network Firewall area, from the **Publisher** list, select the IPFIX publisher the BIG-IP system uses to log Network Firewall events.
6. For the **Log Rule Matches** setting, select how the BIG-IP system logs packets that match ACL rules. You can select any or all of the options.

| Option | Description |
|---|---|
| **Option** | Enables or disables logging of packets that match ACL rules configured with: |
| **Accept** | `action=Accept` |
| **Drop** | `action=Drop` |
| **Reject** | `action=Reject` |

7. Select the **Log IP Errors** check box, to enable logging of IP error packets.
8. Select the **Log TCP Errors** check box, to enable logging of TCP error packets.
9. Select the **Log TCP Events** check box, to enable logging of open and close of TCP sessions.
10. Enable the **Log Translation Fields** setting to log both the original IP address and the NAT-translated IP address for Network Firewall log events.
11. From the **Storage Format** list, select how the BIG-IP system formats the log. Your choices are:

| Option | Description |
|---|---|
| **None** | Specifies the default format type in which the BIG-IP system logs messages to a remote Syslog server, for example:<br>`"management_ip_address","bigip_hostname","context_type", "context_name","src_ip","dest_ip","src_port", "dest_port","vlan","protocol","route_domain", "acl_rule_name","action","drop_reason` |
| **Field-List** | This option allows you to:<br>• Select from a list, the fields to be included in the log.<br>• Specify the order the fields display in the log.<br>• Specify the delimiter that separates the content in the log. The default delimiter is the comma character. |
| **User-Defined** | This option allows you to:<br>• Select from a list, the fields to be included in the log.<br>• Cut and paste, in a string of text, the order the fields display in the log. |

12. In the IP Intelligence area, from the **Publisher** list, select the publisher that the BIG-IP system uses to log source IP addresses, which according to an IP Address Intelligence database have a bad reputation, and the name of the bad reputation category.

    ***Note:*** *The IP Address Intelligence feature must be enabled and licensed.*

13. Click **Finished**.

Assign this custom network firewall Logging profile to a virtual server.

*Overview: Configuring IPFIX logging for AFM*

*Creating a publisher*

## Implementation result

Now you have an implementation in which the BIG-IP® system logs messages about AFM™ events and sends the log messages to a pool of IPFIX collectors.

***Note:*** *Network firewall events are logged only for rules or policies for which logging is enabled.*

# Chapter 9

# Deploying the BIG-IP Network Firewall in ADC Mode


- *About deploying the network firewall in ADC mode*
- *Configuring the Network Firewall in ADC mode*
- *Creating a VLAN for the network firewall*
- *Adding a firewall rule to deny ICMP*
- *Creating an address list*
- *Denying access with firewall rules on the network virtual server*
- *Denying access with firewall rules on the application virtual server*

## About deploying the network firewall in ADC mode

The BIG-IP® Network Firewall provides policy-based access control to and from address and port pairs inside and outside of your network. By default, the network firewall is configured in ADC mode, which is a default allow configuration, in which all traffic is allowed through the firewall, and any traffic you want to block must be explicitly specified.

To understand this firewall scenario, imagine that your prerequisite system load-balances all traffic from the Internet to several internal servers. The internal servers are:

| Device and location | IP address | Traffic type |
|---|---|---|
| Externally accessible FTP server | 70.168.15.104 | FTP |
| Application virtual server | 192.168.15.101 | HTTP, FTP |
| Server on internal network | 10.10.1.10 | HTTP, HTTPS |
| Server on internal network | 10.10.1.11 | HTTP, HTTPS |

The system does not have a separate route domain configured, however you can use Route Domain 0, which is essentially the same as a global rule.

In order for traffic from the internal application virtual server to reach the external network virtual server, you must create a VLAN and enable both internal and external virtual servers on it. In this scenario, these VLANs are specified:

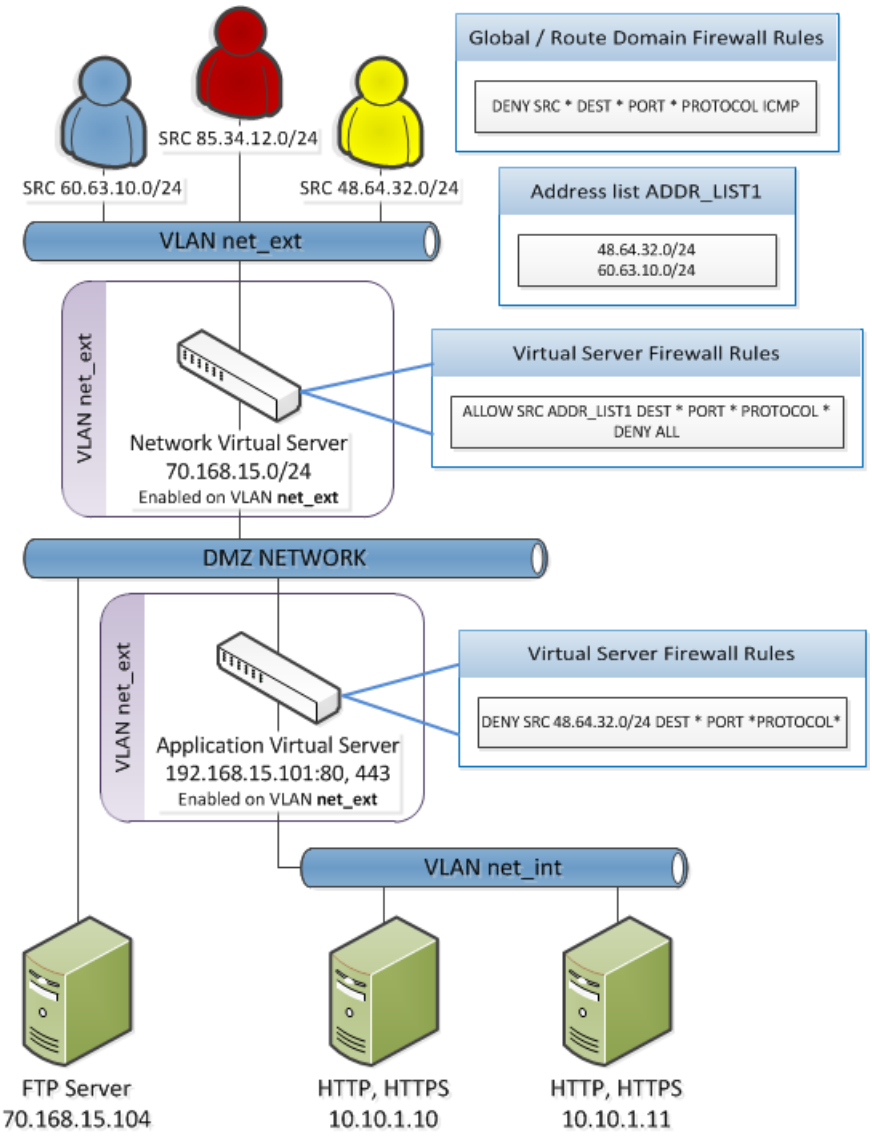
| VLAN | Configuration |
|---|---|
| net_ext | Enabled on 70.168.15.0/24, 192.168.15.101 |
| net_int | Includes pool members 10.10.1.10, 10.10.1.11 |

In addition, in this firewall configuration, there are three external networks that must be firewalled:

| Network | Policy |
|---|---|
| 60.63.10.0/24 | Allow all access |
| 85.34.12.0/24 | Deny all access |
| 48.64.32.0/24 | Allow FTP, deny HTTP and HTTPS |

To set up this scenario, you configure addresses, ports, and firewall rules specific to these networks, ports, and addresses. You will also configure a firewall rule that denies all ICMP traffic, to prevent pinging of network devices.

**Figure 4: Firewall in ADC mode configuration scenario**




## Configuring the Network Firewall in ADC mode

If you have changed the firewall setting to Firewall mode, you can configure the BIG-IP® Network Firewall back to ADC mode.

***Note:*** *The firewall is configured in ADC mode, by default.*

1. On the Main tab, click **Security** > **Options** > **Network Firewall**.
   The Firewall Options screen opens.
2. From the **Virtual Server & Self IP Contexts** list, select the default action **Accept** for the self IP and virtual server contexts.
3. Click **Update**.
   The virtual server and self IP contexts for the firewall are changed.

## Creating a VLAN for the network firewall

Create a VLAN with tagged interfaces, so that each of the specified interfaces can process traffic destined for that VLAN.

1. On the Main tab, click **Network** > **VLANs**.
   The VLAN List screen opens.
2. Click **Create**.
   The New VLAN screen opens.
3. In the **Name** field, type a unique name for the VLAN.
   For purposes of this implementation, name the VLAN `net_ext`.
4. For the **Interfaces** setting, click an interface number or trunk name from the **Available** list, and use the Move button to add the selected interface or trunk to the **Tagged** list. Repeat this step as necessary.
   You can use the same interface for other VLANs later, if you always assign the interface as a tagged interface.
5. If you want the system to verify that the return route to an initial packet is the same VLAN from which the packet originated, select the **Source Check** check box.
6. From the **Configuration** list, select **Advanced**.
7. In the **MTU** field, retain the default number of bytes (**1500**).
8. If you want to base redundant-system failover on VLAN-related events, select the **Fail-safe** box.
9. From the **Auto Last Hop** list, select a value.
10. From the **CMP Hash** list, select a value.
11. To enable the **DAG Round Robin** setting, select the check box.
12. Click **Finished**.
    The screen refreshes, and displays the new VLAN from the list.

The new VLAN appears in the VLAN list.

Enable the new VLAN on both the network virtual server and the application virtual server.

## Configuring an LTM virtual server with a VLAN for Network Firewall

For this implementation, at least two virtual servers and one at least one VLAN are assumed, though your configuration might be different.

You enable two virtual servers on the same VLAN to allow traffic from hosts on one virtual server to reach or pass through the other. In the Network Firewall, if you are using multiple virtual servers to allow or deny traffic to and from specific hosts behind different virtual servers, you must enable those virtual servers on the same VLAN.

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***Tip:*** *By default, the virtual server is set to share traffic on* ***All VLANs and Tunnels****. This configuration will work for your VLANs, but in the firewall context specifying or limiting VLANs that can share traffic provides greater security.*

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1. On the Main tab, click **Local Traffic** > **Virtual Servers**.
   The Virtual Server List screen opens.
2. Click the name of the virtual server you want to modify.

3. From the **VLAN and Tunnel Traffic** list, select **Enabled on**. Then, for the **VLANs and Tunnels** setting, move the VLAN or VLANs on which you want to allow the virtual servers to share traffic from the **Available** list to the **Selected** list.
4. Click **Update** to save the changes.
5. Repeat this task for all virtual servers that must share traffic over the VLAN.

The virtual servers on which you enabled the same VLAN can now pass traffic.

## Adding a firewall rule to deny ICMP

Use this task to create a firewall rule at the Global context, that denies ICMP packets globally.

1. On the Main tab, click **Security** > **Network Firewall** > **Active Rules**.
   The Active Rules screen opens.
2. In the Rules area, click **Add** to add a firewall rule to the list.
3. From the **Context** list, select the **Global** context.
4. In the **Name** field, type **deny_icmp**.
5. From the **Type** list, select **Rule**.
6. From the **State** list, select **Enabled**.
7. From the Protocol list, select **ICMP**.
8. In the **ICMP Message** area, from the **Type** list, select `Any`, and click the **Add** button.

   ***Tip:*** *You can optionally deny only ICMP ping requests, by selecting* `Echo (8)` *from the* ***Type*** *list, and clicking* ***Add****.*
9. Leave the **Source** area configured to allow **Any** address, port, and VLAN.
10. Leave the **Destination** area configured to allow **Any** address or port.
11. From the **Action** list, select **Drop** or **Reject**.
    These options either drop ICMP packets from any source and port to any port and address, or send a reject message and reset the the connection.
12. From the **Logging** list, enable or disable logging for the firewall rule.
13. Click **Finished**.
    The list screen and the new item are displayed.

A new firewall rule is created, and appears in the firewall rule list. This firewall rule denies all access to and from all sources and destinations on the ICMP protocol.

## Creating an address list

Use this procedure to specify the address list to apply to allow access to specific source addresses.

1. On the Main tab, click **Security** > **Network Firewall** > **Address Lists**.
   The Address Lists screen opens.
2. Click **Create** to create a new address list.
3. In the name field, type `ADDR_LIST1`.

4. In the Addresses area, add the following addresses: `48.63.32.0/24` and `60.63.10.0/24`. Click **Add** after you type each address.
5. Click **Finished**.
   The list screen and the new item are displayed.

## Denying access with firewall rules on the network virtual server

The firewall rules in this example apply in the virtual server context. For purposes of this example, the external network-facing virtual server has an IP address of `70.168.15.0/24`. The network virtual server is configured with a pool that includes a publically accessible FTP server at `70.168.15.104`, and an application virtual server at `192.168.15.101`.

Use this task to create a firewall rule that allows all traffic from the networks on the address list ADDR_LIST1, and another firewall rule that denies all traffic. This serves the purpose of allowing all traffic from the networks that are allowed access, and denying all other traffic.

1. On the Main tab, click **Security** > **Network Firewall** > **Active Rules**.
   The Active Rules screen opens.
2. In the Rules area, click **Add** to add a firewall rule to the list.
3. Select the **Virtual Server** context, then select the external network virtual server (in this example, `70.168.15.0/24`).
4. In the **Name** field, type `allow_addr_list`.
5. From the **Type** list, select **Rule**.
6. From the **State** list, select **Enabled**.
7. From the Protocol list, select **Any**.
8. In the **Source** area, from the **Address** list, select **List**.
9. From the **Source Available** list, select `ADDR_LIST1`, then click the **<<** button to move `ADDR_LIST1` to the **Selected** list.
10. Leave the **Destination** area configured with the default **Any** / **Any** settings.
11. From the **Action** list, select **Accept**.
    This allows packets from any source on the list to the any destination and port on any protocol on the DMZ network.
12. From the **Logging** list, enable or disable logging for the firewall rule.
13. Click the **Repeat** button.
    The rule is saved, and a new rule creation page opens, with the same information, so you can create a similar rule.
14. In the **Name** field, type `deny_all`.
15. In the **Source** area, in the **Address** list, select **Any**.
16. Leave the **Destination** area configured to deny access to **Any** address or port.
17. From the **Action** list, select **Reject**.
    This creates a deny all rule for the virtual server.
18. From the **Logging** list, enable or disable logging for the firewall rule.
19. Click **Finished**.
    The list screen and the new item are displayed.
20. From the **Context** list, select **Virtual Server**.
21. From the **Virtual Server** list, select the network virtual server.
22. Click the **Filter** button.

The list screen opens, and all firewall rules that apply to the virtual server are displayed.

## Denying access with firewall rules on the application virtual server

The firewall rules in this example apply in the virtual server context. For purposes of this example, the application virtual server on the internal network has an IP address of `192.168.15.101`, and is configured to load balance traffic to servers `10.10.1.10` and `10.10.1.11` on ports `80` and `443`.

Use this task to create a firewall rule that denies all traffic from the network `48.64.32.0/24` to the internal application servers behind the virtual server **192.168.15.101**.

1. On the Main tab, click **Security** > **Network Firewall** > **Active Rules**.
   The Active Rules screen opens.
2. In the Rules area, click **Add** to add a firewall rule to the list.
3. Select the **Virtual Server** context, then select the application virtual server (in this example, `192.168.15.101`).
4. In the **Name** field, type deny_network_48
5. From the **Type** list, select **Rule**.
6. From the **State** list, select **Enabled**.
7. From the **Schedule** list, select **None**.
8. From the Protocol list, select **Any**.
9. In the **Source** area, from the **Address** list, select **Specify**.
10. In the address field, type `48.64.32.0/24`.
11. Leave the **Destination** area configured to deny access to **Any** address or port.
12. From the **Action** list, select **Drop** or **Reject**.
    This drops packets from the `48.64.32.0` network to any source.
13. From the **Logging** list, enable or disable logging for the firewall rule.
14. Click **Finished**.
    The list screen and the new item are displayed.
15. From the **Context** list, select **Virtual Server**.
16. From the **Virtual Server** list, select the application virtual server.
17. Click the **Filter** button.

The firewall rules are created, and are displayed on the list screen for the application virtual server.

# Chapter 10

# Deploying the BIG-IP Network Firewall in Firewall Mode


- *About Firewall mode in the Network Firewall*
- *Configuring the Network Firewall to drop traffic that is not specifically allowed*
- *Creating a VLAN for the network firewall*
- *Creating an address list*
- *Allowing access from networks on an address list with a firewall rule*
- *Allowing access from a network to a virtual server with a firewall rule*

## About Firewall mode in the Network Firewall

The BIG-IP® Advanced Firewall Manager™ (AFM™) provides policy-based access control to and from address and port pairs, inside and outside of your network. In this scenario, the network firewall is configured in *Firewall mode*, a default deny configuration, in which all traffic is blocked through the firewall, and any traffic you want to allow must be explicitly specified.

To understand this firewall scenario, imagine that your prerequisite system load-balances all traffic from the Internet to several internal servers. The internal servers are:

| Device and location | IP address | Traffic type |
|---|---|---|
| Server on DMZ network | 70.168.15.104 | FTP |
| Server on internal network | 10.10.1.10 | HTTP, HTTPS |
| Server on internal network | 10.10.1.11 | HTTP, HTTPS |

In order for traffic from the internal application virtual server to reach the external network virtual server, you must create a VLAN and enable both internal and external virtual servers on it. In this scenario, these VLANs are specified:

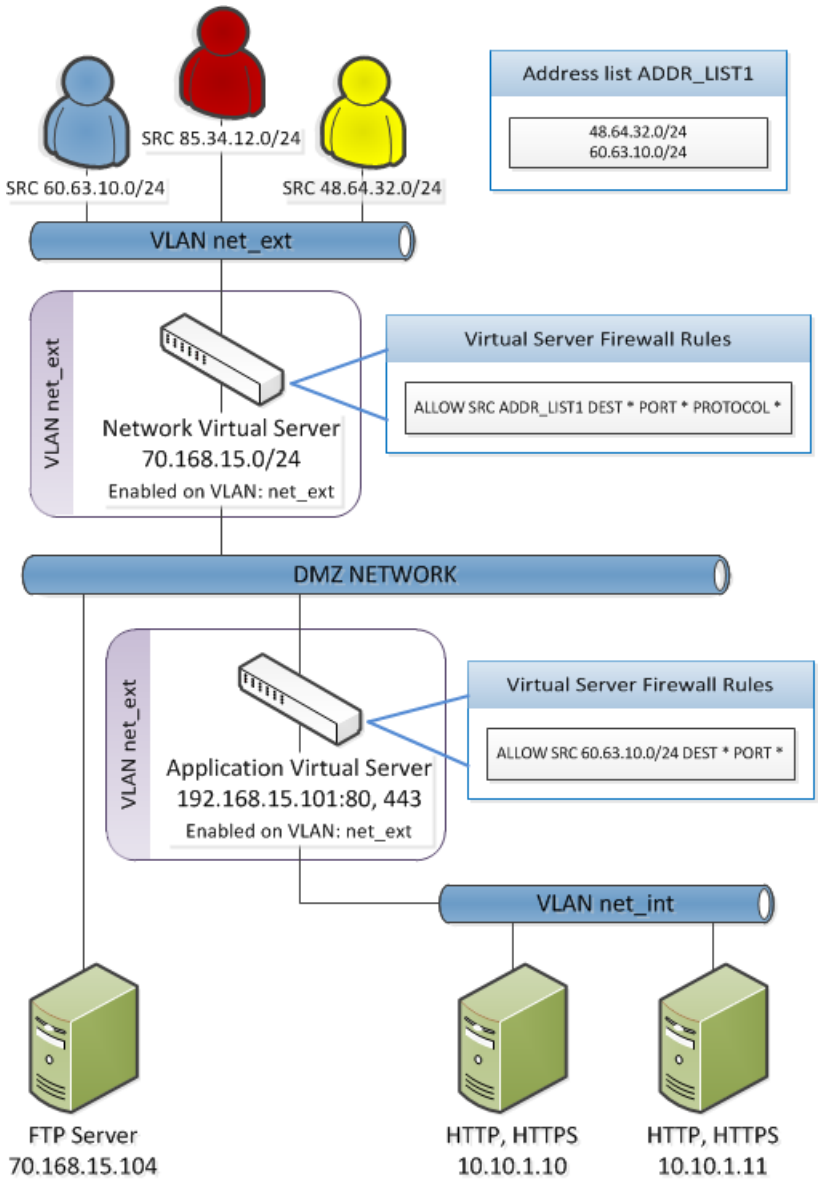
| VLAN | Configuration |
|---|---|
| net_ext | Enabled on 70.168.15.0/24, 192.168.15.101 |
| net_int | Includes pool members 10.10.1.10, 10.10.1.11 |

In addition, in this firewall configuration, there are three external networks that must be firewalled:

| Network | Policy |
|---|---|
| 60.63.10.0/24 | Allow all access |
| 85.34.12.0/24 | Deny all access |
| 48.64.32.0/24 | Allow FTP, deny HTTP and HTTPS |

To set up this scenario, you configure addresses, ports, and firewall rules specific to these networks, ports, and addresses.

**Figure 5: Firewall configuration scenario**




## Configuring the Network Firewall to drop traffic that is not specifically allowed

You can configure the BIG-IP® Network Firewall to deny all traffic not explicitly allowed. In Advanced Firewall Manager™ this is called *Firewall mode*, and this is also referred to as a *default deny* policy. Firewall mode applies a default deny policy to all self IPs and virtual servers.

1. On the Main tab, click **Security** > **Options** > **Network Firewall**.
   The Firewall Options screen opens.
2. From the **Virtual Server & Self IP Contexts** list, select the default action **Drop** for the self IP and virtual server contexts.
3. Click **Update**.
   The default virtual server and self IP firewall context is changed.

If you are using ConfigSync to synchronize two or more devices, and you set the default action to Drop or Reject, you must apply the built-in firewall rules `_sys_self_allow_defaults` or `_sys_self_allow_management` to the specific self IPs that are used to support those services. To do this, add a new rule with the **Self IP** context, select the self IP, and select the **Rule List** rule type. Finally, select the preconfigured rules from the list of rule lists.

## Creating a VLAN for the network firewall

Create a VLAN with tagged interfaces, so that each of the specified interfaces can process traffic destined for that VLAN.

1. On the Main tab, click **Network** > **VLANs**.
   The VLAN List screen opens.
2. Click **Create**.
   The New VLAN screen opens.
3. In the **Name** field, type a unique name for the VLAN.
   For purposes of this implementation, name the VLAN `net_ext`.
4. For the **Interfaces** setting, click an interface number or trunk name from the **Available** list, and use the Move button to add the selected interface or trunk to the **Tagged** list. Repeat this step as necessary.
   You can use the same interface for other VLANs later, if you always assign the interface as a tagged interface.
5. If you want the system to verify that the return route to an initial packet is the same VLAN from which the packet originated, select the **Source Check** check box.
6. From the **Configuration** list, select **Advanced**.
7. In the **MTU** field, retain the default number of bytes (**1500**).
8. If you want to base redundant-system failover on VLAN-related events, select the **Fail-safe** box.
9. From the **Auto Last Hop** list, select a value.
10. From the **CMP Hash** list, select a value.
11. To enable the **DAG Round Robin** setting, select the check box.
12. Click **Finished**.
    The screen refreshes, and displays the new VLAN from the list.

The new VLAN appears in the VLAN list.

Enable the new VLAN on both the network virtual server and the application virtual server.

### Configuring an LTM virtual server with a VLAN for Network Firewall

For this implementation, at least two virtual servers and one at least one VLAN are assumed, though your configuration might be different.

You enable two virtual servers on the same VLAN to allow traffic from hosts on one virtual server to reach or pass through the other. In the Network Firewall, if you are using multiple virtual servers to allow or deny traffic to and from specific hosts behind different virtual servers, you must enable those virtual servers on the same VLAN.

***Tip:*** *By default, the virtual server is set to share traffic on* ***All VLANs and Tunnels****. This configuration will work for your VLANs, but in the firewall context specifying or limiting VLANs that can share traffic provides greater security.*

1. On the Main tab, click **Local Traffic** > **Virtual Servers**.
   The Virtual Server List screen opens.
2. Click the name of the virtual server you want to modify.
3. From the **VLAN and Tunnel Traffic** list, select **Enabled on**. Then, for the **VLANs and Tunnels** setting, move the VLAN or VLANs on which you want to allow the virtual servers to share traffic from the **Available** list to the **Selected** list.
4. Click **Update** to save the changes.
5. Repeat this task for all virtual servers that must share traffic over the VLAN.

The virtual servers on which you enabled the same VLAN can now pass traffic.

## Creating an address list

Use this procedure to specify the address list to apply to allow access to specific source addresses.

1. On the Main tab, click **Security** > **Network Firewall** > **Address Lists**.
   The Address Lists screen opens.
2. Click **Create** to create a new address list.
3. In the name field, type `ADDR_LIST1`.
4. In the Addresses area, add the following addresses: `48.63.32.0/24` and `60.63.10.0/24`. Click **Add** after you type each address.
5. Click **Finished**.
   The list screen and the new item are displayed.

## Allowing access from networks on an address list with a firewall rule

The firewall rules in this example apply in the virtual server context. For purposes of this example, the external network-facing virtual server is named `ex_VS` and has an IP address of `70.168.15.0/24`.

Create a firewall rule that allows traffic from the networks on `ADDR_LIST1` to the DMZ network, which includes an FTP server that is publicly addressed, and two internal servers on a second virtual server.

1. On the Main tab, click **Security** > **Network Firewall** > **Active Rules**.
   The Active Rules screen opens.
2. In the Rules area, click **Add** to add a firewall rule to the list.
3. From the **Context** list, select **Virtual Server**, and then select the external virtual server (in the example, **ex_VS**).
4. In the **Name** field, type `allow_addr_list`.
5. From the **Type** list, select **Rule**.
6. From the **State** list, select **Enabled**.
7. From the **Protocol** list, select **Any**.

8. In the Source area, from the **Address** list, select **Specify**, and click **Address List**.
9. From the list, select **/Common/ADDR_LIST1**, then click **Add** to add **ADDR_LIST1** to the list.
10. Leave the **Destination** area configured with the default **Any** / **Any** settings.
11. From the **Action** list, select **Accept**.
    This allows packets from any source on the list to the any destination and port on any protocol on the DMZ network.
12. From the **Logging** list, enable or disable logging for the firewall rule.
13. Click **Finished**.
    The list screen and the new item are displayed.

A new firewall rule is created, and appears in the firewall rule list.

## Allowing access from a network to a virtual server with a firewall rule

The firewall rules in this example apply in the virtual server context. For purposes of this example, the application virtual server is behind the network virtual server with an IP address of `192.168.15.101` and configured for traffic on ports 80 and 443.

Use this procedure to create a firewall rule that allows traffic from a specific external network to the HTTP and HTTPS servers behind an application virtual server.

1. On the Main tab, click **Security** > **Network Firewall** > **Active Rules**.
   The Active Rules screen opens.
2. In the Rules area, click **Add** to add a firewall rule to the list.
3. In the Context field, select `Virtual Server`, and select the application virtual server (in the example, `192.168.15.101`.
4. In the **Name** field, type `allow_app_vs`.
5. From the **Type** list, select **Rule**.
6. From the **State** list, select **Enabled**.
7. From the Protocol list, select **Any**.
8. In the **Source** area, from the **Address** list, select **Specify**.
9. In the address field, type `60.63.10.0/24`, then click the **Add** button.
10. Leave the **Destination** area configured with the default **Any** / **Any** settings.
11. From the **Action** list, select **Accept**.
    This allows packets from the specified source to any destination and port on any protocol on the internal virtual server. You could specify HTTP and HTTPS protocols, and the internal server addresses, but since these are the only addresses and protocols behind the virtual server, that level of granularity is not necessary.
12. From the **Logging** list, enable or disable logging for the firewall rule.
13. Click **Finished**.
    The list screen and the new item are displayed.

A new firewall rule is created, and appears in the firewall rule list.

# Chapter 11

# Configuring BIG-IP Network Firewall Policies


- *About firewall policies*
- *About firewall policy compilation*
- *Viewing enforced and staged policy rule logs*

# About firewall policies

The BIG-IP® Network Firewall policies combine one or more inline rules or rule lists, and apply them as a combined policy to one or more contexts. Such policies are applied to a context directly, and cannot coexist in that context with inline rules. You can configure a context to use either a specific firewall policy or inline rules, but not both. A firewall policy and inline rules are mutually exclusive of each other. However, firewall context precedence does apply, so inline rules at the global context, for example, apply even if they contradict rules applied at a lower precedence context; for example, at a virtual server.

You can apply a network firewall policy as a staged policy, while continuing to enforce existing inline rules, or you can apply one firewall policy while staging another policy. A *staged policy* allows you to evaluate the effect a policy has on traffic by analyzing the system logs, without actually modifying traffic based on the firewall rules.

## Creating a Network Firewall policy

Use this procedure to create a BIG-IP® Network Firewall policy.

1. On the Main tab, click **Security** > **Network Firewall** > **Policies**.
   The Policies screen opens.
2. Click **Create** to create a new policy.
3. Type a name and optional description for the firewall policy.
4. Click **Finished**.

The Policies screen shows the new policy in the policy list.

Define firewall rules and rule lists for the policy to make it function.

### Creating a Network Firewall policy rule

If you are going to specify address lists or port lists to use with this rule, you must create these lists before creating the firewall policy rule, or add them after you save the policy rule.

Create a network firewall policy rule to manage access from an IP or web network address to a specified network location, server, or address behind a BIG-IP® system.

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***Note:*** *You cannot add rules created with this task to a rule list at a later time. You must create rules for a rule list from within the rule list. Similarly, you cannot use the rules created in a policy to apply as inline rules in another context, though you can use rule lists in a policy rule.*

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1. On the Main tab, click **Security** > **Network Firewall** > **Policies**.
   The Policies screen opens.
2. Click the name of the network firewall policy to which you want to add rules.
3. In the Rules area, click **Add** to add a firewall rule to the list.
4. From the **Type** list, select whether you are creating a standalone network firewall policy rule or creating a rule list.

   If you create a firewall policy rule list, only the **Name**, **Description**, and **State**options apply, and you must select or create a rule list to include.
5. From the **Order** list, select an order modifier.

You can add the rule before or after an existing rule, or you can add it first or last in the rule list. Rules are added in the last position by default.

6. In the **Name** and **Description** fields, type the name and an optional description.
7. From the **State** list, select the rule state.
   - Select **Enabled** to apply the firewall policy rule to the addresses and ports specified.
   - Select **Disabled** to set the firewall policy rule to not apply at all.
   - Select **Scheduled** to apply the firewall policy according to the selected schedule.
8. From the **Protocol** list, select the protocol to which the firewall rule applies.
   - Select **Any** to apply the firewall rule to any protocol.
   - Select the protocol name to apply the rule to a single protocol.

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***Important:*** *ICMP is handled by the BIG-IP system at the global or route domain level. Because of this, ICMP messages receive a response before they reach the virtual server context. You cannot create an inline rule for ICMP or ICMPv6 on a Self IP context. You can apply a rule list to a self IP that includes a rule for ICMP or ICMPv6; however, such a rule will be ignored. To apply firewall actions to the ICMP protocol, create a rule with the* `global` *or* `route domain` *context. ICMP rules are evaluated only for ICMP forwarding requests, and not for the IP addresses of the BIG-IP system itself.*

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***Note:*** *Note that you must select a protocol if you specify ports.*

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9. From the Source **Address/Region** list, select the type of source address to which this rule applies.
   - Select **Any** to have the rule apply to any packet source IP address.
   - Select **Specify** and click **Address** to specify one or more packet source IP addresses to which the rule applies. When selected, you can type single IP addresses into the **Address** field, then click **Add** to add them to the address list.
   - Select **Specify** and click **Address List** to select a predefined list of packet source addresses to which the rule applies. To use an address list with this rule, select the address list and click the **Add** button. Similarly, to remove the list from this rule, select the list and click the **Delete** button.
   - Select **Specify** and click **Address Range** to specify a contiguous range of packet source IP addresses to which the rule applies. When selected, you can type a start and end IP address in the fields, then click **Add** to add the IP address range to the address list.
   - Select **Specify** and click **Country/Region** to identify the geographic origin of packet sources, and to apply rules based on selected geographic locations. When selected, a field appears in which you can select a country. For many countries, an extra field appears after you select the country, in which you can select a state or province. If you do not select a specific state or province, the entire country is selected. After you select a geographic location, click **Add** to add it to the Source address list.
10. From the Source **Port** list, select the type of packet source ports to which this rule applies.
    - Select **Any** to have the rule apply to any packet source port.
    - Select **Specify** and click **Port** to specify one or more packet source ports to which the rule applies. When selected, you can type single port numbers into the **Port** field, then click **Add** to add them to the port list.
    - Select **Specify** and click **Port Range** to specify a list of contiguous packet source port numbers to which the rule applies. When selected, you can type the start and end ports into the fields, then click **Add** to add the ports to the port list.
    - Select **Specify** and click **Port List** to select a predefined list of packet source ports to which the rule applies. To use a port list with this rule, select the port list and click the **Add** button. Similarly, to remove the list from this rule, select the list and click the **Delete** button.
11. From the Source **VLAN/Tunnel** list, select the VLAN on which this rule applies.

- Select **Any** to have the rule apply to traffic on any VLAN through which traffic enters the firewall.
- Select **Specify** to specify one or more VLANs on the firewall to which the rule applies. To use a VLAN with this rule, move the VLAN from the **Available** list to the **Selected** list by clicking the **<<** button. Similarly, to remove the VLAN from this rule, click the **>>** button to move the VLAN from the **Selected** list to the **Available** list.

12. From the Destination **Address/Region** list, select the type of packet destination address to which this rule applies.
    - Select **Any** to have the rule apply to any IP packet destination address.
    - Select **Specify** and click **Address** to specify one or more packet destination IP addresses to which the rule applies. When selected, you can type single IP addresses into the **Address** field, then click **Add** to add them to the address list.
    - Select **Specify** and click **Address List** to select a predefined list of packet destination addresses to which the rule applies. To use an address list with this rule, select the address list and click the **Add** button. Similarly, to remove the list from this rule, select the list and click the **Delete** button.
    - Select **Specify** and click **Address Range** to specify a contiguous range of packet destination IP addresses to which the rule applies. When selected, you can type a start and end IP address in the fields, then click **Add** to add the IP address range to the address list.
    - Select **Specify** and click **Country/Region** to identify the geographic packet destination, and to apply rules based on specific geographic locations. When selected, a field appears in which you can select a country. For many countries, an extra field appears after you select the country, in which you can select a state or province. If you do not select a specific state or province, the entire country is selected. After you select a geographic location, click **Add** to add it to the Destination address list.
13. From the Destination **Port** list, select the type of packet destination ports to which this rule applies.
    - Select **Any** to have the rule apply to any port inside the firewall.
    - Select **Specify** and click **Port** to specify one or more packet destination ports to which the rule applies. When selected, you can type single port numbers into the **Port** field, then click **Add** to add them to the port list.
    - Select **Specify** and click **Port Range** to specify a list of contiguous packet destination port numbers to which the rule applies. When selected, you can type the start and end ports into the fields, then click **Add** to add the ports to the port list.
    - Select **Specify** and click **Port List** to select a predefined list of packet destination ports to which the rule applies. To use a port list with this rule, select the port list and click the **Add** button. Similarly, to remove the list from this rule, select the list and click the **Delete** button.
14. Optionally, from the **iRule** list, select an iRule to start if the rule matches traffic.
15. From the **Action** list, select the firewall action for traffic originating from the specified source address on the specified protocol. Choose from one of the these actions:

| Option | Description |
|---|---|
| **Accept** | Allows packets with the specified source, destination, and protocol to pass through the firewall. Packets that match the rule, and are accepted, traverse the system as if the firewall is not present. |
| **Accept Decisively** | Allows packets with the specified source, destination, and protocol to pass through the firewall, and does not require any further processing by any of the further firewalls. Packets that match the rule, and are accepted, traverse the system as if the firewall is not present. |
| **Drop** | Drops packets with the specified source, destination, and protocol. Dropping a packet is a silent action with no notification to the source or destination systems. Dropping the packet causes the connection to be retried until the retry threshold is reached. |

| Option | Description |
|---|---|
| **Reject** | Rejects packets with the specified source, destination, and protocol. When a packet is rejected the firewall sends a destination unreachable message to the sender. |

16. From the **Logging** list, enable or disable logging for the firewall rule.
17. Click **Finished**.
    The list screen and the new item are displayed.

The new firewall policy rule is created.

## Setting a global firewall policy

You can create a virtual server with a firewall policy, to provide policy-based network firewall actions at the virtual server.

1. On the Main tab, click **Security** > **Network Firewall** > **Active Rules**.
   The Active Rules screen opens.
2. Under **Active Network Firewall Rules**, click the **Global** link.
   The **Global Firewall Rules** screen opens.
3. To enforce rules from a firewall policy in the selected context, in the Network Firewall area, from the **Enforcement** list, select **Policy Rules**, then select the firewall policy to enforce from the **Policy** list.
4. To stage rules from a firewall policy in the selected context, in the Network Firewall area, from the **Staging** list, select **Enabled**, then select the firewall policy to stage from the **Policy** list.

The policy rules you selected are enforced at the global level. If you chose to stage policy rules, the results of those rules are logged, but not enforced.

## Configuring a route domain with a firewall policy

Before you can configure a route domain with a firewall policy, you need a pre-existing route domain.

On a route domain, you can set firewall policies for enforcement and staging. Use this task to set firewall policies on an existing route domain. You create a route domain on BIG-IP® system to segment (isolate) traffic on your network. Route domains are useful for multi-tenant configurations.

1. On the Main tab, click **Network** > **Route Domains**.
   The Route Domain List screen opens.
2. Click the name of the route domain to show the route domain configuration.
3. Click on the **Security** tab.
4. To enforce rules from a firewall policy on the route domain, in the Network Firewall area, from the **Enforcement** list, select **Policy Rules**, then select the firewall policy to enforce from the **Policy** list.
5. To stage rules from a firewall policy on the route domain, in the Network Firewall area, from the **Staging** list, select **Enabled**, then select the firewall policy to stage from the **Policy** list.
6. To enforce any inline rules that apply to the route domain, and not apply a firewall policy, in the Network Firewall area, from the **Enforcement** list, select **Inline Rules**.
7. Click **Update** to save the changes to the route domain.

Now, you have configured a route domain on the BIG-IP system, with either firewall policies or inline rules enforced at the route domain context.

## Setting network firewall policies for a self IP address

Ensure that you have created a self IP address.

You can configure network firewall rules at a self IP address by inline rule, or you can enforce a firewall policy. You can also stage a firewall policy to check the effect without affecting traffic.

1. On the Main tab, click **Network** > **Self IPs**.
   The Self IPs screen opens.
2. Click on the self IP address to which you want to add a network firewall policy.
3. Click the **Security** tab.
4. To enforce rules from a firewall policy on the self IP, in the Network Firewall area, from the **Enforcement** list, select **Policy Rules**, then select the firewall policy to enforce from the **Policy** list.
5. To stage rules from a firewall policy on the self IP, in the Network Firewall area, from the **Staging** list, select **Enabled**, then select the firewall policy to stage from the **Policy** list.
6. To enforce any inline rules that apply to the self IP, and not apply a firewall policy, in the Network Firewall area, from the **Enforcement** list, select **Inline Rules**.
7. Click **Update** to save the changes to the self IP.

The selected self IP now enforces or stages rules according to your selections.

## Creating a virtual server with a firewall policy

You can create a virtual server with a firewall policy, to provide policy-based network firewall actions at the virtual server.

1. On the Main tab, click **Local Traffic** > **Virtual Servers**.
   The Virtual Server List screen opens.
2. Click the **Create** button.
   The New Virtual Server screen opens.
3. In the **Name** field, type a unique name for the virtual server.
4. For the **Destination** setting, in the **Address** field, type the IP address you want to use for the virtual server.

   The IP address you type must be available and not in the loopback network.
5. In the **Service Port** field, type * or select *** All Ports** from the list.
6. Click **Finished**.
7. Click the name of the virtual server you want to modify.
8. On the menu bar, click **Security** > **Policies**.
   The screen displays Policy settings and Inline Rules settings.
9. To enforce rules from a firewall policy on the virtual server, in the Network Firewall area, from the **Enforcement** list, select **Policy Rules**, then select the firewall policy to enforce from the **Policy** list.
10. To stage rules from a firewall policy on the virtual server, in the Network Firewall area, from the **Staging** list, select **Enabled**, then select the firewall policy to stage from the **Policy** list.
11. Click **Update** to save the changes.

The policy rules you selected are enforced on the virtual server. If you chose to stage policy rules, the results of those rules are logged, but not enforced.

# About firewall policy compilation

When you apply a rule list or policy to a context, the rule list or policy requires some server resources to compile. You can view the resources used on a context for the last rule compilation, by viewing compiler statistics on the context page. Compiler statistics are displayed for several items.

**Activation Time**
Displays the time at which firewall policies or rule lists were last activated on this context.

**Compilation Duration**
Displays the amount of time required to compile the rule sets or policies at the last activation.

**Compilation Size**
Displays the file size of the compiled rule sets or policies, after the last activation.

**Maximum Transient Memory**
Displays the maximum memory used to compile the rule sets or policies during the last activation.

## Viewing compilation statistics for a firewall rule or policy

You can view the most recent compilation statistics for a rule list or policy on the Global Context, or on a Route Domain, Self IP, or Virtual Server context.

1. On the Main tab, click **Security** > **Network Firewall** > **Active Rules**.
   The Active Rules screen opens.
2. From the **Context** list, select **All**.
3. Click on the name of the context for which you want to view statistics.

   For example, the Global Context is always called **Global**. A virtual server or self IP has the name you assigned when you created it; for example, `vs_http_134` or `self_lb_11` . A route domain is identified with a number; for example, `0`.
4. View statistics for rule compilation.
   - In the Global Context, from the **Policy Settings** list, select **Advanced**.
   - In a Route Domain, Self IP, or Virtual Server context, click the Security tab. Then, from the **Policy Settings** list, select **Advanced**.

Statistics are displayed for the most recent rule list and policy compilation on the selected context.

# Viewing enforced and staged policy rule logs

With BIG-IP® Advanced Firewall Manager™, you can choose to enforce either inline firewall rules or a firewall policy for a specific context. You can also choose to stage policies for a specific context. *Staged policies* apply all of the specified firewall rules to the policy context, but do not enforce the firewall action. Therefore, the result of a staged policy is informational only, and the result can be analyzed in the firewall logs.

A staged policy on a particular context might not behave the same after you change it to an enforcement policy. Because there can be multiple staged policies on different contexts, the staged policy results you

see (in logs and stats) are actually the aggregate of *all* staged policies on all contexts. Thus, if you enforce a previously staged policy on one or more contexts, but other staged policies remain on other contexts that you do not enforce, the actual enforced results might differ from what you expected from viewing logs and statistics for staged rules.

***Important:*** *You must enable logging for a policy, if you want to view the results of staged or enforced rules in the logs.*

## Viewing Network Firewall enforced policy events on the local BIG-IP system

Ensure that the BIG-IP® system is configured to log the types of events you want to view, and to store the log messages locally on the BIG-IP system.

When the BIG-IP system is configured to log events locally, you can view those events using the Configuration utility.

1. On the Main tab, click **Security** > **Event Logs** > **Network** > **Firewall**.
   The Network Firewall event log displays.
2. To search for enforced policy events, in the search field, type `Enforced`, then click **Search**.
3. To narrow your search for enforced events, click **Custom Search**. Drag the `Enforced` text from the **Policy Type** column to the custom search table. Narrow your search further by dragging other items from the log display, for example, from the **action**, **policy**, or **rule** columns. the event data that you want to search for from the Event Log table into the Custom Search table, and then click **Search**.

## Viewing Network Firewall staged policy events on the local BIG-IP system

Ensure that the BIG-IP® system is configured to log the types of events you want to view, and to store the log messages locally on the BIG-IP system.

When the BIG-IP system is configured to log events locally, you can view those events using the Configuration utility.

***Important:*** *You must enable logging for a policy, if you want to view the results of staged or enforced rules in the logs.*

1. On the Main tab, click **Security** > **Event Logs** > **Network** > **Firewall**.
   The Network Firewall event log displays.
2. To search for staged policy events, in the search field, type `Staged`, then click **Search**.
3. To narrow your search for staged policy events, click **Custom Search**. Drag the `Staged` text from the **Policy Type** column to the custom search table. Narrow your search further by dragging other items from the log display. For example, from the **action**, **policy**, or **rule** columns, you can drag event data that you want to search for from the Event Log table into the Custom Search table, and then click **Search**.

# Chapter 12

## About HTTP Protocol Security

- *Overview: Securing HTTP traffic*
- *Creating an HTTP virtual server with protocol security*
- *Attaching an HTTP protocol security profile to a virtual server*
- *Reviewing violation statistics for security profiles*
- *Overview: Creating a custom HTTP security profile*
- *Overview: Increasing HTTP traffic security*
- *About RFC compliance and validation checks*
- *About evasion techniques checks*
- *About the types of HTTP request checks*
- *Configuring the blocking response page for HTTP security profiles*
- *Overview: Configuring Local Protocol Security Event Logging*
- *Task summary*
- *Implementation result*
- *Overview: Configuring Remote Protocol Security Event Logging*
- *Implementation result*

## Overview: Securing HTTP traffic

You can secure HTTP traffic by using a default configuration or by customizing the configuration. You can adjust the following security checks in an HTTP security profile:

- HTTP protocol compliance validation
- Evasion technique detection
- Length checking to help avoid buffer overflow attacks
- HTTP method validation
- Inclusion or exclusion of certain files by type
- Mandatory header enforcement

You can also specify how you want the system to respond when it encounters a violation. If the system detects a violation and you enabled the Block flag, instead of forwarding the request, the system can either send a blocking response page or redirect the client to a different location.

## Creating an HTTP virtual server with protocol security

When you enable protocol security for an HTTP virtual server, the system scans any incoming HTTP traffic for vulnerabilities before the traffic reaches the HTTP servers.

1. On the Main tab, click **Local Traffic** > **Virtual Servers**.
   The Virtual Server List screen opens.
2. Click the **Create** button.
   The New Virtual Server screen opens.
3. In the **Name** field, type a unique name for the virtual server.
4. For the **Destination** setting, in the **Address** field, type the IP address you want to use for the virtual server.

   The IP address you type must be available and not in the loopback network.
5. In the **Service Port** field, type `80` (for HTTP) or `443` (for HTTPS), or select **HTTP** or **HTTPS** from the list.
6. In the Configuration area, for the **HTTP Profile** setting, select the default profile, `http`.
7. From the **Source Address Translation** list, select **Auto Map**.
8. For the **Default Pool** setting, either select an existing pool from the list, or click the Create (+) button and create a new pool.
9. Click **Finished**.

The HTTP virtual server appears in the Virtual Servers list.

## Attaching an HTTP protocol security profile to a virtual server

The easiest method for adding HTTP protocol security to your HTTP virtual server is to use the system default profile. You do this by configuring a virtual server with the **HTTP profile** `http`, and then associating the default HTTP protocol security profile `http_security` with the virtual server.

1. On the Main tab, click **Local Traffic** > **Virtual Servers**.
   The Virtual Server List screen opens.
2. In the **Name** column, click the virtual server you previously created.
   The Properties screen for the virtual server opens.
3. From the **Security** menu, choose **Policies**.
4. From the **Protocol Security** list, select **Enabled**.
5. From the **Profile** list, select `http_security`.
   This configures the virtual server with the default HTTP protocol security profile.
6. Click **Update**.

You now have a virtual server configured so that HTTP protocol checks are performed on the traffic that the HTTP virtual server receives.

## Reviewing violation statistics for security profiles

You can view statistics and transaction information for each security profile that triggers security violations.

1. On the Main tab, click **Security** > **Event Logs** > **Protocol** and click **HTTP**, **FTP**, **SMTP**, or **DNS**.
   The appropriate statistics screen opens listing all violations for that protocol, with the number of occurrences.
2. Type a Support ID, if you have one, to filter the violations and view one in particular.
3. Click a violation's hyperlink to see details about the requests causing the violation.
   On the Statistics screen, in the left column, you can review information regarding the traffic volume for each security profile configured.

## Overview: Creating a custom HTTP security profile

This implementation describes how to set up the BIG-IP® system to perform security checks on your HTTP virtual server traffic customized to the needs of your environment. Custom configuration of HTTP security and traffic management requires creating an HTTP service profile with security, and fine tuning this profile so it protects HTTP traffic the way you want. Once you have all HTTP settings specified, you create a virtual server using the HTTP custom service profile, and a default pool to handle the HTTP traffic.

### Task summary

*Creating a custom HTTP profile*
*Creating a security profile for HTTP traffic*
*Configuring an HTTP virtual server with an HTTP security profile*
*Reviewing violation statistics for security profiles*

### Creating a custom HTTP profile

An HTTP profile defines the way that you want the BIG-IP®system to manage HTTP traffic.

1. On the Main tab, click **Local Traffic** > **Profiles** > **Services** > **HTTP**.
   The HTTP profile list screen opens.
2. Click **Create**.
   The New HTTP Profile screen opens.
3. In the **Name** field, type a unique name for the profile.
4. From the **Parent Profile** list, select **http**.
5. Select the **Custom** check box.
6. Modify the settings, as required.
7. Click **Finished**.

The custom HTTP profile now appears in the HTTP profile list screen.

## Creating a security profile for HTTP traffic

Before performing this procedure, verify that you have installed and provisioned BIG-IP® Advanced Firewall Manager™ (AFM) on the BIG-IP system.

An *HTTP security profile* specifies security checks that apply to HTTP traffic, and that you want the BIG-IP® system to enforce. In the security profile, you can also configure remote logging and trusted XFF headers.

1. On the Main tab, click **Security** > **Protocol Security** > **Security Profiles** > **HTTP**.
   The Security Profiles: HTTP screen opens.
2. Click the **Create** button.
   The New HTTP Security Profile screen opens.
3. In the **Profile Name** field, type a unique name for the profile.
4. If you want the system to trust XFF (X-Forwarded-For) headers in the requests:
   a) Select the **Trust XFF Header** check box.

      Select this option if the BIG-IP system is deployed behind an internal or other trusted proxy. Then, the system uses the IP address that initiated the connection to the proxy instead of the internal proxy's IP address.

      The screen refreshes and provides an additional setting.
   b) In the **New Custom XFF Header** field, type the header that you want the system to trust, then click **Add**.

      You can add up to five custom XFF headers.
5. If you want the security profile to be case-sensitive, leave the **Profile is case sensitive** check box selected. Otherwise, clear the check box.

   ***Note:*** *You cannot change this setting after you create the security profile.*
6. Modify the blocking policy settings by clicking **HTTP Protocol Checks** and **Request Checks**, selecting the appropriate options, and enabling the **Block** or **Alarm** options as needed.

   ***Note:*** *If you do not enable either **Alarm** or **Block** for a protocol check, the system does not perform the corresponding security verification.*

   - **Alarm**: The system logs any requests that trigger the security profile violation.
   - **Block**: The system blocks any requests that trigger the security profile violation.
   - **Alarm** and **Block**: The system both logs and blocks any requests that trigger the security profile violation.

7. Click **Blocking Page** if you want to configure the blocking response page.
8. Click **Create**.
   The screen refreshes, and you see the new security profile in the list.

The BIG-IP® system automatically assigns this service profile to HTTP traffic that a designated virtual server receives.

## Configuring an HTTP virtual server with an HTTP security profile

You can configure a local traffic virtual server and a default pool for your network's HTTP servers. When the virtual server receives HTTP traffic, an HTTP security profile can scan for security vulnerabilities, and load balance traffic that passes the scan.

1. On the Main tab, click **Local Traffic** > **Virtual Servers**.
   The Virtual Server List screen opens.
2. Click the **Create** button.
   The New Virtual Server screen opens.
3. In the **Name** field, type a unique name for the virtual server.
4. In the **Service Port** field, type `443` or select **HTTPS** from the list.
5. From the **HTTP Profile** list, select the `http` profile .
6. In the Resources area of the screen, for the **Default Pool** setting, click the **Create (+)** button.
   The New Pool screen opens.
7. In the **Name** field, type a unique name for the pool.
8. In the Resources area, for the **New Members** setting, select the type of new member you are adding, then type the appropriate information in the **Node Name**, **Address**, and **Service Port** fields, and click **Add** to add as many pool members as you need.
9. Click **Finished** to create the pool.
   The screen refreshes, and reopens the New Virtual Server screen. The new pool name appears in the **Default Pool** list.
10. Click **Finished** to create the virtual server.
    The screen refreshes, and you see the new virtual server in the list.
11. In the Name column, click the name of the relevant virtual server.
    This displays the properties of the virtual server.
12. From the **Security** menu, choose **Policies**.
13. From the **Protocol Security** list, select **Enabled**.
14. From the **Protocol Security Profile** list, select your custom HTTP security profile.
15. Click **Update** to save the changes.

## Reviewing violation statistics for security profiles

You can view statistics and transaction information for each security profile that triggers security violations.

1. On the Main tab, click **Security** > **Event Logs** > **Protocol** and click **HTTP**, **FTP**, **SMTP**, or **DNS**.
   The appropriate statistics screen opens listing all violations for that protocol, with the number of occurrences.
2. Type a Support ID, if you have one, to filter the violations and view one in particular.
3. Click a violation's hyperlink to see details about the requests causing the violation.

On the Statistics screen, in the left column, you can review information regarding the traffic volume for each security profile configured.

## Overview: Increasing HTTP traffic security

The HTTP security profile consists of many different security checks for the various components of HTTP traffic. This implementation shows you how to fine-tune your HTTP security profile as required by your environment. The custom checks are described under the assumption that you have already created a custom HTTP security profile but have no other prerequisite or special order. You need configure only the custom checks that you are interested in.

You can achieve a greater level of security when you configure the system to perform the following checks:

- HTTP Protocol Checks that are related to RFC compliance and actions to take resulting from a violation
- Request Checks, such as length, allowable HTTP request methods, inclusion or exclusion of file types, and custom headers that must occur in every request
- Blocking Page configuration which describes the page to display in the event of a blocked request when a violation is encountered

## About RFC compliance and validation checks

When the BIG-IP® system receives an HTTP request from a client, the first validation check that the system performs is to ensure that it is RFC protocol compliant. If the request passes the compliance checks, the system applies the security profile to the request. So that your system fully validates RFC compliance, keep the following HTTP Protocol Checks enabled (they are enabled by default):

- **Several Content-Length headers**: This security check fails when the incoming request contains more than one content-length header.
- **Null in request**: This security check fails when the incoming request contains a null character.
- **Unparsable request content**: This security check fails when the Advanced Firewall Manager™ is unable to parse the incoming request.

### Modifying HTTP protocol compliance checks

F5 Networks® recommends that you retain the default properties for the HTTP protocol security checks. This task allows you to take additional precautions such as enabling the Block flag for the HTTP Protocol Checks setting, even if you enable only the Alarm flag for the other security checks. When you do this, the system blocks all requests that are not compliant with HTTP protocol standards, and performs additional security checks only on valid HTTP traffic.

1. On the Main tab, click **Security** > **Protocol Security** > **Security Profiles** > **HTTP**.
   The Security Profiles: HTTP screen opens.
2. In the HTTP Security Profiles area, in the Profile Name column, click the name of the security profile that you are modifying.
   The HTTP Profile Properties screen opens.
3. On the HTTP Protocol Checks tab, for the **HTTP Protocol Checks** setting, select the check boxes for the protocol checks that you want the system to validate.

4. Select **Alarm** or **Block** to indicate how you want the system to respond to a triggered violation.
   The default setting is **Alarm**.
   - **Alarm**: The system logs any requests that trigger the violation.
   - **Block**: The system blocks any requests that trigger the violation.
   - **Alarm** and **Block**: The system both logs and blocks any requests that trigger the violation.
5. Click **Update** to retain changes.

The BIG-IP® system is now enabled for compliance checks on all valid HTTP traffic.

## About evasion techniques checks

Advanced Firewall Manager™ can examine HTTP requests for methods of application attack that are designed to avoid detection. When found, these coding methods, called *evasion techniques*, trigger the Evasion technique detected violation. By creating HTTP security profiles, you can detect evasion techniques, such as:

- Directory traversal, for example, `a/b/../c` turns into `a/c`
- Multiple decoding passes
- Multiple backslash characters in a URI, for example, `\\servername`
- Bare byte decoding (higher than ASCII-127) in a URI
- Apache whitespace characters `(0x09, 0x0b, or 0x0c)`
- Bad unescape

By default, the system logs requests that contain evasion techniques. You can also block requests that include evasion techniques.

### Configuring HTTP protocol evasion techniques blocking policy

You can use HTTP security profiles to detect, log, alarm, and block evasion techniques detected in HTTP traffic.

1. On the Main tab, click **Security** > **Protocol Security** > **Security Profiles** > **HTTP**.
   The Security Profiles: HTTP screen opens.
2. In the HTTP Security Profiles area, in the Profile Name column, click the name of the security profile that you are modifying.
   The HTTP Profile Properties screen opens.
3. On the HTTP Protocol Checks tab, for the **Evasion Techniques Checks** setting, select or clear the **Alarm** or **Block** check boxes, as required.

| Option | Description |
|---|---|
| **Alarm** | The system logs any requests that trigger the violation. This is the default setting. |
| **Block** | The system blocks any requests that trigger the violation. |
| **Alarm and Block** | The system both logs and blocks any requests that trigger the violation. |

4. Click **Update** to retain changes.

## About the types of HTTP request checks

By creating HTTP security profiles, you can perform several types of checks on HTTP requests to ensure that the requests are well-formed and protocol-compliant.

**Length checks**
Specify valid maximum lengths for request components to help prevent buffer overflow attacks.

**Method checks**
Specify which HTTP methods the system allows in requests.

**File type checks**
Specify which file types users can or cannot access.

**Mandatory headers**
Specify custom headers that must occur in every request.

**Null in request**
This security check fails when the incoming request contains a null character.

**Unparsable request content**
This security check fails when the system is unable to parse the incoming request.

## Configuring length checks for HTTP traffic

Before performing this procedure, verify that you have installed and provisioned BIG-IP® Advanced Firewall Manager™ (AFM) on the BIG-IP system.

You can specify valid maximum lengths for request components in HTTP security profiles to prevent buffer overflow attacks. You can set maximum lengths for URLs, query strings, POST data, and the entire request.

1. On the Main tab, click **Security** > **Protocol Security** > **Security Profiles** > **HTTP**.
   The Security Profiles: HTTP screen opens.
2. In the Profile Name column, click the name of the security profile for which you want to configure length checking.
   The Profile Properties screen opens.
3. Click the Request Checks tab.
4. For each option of the **Length Checks** setting, specify **Any** to allow any length or click **Length** and specify the maximum length you want to allow.
5. Select **Alarm** or **Block**, to indicate how you want the system to respond to a triggered violation.
   The default setting is **Alarm**.
   - **Alarm**: The system logs any requests that trigger the violation.
   - **Block**: The system blocks any requests that trigger the violation.
   - **Alarm** and **Block**: The system both logs and blocks any requests that trigger the violation.
6. For the **Request Length Exceeds Defined Buffer Size** setting, select or clear **Alarm** and **Block**, as needed.
   - **Alarm**: The system logs any requests that are longer than allowed by the **long_request_buffer_size** internal parameter (the default is 10,000,000 bytes).

- **Block** The system blocks any requests that are longer than allowed by the **long_request_buffer_size** internal parameter (the default is 10,000,000 bytes).
- **Alarm** and **Block**The system both logs and blocks any requests that trigger the violation.

7. Click **Update** to retain changes.

## Specifying which HTTP methods to allow

Before performing this procedure, verify that you have installed and provisioned BIG-IP® Advanced Firewall Manager™ (AFM) on the BIG-IP system.

The HTTP security profile accepts certain HTTP methods by default. The default allowed methods are GET, HEAD, and POST. The system treats any incoming HTTP request that includes an HTTP method other than the allowed methods as a violating request. Later, you can decide how to handle each violation.

1. On the Main tab, click **Security** > **Protocol Security** > **Security Profiles** > **HTTP**.
   The Security Profiles: HTTP screen opens.
2. In the Profile Name column, click the name of the security profile for which you want to modify allowable HTTP methods.
   The Profile Properties screen opens.
3. Click the Request Checks tab.
4. For the **Methods** setting, specify which HTTP methods to allow:
   The default allowed methods are GET, HEAD, and POST.
   - From the **Available** list, select the methods you want to allow in a request and move them to the **Allowed** list.
   - To add a new method to the **Available** list: type the name in the **Method** field, click **Add** to add it to the list, and move it to the **Allowed** list.
5. Select **Alarm** or **Block**, to indicate how you want the system to respond to a triggered violation.
   The default setting is **Alarm**.
   - **Alarm**: The system logs any requests that trigger the violation.
   - **Block**: The system blocks any requests that trigger the violation.
   - **Alarm** and **Block**: The system both logs and blocks any requests that trigger the violation.
6. Click **Update** to retain changes.

## Including or excluding files by type in HTTP security profiles

Before performing this procedure, verify that you have installed and provisioned BIG-IP® Advanced Firewall Manager™ (AFM) on the BIG-IP system.

By default, an HTTP security profile permits all file types in a request. For tighter security, you can create a list that specifies either all file types you want to allow, or a list specifying all the file types you do not want allowed.

1. On the Main tab, click **Security** > **Protocol Security** > **Security Profiles** > **HTTP**.
   The Security Profiles: HTTP screen opens.
2. In the Profile Name column, click the name of the security profile you want to update.
   The Profile Properties screen opens.
3. Click the Request Checks tab.

4. For the **File Types** setting, specify whether you want to create a list of allowed or disallowed file types, and which files you want in the list.
   - To create a list of file types that are permitted in requests, select **Define Allowed**.
   - To create a list of file types not permitted, select **Define Disallowed**.
   - Select file types from the **Available** list, and move them to the **Allowed** or **Disallowed** list.
   - To add a new file type, type the name in the **File Type** field, click **Add** to add it to the **Available** list, and then move it to the **Allowed** or **Disallowed** list.

   ***Important:*** *If the profile is case-sensitive, the file types are case-sensitive. For example,* ***jsp*** *and* ***JSP*** *will be treated as separate file types.*

5. Select **Alarm** or **Block**, to indicate how you want the system to respond to a triggered violation.
   The default setting is **Alarm**.
   - **Alarm**: The system logs any requests that trigger the violation.
   - **Block**: The system blocks any requests that trigger the violation.
   - **Alarm** and **Block**: The system both logs and blocks any requests that trigger the violation.

The page you configured is displayed every time one of the security checks set to **Block** has been violated.

## Configuring a mandatory header for an HTTP security profile

Before performing this procedure, verify that you have installed and provisioned BIG-IP® Advanced Firewall Manager™ (AFM) on the BIG-IP system.

When the BIG-IP® system is managing an application that uses custom headers that must occur in every request, you can specify mandatory HTTP headers in the security profile. The system verifies that all requests contain those headers. If a request does not contain the mandatory header, the system issues the Mandatory HTTP header is missing violation, and takes the action that you configure: Alarm, Block, or both.

1. On the Main tab, click **Security** > **Protocol Security** > **Security Profiles** > **HTTP**.
   The Security Profiles: HTTP screen opens.
2. In the Profile Name column, click the name of the security profile for which you want to configure a Mandatory Header alarm.
   The Profile Properties screen opens.
3. Click the Request Checks tab.
4. For the **Mandatory Headers** setting, specify the header that must be in the request:
   a) In the **Header** field, type the name of the mandatory header, and click the **Add** button to add it to the **Available** list.
   b) Move the new mandatory header from the **Available** list to the **Mandatory** list.
   c) Select or clear the **Alarm** or **Block** check boxes as required.

| Option | Description |
|---|---|
| **Alarm** | The system logs any responses that trigger the **Mandatory HTTP header is missing** violation. This is the default setting. |
| **Block** | The system blocks any requests that trigger the **Mandatory HTTP header is missing** violation. |
| **Alarm and Block** | The system both logs and blocks any requests that trigger the **Mandatory HTTP header is missing** violation. |

5. Click **Update** to retain changes.

All HTTP requests are checked for the mandatory headers you have selected.

## Configuring the blocking response page for HTTP security profiles

If your HTTP security profile is set up to block requests that violate one or more of the security checks, the system displays a page, called the blocking response page, on the client's screen. The default blocking response page states that the request was rejected, and provides a support ID. You can also configure the system to redirect the client to a specific web site instead of displaying the blocking response page.

1. On the Main tab, click **Security** > **Protocol Security** > **Security Profiles** > **HTTP**.
   The Security Profiles: HTTP screen opens.
2. In the Profile Name column, click the name of the security profile for which you want to configure a blocking page.
   The Profile Properties screen opens.
3. Click the Blocking Page tab.
4. For the **Response Type** setting, select one of the options:
   - **Default Response**: Specifies that the system returns the system-supplied blocking response page. Though you cannot edit the HTML code on the default blocking page, you can copy it into a custom response and edit it.
   - **Custom Response**: Specifies that the system returns a response page that you design or upload.
   - **Redirect URL**: Specifies that the system redirects the client to the specified URL.
   - **SOAP Fault**: Specifies that the system displays a blocking page in standard SOAP fault message format. Though you cannot edit the SOAP fault code, you can copy it into a custom response and edit it.

   The settings on the screen change depending on the selection that you make for the Response Type setting.
5. If you selected the **Custom Response** option, you can either create a new response or upload an HTML file.
   - To create a custom response, make the changes you want to the default responses for the **Response Header** and **Response Body** settings using HTTP syntax for the content, and click **Upload**.
   - To upload an HTML file for the response body, navigate to an existing HTML response page, and click **Upload**.
6. If you selected **Redirect URL**, type the full path of the web page to which the system should redirect the client in the **Redirect URL** field.
7. Click **Update** to retain changes.

The system displays the response page when a violation occurs on any of the security checks set to **Block**.

## Overview: Configuring Local Protocol Security Event Logging

You can configure the BIG-IP® system to log detailed information about protocol security events and store those logs locally.

***Important:*** *The BIG-IP Advanced Firewall Manager™ (AFM) must be licensed and provisioned and DNS Services must be licensed before you can configure Protocol Security event logging.*

## Task summary

Perform these tasks to configure Protocol Security event logging locally on the BIG-IP® system.

***Note:*** *Enabling logging and storing the logs locally impacts BIG-IP system performance.*

*Creating a local Protocol Security Logging profile*
*Configuring a virtual server for Protocol Security event logging*
*Viewing Protocol Security event logs locally on the BIG-IP system*
*Disabling logging*

### Creating a local Protocol Security Logging profile

Create a custom Logging profile to log BIG-IP system network firewall events locally on the BIG-IP system.

1. On the Main tab, click **Security** > **Event Logs** > **Logging Profiles**.
   The Logging Profiles list screen opens.
2. Click **Create**.
   The New Logging Profile screen opens.
3. In the **Profile Name** field, type a unique name for the profile.
4. Select the **Protocol Security** check box, to enable the BIG-IP system to log HTTP, FTP, DNS, and SMTP protocol request events.
5. In the HTTP, FTP, and SMTP Security area, from the **Publisher** list, select **local-db-publisher**.
6. In the DNS Security area, from the **Publisher** list, select **local-db-publisher**.
7. Select the **Log Dropped DNS Requests** check box, to enable the BIG-IP system to log dropped DNS requests.
8. Select the **Log Filtered Dropped DNS Requests** check box, to enable the BIG-IP system to log DNS requests dropped due to DNS query/header-opcode filtering.

   ***Note:*** *The system does not log DNS requests that are dropped due to errors in the way the system processes DNS packets.*

9. Select the **Log Malformed DNS Requests** check box, to enable the BIG-IP system to log malformed DNS requests.
10. Select the **Log Rejected DNS Requests** check box, to enable the BIG-IP system to log rejected DNS requests.
11. Select the **Log Malicious DNS Requests** check box, to enable the BIG-IP system to log malicious DNS requests.
12. Click **Finished**.

Assign this custom protocol security Logging profile to a virtual server.

*Task summary*

## Configuring a virtual server for Protocol Security event logging

Ensure that at least one Log Publisher exists on the BIG-IP® system.

Assign a custom Protocol Security Logging profile to a virtual server when you want the BIG-IP system to log Protocol Security events on the traffic the virtual server processes.

***Note:*** *This task applies only to systems provisioned at a minimum level (or higher) for* ***Local Traffic (LTM)****. You can check the provisioning level on the* ***System*** *>* ***Resource Provisioning*** *screen.*

1. On the Main tab, click **Local Traffic** > **Virtual Servers**.
   The Virtual Server List screen opens.
2. Click the name of the virtual server you want to modify.
3. On the menu bar, click **Security** > **Policies**.
   The screen displays Policy settings and Inline Rules settings.
4. From the **Log Profile** list, select **Enabled**. Then, for the **Profile** setting, move the profiles that log specific events to specific locations from the **Available** list to the **Selected** list.
5. Click **Update** to save the changes.

*Task summary*

## Viewing Protocol Security event logs locally on the BIG-IP system

Ensure that the BIG-IP® system is configured to log the types of events you want to view, and to store the log messages locally on the BIG-IP system.

When the BIG-IP system is configured to log events locally, you can view those events using the Configuration utility.

1. On the Main tab, click **Security** > **Event Logs** > **Protocol** > **DNS**.
   The Protocol Security event log displays.
2. To search for specific events, click **Custom Search**. Drag the event data that you want to search for from the Event Log table into the Custom Search table, and then click **Search**.

*Task summary*

## Disabling logging

Disable Network Firewall, Protocol Security, or DoS Protection event logging when you no longer want the BIG-IP® system to log specific events on the traffic handled by specific resources.

***Note:*** *You can disable and re-enable logging for a specific resource based on your network administration needs.*

1. On the Main tab, click **Local Traffic** > **Virtual Servers**.
   The Virtual Server List screen opens.
2. Click the name of the virtual server you want to modify.
3. On the menu bar, click **Security** > **Policies**.
   The screen displays Policy settings and Inline Rules settings.

4. From the **Log Profile** list, select **Disabled**.
5. Click **Update** to save the changes.

The BIG-IP system does not log the events specified in this profile for the resources to which this profile is assigned.

*Task summary*

## Implementation result

You now have an implementation in which the BIG-IP® system logs specific Protocol Security events locally.

## Overview: Configuring Remote Protocol Security Event Logging

You can configure the BIG-IP® system to log information about BIG-IP system Protocol Security events and send the log messages to remote high-speed log servers.

***Important:*** *The Advanced Firewall Manager™ (AFM™) must be licensed and provisioned before you can configure Protocol Security event logging.*

When configuring remote high-speed logging of Protocol Security events, it is helpful to understand the objects you need to create and why, as described here:

| Object to create in implementation | Reason |
|---|---|
| Pool of remote log servers | Create a pool of remote log servers to which the BIG-IP system can send log messages. |
| Destination (unformatted) | Create a log destination of Remote High-Speed Log type that specifies a pool of remote log servers. |
| Destination (formatted) | If your remote log servers are the ArcSight, Splunk, IPFIX, or Remote Syslog type, create an additional log destination to format the logs in the required format and forward the logs to a remote high-speed log destination. |
| Publisher | Create a log publisher to send logs to a set of specified log destinations. |
| Logging profile | Create a custom Logging profile to enable logging of user-specified data at a user-specified level, and associate a log publisher with the profile. |
| LTM® virtual server | Associate a custom Logging profile with a virtual server to define how the BIG-IP system logs security events on the traffic that the virtual server processes. |

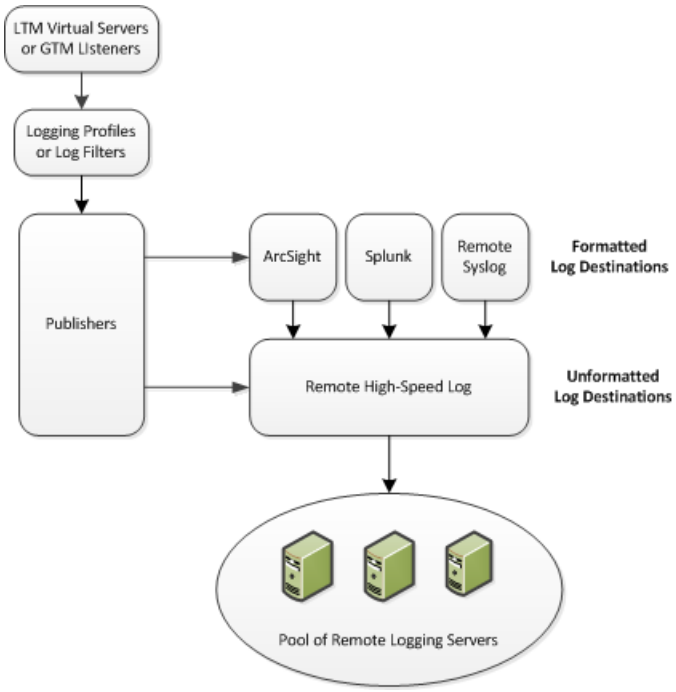


**Figure 6: Association of remote high-speed logging configuration objects**

### Task summary

Perform these tasks to configure Protocol Security event logging on the BIG-IP® system.

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***Note:*** *Enabling remote high-speed logging impacts BIG-IP system performance.*

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*Creating a pool of remote logging servers*
*Creating a remote high-speed log destination*
*Creating a formatted remote high-speed log destination*
*Creating a publisher*
*Creating a custom Protocol Security Logging profile*
*Configuring a virtual server for Protocol Security event logging*
*Disabling logging*

## Creating a pool of remote logging servers

Before creating a pool of log servers, gather the IP addresses of the servers that you want to include in the pool. Ensure that the remote log servers are configured to listen to and receive log messages from the BIG-IP® system.

Create a pool of remote log servers to which the BIG-IP system can send log messages.

1. On the Main tab, click **DNS** > **Delivery** > **Load Balancing** > **Pools** or **Local Traffic** > **Pools**.
   The Pool List screen opens.
2. Click **Create**.
   The New Pool screen opens.
3. In the **Name** field, type a unique name for the pool.
4. Using the **New Members** setting, add the IP address for each remote logging server that you want to include in the pool:

a) Type an IP address in the **Address** field, or select a node address from the **Node List**.
b) Type a service number in the **Service Port** field, or select a service name from the list.

***Note:*** *Typical remote logging servers require port* `514`.

c) Click **Add**.

5. Click **Finished**.

## Creating a remote high-speed log destination

Before creating a remote high-speed log destination, ensure that at least one pool of remote log servers exists on the BIG-IP® system.

Create a log destination of the **Remote High-Speed Log** type to specify that log messages are sent to a pool of remote log servers.

1. On the Main tab, click **System** > **Logs** > **Configuration** > **Log Destinations**.
   The Log Destinations screen opens.
2. Click **Create**.
3. In the **Name** field, type a unique, identifiable name for this destination.
4. From the **Type** list, select **Remote High-Speed Log**.

***Important:*** *If you use log servers such as Remote Syslog, Splunk, or ArcSight, which require data be sent to the servers in a specific format, you must create an additional log destination of the required type, and associate it with a log destination of the* ***Remote High-Speed Log*** *type. With this configuration, the BIG-IP system can send data to the servers in the required format.*

   The BIG-IP system is configured to send an unformatted string of text to the log servers.
5. From the **Pool Name** list, select the pool of remote log servers to which you want the BIG-IP system to send log messages.
6. From the **Protocol** list, select the protocol used by the high-speed logging pool members.
7. Click **Finished**.

## Creating a formatted remote high-speed log destination

Ensure that at least one remote high-speed log destination exists on the BIG-IP® system.

Create a formatted logging destination to specify that log messages are sent to a pool of remote log servers, such as Remote Syslog, Splunk, or ArcSight servers.

1. On the Main tab, click **System** > **Logs** > **Configuration** > **Log Destinations**.
   The Log Destinations screen opens.
2. Click **Create**.
3. In the **Name** field, type a unique, identifiable name for this destination.
4. From the **Type** list, select a formatted logging destination, such as **IPFIX**, **Remote Syslog**, **Splunk**, or **ArcSight**.

***Important:*** *ArcSight formatting is only available for logs coming from Advanced Firewall Manager (AFM), Application Security Manager (ASM™), and the Secure Web Gateway component of Access Policy Manager® (APM®). IPFIX is not available for Secure Web Gateway.*

The BIG-IP system is configured to send a formatted string of text to the log servers.

5. If you selected **Remote Syslog**, from the **Syslog Format** list, select a format for the logs, and then from the **High-Speed Log Destination** list, select the destination that points to a pool of remote Syslog servers to which you want the BIG-IP system to send log messages.
6. If you selected **Splunk** or **IPFIX**, from the **Forward To** list, select the destination that points to a pool of high-speed log servers to which you want the BIG-IP system to send log messages.
7. Click **Finished**.

## Creating a publisher

Ensure that at least one destination associated with a pool of remote log servers exists on the BIG-IP® system.

Create a publisher to specify where the BIG-IP system sends log messages for specific resources.

1. On the Main tab, click **System** > **Logs** > **Configuration** > **Log Publishers**.
   The Log Publishers screen opens.
2. Click **Create**.
3. In the **Name** field, type a unique, identifiable name for this publisher.
4. For the **Destinations** setting, select a destination from the **Available** list, and click **<<** to move the destination to the **Selected** list.

***Note:*** *If you are using a formatted destination, select the destination that matches your log servers, such as Remote Syslog, Splunk, or ArcSight.*

5. Click **Finished**.

## Creating a custom Protocol Security Logging profile

Create a logging profile to log Protocol Security events for the traffic handled by the virtual server to which the profile is assigned.

***Note:*** *You can configure logging profiles for HTTP and DNS security events on Advanced Firewall Manager™, and FTP and SMTP security events on Application Security Manager™.*

1. On the Main tab, click **Security** > **Event Logs** > **Logging Profiles**.
   The Logging Profiles list screen opens.
2. Click **Create**.
   The New Logging Profile screen opens.
3. Select the **Protocol Security** check box, to enable the BIG-IP system to log HTTP, FTP, DNS, and SMTP protocol request events.
4. In the HTTP, FTP, and SMTP Security area, from the **Publisher** list, select the publisher that the BIG-IP system uses to log HTTP, FTP, and SMTP Security events.

5. In the DNS Security area, from the **Publisher** list, select the publisher that the BIG-IP system uses to log DNS Security events.
6. Select the **Log Dropped DNS Requests** check box, to enable the BIG-IP system to log dropped DNS requests.
7. Select the **Log Filtered Dropped DNS Requests** check box, to enable the BIG-IP system to log DNS requests dropped due to DNS query/header-opcode filtering.

   ***Note:*** *The system does not log DNS requests that are dropped due to errors in the way the system processes DNS packets.*

8. Select the **Log Malformed DNS Requests** check box, to enable the BIG-IP system to log malformed DNS requests.
9. Select the **Log Rejected DNS Requests** check box, to enable the BIG-IP system to log rejected DNS requests.
10. Select the **Log Malicious DNS Requests** check box, to enable the BIG-IP system to log malicious DNS requests.
11. From the **Storage Format** list, select how the BIG-IP system formats the log. Your choices are:

| Option | Description |
|---|---|
| **None** | Specifies the default format type in which the BIG-IP system logs messages to a remote Syslog server, for example:<br>`"management_ip_address","bigip_hostname","context_type", "context_name","src_ip","dest_ip","src_port", "dest_port","vlan","protocol","route_domain", "acl_rule_name","action","drop_reason` |
| **Field-List** | This option allows you to:<br>• Select from a list, the fields to be included in the log.<br>• Specify the order the fields display in the log.<br>• Specify the delimiter that separates the content in the log. The default delimiter is the comma character. |
| **User-Defined** | This option allows you to:<br>• Select from a list, the fields to be included in the log.<br>• Cut and paste, in a string of text, the order the fields display in the log. |

12. Click **Finished**.

Assign this custom Protocol Security Logging profile to a virtual server.

## Configuring a virtual server for Protocol Security event logging

Ensure that at least one Log Publisher exists on the BIG-IP® system.

Assign a custom Protocol Security Logging profile to a virtual server when you want the BIG-IP system to log Protocol Security events on the traffic the virtual server processes.

***Note:*** *This task applies only to systems provisioned at a minimum level (or higher) for* ***Local Traffic (LTM)****. You can check the provisioning level on the* ***System*** *>* ***Resource Provisioning*** *screen.*

1. On the Main tab, click **Local Traffic** > **Virtual Servers**.
   The Virtual Server List screen opens.

2. Click the name of the virtual server you want to modify.
3. On the menu bar, click **Security** > **Policies**.
   The screen displays Policy settings and Inline Rules settings.
4. From the **Log Profile** list, select **Enabled**. Then, for the **Profile** setting, move the profiles that log specific events to specific locations from the **Available** list to the **Selected** list.
5. Click **Update** to save the changes.

*Task summary*

### Disabling logging

Disable Network Firewall, Protocol Security, or DoS Protection event logging when you no longer want the BIG-IP® system to log specific events on the traffic handled by specific resources.

***Note:*** *You can disable and re-enable logging for a specific resource based on your network administration needs.*

1. On the Main tab, click **Local Traffic** > **Virtual Servers**.
   The Virtual Server List screen opens.
2. Click the name of the virtual server you want to modify.
3. On the menu bar, click **Security** > **Policies**.
   The screen displays Policy settings and Inline Rules settings.
4. From the **Log Profile** list, select **Disabled**.
5. Click **Update** to save the changes.

The BIG-IP system does not log the events specified in this profile for the resources to which this profile is assigned.

*Task summary*

## Implementation result

You now have an implementation in which the BIG-IP® system logs specific Protocol Security events and sends the logs to a specific location.

# Appendix
# A

## IPFIX Templates for AFM Events


- *Overview: IPFIX Templates for AFM Events*
- *About IPFIX Information Elements for AFM events*
- *About individual IPFIX templates for each event*

# Overview: IPFIX Templates for AFM Events

The IP Flow Information Export (IPFIX) Protocol is a logging mechanism for IP events. This appendix defines the IPFIX Information Elements (IEs) and Templates used to log F5's Application Firewall Manager (AFM) events. An *IE* is the smallest form of useful information in an IPFIX log message, such as an IP address or a timestamp for the event. An *IPFIX template* is an ordered collection of specific IEs used to record one IP event, such as the acceptance of a network packet.

# About IPFIX Information Elements for AFM events

Information Elements (IEs) are individual fields in an IPFIX template. An IPFIX template describes a single Advanced Firewall Manager™(AFM™) event.

## IANA-defined IPFIX Information Elements

IANA maintains a list of standard IPFIX Information Elements (IEs), each with a unique Element Identifier. The F5® AFM™ IPFIX implementation uses a subset of these IEs to publish AFM events. This subset is summarized in the table.

| Information Element (IE) | Size (Bytes) | IANA ID |
|---|---|---|
| destinationIPv4Address | 4 | 12 |
| destinationIPv6Address | 16 | 28 |
| destinationTransportPort | 2 | 11 |
| ingressVRFID | 4 | 234 |
| observationTimeMilliseconds | 8 | 323 |
| protocolIdentifier | 1 | 4 |
| sourceIPv4Address | 4 | 8 |
| sourceIPv6Address | 16 | 27 |
| sourceTransportPort | 2 | 7 |

## IPFIX enterprise Information Elements

IPFIX provides for enterprises to define their own Information Elements. F5® currently uses the following non-standard IEs for AFM™ events:

| Information Element (IE) | Size (Bytes) |
|---|---|
| aclPolicyName | Variable |
| aclPolicyType | Variable |
| aclRuleName | Variable |
| action | Variable |

| Information Element (IE) | Size (Bytes) |
|---|---|
| attackType | Variable |
| bigipHostName | Variable |
| bigipMgmtIPv4Address | 4 |
| bigipMgmtIPv6Address | 16 |
| contextName | Variable |
| contextType | Variable |
| destinationGeo | Variable |
| deviceProduct | Variable |
| deviceVendor | Variable |
| deviceVersion | Variable |
| dosAttackEvent | Variable |
| dosAttackId | 4 |
| dosAttackName | Variable |
| dosPacketsDropped | 4 |
| dosPacketsReceived | 4 |
| dropReason | Variable |
| errdefsMsgNo | 4 |
| flowId | 8 |
| ipfixMsgNo | 4 |
| ipintelligencePolicyName | Variable |
| ipintelligenceThreatName | Variable |
| messageSeverity | 1 |
| msgName | Variable |
| partitionName | Variable |
| saTransPool | Variable |
| saTransType | Variable |
| sourceGeo | Variable |
| transDestinationIPv4Address | 4 |
| transDestinationIPv6Address | 16 |
| transDestinationPort | 2 |
| transIpProtocol | 1 |
| transRouteDomain | 4 |
| transSourceIPv4Address | 4 |
| transSourceIPv6Address | 16 |
| transSourcePort | 2 |
| transVlanName | Variable |

| Information Element (IE) | Size (Bytes) |
|---|---|
| vlanName | Variable |

***Note:*** *IPFIX, unlike NetFlow v9, supports variable-length IEs, where the length is encoded within the field in the Data Record. NetFlow v9 collectors (and their variants) cannot correctly process variable-length IEs, so they are omitted from logs sent to those collector types.*

## About individual IPFIX templates for each event

F5® uses IPFIX templates to publish AFM™ events.

### Network accept or deny

This IPFIX template is used whenever a network packet is accepted or denied by an AFM™ firewall.

| Information Element (IE) | Size (Bytes) | Notes |
|---|---|---|
| aclPolicyName | Variable | This IE is omitted for NetFlow v9. |
| aclPolicyType | Variable | This IE is omitted for NetFlow v9. |
| aclRuleName | Variable | This IE is omitted for NetFlow v9. |
| action | Variable | This IE is omitted for NetFlow v9. |
| bigipHostName | Variable | This IE is omitted for NetFlow v9. |
| bigipMgmtIPv4Address | 4 | |
| bigipMgmtIPv6Address | 16 | |
| contextName | Variable | This IE is omitted for NetFlow v9. |
| contextType | Variable | This IE is omitted for NetFlow v9. |
| observationTimeMilliseconds | 8 | |
| destinationGeo | Variable | This IE is omitted for NetFlow v9. |
| destinationIPv4Address | 4 | |
| destinationIPv6Address | 16 | |
| destinationTransportPort | 2 | |
| deviceProduct | Variable | This IE is omitted for NetFlow v9. |
| deviceVendor | Variable | This IE is omitted for NetFlow v9. |
| deviceVersion | Variable | This IE is omitted for NetFlow v9. |
| dropReason | Variable | This IE is omitted for NetFlow v9. |
| msgName | Variable | This IE is omitted for NetFlow v9. |
| errdefsMsgNo | 4 | |
| flowId | 8 | |
| ipfixMsgNo | 4 | |

| Information Element (IE) | Size (Bytes) | Notes |
|---|---|---|
| protocolIdentifier | 1 | |
| messageSeverity | 1 | |
| partitionName | Variable | This IE is omitted for NetFlow v9. |
| ingressVRFID | 4 | |
| saTransPool | Variable | This IE is omitted for NetFlow v9. |
| saTransType | Variable | This IE is omitted for NetFlow v9. |
| sourceGeo | Variable | This IE is omitted for NetFlow v9. |
| sourceIPv4Address | 4 | |
| sourceIPv6Address | 16 | |
| sourceTransportPort | 2 | |
| transDestinationIPv4Address | 4 | |
| transDestinationIPv6Address | 16 | |
| transDestinationPort | 2 | |
| transIpProtocol | 1 | |
| transRouteDomain | 4 | |
| transSourceIPv4Address | 4 | |
| transSourceIPv6Address | 16 | |
| transSourcePort | 2 | |
| transVlanName | Variable | This IE is omitted for NetFlow v9. |
| vlanName | Variable | This IE is omitted for NetFlow v9. |

## DoS device

| Information Element (IE) | Size (Bytes) | Notes |
|---|---|---|
| action | Variable | This IE is omitted for NetFlow v9. |
| bigipHostName | Variable | This IE is omitted for NetFlow v9. |
| bigipMgmtIPv4Address | 4 | |
| bigipMgmtIPv6Address | 16 | |
| contextName | Variable | This IE is omitted for NetFlow v9. |
| observationTimeMilliseconds | 8 | |
| destinationIPv4Address | 4 | |
| destinationIPv6Address | 16 | |
| destinationTransportPort | 2 | |
| deviceProduct | Variable | This IE is omitted for NetFlow v9. |
| deviceVendor | Variable | This IE is omitted for NetFlow v9. |
| deviceVersion | Variable | This IE is omitted for NetFlow v9. |

| Information Element (IE) | Size (Bytes) | Notes |
|---|---|---|
| dosAttackEvent | Variable | This IE is omitted for NetFlow v9. |
| dosAttackId | 4 | |
| dosAttackName | Variable | This IE is omitted for NetFlow v9. |
| dosPacketsDropped | 4 | |
| dosPacketsReceived | 4 | |
| msgName | Variable | This IE is omitted for NetFlow v9. |
| errdefsMsgNo | 4 | |
| flowId | 8 | |
| ipfixMsgNo | 4 | |
| messageSeverity | 1 | |
| partitionName | Variable | This IE is omitted for NetFlow v9. |
| ingressVRFID | 4 | |
| sourceIPv4Address | 4 | |
| sourceIPv6Address | 16 | |
| sourceTransportPort | 2 | |
| vlanName | Variable | This IE is omitted for NetFlow v9. |

## IP intelligence

| Information Element (IE) | Size (Bytes) | Notes |
|---|---|---|
| action | Variable | This IE is omitted for NetFlow v9. |
| attackType | Variable | This IE is omitted for NetFlow v9. |
| bigipHostName | Variable | This IE is omitted for NetFlow v9. |
| bigipMgmtIPv4Address | 4 | |
| bigipMgmtIPv6Address | 16 | |
| contextName | Variable | This IE is omitted for NetFlow v9. |
| contextType | Variable | This IE is omitted for NetFlow v9. |
| observationTimeMilliseconds | 8 | |
| destinationIPv4Address | 4 | |
| destinationIPv6Address | 16 | |
| destinationTransportPort | 2 | |
| deviceProduct | Variable | This IE is omitted for NetFlow v9. |
| deviceVendor | Variable | This IE is omitted for NetFlow v9. |
| deviceVersion | Variable | This IE is omitted for NetFlow v9. |
| msgName | Variable | This IE is omitted for NetFlow v9. |
| errdefsMsgNo | 4 | |

| Information Element (IE) | Size (Bytes) | Notes |
|---|---|---|
| flowId | 8 | |
| ipfixMsgNo | 4 | |
| ipintelligencePolicyName | Variable | This IE is omitted for NetFlow v9. |
| ipintelligenceThreatName | Variable | This IE is omitted for NetFlow v9. |
| protocolIdentifier | 1 | |
| messageSeverity | 1 | |
| partitionName | Variable | This IE is omitted for NetFlow v9. |
| ingressVRFID | 4 | |
| saTransPool | Variable | This IE is omitted for NetFlow v9. |
| saTransType | Variable | This IE is omitted for NetFlow v9. |
| sourceIPv4Address | 4 | |
| sourceIPv6Address | 16 | |
| sourceTransportPort | 2 | |
| transDestinationIPv4Address | 4 | |
| transDestinationIPv6Address | 16 | |
| transDestinationPort | 2 | |
| transIpProtocol | 1 | |
| transRouteDomain | 4 | |
| transSourceIPv4Address | 4 | |
| transSourceIPv6Address | 16 | |
| transSourcePort | 2 | |
| transVlanName | Variable | This IE is omitted for NetFlow v9. |
| vlanName | Variable | This IE is omitted for NetFlow v9. |

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