



Introduction to the Cisco ASA

The Cisco ASA provides advanced stateful firewall and VPN concentrator functionality in one device as well as integrated services with add-on modules. The ASA includes many advanced features, such as multiple security contexts (similar to virtualized firewalls), clustering (combining multiple firewalls into a single firewall), transparent (Layer 2) firewall or routed (Layer 3) firewall operation, advanced inspection engines, IPsec VPN, SSL VPN, and clientless SSL VPN support, and many more features.

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Hardware and Software Compatibility

For a complete list of supported hardware and software, see [Cisco ASA Compatibility](#).

VPN Compatibility

See [Supported VPN Platforms, Cisco ASA Series](#).

New Features

This section lists new features for each release.



Note New, changed, and deprecated syslog messages are listed in the syslog message guide.

New Features in ASA 9.10(1)

Released: October 25, 2018

Feature	Description
Platform Features	
ASAv VHD custom images for Azure	You can now create your own custom ASAv images on Azure using a compressed VHD image available from Cisco. To deploy using a VHD image, you upload the VHD image to your Azure storage account. Then, you can create a managed image using the uploaded disk image and an Azure Resource Manager template. Azure templates are JSON files that contain resource descriptions and parameter definitions.
ASAv for Azure	The ASAv is available in the Azure China Marketplace.
ASAv support for DPDK	DPDK (Dataplane Development Kit) is integrated into the dataplane of the ASAv using poll-mode drivers.
ISA 3000 support for FirePOWER module Version 6.3	The previous supported version was FirePOWER 5.4.
Firewall Features	
Cisco Umbrella support	<p>You can configure the device to redirect DNS requests to Cisco Umbrella, so that your Enterprise Security policy defined in Cisco Umbrella can be applied to user connections. You can allow or block connections based on FQDN, or for suspicious FQDNs, you can redirect the user to the Cisco Umbrella intelligent proxy, which can perform URL filtering. The Umbrella configuration is part of the DNS inspection policy.</p> <p>New/Modified commands: umbrella, umbrella-global, token, public-key, timeout edns, dnsdecrypt, show service-policy inspect dns detail</p>
GTP inspection enhancements for MSISDN and Selection Mode filtering, anti-replay, and user spoofing protection	<p>You can now configure GTP inspection to drop Create PDP Context messages based on Mobile Station International Subscriber Directory Number (MSISDN) or Selection Mode. You can also implement anti-replay and user spoofing protection.</p> <p>New/Modified commands: anti-replay, gtp-u-header-check, match msisdn, match selection-mode</p>
Default idle timeout for TCP state bypass	The default idle timeout for TCP state bypass connections is now 2 minutes instead of 1 hour.
Support for removing the logout button from the cut-through proxy login page	<p>If you configure the cut-through proxy to obtain user identity information (the AAA authentication listener), you can now remove the logout button from the page. This is useful in case where users connect from behind a NAT device and cannot be distinguished by IP address. When one user logs out, it logs out all users of the IP address.</p> <p>New/Modified commands: aaa authentication listener no-logout-button</p> <p><i>Also in 9.8(3).</i></p>

Feature	Description
Trustsec SXP connection configurable delete hold down timer	<p>The default SXP connection hold down timer is 120 seconds. You can now configure this timer, between 120 to 64000 seconds.</p> <p>New/Modified commands: cts sxp delete-hold-down period, show cts sxp connection brief, show cts sxp connections</p> <p><i>Also in 9.8(3).</i></p>
Support for offloading NAT'ed flows in transparent mode.	<p>If you are using flow offload (the flow-offload enable and set connection advanced-options flow-offload commands), offloaded flows can now include flows that require NAT in transparent mode.</p>
Support for transparent mode deployment for a Firepower 4100/9300 ASA logical device	<p>You can now specify transparent or routed mode when you deploy the ASA on a Firepower 4100/9300.</p> <p>New/Modified FXOS commands: enter bootstrap-key FIREWALL_MODE, set value routed, set value transparent</p>
VPN Features	
Support for legacy SAML authentication	<p>If you deploy an ASA with the fix for CSCvg65072, then the default SAML behavior is to use the embedded browser, which is not supported on AnyConnect 4.4 or 4.5. Therefore, to continue to use AnyConnect 4.4 or 4.5, you must enable the legacy external browser SAML authentication method. Because of security limitations, use this option only as part of a temporary plan to migrate to AnyConnect 4.6 (or later). This option will be deprecated in the near future.</p> <p>New/Modified commands: saml external-browser</p> <p><i>Also in 9.8(3).</i></p>
DTLS 1.2 support for AnyConnect VPN remote access connections.	<p>DTLS 1.2, as defined in RFC- 6347, is now supported for AnyConnect remote access in addition to the currently supported DTLS 1.0 (1.1 version number is not used for DTLS). This applies to all ASA models except the 5506-X, 5508-X, and 5516-X; and applies when the ASA is acting as a server only, not a client. DTLS 1.2 supports additional ciphers, as well as all current TLS/DTLS cyphers, and a larger cookie size.</p> <p>New/Modified commands: show run ssl, show vpn-sessiondb detail anyconnectssl cipher, ssl server-version</p>
High Availability and Scalability Features	
Cluster control link customizable IP Address for the Firepower 4100/9300	<p>By default, the cluster control link uses the 127.2.0.0/16 network. You can now set the network when you deploy the cluster in FXOS. The chassis auto-generates the cluster control link interface IP address for each unit based on the chassis ID and slot ID: <code>127.2.chassis_id.slot_id</code>. However, some networking deployments do not allow 127.2.0.0/16 traffic to pass. Therefore, you can now set a custom /16 subnet for the cluster control link in FXOS except for loopback (127.0.0.0/8) and multicast (224.0.0.0/4) addresses.</p> <p>New/Modified FXOS commands: set cluster-control-link network</p>

Feature	Description
Parallel joining of cluster units per Firepower 9300 chassis	For the Firepower 9300, this feature ensures that the security modules in a chassis join the cluster simultaneously, so that traffic is evenly distributed between the modules. If a module joins very much in advance of other modules, it can receive more traffic than desired, because the other modules cannot yet share the load. New/Modified commands: unit parallel-join
Cluster interface debounce time now applies to interfaces changing from a down state to an up state	When an interface status update occurs, the ASA waits the number of milliseconds specified in the health-check monitor-interface debounce-time command or the ASDM Configuration > Device Management > High Availability and Scalability > ASA Cluster screen before marking the interface as failed and the unit is removed from the cluster. This feature now applies to interfaces changing from a down state to an up state. For example, in the case of an EtherChannel that transitions from a down state to an up state (for example, the switch reloaded, or the switch enabled an EtherChannel), a longer debounce time can prevent the interface from appearing to be failed on a cluster unit just because another cluster unit was faster at bundling the ports. We did not modify any commands.
Active/Backup High Availability for ASAv on Microsoft Azure Government Cloud	The stateless Active/Backup solution that allows for a failure of the active ASAv to trigger an automatic failover of the system to the backup ASAv in the Microsoft Azure public cloud is now available in the Azure Government Cloud. New or modified command: failover cloud Monitoring > Properties > Failover > Status Monitoring > Properties > Failover > History
Interface Features	
show interface ip brief and show ipv6 interface output enhancement to show the supervisor association for the Firepower 2100/4100/9300	For the Firepower 2100/4100/9300, the output of the command is enhanced to indicate the supervisor association status of the interfaces. New/Modified commands: show interface ip brief , show ipv6 interface
The set lacp-mode command was changed to set port-channel-mode on the Firepower 2100	The set lacp-mode command was changed to set port-channel-mode to match the command usage in the Firepower 4100/9300. New/Modified FXOS commands: set port-channel-mode
Administrative, Monitoring, and Troubleshooting Features	
Support for NTP Authentication on the Firepower 2100	You can now configure SHA1 NTP server authentication in FXOS. New/Modified FXOS commands: enable ntp-authentication , set ntp-sha1-key-id , set ntp-sha1-key-string New/Modified Firepower Chassis Manager screens: Platform Settings > NTP New/Modified options: NTP Server Authentication: Enable check box, Authentication Key field, Authentication Value field

Feature	Description
Packet capture support for matching IPv6 traffic without using an ACL	If you use the match keyword for the capture command, the any keyword only matches IPv4 traffic. You can now specify any4 and any6 keywords to capture either IPv4 or IPv6 traffic. The any keyword continues to match only IPv4 traffic. New/Modified commands: capture match
Support for public key authentication for SSH to FXOS on the Firepower 2100	You can set the SSH key so you can use public key authentication instead of/as well as password authentication. New/Modified FXOS commands: set sshkey
Support for GRE and IPinIP encapsulation	When you do a packet capture on interface inside, the output of the command is enhanced to display the GRE and IPinIP encapsulation on ICMP, UDP, TCP, and others. New/Modified commands: show capture
Support to enable memory threshold that restricts application cache allocations	You can restrict application cache allocations on reaching certain memory threshold so that there is a reservation of memory to maintain stability and manageability of the device. New/Modified commands: memory threshold enable, show run memory threshold, clear conf memory threshold
Support for RFC 5424 logging timestamp	You can enable the logging timestamp as per RFC 5424 format. New/Modified command: logging timestamp
Support to display memory usage of TCB-IPS	Shows application level memory cache for TCB-IPS New/Modified command: show memory app-cache
Support to enable and disable the results for free memory and used memory statistics during SNMP walk operations	To avoid overutilization of CPU resources, you can enable and disable the query of free memory and used memory statistics collected through SNMP walk operations. New/Modified command: snmp-server enable oid

Firewall Functional Overview

Firewalls protect inside networks from unauthorized access by users on an outside network. A firewall can also protect inside networks from each other, for example, by keeping a human resources network separate from a user network. If you have network resources that need to be available to an outside user, such as a web or FTP server, you can place these resources on a separate network behind the firewall, called a *demilitarized zone* (DMZ). The firewall allows limited access to the DMZ, but because the DMZ only includes the public servers, an attack there only affects the servers and does not affect the other inside networks. You can also control when inside users access outside networks (for example, access to the Internet), by allowing only certain addresses out, by requiring authentication or authorization, or by coordinating with an external URL filtering server.

When discussing networks connected to a firewall, the *outside* network is in front of the firewall, the *inside* network is protected and behind the firewall, and a *DMZ*, while behind the firewall, allows limited access to outside users. Because the ASA lets you configure many interfaces with varied security policies, including

many inside interfaces, many DMZs, and even many outside interfaces if desired, these terms are used in a general sense only.

Security Policy Overview

A security policy determines which traffic is allowed to pass through the firewall to access another network. By default, the ASA allows traffic to flow freely from an inside network (higher security level) to an outside network (lower security level). You can apply actions to traffic to customize the security policy.

Permitting or Denying Traffic with Access Rules

You can apply access rules to limit traffic from inside to outside, or allow traffic from outside to inside. For bridge group interfaces, you can also apply an EtherType access rule to allow non-IP traffic.

Applying NAT

Some of the benefits of NAT include the following:

- You can use private addresses on your inside networks. Private addresses are not routable on the Internet.
- NAT hides the local addresses from other networks, so attackers cannot learn the real address of a host.
- NAT can resolve IP routing problems by supporting overlapping IP addresses.

Protecting from IP Fragments

The ASA provides IP fragment protection. This feature performs full reassembly of all ICMP error messages and virtual reassembly of the remaining IP fragments that are routed through the ASA. Fragments that fail the security check are dropped and logged. Virtual reassembly cannot be disabled.

Applying HTTP, HTTPS, or FTP Filtering

Although you can use access lists to prevent outbound access to specific websites or FTP servers, configuring and managing web usage this way is not practical because of the size and dynamic nature of the Internet.

You can configure Cloud Web Security on the ASA, or install an ASA module that provides URL and other filtering services, such as ASA CX or ASA FirePOWER. You can also use the ASA in conjunction with an external product such as the Cisco Web Security Appliance (WSA).

Applying Application Inspection

Inspection engines are required for services that embed IP addressing information in the user data packet or that open secondary channels on dynamically assigned ports. These protocols require the ASA to do a deep packet inspection.

Sending Traffic to Supported Hardware or Software Modules

Some ASA models allow you to configure software modules, or to insert hardware modules into the chassis, to provide advanced services. These modules provide additional traffic inspection and can block traffic based on your configured policies. You can send traffic to these modules to take advantage of these advanced services.

Applying QoS Policies

Some network traffic, such as voice and streaming video, cannot tolerate long latency times. QoS is a network feature that lets you give priority to these types of traffic. QoS refers to the capability of a network to provide better service to selected network traffic.

Applying Connection Limits and TCP Normalization

You can limit TCP and UDP connections and embryonic connections. Limiting the number of connections and embryonic connections protects you from a DoS attack. The ASA uses the embryonic limit to trigger TCP Intercept, which protects inside systems from a DoS attack perpetrated by flooding an interface with TCP SYN packets. An embryonic connection is a connection request that has not finished the necessary handshake between source and destination.

TCP normalization is a feature consisting of advanced TCP connection settings designed to drop packets that do not appear normal.

Enabling Threat Detection

You can configure scanning threat detection and basic threat detection, and also how to use statistics to analyze threats.

Basic threat detection detects activity that might be related to an attack, such as a DoS attack, and automatically sends a system log message.

A typical scanning attack consists of a host that tests the accessibility of every IP address in a subnet (by scanning through many hosts in the subnet or sweeping through many ports in a host or subnet). The scanning threat detection feature determines when a host is performing a scan. Unlike IPS scan detection that is based on traffic signatures, the ASA scanning threat detection feature maintains an extensive database that contains host statistics that can be analyzed for scanning activity.

The host database tracks suspicious activity such as connections with no return activity, access of closed service ports, vulnerable TCP behaviors such as non-random IPID, and many more behaviors.

You can configure the ASA to send system log messages about an attacker or you can automatically shun the host.

Firewall Mode Overview

The ASA runs in two different firewall modes:

- Routed
- Transparent

In routed mode, the ASA is considered to be a router hop in the network.

In transparent mode, the ASA acts like a “bump in the wire,” or a “stealth firewall,” and is not considered a router hop. The ASA connects to the same network on its inside and outside interfaces in a “bridge group”.

You might use a transparent firewall to simplify your network configuration. Transparent mode is also useful if you want the firewall to be invisible to attackers. You can also use a transparent firewall for traffic that would otherwise be blocked in routed mode. For example, a transparent firewall can allow multicast streams using an EtherType access list.

Routed mode supports Integrated Routing and Bridging, so you can also configure bridge groups in routed mode, and route between bridge groups and regular interfaces. In routed mode, you can replicate transparent mode functionality; if you do not need multiple context mode or clustering, you might consider using routed mode instead.

Stateful Inspection Overview

All traffic that goes through the ASA is inspected using the Adaptive Security Algorithm and either allowed through or dropped. A simple packet filter can check for the correct source address, destination address, and ports, but it does not check that the packet sequence or flags are correct. A filter also checks *every* packet against the filter, which can be a slow process.



Note The TCP state bypass feature allows you to customize the packet flow.

A stateful firewall like the ASA, however, takes into consideration the state of a packet:

- Is this a new connection?

If it is a new connection, the ASA has to check the packet against access lists and perform other tasks to determine if the packet is allowed or denied. To perform this check, the first packet of the session goes through the “session management path,” and depending on the type of traffic, it might also pass through the “control plane path.”

The session management path is responsible for the following tasks:

- Performing the access list checks
- Performing route lookups
- Allocating NAT translations (xlates)
- Establishing sessions in the “fast path”

The ASA creates forward and reverse flows in the fast path for TCP traffic; the ASA also creates connection state information for connectionless protocols like UDP, ICMP (when you enable ICMP inspection), so that they can also use the fast path.



Note For other IP protocols, like SCTP, the ASA does not create reverse path flows. As a result, ICMP error packets that refer to these connections are dropped.

Some packets that require Layer 7 inspection (the packet payload must be inspected or altered) are passed on to the control plane path. Layer 7 inspection engines are required for protocols that have two or more channels: a data channel, which uses well-known port numbers, and a control channel, which uses different port numbers for each session. These protocols include FTP, H.323, and SNMP.

- Is this an established connection?

If the connection is already established, the ASA does not need to re-check packets; most matching packets can go through the “fast” path in both directions. The fast path is responsible for the following tasks:

- IP checksum verification
- Session lookup
- TCP sequence number check
- NAT translations based on existing sessions
- Layer 3 and Layer 4 header adjustments

Data packets for protocols that require Layer 7 inspection can also go through the fast path.

Some established session packets must continue to go through the session management path or the control plane path. Packets that go through the session management path include HTTP packets that require inspection or content filtering. Packets that go through the control plane path include the control packets for protocols that require Layer 7 inspection.

VPN Functional Overview

A VPN is a secure connection across a TCP/IP network (such as the Internet) that appears as a private connection. This secure connection is called a tunnel. The ASA uses tunneling protocols to negotiate security parameters, create and manage tunnels, encapsulate packets, transmit or receive them through the tunnel, and unencapsulate them. The ASA functions as a bidirectional tunnel endpoint: it can receive plain packets, encapsulate them, and send them to the other end of the tunnel where they are unencapsulated and sent to their final destination. It can also receive encapsulated packets, unencapsulate them, and send them to their final destination. The ASA invokes various standard protocols to accomplish these functions.

The ASA performs the following functions:

- Establishes tunnels
- Negotiates tunnel parameters
- Authenticates users
- Assigns user addresses
- Encrypts and decrypts data
- Manages security keys
- Manages data transfer across the tunnel
- Manages data transfer inbound and outbound as a tunnel endpoint or router

The ASA invokes various standard protocols to accomplish these functions.

Security Context Overview

You can partition a single ASA into multiple virtual devices, known as security contexts. Each context is an independent device, with its own security policy, interfaces, and administrators. Multiple contexts are similar to having multiple standalone devices. Many features are supported in multiple context mode, including routing tables, firewall features, IPS, and management; however, some features are not supported. See the feature chapters for more information.

In multiple context mode, the ASA includes a configuration for each context that identifies the security policy, interfaces, and almost all the options you can configure on a standalone device. The system administrator adds and manages contexts by configuring them in the system configuration, which, like a single mode configuration, is the startup configuration. The system configuration identifies basic settings for the ASA. The system configuration does not include any network interfaces or network settings for itself; rather, when the system needs to access network resources (such as downloading the contexts from the server), it uses one of the contexts that is designated as the admin context.

The admin context is just like any other context, except that when a user logs into the admin context, then that user has system administrator rights and can access the system and all other contexts.

ASA Clustering Overview

ASA Clustering lets you group multiple ASAs together as a single logical device. A cluster provides all the convenience of a single device (management, integration into a network) while achieving the increased throughput and redundancy of multiple devices.

You perform all configuration (aside from the bootstrap configuration) on the control unit only; the configuration is then replicated to the member units.

Special and Legacy Services

For some services, documentation is located outside of the main configuration guides and online help.

Special Services Guides

Special services allow the ASA to interoperate with other Cisco products; for example, by providing a security proxy for phone services (Unified Communications), or by providing Botnet traffic filtering in conjunction with the dynamic database from the Cisco update server, or by providing WCCP services for the Cisco Web Security Appliance. Some of these special services are covered in separate guides:

- [Cisco ASA Botnet Traffic Filter Guide](#)
- [Cisco ASA NetFlow Implementation Guide](#)
- [Cisco ASA Unified Communications Guide](#)
- [Cisco ASA WCCP Traffic Redirection Guide](#)
- [SNMP Version 3 Tools Implementation Guide](#)

Legacy Services Guide

Legacy services are still supported on the ASA, however there may be better alternative services that you can use instead. Legacy services are covered in a separate guide:

[Cisco ASA Legacy Feature Guide](#)

This guide includes the following chapters:

- Configuring RIP
- AAA Rules for Network Access

- Using Protection Tools, which includes Preventing IP Spoofing (**ip verify reverse-path**), Configuring the Fragment Size (**fragment**), Blocking Unwanted Connections (**shun**), Configuring TCP Options (for ASDM), and Configuring IP Audit for Basic IPS Support (**ip audit**).
- Configuring Filtering Services

