CHAPTER 54

Configuring the Botnet Traffic Filter

Malware is malicious software that is installed on an unknowing host. Malware that attempts network activity such as sending private data (passwords, credit card numbers, key strokes, or proprietary data) can be detected by the Botnet Traffic Filter when the malware starts a connection to a known bad IP address. The Botnet Traffic Filter checks incoming and outgoing connections against a dynamic database of known bad domain names and IP addresses (the *blacklist*), and then logs or blocks any suspicious activity.

You can also supplement the Cisco dynamic database with blacklisted addresses of your choosing by adding them to a static blacklist; if the dynamic database includes blacklisted addresses that you think should not be blacklisted, you can manually enter them into a static *whitelist*. Whitelisted addresses still generate syslog messages, but because you are only targeting blacklist syslog messages, they are informational.

Note If you do not want to use the Cisco dynamic database at all, because of internal requirements, you can use the static blacklist alone if you can identify all the malware sites that you want to target.

This chapter describes how to configure the Botnet Traffic Filter, and includes the following sections:

Information About the Botnet Traffic Filter

This section includes information about the Botnet Traffic Filter, and includes the following topics:

Botnet Traffic Filter Address Categories

Addresses monitored by the Botnet Traffic Filter include:

- Known malware addresses—These addresses are on the blacklist identified by the dynamic database and the static blacklist.
- Known allowed addresses—These addresses are on the whitelist. The whitelist is useful when an address is blacklisted by the dynamic database and also identified by the static whitelist.
- Ambiguous addresses—These addresses are associated with multiple domain names, but not all of these domain names are on the blacklist. These addresses are on the *greylist*.
- Unlisted addresses—These addresses are unknown, and not included on any list.

Botnet Traffic Filter Actions for Known Addresses

You can configure the Botnet Traffic Filter to log suspicious activity, and you can optionally configure it to block suspicious traffic automatically.

Unlisted addresses do not generate any syslog messages, but addresses on the blacklist, whitelist, and greylist generate syslog messages differentiated by type. See the "Botnet Traffic Filter Syslog Messaging" section on page 54-17 for more information.

Botnet Traffic Filter Databases

The Botnet Traffic Filter uses two databases for known addresses. You can use both databases together, or you can disable use of the dynamic database and use the static database alone. This section includes the following topics:

Information About the Dynamic Database

The Botnet Traffic Filter can receive periodic updates for the dynamic database from the Cisco update server. This database lists thousands of known bad domain names and IP addresses.

How the ASA Uses the Dynamic Database

The ASA uses the dynamic database as follows:

1. When the domain name in a DNS reply matches a name in the dynamic database, the Botnet Traffic Filter adds the name and IP address to the *DNS reverse lookup cache*.

2. When the infected host starts a connection to the IP address of the malware site, then the ASA sends a syslog message informing you of the suspicious activity and optionally drops the traffic if you configured the ASA to do so.
3. In some cases, the IP address itself is supplied in the dynamic database, and the Botnet Traffic Filter logs or drops any traffic to that IP address without having to inspect DNS requests.

Database Files

The database files are downloaded from the Cisco update server, and then stored in running memory; they are not stored in flash memory. Be sure to identify a DNS server for the ASA so that it can access the Cisco update server URL. In multiple context mode, the system downloads the database for all contexts using the admin context interface; be sure to identify a DNS server in the admin context.

If you need to delete the database, use the **dynamic-filter database purge** command instead. Be sure to first disable use of the database by entering the **no dynamic-filter use-database** command.

Note To filter on the domain names in the dynamic database, you need to enable DNS packet inspection with Botnet Traffic Filter snooping; the ASA looks inside the DNS packets for the domain name and associated IP address.

Database Traffic Types

The dynamic database includes the following types of addresses:

- Ads—These are advertising networks that deliver banner ads, interstitials, rich media ads, pop-ups, and pop-unders for websites, spyware and adware. Some of these networks send ad-oriented HTML emails and email verification services.
- Data Tracking—These are sources associated with companies and websites that offer data tracking and metrics services to websites and other online entities. Some of these also run small advertising networks.
- Spyware—These are sources that distribute spyware, adware, greyware, and other potentially unwanted advertising software. Some of these also run exploits to install such software.
- Malware—These are sources that use various exploits to deliver adware, spyware and other malware to victim computers. Some of these are associated with rogue online vendors and distributors of dialers which deceptively call premium-rate phone numbers.
- Adult—These are sources associated with adult networks/services offering web hosting for adult content, advertising, content aggregation, registration & billing, and age verification. These may be tied to distribution of adware, spyware, and dialers.
- Bot and Threat Networks—These are rogue systems that control infected computers. They are either systems hosted on threat networks or systems that are part of the botnet itself.

Information About the Static Database

You can manually enter domain names or IP addresses (host or subnet) that you want to tag as bad names in a blacklist. Static blacklist entries are always designated with a Very High threat level. You can also enter names or IP addresses in a whitelist, so that names or addresses that appear on both the *dynamic* blacklist and the whitelist are identified only as whitelist addresses in syslog messages and reports. Note that you see syslog messages for whitelisted addresses even if the address is not also in the dynamic blacklist.

When you add a domain name to the static database, the ASA waits 1 minute, and then sends a DNS request for that domain name and adds the domain name/IP address pairing to the *DNS host cache*. (This action is a background process, and does not affect your ability to continue configuring the ASA). We recommend also enabling DNS packet inspection with Botnet Traffic Filter snooping. The ASA uses Botnet Traffic Filter snooping instead of the regular DNS lookup to resolve static blacklist domain names in the following circumstances:

- The ASA DNS server is unavailable.
- A connection is initiated during the 1 minute waiting period before the ASA sends the regular DNS request.

If DNS snooping is used, when an infected host sends a DNS request for a name on the static database, the ASA looks inside the DNS packets for the domain name and associated IP address and adds the name and IP address to the DNS reverse lookup cache.

If you do not enable Botnet Traffic Filter snooping, and one of the above circumstances occurs, then that traffic will not be monitored by the Botnet Traffic Filter.

Information About the DNS Reverse Lookup Cache and DNS Host Cache

When you use the dynamic database with DNS snooping, entries are added to the DNS reverse lookup cache. If you use the static database, entries are added to the DNS host cache (see the "Information About the Static Database" section on page 54-3 about using the static database with DNS snooping and the DNS reverse lookup cache).

Entries in the DNS reverse lookup cache and the DNS host cache have a time to live (TTL) value provided by the DNS server. The largest TTL value allowed is 1 day (24 hours); if the DNS server provides a larger TTL, it is truncated to 1 day maximum.

For the DNS reverse lookup cache, after an entry times out, the ASA renews the entry when an infected host initiates a connection to a known address, and DNS snooping occurs.

For the DNS host cache, after an entry times out, the ASA periodically requests a refresh for the entry.

For the DNS host cache, the maximum number of blacklist entries and whitelist entries is 1000 each.

Table 54-1 lists the maximum number of entries in the DNS reverse lookup cache per model.

Table 54-1 DNS Reverse Lookup Cache Entries per Model

ASA Model	Maximum Entries
ASA 5505	5000
ASA 5510	10,000
ASA 5520	20,000
ASA 5540	40,000
ASA 5550	40,000
ASA 5580	100,000

How the Botnet Traffic Filter Works

Figure 54-1 shows how the Botnet Traffic Filter works with the dynamic database plus DNS inspection with Botnet Traffic Filter snooping.

Figure 54-1 How the Botnet Traffic Filter Works with the Dynamic Database

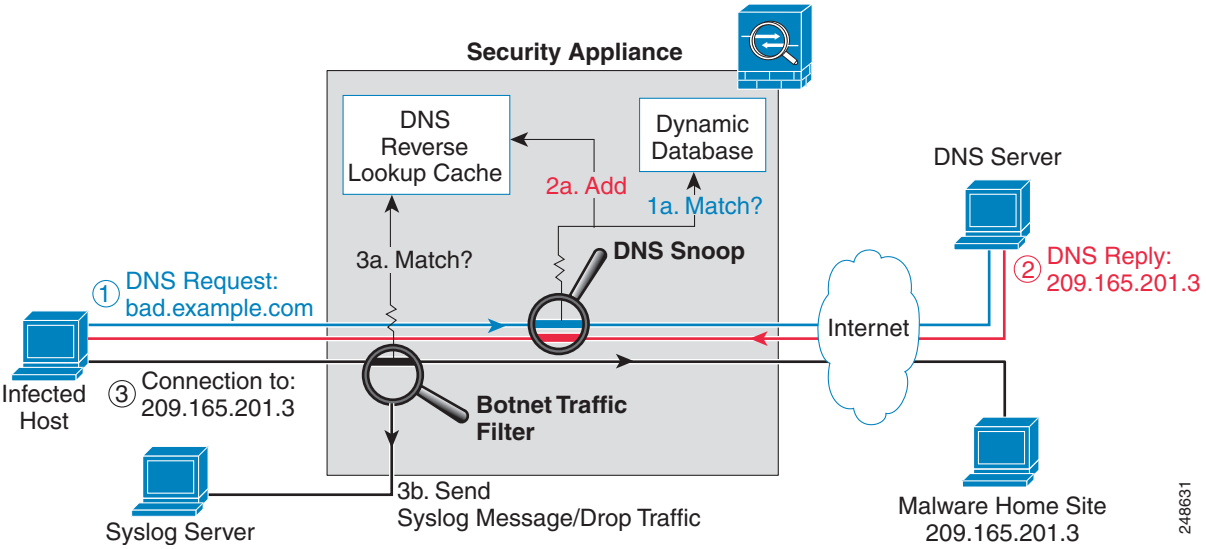
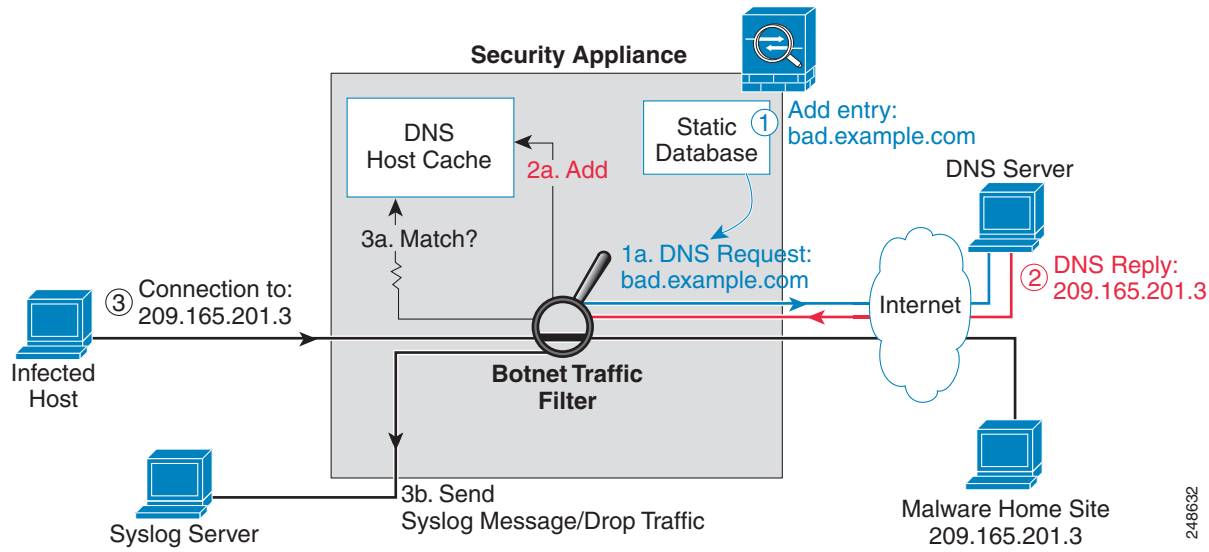


Figure 54-2 shows how the Botnet Traffic Filter works with the static database.

Figure 54-2 How the Botnet Traffic Filter Works with the Static Database



Licensing Requirements for the Botnet Traffic Filter

The following table shows the licensing requirements for this feature:

Model	License Requirement
All models	You need the following licenses: • Botnet Traffic Filter License. • Strong Encryption (3DES/AES) License to download the dynamic database.

Prerequisites for the Botnet Traffic Filter

To use the dynamic database, identify a DNS server for the ASA so that it can access the Cisco update server URL. In multiple context mode, the system downloads the database for all contexts using the admin context interface; be sure to identify a DNS server in the admin context.

Guidelines and Limitations

This section includes the guidelines and limitations for this feature.

Context Mode Guidelines

Supported in single and multiple context mode.

Firewall Mode Guidelines

Supported in routed and transparent firewall mode.

Failover Guidelines

Does not support replication of the DNS reverse lookup cache, DNS host cache, or the dynamic database in Stateful Failover.

IPv6 Guidelines

Does not support IPv6.

Additional Guidelines and Limitations

- TCP DNS traffic is not supported.
- You can add up to 1000 blacklist entries and 1000 whitelist entries in the static database.

Default Settings

By default, the Botnet Traffic Filter is disabled, as is use of the dynamic database.

For DNS inspection, which is enabled by default, Botnet Traffic Filter snooping is disabled by default.

Configuring the Botnet Traffic Filter

This section includes the following topics:

Task Flow for Configuring the Botnet Traffic Filter

To configure the Botnet Traffic Filter, perform the following steps:

Step 1 Enable use of the dynamic database. See the "Configuring the Dynamic Database" section on page 54-8.

This procedure enables database updates from the Cisco update server, and also enables use of the downloaded dynamic database by the ASA. Disallowing use of the downloaded database is useful in multiple context mode so you can configure use of the database on a per-context basis.

Step 2 (Optional) Add static entries to the database. See the "Adding Entries to the Static Database" section on page 54-9.

This procedure lets you augment the dynamic database with domain names or IP addresses that you want to blacklist or whitelist. You might want to use the static database instead of the dynamic database if you do not want to download the dynamic database over the Internet.

Step 3 Enable DNS snooping. See the "Enabling DNS Snooping" section on page 54-10.

This procedure enables inspection of DNS packets, compares the domain name with those in the dynamic database or the static database (when a DNS server for the ASA is unavailable), and adds the name and IP address to the DNS reverse lookup cache. This cache is then used by the Botnet Traffic Filter when connections are made to the suspicious address.

Step 4 Enable traffic classification and actions for the Botnet Traffic Filter. See the "Enabling Traffic Classification and Actions for the Botnet Traffic Filter" section on page 54-12.

This procedure enables the Botnet Traffic Filter, which compares the source and destination IP address in each initial connection packet to the IP addresses in the dynamic database, static database, DNS reverse lookup cache, and DNS host cache, and sends a syslog message or drops any matching traffic.

Step 5 (Optional) Block traffic manually based on syslog message information. See the "Blocking Botnet Traffic Manually" section on page 54-15.

If you choose not to block malware traffic automatically, you can block traffic manually by configuring an access list to deny traffic, or by using the **shun** command to block all traffic to and from a host.

Configuring the Dynamic Database

This procedure enables database updates, and also enables use of the downloaded dynamic database by the ASA. In multiple context mode, the system downloads the database for all contexts using the admin context interface. You can configure *use* of the database on a per-context basis.

By default, downloading and using the dynamic database is disabled.

Prerequisites

Enable ASA use of a DNS server according to the "Configuring the DNS Server" section on page 8-6 in the general operations configuration guide. In multiple context mode, the system downloads the database for all contexts using the admin context interface; be sure to identify a DNS server in the admin context.

Detailed Steps

	Command	Purpose
Step 1	**dynamic-filter updater-client enable** **Example:** `hostname(config)# dynamic-filter updater-client enable`	Enables downloading of the dynamic database from the Cisco update server. In multiple context mode, enter this command in the system execution space. If you do not have a database already installed on the ASA, it downloads the database after approximately 2 minutes. The update server determines how often the ASA polls the server for future updates, typically every hour.
Step 2	(Multiple context mode only) **changeto context** *context_name* **Example:** `hostname# changeto context admin` `hostname/admin#`	Changes to the context so that you can configure use of the database on a per-context basis.
Step 3	**dynamic-filter use-database** **Example:** `hostname(config)# dynamic-filter use-database`	Enables use of the dynamic database. In multiple context mode, enter this command in the context execution space.

Examples

The following multiple mode example enables downloading of the dynamic database, and enables use of the database in context1 and context2:

```
hostname(config)# dynamic-filter updater-client enable
hostname(config)# changeto context context1
hostname/context1(config)# dynamic-filter use-database
hostname/context1(config)# changeto context context2
hostname/context2(config)# dynamic-filter use-database
```

The following single mode example enables downloading of the dynamic database, and enables use of the database:

```
hostname(config)# dynamic-filter updater-client enable
hostname(config)# dynamic-filter use-database
```

What to Do Next

See the "Adding Entries to the Static Database" section on page 54-9.

Adding Entries to the Static Database

The static database lets you augment the dynamic database with domain names or IP addresses that you want to blacklist or whitelist. Static blacklist entries are always designated with a Very High threat level. See the "Information About the Static Database" section on page 54-3 for more information.

Prerequisites

- In multiple context mode, perform this procedure in the context execution space.
- Enable ASA use of a DNS server according to the "Configuring the DNS Server" section on page 8-6.

Detailed Steps

	Command	Purpose
Step 1	**dynamic-filter blacklist** **Example:** `hostname(config)# dynamic-filter blacklist`	Edits the Botnet Traffic Filter blacklist.
Step 2	Enter one or both of the following:	
	name *domain_name* **Example:** `hostname(config-llist)# name bad.example.com`	Adds a name to the blacklist. You can enter this command multiple times for multiple entries. You can add up to 1000 blacklist entries.
	address *ip_address mask* **Example:** `hostname(config-llist)# address 10.1.1.1 255.255.255.255`	Adds an IP address to the blacklist. You can enter this command multiple times for multiple entries. The *mask* can be for a single host or for a subnet.
Step 3	**dynamic-filter whitelist** **Example:** `hostname(config)# dynamic-filter whitelist`	Edits the Botnet Traffic Filter whitelist.
Step 4	Enter one or both of the following:	

Command	Purpose
name *domain_name* **Example:** `hostname(config-llist)# name good.example.com`	Adds a name to the whitelist. You can enter this command multiple times for multiple entries. You can add up to 1000 whitelist entries.
address *ip_address mask* **Example:** `hostname(config-llist)# address 10.1.1.2 255.255.255.255`	Adds an IP address to the whitelist. You can enter this command multiple times for multiple entries. The *mask* can be for a single host or for a subnet.

Examples

The following example creates entries for the blacklist and whitelist:

```
hostname(config)# dynamic-filter blacklist
hostname(config-llist)# name bad1.example.com
hostname(config-llist)# name bad2.example.com
hostname(config-llist)# address 10.1.1.1 255.255.255.0
hostname(config-llist)# dynamic-filter whitelist
hostname(config-llist)# name good.example.com
hostname(config-llist)# name great.example.com
hostname(config-llist)# name awesome.example.com
hostname(config-llist)# address 10.1.1.2 255.255.255.255
```

What to Do Next

See the "Enabling DNS Snooping" section on page 54-10.

Enabling DNS Snooping

This procedure enables inspection of DNS packets and enables Botnet Traffic Filter snooping, which compares the domain name with those on the dynamic database or static database, and adds the name and IP address to the Botnet Traffic Filter DNS reverse lookup cache. This cache is then used by the Botnet Traffic Filter when connections are made to the suspicious address.

The following procedure creates an interface-specific service policy for DNS inspection. See the "DNS Inspection" section on page 41-1 and Chapter 9, "Configuring Modular Policy Framework," for detailed information about configuring advanced DNS inspection options using the Modular Policy Framework.

Prerequisites

In multiple context mode, perform this procedure in the context execution space.

Restrictions

TCP DNS traffic is not supported.

Default DNS Inspection Configuration and Recommended Configuration

The default configuration for DNS inspection inspects all UDP DNS traffic on all interfaces, and does not have DNS snooping enabled.

We suggest that you enable DNS snooping only on interfaces where external DNS requests are going. Enabling DNS snooping on all UDP DNS traffic, including that going to an internal DNS server, creates unnecessary load on the ASA.

For example, if the DNS server is on the outside interface, you should enable DNS inspection with snooping for all UDP DNS traffic on the outside interface. See the "Examples" section for the recommended commands for this configuration.

Detailed Steps

	Command	Purpose
Step 1	**class-map** *name* **Example:** `hostname(config)# class-map dynamic-filter_snoop_class`	Creates a class map to identify the traffic for which you want to inspect DNS.
Step 2	**match** *parameters* **Example:** `hostname(config-cmap)# match port udp eq domain`	Specifies traffic for the class map. See the "Identifying Traffic (Layer 3/4 Class Map)" section on page 9-13 for more information about available parameters. For example, you can specify an access list for DNS traffic to and from certain addresses, or you can specify all UDP DNS traffic.
Step 3	**policy-map** *name* **Example:** `hostname(config)# policy-map dynamic-filter_snoop_policy`	Adds or edits a policy map so you can set the actions to take with the class map traffic.
Step 4	**class** *name* **Example:** `hostname(config-pmap)# class dynamic-filter_snoop_class`	Identifies the class map you created in Step 1.

	Command	Purpose
Step 5	**inspect dns** [*map_name*] **dynamic-filter-snoop** **Example:** `hostname(config-pmap-c)# inspect dns preset_dns_map dynamic-filter-snoop`	Enables DNS inspection with Botnet Traffic Filter snooping. To use the default DNS inspection policy map for the *map_name*, specify **preset_dns_map** for the map name. See the "DNS Inspection" section on page 41-1 for more information about creating a DNS inspection policy map.
Step 6	**service-policy** *policymap_name* **interface** *interface_name* **Example:** `hostname(config)# service-policy dynamic-filter_snoop_policy interface outside`	Activates the policy map on an interface. The interface-specific policy overrides the global policy. You can only apply one policy map to each interface.

Examples

The following recommended configuration creates a class map for all UDP DNS traffic, enables DNS inspection and Botnet Traffic Filter snooping with the default DNS inspection policy map, and applies it to the outside interface:

```
hostname(config)# class-map dynamic-filter_snoop_class
hostname(config-cmap)# match port udp eq domain
hostname(config-cmap)# policy-map dynamic-filter_snoop_policy
hostname(config-pmap)# class dynamic-filter_snoop_class
hostname(config-pmap-c)# inspect dns preset_dns_map dynamic-filter-snoop
hostname(config-pmap-c)# service-policy dynamic-filter_snoop_policy interface outside
```

What to Do Next

See the "Enabling Traffic Classification and Actions for the Botnet Traffic Filter" section on page 54-12.

Enabling Traffic Classification and Actions for the Botnet Traffic Filter

This procedure enables the Botnet Traffic Filter. The Botnet Traffic Filter compares the source and destination IP address in each initial connection packet to the following:

- Dynamic database IP addresses
- Static database IP addresses
- DNS reverse lookup cache (for dynamic database domain names)
- DNS host cache (for static database domain names)

When an address matches, the ASA sends a syslog message. The only additional action currently available is to drop the connection.

Prerequisites

In multiple context mode, perform this procedure in the context execution space.

Recommended Configuration

Although DNS snooping is not required, we recommend configuring DNS snooping for maximum use of the Botnet Traffic Filter (see the "Enabling DNS Snooping" section on page 54-10). Without DNS snooping for the dynamic database, the Botnet Traffic Filter uses only the static database entries, plus any IP addresses in the dynamic database; domain names in the dynamic database are not used.

We recommend enabling the Botnet Traffic Filter on all traffic on the Internet-facing interface, and enabling dropping of traffic with a severity of moderate and higher. See the "Examples" section for the recommended commands used for this configuration.

Detailed Steps

	Command	Purpose
Step 1	(Optional) **access-list** *access_list_name* **extended** {**deny** | **permit**} *protocol source_address mask* [*operator port*] *dest_address mask* [*operator port*] **Example:** `hostname(config)# access-list dynamic-filter_acl extended permit tcp any any eq 80` `hostname(config)# access-list dynamic-filter_acl_subset extended permit tcp 10.1.1.0 255.255.255.0 any eq 80`	Identifies the traffic that you want to monitor or drop. If you do not create an access list for monitoring, by default you monitor all traffic. You can optionally use an access list to identify a subset of monitored traffic that you want to drop; be sure the access list is a subset of the monitoring access list. See Chapter 11, "Adding an Extended Access List," for more information about creating an access list.
Step 2	**dynamic-filter enable** [**interface** *name*] [**classify-list** *access_list*] **Example:** `hostname(config)# dynamic-filter enable interface outside classify-list dynamic-filter_acl`	Enables the Botnet Traffic Filter; without any options, this command monitors all traffic. We recommend enabling the Botnet Traffic Filter on all traffic on the Internet-facing interface using the **interface** keyword. You can optionally limit monitoring to specific traffic by using the **classify-list** keyword with an access list. You can enter this command one time for each interface and one time for the global policy (where you do not specify the **interface** keyword). Each interface and global command can have an optional **classify-list** keyword. Any interface-specific commands take precedence over the global command.

	Command	Purpose
Step 3	(Optional) **dynamic-filter drop blacklist** [**interface** *name*] [**action-classify-list** *subset_access_list*] [**threat-level** {**eq** *level* | **range** *min max*}] **Example:** `hostname(config)# dynamic-filter drop blacklist interface outside action-classify-list dynamic-filter_acl_subset threat-level range moderate very-high`	Automatically drops malware traffic. To manually drop traffic, see the "Blocking Botnet Traffic Manually" section on page 54-15. Be sure to first configure a **dynamic-filter enable** command to monitor any traffic you also want to drop. The **action-classify-list** keyword limits the traffic dropped to a subset of monitored traffic. The dropped traffic must always be equal to or a subset of the monitored traffic. For example, if you specify an access list for the **dynamic-filter enable** command, and you specify the **action-classify-list** for this command, then it must be a subset of the **dynamic-filter enable** access list. You can set an interface policy using the **interface** keyword, or a global policy (where you do not specify the **interface** keyword). Any interface-specific commands take precedence over the global command. You can enter this command multiple times for each interface and global policy. Make sure you do not specify overlapping traffic in multiple commands for a given interface/global policy. Because you cannot control the exact order that commands are matched, overlapping traffic means you do not know which command will be matched. For example, do not specify both a command that matches all traffic (without the **action-classify-list** keyword) as well as a command with the **action-classify-list** keyword for a given interface. In this case, the traffic might never match the command with the **action-classify-list** keyword. Similarly, if you specify multiple commands with the **action-classify-list** keyword, make sure each access list is unique, and that the networks do not overlap. You can additionally limit the traffic dropped by setting the threat level. If you do not explicitly set a threat level, the level used is **threat-level range moderate very-high**. **Note** We highly recommend using the default setting unless you have strong reasons for changing the setting. The *level* and *min* and *max* options are: • **very-low** • **low** • **moderate** • **high** • **very-high** **Note** Static blacklist entries are always designated with a Very High threat level.

	Command	Purpose
Step 4	(Optional) **dynamic-filter ambiguous-is-black** **Example:** `hostname(config)# dynamic-filter ambiguous-is-black`	If you configured the **dynamic-filter drop blacklist** command, then this command treats greylisted traffic as blacklisted traffic for dropping purposes. If you do not enable this command, greylisted traffic will not be dropped. See the "Botnet Traffic Filter Address Categories" section on page 54-2 for more information about the greylist.

Examples

The following recommended configuration monitors all traffic on the outside interface and drops all traffic at a threat level of moderate or higher:

```
hostname(config)# dynamic-filter enable interface outside
hostname(config)# dynamic-filter drop blacklist interface outside
```

If you decide not to monitor all traffic, you can limit the traffic using an access list. The following example monitors only port 80 traffic on the outside interface, and drops traffic threat level very-high only:

```
hostname(config)# access-list dynamic-filter_acl extended permit tcp any any eq 80
hostname(config)# dynamic-filter enable interface outside classify-list dynamic-filter_acl
hostname(config)# dynamic-filter drop blacklist interface outside threat-level eq
very-high
```

Blocking Botnet Traffic Manually

If you choose not to block malware traffic automatically (see the "Enabling Traffic Classification and Actions for the Botnet Traffic Filter" section on page 54-12), you can block traffic manually by configuring an access list to deny traffic, or by using the **shun** command tool to block all traffic to and from a host.

For example, you receive the following syslog message:

```
ASA-4-338002: Dynamic Filter permitted black listed TCP traffic from inside:10.1.1.45/6798
(209.165.201.1/7890) to outside:209.165.202.129/80 (209.165.202.129/80), destination
209.165.202.129 resolved from dynamic list: bad.example.com
```

You can then perform one of the following actions:

- Create an access list to deny traffic.

  For example, using the syslog message above, you might want to deny traffic from the infected host at 10.1.1.45 to the malware site at 209.165.202.129. Or, if there are many connections to different blacklisted addresses, you can create an access list to deny all traffic from 10.1.1.45 until you resolve the infection on the host computer. For example, the following commands deny all traffic from 10.1.1.5 to 209.165.202.129, but permits all other traffic on the inside interface:

  ```
  hostname(config)# access-list BLOCK_OUT extended deny ip host 10.1.1.45 host
  209.165.202.129
  hostname(config)# access-list BLOCK_OUT extended permit ip any any
  hostname(config)# access-group BLOCK_OUT in interface inside
  ```

  See Chapter 11, "Adding an Extended Access List," for more information about creating an access list andapplying the access list to the interface.

Note Access lists block all future connections. To block the current connection, if it is still active, enter the **clear conn** command. For example, to clear only the connection listed in the syslog message, enter the **clear conn address 10.1.1.45 address 209.165.202.129** command. See the *Cisco ASA 5500 Series Command Reference* for more information.

- Shun the infected host.

  Shunning blocks all connections from the host, so you should use an access list if you want to block connections to certain destination addresses and ports. To shun a host, enter the following command. To drop the current connection as well as blocking all future connections, enter the destination address, source port, destination port, and optional protocol.

  ```
  hostname(config)# shun src_ip [dst_ip src_port dest_port [protocol]]
  ```

  For example, to block future connections from 10.1.1.45, and also drop the current connection to the malware site in the syslog message, enter:

  ```
  hostname(config)# shun 10.1.1.45 209.165.202.129 6798 80
  ```

  See the "Blocking Unwanted Connections" section on page 57-2 for more information about shunning.

After you resolve the infection, be sure to remove the access list or the shun. To remove the shun, enter **no shun** *src_ip*.

Searching the Dynamic Database

If you want to check if a domain name or IP address is included in the dynamic database, you can search the database for a string.

Detailed Steps

Command	Purpose
dynamic-filter database find *string* **Example:** hostname# dynamic-filter database find	Searches the dynamic database for a domain name or IP address. The *string* can be the complete domain name or IP address, or you can enter part of the name or address, with a minimum search string of 3 characters. If there are multiple matches, the first two matches are shown. To refine your search for a more specific match, enter a longer string. **Note** Regular expressions are not supported for the database search.

Examples

The following example searches on the string "example.com", and finds 1 match:

```
hostname# dynamic-filter database find bad.example.com

   bad.example.com
Found 1 matches
```

The following example searches on the string "bad", and finds more than 2 matches:

```
hostname# dynamic-filter database find bad
```

```
   bad.example.com
   bad.example.net
Found more than 2 matches, enter a more specific string to find an exact
match
```

Monitoring the Botnet Traffic Filter

Whenever a known address is classified by the Botnet Traffic Filter, then a syslog message is generated. You can also monitor Botnet Traffic Filter statistics and other parameters by entering commands on the ASA. This section includes the following topics:

- Botnet Traffic Filter Syslog Messaging, page 54-17
- Botnet Traffic Filter Commands, page 54-17

Botnet Traffic Filter Syslog Messaging

The Botnet Traffic Filter generates detailed syslog messages numbered 338*nnn*. Messages differentiate between incoming and outgoing connections, blacklist, whitelist, or greylist addresses, and many other variables. (The greylist includes addresses that are associated with multiple domain names, but not all of these domain names are on the blacklist.)

See the *Cisco ASA 5500 Series System Log Messages* for detailed information about syslog messages.

Botnet Traffic Filter Commands

To monitor the Botnet Traffic Filter, enter one of the following commands:

Command	Purpose
show dynamic-filter statistics [**interface** *name*] [**detail**]	Shows how many connections were classified as whitelist, blacklist, and greylist connections, and how many connections were dropped. (The greylist includes addresses that are associated with multiple domain names, but not all of these domain names are on the blacklist.) The **detail** keyword shows how many packets at each threat level were classified or dropped. To clear the statistics, enter the **clear dynamic-filter statistics** [**interface** *name*] command.
show dynamic-filter reports top [**malware-sites** | **malware-ports** | **infected-hosts**]	Generates reports of the top 10 malware sites, ports, and infected hosts monitored. The top 10 malware-sites report includes the number of connections dropped, and the threat level and category of each site. This report is a snapshot of the data, and may not match the top 10 items since the statistics started to be collected. To clear the report data, enter the **clear dynamic-filter reports top** command.

Command	Purpose
show dynamic-filter reports infected-hosts {**max-connections** | **latest-active** | **highest-threat** | **subnet** *ip_address netmask* | **all**}	Generates reports about infected hosts. These reports contain detailed history about infected hosts, showing the correlation between infected hosts, visited malware sites, and malware ports. The **max-connections** keyword shows the 20 infected hosts with the most number of connections. The **latest-active** keyword shows the 20 hosts with the most recent activity. The **highest-threat** keyword shows the 20 hosts that connected to the malware sites with the highest threat level. The **subnet** keyword shows up to 20 hosts within the specified subnet. The **all** keyword shows all buffered infected-hosts information. This display might include thousands of entries. You might want to use ASDM to generate a PDF file instead of using the CLI. To clear the report data, enter the **clear dynamic-filter reports infected-hosts** command.
show dynamic-filter updater-client	Shows information about the updater server, including the server IP address, the next time the ASA will connect with the server, and the database version last installed.
show dynamic-filter dns-snoop [**detail**]	Shows the Botnet Traffic Filter DNS snooping summary, or with the **detail** keyword, the actual IP addresses and names. All inspected DNS data is included in this output, and not just matching names in the blacklist. DNS data from static entries are not included. To clear the DNS snooping data, enter the **clear dynamic-filter dns-snoop** command.
show dynamic-filter data	Shows information about the dynamic database, including when the dynamic database was last downloaded, the version of the database, how many entries the database contains, and 10 sample entries.
show asp table dynamic-filter [**hits**]	Shows the Botnet Traffic Filter rules that are installed in the accelerated security path.

Examples

The following is sample output from the **show dynamic-filter statistics** command:

```
hostname# show dynamic-filter statistics
Enabled on interface outside
 Total conns classified 11, ingress 11, egress 0
 Total whitelist classified 0, ingress 0, egress 0
 Total greylist classified 0, dropped 0, ingress 0, egress 0
 Total blacklist classified 11, dropped 5, ingress 11, egress 0
Enabled on interface inside
 Total conns classified 1182, ingress 1182, egress 0
 Total whitelist classified 3, ingress 3, egress 0
 Total greylist classified 0, dropped 0, ingress 0, egress 0
 Total blacklist classified 1179, dropped 1000, ingress 1179, egress 0
```

The following is sample output from the **show dynamic-filter reports top malware-sites** command:

```
hostname# show dynamic-filter reports top malware-sites
Site                                 Connections logged dropped Threat Level Category
-------------------------------------------------------------------------------------
bad1.example.com (10.67.22.34)                        11     0          2      Botnet
bad2.example.com (209.165.200.225)                     8     8          3      Virus
bad1.cisco.example(10.131.36.158)                      6     6          3      Virus
bad2.cisco.example(209.165.201.1)                      2     2          3      Trojan
```

```
horrible.example.net(10.232.224.2)                    2     2          3      Botnet
nono.example.org(209.165.202.130)                     1     1          3      Virus

Last clearing of the top sites report: at 13:41:06 UTC Jul 15 2009
```

The following is sample output from the **show dynamic-filter reports top malware-ports** command:

```
hostname# show dynamic-filter reports top malware-ports
Port                                        Connections logged
------------------------------------------------------------------------
tcp 1000                                                  617
tcp 2001                                                  472
tcp 23                                                     22
tcp 1001                                                   19
udp 2000                                                   17
udp 2001                                                   17
tcp 8080                                                    9
tcp 80                                                      3
tcp >8192                                                   2

Last clearing of the top sites report: at 13:41:06 UTC Jul 15 2009
```

The following is sample output from the **show dynamic-filter reports top infected-hosts** command:

```
hostname# show dynamic-filter reports top infected-hosts
Host                                        Connections logged
------------------------------------------------------------------------
10.10.10.51(inside)                                      1190
10.12.10.10(inside)                                        10
10.10.11.10(inside)                                         5

Last clearing of the top infected-hosts report: at 13:41:06 UTC Jul 15 2009
```

Configuration Examples for the Botnet Traffic Filter

This section includes the recommended configuration for single and multiple context mode, as well as other possible configurations. This section includes the following topics:

Recommended Configuration Example

The following recommended example configuration for single context mode enables downloading of the dynamic database, and enables use of the database. It creates a class map for all UDP DNS traffic, enables DNS inspection and Botnet Traffic Filter snooping with the default DNS inspection policy map, and applies it to the outside interface, the Internet-facing interface.

Example 54-1 Single Mode Botnet Traffic Filter Recommended Example

```
hostname(config)# dynamic-filter updater-client enable
hostname(config)# dynamic-filter use-database
hostname(config)# class-map dynamic-filter_snoop_class
hostname(config-cmap)# match port udp eq domain
hostname(config-cmap)# policy-map dynamic-filter_snoop_policy
hostname(config-pmap)# class dynamic-filter_snoop_class
```

```
hostname(config-pmap-c)# inspect dns preset_dns_map dynamic-filter-snoop
hostname(config-pmap-c)# service-policy dynamic-filter_snoop_policy interface outside
hostname(config)# dynamic-filter enable interface outside
hostname(config)# dynamic-filter drop blacklist interface outside
```

The following recommended example configuration for multiple context mode enables the Botnet Traffic Filter for two contexts:

Example 54-2 Multiple Mode Botnet Traffic Filter Recommended Example

```
hostname(config)# dynamic-filter updater-client enable

hostname(config)# changeto context context1

hostname/context1(config)# dynamic-filter use-database
hostname/context1(config)# class-map dynamic-filter_snoop_class
hostname/context1(config-cmap)# match port udp eq domain
hostname/context1(config-cmap)# policy-map dynamic-filter_snoop_policy
hostname/context1(config-pmap)# class dynamic-filter_snoop_class
hostname/context1(config-pmap-c)# inspect dns preset_dns_map dynamic-filter-snoop
hostname/context1(config-pmap-c)# service-policy dynamic-filter_snoop_policy interface
outside
hostname/context1(config)# dynamic-filter enable interface outside
hostname/context1(config)# dynamic-filter drop blacklist interface outside

hostname/context1(config)# changeto context context2

hostname/context2(config)# dynamic-filter use-database
hostname/context2(config)# class-map dynamic-filter_snoop_class
hostname/context2(config-cmap)# match port udp eq domain
hostname/context2(config-cmap)# policy-map dynamic-filter_snoop_policy
hostname/context2(config-pmap)# class dynamic-filter_snoop_class
hostname/context2(config-pmap-c)# inspect dns preset_dns_map dynamic-filter-snoop
hostname/context2(config-pmap-c)# service-policy dynamic-filter_snoop_policy interface
outside
hostname/context2(config)# dynamic-filter enable interface outside
hostname/context2(config)# dynamic-filter drop blacklist interface outside
```

Other Configuration Examples

The following sample configuration adds static entries are to the blacklist and to the whitelist. Then, it monitors all port 80 traffic on the outside interface, and drops blacklisted traffic. It also treats greylist addresses as blacklisted addresses.

```
hostname(config)# dynamic-filter updater-client enable

hostname(config)# changeto context context1

hostname/context1(config)# dynamic-filter use-database
hostname/context1(config)# class-map dynamic-filter_snoop_class
hostname/context1(config-cmap)# match port udp eq domain
hostname/context1(config-cmap)# policy-map dynamic-filter_snoop_policy
hostname/context1(config-pmap)# class dynamic-filter_snoop_class
hostname/context1(config-pmap-c)# inspect dns preset_dns_map dynamic-filter-snoop
hostname/context1(config-pmap-c)# service-policy dynamic-filter_snoop_policy interface
outside
hostname/context1(config-pmap-c)# dynamic-filter blacklist
hostname/context1(config-llist)# name bad1.example.com
hostname/context1(config-llist)# name bad2.example.com
```

```
hostname/context1(config-llist)# address 10.1.1.1 255.255.255.0
hostname/context1(config-llist)# dynamic-filter whitelist
hostname/context1(config-llist)# name good.example.com
hostname/context1(config-llist)# name great.example.com
hostname/context1(config-llist)# name awesome.example.com
hostname/context1(config-llist)# address 10.1.1.2 255.255.255.255
hostname/context1(config-llist)# access-list dynamic-filter_acl extended permit tcp any
any eq 80
hostname/context1(config)# dynamic-filter enable interface outside classify-list
dynamic-filter_acl
hostname/context1(config)# dynamic-filter drop blacklist interface outside
hostname/context1(config)# dynamic-filter ambiguous-is-black

hostname/context1(config)# changeto context context2

hostname/context2(config)# dynamic-filter use-database
hostname/context2(config)# class-map dynamic-filter_snoop_class
hostname/context2(config-cmap)# match port udp eq domain
hostname/context2(config-cmap)# policy-map dynamic-filter_snoop_policy
hostname/context2(config-pmap)# class dynamic-filter_snoop_class
hostname/context2(config-pmap-c)# inspect dns preset_dns_map dynamic-filter-snoop
hostname/context2(config-pmap-c)# service-policy dynamic-filter_snoop_policy interface
outside
hostname/context2(config-pmap-c)# dynamic-filter blacklist
hostname/context2(config-llist)# name bad1.example.com
hostname/context2(config-llist)# name bad2.example.com
hostname/context2(config-llist)# address 10.1.1.1 255.255.255.0
hostname/context2(config-llist)# dynamic-filter whitelist
hostname/context2(config-llist)# name good.example.com
hostname/context2(config-llist)# name great.example.com
hostname/context2(config-llist)# name awesome.example.com
hostname/context2(config-llist)# address 10.1.1.2 255.255.255.255
hostname/context2(config-llist)# access-list dynamic-filter_acl extended permit tcp any
any eq 80
hostname/context2(config)# dynamic-filter enable interface outside classify-list
dynamic-filter_acl
hostname/context2(config)# dynamic-filter drop blacklist interface outside
hostname/context2(config)# dynamic-filter ambiguous-is-black
```

Where to Go Next

- To configure the syslog server, see Chapter 74, “Configuring Logging.”
- To configure an access list to block traffic, see Chapter 11, “Adding an Extended Access List.”
- To shun connections, see the “Blocking Unwanted Connections” section on page 57-2.

Feature History for the Botnet Traffic Filter

Table 54-2 lists each feature change and the platform release in which it was implemented.

Table 54-2 Feature History for the Botnet Traffic Filter

Feature Name	Platform Releases	Feature Information
Botnet Traffic Filter	8.2(1)	This feature was introduced.
Automatic blocking, and blacklist category and threat level reporting.	8.2(2)	The Botnet Traffic Filter now supports automatic blocking of blacklisted traffic based on the threat level. You can also view the category and threat level of malware sites in statistics and reports. The following commands were introduced or modified: **dynamic-filter ambiguous-is-black**, **dynamic-filter drop blacklist**, **show dynamic-filter statistics**, **show dynamic-filter reports infected-hosts**, and **show dynamic-filter reports top**.