Configuring the Identity Firewall

This chapter describes how to configure the ASA for the Identity Firewall and includes the following sections:

Information About the Identity Firewall

This section includes the following topics:

Overview of the Identity Firewall

In an enterprise, users often need access to one or more server resources. Typically, a firewall is not aware of the users' identities and, therefore, cannot apply security policies based on identity. To configure per-user access policies, you must configure a user authentication proxy, which requires user interaction (a username/password query).

The Identity Firewall in the ASA provides more granular access control based on users' identities. You can configure access rules and security policies based on user names and user group names rather than through source IP addresses. The ASA applies the security policies based on an association of IP addresses to Windows Active Directory login information and reports events based on the mapped usernames instead of network IP addresses.

The Identity Firewall integrates with Microsoft Active Directory in conjunction with an external Active Directory (AD) Agent that provides the actual identity mapping. The ASA uses Windows Active Directory as the source to retrieve the current user identity information for specific IP addresses and allows transparent authentication for Active Directory users.

Identity-based firewall services enhance the existing access control and security policy mechanisms by allowing users or groups to be specified in place of source IP addresses. Identity-based security policies can be interleaved without restriction between traditional IP address-based rules.

The key benefits of the Identity Firewall include:

- Decoupling network topology from security policies
- Simplifying the creation of security policies
- Providing the ability to easily identify user activities on network resources
- Simplifying user activity monitoring

Architecture for Identity Firewall Deployments

The Identity Firewall integrates with Window Active Directory in conjunction with an external Active Directory (AD) Agent that provides the actual identity mapping.

The identity firewall consists of three components:

- ASA
- Microsoft Active Directory

  Although Active Directory is part of the Identity Firewall on the ASA, Active Directory administrators manage it. The reliability and accuracy of the data depends on data in Active Directory.

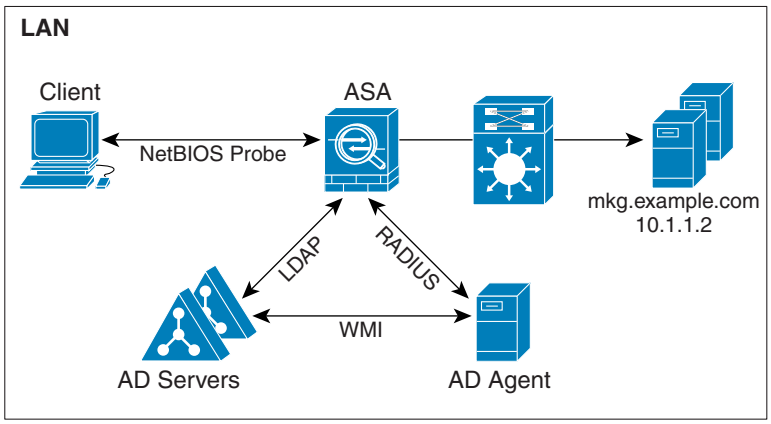
  Supported versions include Windows Server 2003, Windows Server 2008, and Windows Server 2008 R2 servers.
- Active Directory (AD) Agent

  The AD Agent runs on a Windows server. Supported Windows servers include Windows 2003, Windows 2008, and Windows 2008 R2.

Note Windows 2003 R2 is not supported for the AD Agent server.

Figure 38-1 show the components of the Identity Firewall. The succeeding table describes the roles of these components and how they communicate with one another.

Figure 38-1 Identity Firewall Components



1	**On the ASA**: Administrators configure local user groups and Identity Firewall policies.	**4**	**Client <-> ASA**: The client logs into the network through Microsoft Active Directory. The AD Server authenticates users and generates user login security logs. Alternatively, the client can log into the network through a cut-through proxy or VPN.
2	**ASA <-> AD Server**: The ASA sends an LDAP query for the Active Directory groups configured on the AD Server. The ASA consolidates local and Active Directory groups and applies access rules and Modular Policy Framework security policies based on user identity.	**5**	**ASA <-> Client**: Based on the policies configured on the ASA, it grants or denies access to the client. If configured, the ASA probes the NetBIOS of the client to pass inactive and no-response users.
3	**ASA <-> AD Agent**: Depending on the Identity Firewall configuration, the ASA downloads the IP-user database or sends a RADIUS request to the AD Agent that asks for the user's IP address. The ASA forwards the new mapped entries that have been learned from web authentication and VPN sessions to the AD Agent.	**6**	**AD Agent <-> AD Server**: The AD Agent maintains a cache of user ID and IP address mapped entries. and notifies the ASA of changes. The AD Agent sends logs to a syslog server.

Features of the Identity Firewall

The Identity Firewall includes the following key features.

Flexibility

- The ASA can retrieve user identity and IP address mapping from the AD Agent by querying the AD Agent for each new IP address or by maintaining a local copy of the entire user identity and IP address database.
- Supports host group, subnet, or IP address for the destination of a user identity policy.

- Supports a fully qualified domain name (FQDN) for the source and destination of a user identity policy.
- Supports the combination of 5-tuple policies with ID-based policies. The identity-based feature works in tandem with the existing 5-tuple solution.
- Supports use with IPS and Application Inspection policies.
- Retrieves user identity information from remote access VPN, AnyConnect VPN, L2TP VPN and cut-through proxy. All retrieved users are populated to all ASAs that are connected to the AD Agent.

Scalability

- Each AD Agent supports 100 ASAs. Multiple ASAs are able to communicate with a single AD Agent to provide scalability in larger network deployments.
- Supports 30 Active Directory servers provided the IP address is unique among all domains.
- Each user identity in a domain can have up to 8 IP addresses.
- Supports up to 64,000 user identity-IP address mapped entries in active policies for the ASA 5500 Series models. This limit controls the maximum number of users who have policies applied. The total number of users are the aggregate of all users configured in all different contexts.
- Supports up to 1024 user identity-IP address mapped entries in active policies for the ASA 5505.
- Supports up to 256 user groups in active ASA policies.
- A single access rule can contain one or more user groups or users.
- Supports multiple domains.

Availability

- The ASA retrieves group information from the Active Directory and falls back to web authentication for IP addresses when the AD Agent cannot map a source IP address to a user identity.
- The AD Agent continues to function when any of the Active Directory servers or the ASA are not responding.
- Supports configuring a primary AD Agent and a secondary AD Agent on the ASA. If the primary AD Agent stops responding, the ASA can switch to the secondary AD Agent.
- If the AD Agent is unavailable, the ASA can fall back to existing identity sources such as cut-through proxy and VPN authentication.
- The AD Agent runs a watchdog process that automatically restarts its services when they are down.
- Allows a distributed IP address/user mapping database for use among ASAs.

Deployment Scenarios

You can deploy the components of the Identity Firewall in the following ways, depending on your environmental requirements.

Figure 38-2 shows how you can deploy the components of the Identity Firewall to allow for redundancy. Scenario 1 shows a simple installation without component redundancy. Scenario 2 also shows a simple installation without redundancy. However, in this deployment scenario, the Active Directory server and AD Agent are co-located on the same Windows server.

Figure 38-2 Deployment Scenario without Redundancy

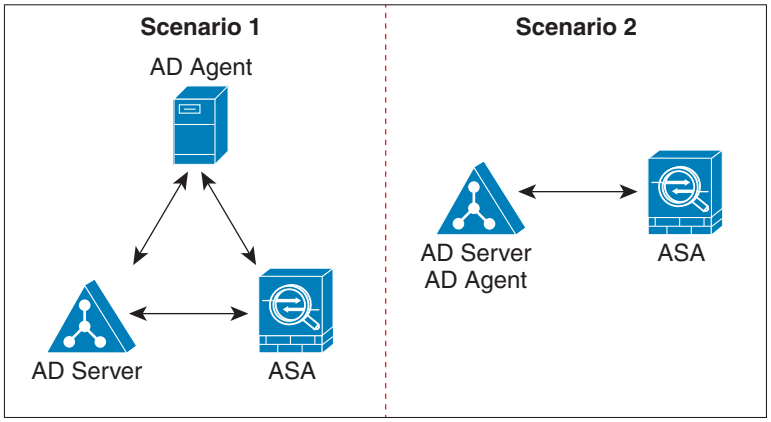


Figure 38-3 shows how you can deploy the Identity Firewall components to support redundancy. Scenario 1 shows a deployment with multiple Active Directory servers and a single AD Agent installed on a separate Windows server. Scenario 2 shows a deployment with multiple Active Directory servers and multiple AD Agents installed on separate Windows servers.

Figure 38-3 Deployment Scenario with Redundant Components

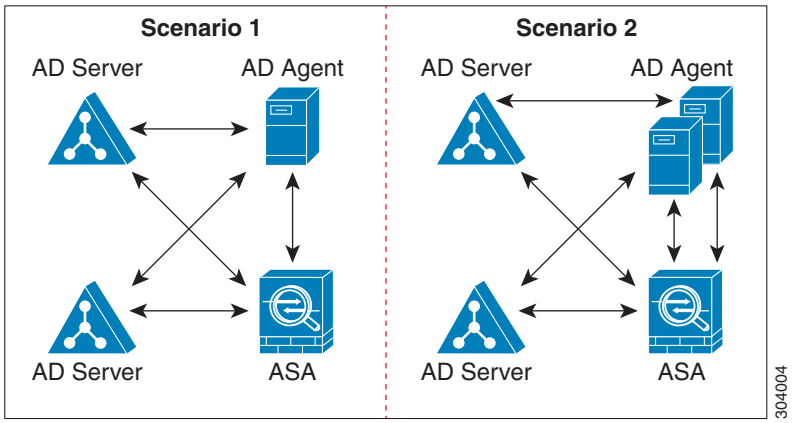


Figure 38-4 shows how all Identity Firewall components—Active Directory server, the AD Agent, and the clients—are installed and communicate on the LAN.

Figure 38-4 LAN -based Deployment

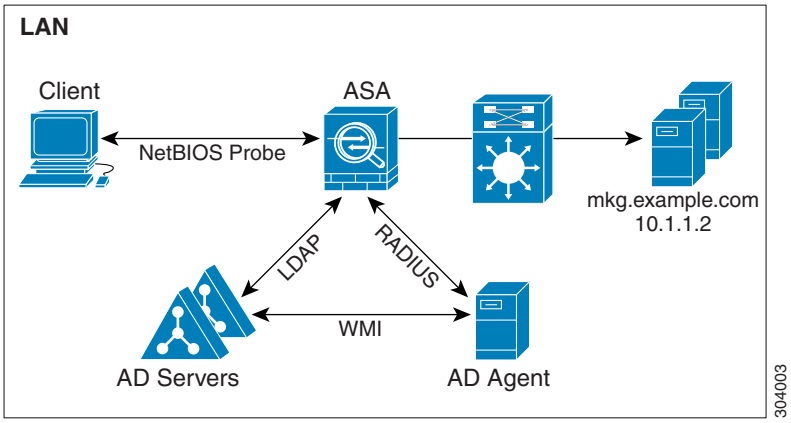


Figure 38-5 shows a WAN-based deployment to support a remote site. The Active Directory server and the AD Agent are installed on the main site LAN. The clients are located at a remote site and connect to the Identity Firewall components over a WAN.

Figure 38-5 WAN-based Deployment

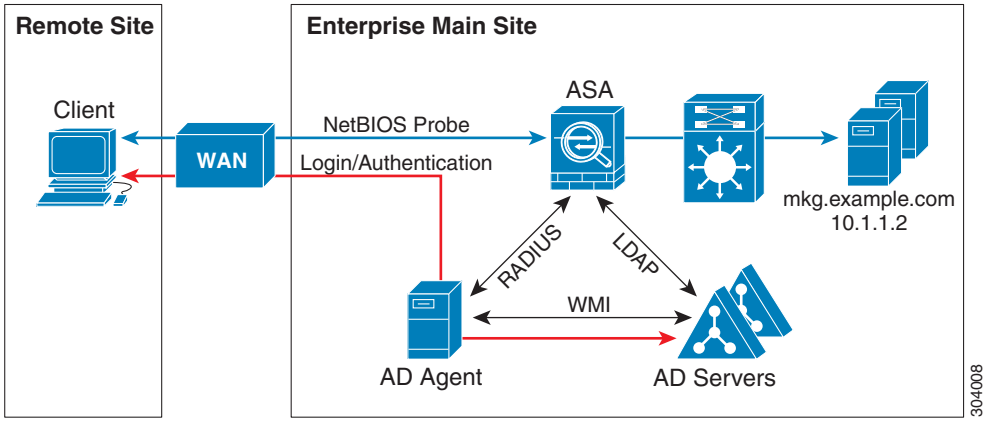


Figure 38-6 also shows a WAN-based deployment to support a remote site. The Active Directory server is installed on the main site LAN. However, the AD Agent is installed and accessed by the clients at the remote site. The remote clients connect to the Active Directory servers at the main site over a WAN.

Figure 38-6 WAN-based Deployment with Remote AD Agent

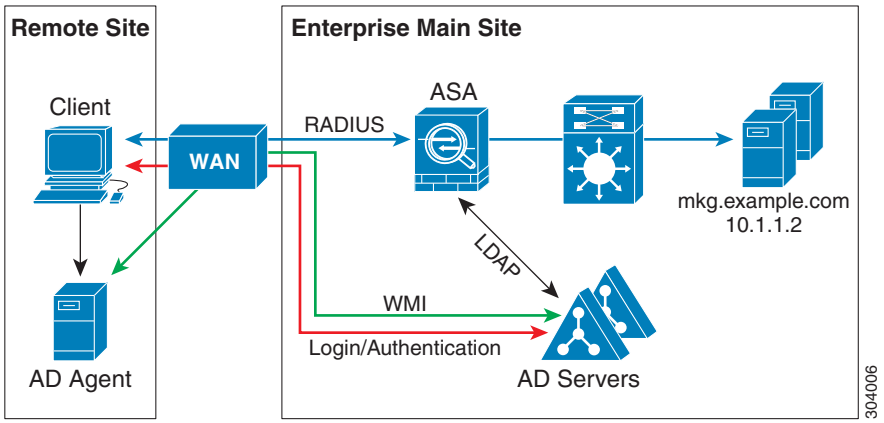
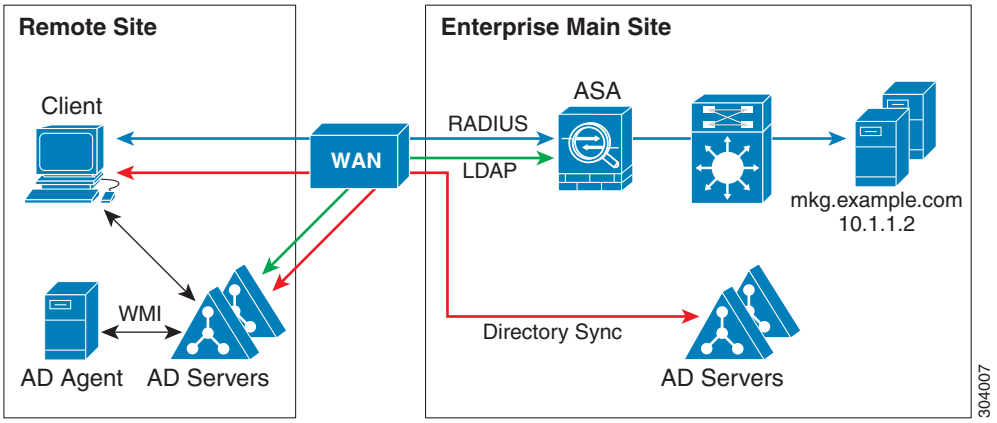


Figure 38-7 shows an expanded remote site installation. An AD Agent and Active Directory servers are installed at the remote site. The clients access these components locally when logging into network resources located at the main site. The remote Active Directory server must synchronize its data with the central Active Directory servers located at the main site.

Figure 38-7 WAN-based Deployment with Remote AD Agent and AD Servers



Licensing for the Identity Firewall

The following table shows the licensing requirements for this feature:

Model	License Requirement
All models	Base License.

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 modes.

Failover Guidelines

- The Identity Firewall supports user identity-IP address mapping and AD Agent status replication from active to standby when Stateful Failover is enabled. However, only user identity-IP address mapping, AD Agent status, and domain status are replicated. User and user group records are not replicated to the standby ASA.
- When failover is configured, the standby ASA must also be configured to connect to the AD Agent directly to retrieve user groups. The standby ASA does not send NetBIOS packets to clients even when the NetBIOS probing options are configured for the Identity Firewall.
- When a client is determined to be inactive by the active ASA, the information is propagated to the standby ASA. User statistics are not propagated to the standby ASA.
- When you have failover configured, you must configure the AD Agent to communicate with both the active and standby ASAs. See the *Installation and Setup Guide for the Active Directory Agent* for the steps to configure the ASA on the AD Agent server.

IPv6 Guidelines

- Supports IPv6.
- The AD Agent supports endpoints with IPv6 addresses. It can receive IPv6 addresses in log events, maintain them in its cache, and send them through RADIUS messages.
- NetBIOS over IPv6 is not supported.

Additional Guidelines and Limitations

- A full URL as a destination address is not supported.
- For NetBIOS probing to function, the network between the ASA, AD Agent, and clients must support UDP-encapsulated NetBIOS traffic.
- MAC address checking by the Identity Firewall does not work when intervening routers are present. Users logged into clients that are behind the same router have the same MAC addresses. With this implementation, all the packets from the same router are able to pass the check, because the ASA is unable to ascertain the actual MAC addresses behind the router.
- The following ASA features do not support using the identity-based object and FQDN in an extended ACL:
  - Route maps
  - Crypto maps
  - WCCP
  - NAT
  - Group policy (except for VPN filters)

  - DAP

- You can use the **user-identity update active-user-database** command to actively initiate a user-IP address download from the AD agent.

  By design, if a previous download session has finished, the ASA does not allow you to issue this command again.

  As a result, if the user-IP database is very large, the previous download session is not finished yet, and you issue another **user-identity update active-user-database** command, the following error message appears:

  ```
  "ERROR: one update active-user-database is already in progress."
  ```

  You need to wait until the previous session is completely finished, then you can issue another **user-identity update active-user-database** command.

  Another example of this behavior occurs because of packet loss from the AD Agent to the ASA.

  When you issue a **user-identity update active-user-database** command, the ASA requests the total number of user-IP mapped entries to be downloaded. Then the AD Agent initiates a UDP connection to the ASA and sends the change of authorization request packet.

  If for some reason the packet is lost, there is no way for the ASA to discern this. As a result, the ASA holds the session for 4-5 minutes, during which time this error message continues to appear if you have issued the **user-identity update active-user-database** command.

- When you use the Cisco Context Directory Agent (CDA) in conjunction with the ASA or Cisco Ironport Web Security Appliance (WSA), make sure that you open the following ports:
  - Authentication port for UDP—1645
  - Accounting port for UDP—1646
  - Listening port for UDP—3799

    The listening port is used to send change of authorization requests from the CDA to the ASA or to the WSA.
- For domain names, the following characters are not valid: \/:*?"<>|. For naming conventions, see http://support.microsoft.com/kb/909264.
- For usernames, the following characters are not valid: \/[]:;=,+*?"<>|@.
- For user group names, the following characters are not valid: \/[]:;=,+*?"<>|.

Prerequisites

Before configuring the Identity Firewall in the ASA, you must meet the prerequisites for the AD Agent and Microsoft Active Directory.

AD Agent

- The AD Agent must be installed on a Windows server that is accessible to the ASA. Additionally, you must configure the AD Agent to obtain information from the Active Directory servers and to communicate with the ASA.
- Supported Windows servers include Windows 2003, Windows 2008, and Windows 2008 R2.

Note Windows 2003 R2 is not supported for the AD Agent server.

- For the steps to install and configure the AD Agent, see the *Installation and Setup Guide for the Active Directory Agent*.
- Before configuring the AD Agent in the ASA, obtain the secret key value that the AD Agent and the ASA use to communicate. This value must match on both the AD Agent and the ASA.

Microsoft Active Directory

- Microsoft Active Directory must be installed on a Windows server and accessible by the ASA. Supported versions include Windows 2003, 2008, and 2008 R2 servers.
- Before configuring the Active Directory server on the ASA, create a user account in Active Directory for the ASA.
- Additionally, the ASA sends encrypted log-in information to the Active Directory server by using SSL enabled over LDAP. SSL must be enabled on the Active Directory server. See the documentation for Microsoft Active Directory for how to enable SSL for Active Directory.

Note Before running the AD Agent Installer, you must install the patches listed in the *README First for the Cisco Active Directory Agent* on each Microsoft Active Directory server that the AD Agent monitors. These patches are required even when the AD Agent is installed directly on the domain controller server.

Configuring the Identity Firewall

This section contains the following topics:

Task Flow for Configuring the Identity Firewall

To configure the Identity Firewall, perform the following tasks:

Step 1 Configure the Active Directory domain in the ASA.

See the "Configuring the Active Directory Domain" section on page 38-11.

See also the "Deployment Scenarios" section on page 38-4 for the ways in which you can deploy the Active Directory servers to meet your environment requirements.

Step 2 Configure the AD Agent in ASA.

See the "Configuring Active Directory Agents" section on page 38-13.

See also "Deployment Scenarios" section on page 38-4 for the ways in which you can deploy the AD Agents to meet your environment requirements.

Step 3 Configure Identity Options.

See the "Configuring Identity Options" section on page 38-14.

Step 4 Configure Identity-based Security Policy. After the AD domain and AD Agent are configured, you can create identity-based object groups and ACLs for use in many features.

See the "Configuring Identity-Based Security Policy" section on page 38-19.

Configuring the Active Directory Domain

Active Directory domain configuration on the ASA is required for the ASA to download Active Directory groups and accept user identities from specific domains when receiving IP-user mapping from the AD Agent.

Prerequisites

- Active Directory server IP address
- Distinguished Name for LDAP base DN
- Distinguished Name and password for the Active Directory user that the Identity Firewall uses to connect to the Active Directory domain controller

To configure the Active Directory domain, perform the following steps:

	Command	Purpose
Step 1	**aaa-server** *server-tag* **protocol ldap** **Example:** `hostname(config)# aaa-server adserver protocol ldap`	Creates the AAA server group and configures AAA server parameters for the Active Directory server.
Step 2	**aaa-server** *server-tag* [(*interface-name*)] **host** {*server-ip* | *name*} [*key*] [**timeout** *seconds*] **Example:** `hostname(config-aaa-server-group)# aaa-server adserver (mgmt) host 172.168.224.6`	For the Active Directory server, configures the AAA server as part of a AAA server group and the AAA server parameters that are host-specific.
Step 3	**ldap-base-dn** *string* **Example:** `hostname(config-aaa-server-host)# ldap-base-dn DC=SAMPLE,DC=com`	Specifies the location in the LDAP hierarchy where the server should begin searching when it receives an authorization request. Specifying the **ldap-base-dn** command is optional. If you do not specify this command, the ASA retrieves the defaultNamingContext from the Active Directory and uses it as the base DN.
Step 4	**ldap-scope subtree** **Example:** `hostname(config-aaa-server-host)# ldap-scope subtree`	Specifies the extent of the search in the LDAP hierarchy that the server should make when it receives an authorization request.

	Command	Purpose
Step 5	**ldap-login-password** *string* **Example:** `hostname(config-aaa-server-host)# ldap-login-password obscurepassword`	Specifies the login password for the LDAP server.
Step 6	**ldap-login-dn** *string* **Example:** `hostname(config-aaa-server-host)# ldap-login-dn SAMPLE\user1`	Specifies the name of the directory object that the system should bind this as. The ASA identifies itself for authenticated binding by attaching a Login DN field to the user authentication request. The Login DN field describes the authentication characteristics of the ASA. The *string* argument is a case-sensitive string of up to 128 characters that specifies the name of the directory object in the LDAP hierarchy. Spaces are not permitted in the string, but other special characters are allowed. You can specify the traditional or simplified format. The typical **ldap-login-dn** command format includes: CN=username,OU=Employees,OU=Sample Users,DC=sample,DC=com.
Step 7	**server-type microsoft** **Example:** `hostname(config-aaa-server-host)# server-type microsoft`	Configures the LDAP server model for the Microsoft Active Directory server.
Step 8	**ldap-group-base-dn** *string* **Example:** `hostname(config-aaa-server-host)# ldap-group-base-dn OU=Sample Groups,DC=SAMPLE,DC=com`	Specifies location of the Active Directory groups configuration in the Active Directory domain controller. If not specified, the value in the **ldap-group-base-dn** command is used. Specifying the **ldap-group-base-dn** command is optional.
Step 9	**ldap-over-ssl enable** **Example:** `hostname(config-aaa-server-host)# ldap-over-ssl enable`	Allows the ASA to access the Active Directory domain controller over SSL. To support LDAP over SSL, Active Directory server needs to be configured to have this support. By default, the Active Directory does not have SSL configured. If SSL is not configured on the Active Directory, you do not need to configure it on the ASA for the Identity Firewall.

	Command	Purpose

Step 10	**server-port** *port-number*
	
	Example:
	`hostname(config-aaa-server-host)# server-port 389`
	`hostname(config-aaa-server-host)# server-port 636`
		By default, if the **ldap-over-ssl** command is not enabled, the default server port is 389; if the **ldap-over-ssl** command is enabled, the default server port is 636.

Step 11	**group-search-timeout** *seconds*
	
	Example:
	`hostname(config-aaa-server-host)#`
	`group-search-timeout 300`
		Sets the amount of time before LDAP queries time out.

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Configuring Active Directory Agents

Configure the primary and secondary AD Agents for the AD Agent Server Group. When the ASA detects that the primary AD Agent is not responding and a secondary agent is specified, the ASA switches to the secondary AD Agent. The Active Directory server for the AD agent uses RADIUS as the communication protocol; therefore, you should specify a key attribute for the shared secret between the ASA and AD Agent.

Prerequisites

Make sure that you have the following information before configuring the AD Agents:

- AD agent IP address
- Shared secret between the ASA and AD agent

To configure the AD Agents, perform the following steps:

	Command	Purpose
Step 1	**aaa-server** *server-tag* **protocol radius** **Example:** `hostname(config)# aaa-server adagent protocol radius`	Creates the AAA server group and configures AAA server parameters for the AD Agent.
Step 2	**ad-agent-mode** **Example:** `hostname(config)# ad-agent-mode`	Enables the AD Agent mode.

Step 3	**aaa-server** *server-tag* [(*interface-name*)] **host** {*server-ip* | *name*} [*key*] [**timeout** *seconds*]
	
	Example:
	`hostname(config-aaa-server-group)# aaa-server`
	`adagent (inside) host 192.168.1.101`
		For the AD Agent, configures the AAA server as part of a AAA server group and the AAA server parameters that are host-specific.

	Command	Purpose
Step 4	**key** *key* **Example:** `hostname(config-aaa-server-host)# key mysecret`	Specifies the server secret value used to authenticate the ASA to the AD Agent server.
Step 5	**user-identity ad-agent aaa-server** *aaa_server_group_tag* **Example:** `hostname(config-aaa-server-hostkey)# user-identity ad-agent aaa-server adagent`	Defines the server group of the AD Agent. The first server defined in the *aaa_server_group_tag* argument is the primary AD Agent and the second server defined is the secondary AD Agent. The Identity Firewall supports defining only two AD Agent hosts. When the ASA detects that the primary AD Agent is down and a secondary agent is specified, it switches to the secondary AD Agent. The AAA server for the AD agent uses RADIUS as the communication protocol, and should specify a key attribute for the shared secret between the ASA and AD Agent.
Step 6	**test aaa-server ad-agent** **Example:** `hostname(config-aaa-server-host)# test aaa-server ad-agent`	Tests the communication between the ASA and the AD Agent server.

What to Do Next

Configure access rules for the Identity Firewall. See the "Configuring Identity-Based Security Policy" section on page 38-19.

Configuring Identity Options

Perform this procedure to add or edit the Identity Firewall feature; check the **Enable** check box to enable the feature. By default, the Identity Firewall feature is disabled.

Prerequisites

Before configuring the identify options for the Identity Firewall, you must meet the prerequisites for the AD Agent and Microsoft Active Directory. See the "Prerequisites" section on page 38-9 for the requirements of the AD Agent and Microsoft Active Directory installation.

To configure the Identity Options for the Identity Firewall, perform the following steps:

	Command	Purpose
Step 1	**user-identity enable** **Example:** `hostname(config)# user-identity enable`	Enables the Identity Firewall feature.
Step 2	**user-identity default-domain** *domain_NetBIOS_name* **Example:** `hostname(config)# user-identity default-domain SAMPLE`	Specifies the default domain for the Identity Firewall. For the *domain_NetBIOS_name* argument, enter a name of up to 32 characters that consists of [a-z], [A-Z], [0-9], [!@#$%^&()-_=+[]{};,.] except '.' and ' ' at the first character. If the domain name includes a space, enclose the entire name in quotation marks. The domain name is not case sensitive. The default domain is used for all users and user groups when a domain has not been explicitly configured for those users or groups. When a default domain is not specified, the default domain for users and groups is LOCAL. For multiple context modes, you can set a default domain name for each context, as well as within the system execution space. **Note** The default domain name that you specify must match the NetBIOS domain name configured on the Active Directory domain controller. If the domain name does not match, the AD Agent incorrectly associates the user identity-IP address mapped entries with the domain name that you enter when configuring the ASA. To view the NetBIOS domain name, open the Active Directory user event security log in any text editor. The Identity Firewall uses the LOCAL domain for all locally defined user groups or locally defined users. Users logging in through a web portal (cut-through proxy) are designated as belonging to the Active Directory domain with which they authenticated. Users logging in through a VPN are designated as belonging to the LOCAL domain unless the VPN is authenticated by LDAP with the Active Directory. In this case, the Identity Firewall can associate the users with their Active Directory domain.

	Command	Purpose
Step 3	**user-identity domain** *domain_nickname* **aaa-server** *aaa_server_group_tag* **Example:** `hostname(config)# user-identity domain SAMPLE aaa-server ds`	Associates the LDAP parameters defined for the AAA server for importing user group queries with the domain name. For the *domain_nickname* argument, enter a name of up to 32 characters consisting of [a-z], [A-Z], [0-9], [!@#$%^&()-_=+[]{};,.] except '.' and ' ' at the first character. If the domain name includes a space, you must enclose that space character in quotation marks. The domain name is not case sensitive.
Step 4	**user-identity logout-probe netbios local-system probe-time minutes** *minutes* **retry-interval seconds** *seconds* **retry-count** *times* [**user-not-needed** | **match-any** | **exact-match**] **Example:** `hostname(config)# user-identity logout-probe netbios local-system probe-time minutes 10 retry-interval seconds 10 retry-count 2 user-not-needed`	Enables NetBIOS probing. Enabling this option configures how often the ASA probes the user client IP address to determine whether the client is still active. By default, NetBIOS probing is disabled. To minimize the NetBIOS packets, the ASA only sends a NetBIOS probe to a client when the user has been idle for more than the specified number of minutes. • **Exact-match**—The username of the user assigned to the IP address must be the only one in the NetBIOS response. Otherwise, the user identity of that IP address is considered invalid. • **User-not-needed**—As long as the ASA received a NetBIOS response from the client, the user identity is considered valid. The Identity Firewall only performs NetBIOS probing for those users identities that are in the active state and exist in at least one security policy. The ASA does not perform NetBIOS probing for clients where the users logged in through cut-through proxy or by using a VPN.
Step 5	**user-identity inactive-user-timer minutes** *minutes* **Example:** `hostname(config)# user-identity inactive-user-timer minutes 120`	Specifies the amount of time before a user is considered idle, meaning the ASA has not received traffic from the user's IP address for the specified amount of time. When the timer expires, the user's IP address is marked as inactive and removed from the local cached user identity-IP address mapping database, and the ASA no longer notifies the AD Agent about that IP address. Existing traffic is still allowed to pass. When this command is specified, the ASA runs an inactive timer even when the NetBIOS Logout Probe is configured. By default, the idle timeout is set to 60 minutes. **Note** The Idle Timeout option does not apply to VPN or cut-through proxy users.

	Command	Purpose
Step 6	**user-identity poll-import-user-group-timer hours** *hours* **Example:** `hostname(config)# user-identity poll-import-user-group-timer hours 1`	Specifies the amount of time before the ASA queries the Active Directory server for user group information. If a user is added to or deleted from an Active Directory group, the ASA received the updated user group after the import group timer ran. By default, the **poll-import-user-group-timer hours** value is 8 hours. To immediately update user group information, enter the **user-identity update import-user** command.
Step 7	**user-identity action netbios-response-fail remove-user-ip** **Example:** `hostname(config)# user-identity action netbios-response-fail remove-user-ip`	Specifies the action when a client does not respond to a NetBIOS probe. For example, the network connection might be blocked to that client or the client is not active. When the **user-identity action remove-user-ip** command is configured, the ASA removed the user identity-IP address mapping for that client. By default, this command is disabled.
Step 8	**user-identity action domain-controller-down** *domain_nickname* **disable-user-identity-rule** **Example:** `hostname(config)# user-identity action domain-controller-down SAMPLE disable-user-identity-rule`	Specifies the action when the domain is down, because the Active Directory domain controller is not responding. When the domain is down and the **disable-user-identity-rule** keyword is configured, the ASA disables the user identity-IP address mapping for that domain. Additionally, the status of all user IP addresses in that domain are marked as disabled in the output displayed by the **show user-identity user** command. By default, this command is disabled.
Step 9	**user-identity user-not-found enable** **Example:** `hostname(config)# user-identity user-not-found enable`	Enables user-not-found tracking. Only the last 1024 IP addresses are tracked. By default, this command is disabled.
Step 10	**user-identity action ad-agent-down disable-user-identity-rule** **Example:** `hostname(config)# user-identity action ad-agent-down disable-user-identity-rule`	Specifies the action when the AD Agent is not responding. When the AD Agent is down and the **user-identity action ad-agent-down** command is configured, the ASA disables the user identity rules associated with the users in that domain. Additionally, the status of all user IP addresses in that domain is marked as disabled in the output displayed by the **show user-identity user** command. By default, this command is disabled.

	Command	Purpose
Step 11	**user-identity action mac-address-mismatch remove-user-ip** **Example:** `hostname(config)# user-identity action mac-address-mismatch remove-user-ip`	Specifies the action when a user's MAC address is found to be inconsistent with the ASA IP address currently mapped to that MAC address. When the **user-identity action mac-address-mismatch** command is configured, the ASA removes the user identity-IP address mapping for that client. By default, the ASA uses the **remove-user-ip** keyword when this command is specified.
Step 12	**user-identity ad-agent active-user-database** {**on-demand** | **full-download**} **Example:** `hostname(config)# user-identity ad-agent active-user-database full-download`	Defines how the ASA retrieves the user identity-IP address mapping information from the AD Agent: • **Full-download**—Specifies that the ASA send a request to the AD Agent to download the entire IP-user mapping table when the ASA starts and then to receive incremental IP-user mapping information when users log in and log out. • **On-demand**—Specifies that the ASA retrieve the user mapping information of an IP address from the AD Agent when the ASA receives a packet that requires a new connection, and the user of its source IP address is not in the user-identity database. By default, the ASA 5505 uses the on-demand option. The other ASA platforms use the full-download option. Full downloads are event driven, meaning that when there are subsequent requests to download the database, just the updates to the user identity-IP address mapping database are sent. When the ASA registers a change request with the AD Agent, the AD Agent sends a new event to the ASA.

	Command	Purpose
Step 13	**user-identity ad-agent hello-timer seconds** *seconds* **retry-times** *number* **Example:** `hostname(config)# user-identity ad-agent hello-timer seconds 20 retry-times 3`	Defines the hello timer between the ASA and the AD Agent. The hello timer between the ASA and the AD Agent defines how frequently the ASA exchanges hello packets. The ASA uses the hello packet to obtain ASA replication status (in-sync or out-of-sync) and domain status (up or down). If the ASA does not receive a response from the AD Agent, it resends a hello packet after the specified interval. By default, the hello timer is set to 30 seconds and 5 retries.
Step 14	**user-identity ad-agent aaa-server** *aaa_server_group_tag* **Example:** `hostname(config)# user-identity ad-agent aaa-server adagent`	Defines the server group of the AD Agent. For the *aaa_server_group_tag* argument, enter the value defined by the **aaa-server** command.

What to Do Next

Configure the Active Directory domain and server groups. See the "Configuring the Active Directory Domain" section on page 38-11.

Configure AD Agents. See the "Configuring Active Directory Agents" section on page 38-13.

Configuring Identity-Based Security Policy

You can incorporate identity-based policy in many ASA features. Any feature that uses extended ACLs (other than those listed as unsupported in the "Guidelines and Limitations" section on page 38-8) can take advantage of an identity firewall. You can now add user identity arguments to extended ACLs, as well as network-based parameters.

- To configure an extended ACL, see Chapter 19, "Adding an Extended Access Control List."
- To configure local user groups, which can be used in the ACL, see the "Configuring Local User Groups" section on page 17-11.

Features that can use identity include the following:

- Access rules—An access rule permits or denies traffic on an interface using network information. With an identity firewall, you can control access based on user identity. See Chapter 6, "Configuring Access Rules," in the firewall configuration guide.
- AAA rules—An authentication rule (also known as cut-through proxy) controls network access based on the user. Because this function is very similar to an access rule plus an identity firewall, AAA rules can now be used as a backup method of authentication if a user's AD login expires. For example, for any user without a valid login, you can trigger a AAA rule. To ensure that the AAA rule is only triggered for users that do not have valid logins, you can specify special usernames in the extended ACL used for the access rule and for the AAA rule: None (users without a valid login) and Any (users with a valid login). In the access rule, configure your policy as usual for users and groups, but then include a AAA rule that permits all None users; you must permit these users so they

can later trigger a AAA rule. Then, configure a AAA rule that denies Any users (these users are not subject to the AAA rule, and were handled already by the access rule), but permits all None users. For example:

```
access-list 100 ex permit ip user CISCO\xyz any any
access-list 100 ex deny ip user CISCO\abc any any
access-list 100 ex permit ip user NONE any any
access-list 100 ex deny any any
access-group 100 in interface inside

access-list 200 ex deny ip user ANY any any
access-list 200 ex permit user NONE any any
aaa authenticate match 200 inside user-identity
```

For more information, see Chapter 7, "Configuring AAA Rules for Network Access," in the firewall configuration guide.

- Cloud Web Security—You can control which users are sent to the Cloud Web Security proxy server. In addition, you can configure policy on the Cloud Web Security ScanCenter that is based on user groups that are included in ASA traffic headers sent to Cloud Web Security. See Chapter 25, "Configuring the ASA for Cisco Cloud Web Security," in the firewall configuration guide.
- VPN filter—Although a VPN does not support identity firewall ACLs in general, you can configure the ASA to enforce identity-based access rules on VPN traffic. By default, VPN traffic is not subject to access rules. You can force VPN clients to abide by access rules that use an identity firewall ACL (with the **no sysopt connection permit-vpn** command). You can also use an identity firewall ACL with the VPN filter feature; a VPN filter accomplishes a similar effect as allowing access rules in general.

Collecting User Statistics

To activate the collection of user statistics by the Modular Policy Framework and match lookup actions for the Identify Firewall, enter the following command:

Command	Purpose

user-statistics [**accounting** | **scanning**]
 	
Example:
`ciscoasa(config)# class-map c-identity-example-1`
`ciscoasa(config-cmap)# match access-list identity-example-1`
`ciscoasa(config-cmap)# exit`
`ciscoasa(config)# policy-map p-identity-example-1`
`ciscoasa(config-pmap)# class c-identity-example-1`
`ciscoasa(config-pmap)# user-statistics accounting`
`ciscoasa(config-pmap)# exit`
`ciscoasa(config)# service-policy p-identity-example-1 interface outside`
	Activates the collection of user statistics by the Modular Policy Framework and matches lookup actions for the Identify Firewall.
	
	The **accounting** keyword specifies that the ASA collect the sent packet count, sent drop count, and received packet count. The **scanning** keyword specifies that the ASA collect only the sent drop count.
	
	When you configure a policy map to collect user statistics, the ASA collects detailed statistics for selected users. When you specify the **user-statistics** command without the **accounting** or **scanning** keywords, the ASA collects both accounting and scanning statistics.

Configuration Examples

This section includes the following topics:

AAA Rule and Access Rule Example 1

This example shows a typical cut-through proxy configuration to allow a user to log in through the ASA. In this example, the following conditions apply:

- The ASA IP address is 172.1.1.118.
- The Active Directory domain controller has the IP address 71.1.2.93.
- The end-user client has the IP address 172.1.1.118 and uses HTTPS to log in through a web portal.
- The user is authenticated by the Active Directory domain controller via LDAP.
- The ASA uses the inside interface to connect to the Active Directory domain controller on the corporate network.

```
hostname(config)# access-list AUTH extended permit tcp any 172.1.1.118 255.255.255.255 eq http
hostname(config)# access-list AUTH extended permit tcp any 172.1.1.118 255.255.255.255 eq https
hostname(config)# aaa-server LDAP protocol ldap
hostname(config-aaa-server-group)# aaa-server LDAP (inside) host 171.1.2.93
hostname(config-aaa-server-host)# ldap-base-dn DC=cisco,DC=com
hostname(config-aaa-server-host)# ldap-group-base-dn DC=cisco,DC=com
hostname(config-aaa-server-host)# ldap-scope subtree
hostname(config-aaa-server-host)# ldap-login-dn cn=kao,OU=Employees,OU=Cisco Users,DC=cisco,DC=com
hostname(config-aaa-server-host)# ldap-login-password *****
hostname(config-aaa-server-host)# ldap-over-ssl enable
hostname(config-aaa-server-host)# server-type microsoft
hostname(config-aaa-server-host)# aaa authentication match AUTH inside LDAP
hostname(config)#
hostname(config)# http server enable
hostname(config)# http 0.0.0.0 0.0.0.0 inside
hostname(config)#
hostname(config)# auth-prompt prompt Enter Your Authentication
hostname(config)# auth-prompt accept You are Good
hostname(config)# auth-prompt reject Goodbye
```

AAA Rule and Access Rule Example 2

In this example, the following guidelines apply:

- In **access list** commands, permit user NONE rules should be written before entering the **access-list 100 ex deny any any** command to allow unauthenticated incoming users to trigger AAA cut-through proxy.
- In the **auth access-list** command, permit user NONE rules guarantee only unauthenticated trigger cut-through proxy. Ideally, they should be the last lines.

```
hostname(config)# access-list listenerAuth extended permit tcp any any
hostname(config)# aaa authentication match listenerAuth inside ldap
hostname(config)# aaa authentication listener http inside port 8888
```

```
hostname(config)# access-list 100 ex permit ip user SAMPLE\user1 any any
hostname(config)# access-list 100 ex deny ip user SAMPLE\user2 any any
hostname(config)# access-list 100 ex permit ip user NONE any any
hostname(config)# access-list 100 ex deny any any
hostname(config)# access-group 100 in interface inside
hostname(config)# aaa authenticate match 200 inside user-identity
```

VPN Filter Example

Some traffic might need to bypass the Identity Firewall.

The ASA reports users logging in through VPN authentication or a web portal (cut-through proxy) to the AD Agent, which distributes the user information to all registered ASA devices. Specifically, the IP-user mapping of authenticated users is forwarded to all ASA contexts that include the input interface where HTTP/HTTPS packets are received and authenticated. The ASA designates users logging in through a VPN as belonging the LOCAL domain.

There are two different ways to apply identity firewall (IDFW) rules to VPN users:

- Apply VPN-Filter with bypassing access-list check disabled
- Apply VPN-Filter with bypassing access-list check enabled

VPN with IDFW Rule -1 Example

By default, the **sysopt connection permit-vpn** command is enabled and VPN traffic is exempted from an access list check. To apply interface-based ACL rules for VPN traffic, VPN traffic access list bypassing needs to be disabled.

In this example, if the user logs in from the outside interface, the IDFW rules control which network resources are accessible. All VPN users are to be stored under the LOCAL domain. Therefore, it is only meaningful to apply the rules for LOCAL users or object groups that include LOCAL users.

```
! Apply VPN-Filter with bypassing access-list check disabled
no sysopt connection permit-vpn
access-list v1 extended deny ip user LOCAL\idfw any 10.0.0.0 255.255.255.0
access-list v1 extended permit ip user LOCAL\idfw any 20.0.0.0 255.255.255.0
access-group v1 in interface outside
```

VPN with IDFW Rule -2 Example

By default, the **sysopt connection permit-vpn** command is enabled, with VPN traffic access bypassing enabled. A VPN filter can be used to apply the IDFW rules to the VPN traffic. A VPN filter with IDFW rules can be defined in the CLI username and group policy.

In the example, when user idfw logs in, the user can access network resources in the 10.0.00/24 subnet. However, when user user1 logs in, access to network resources in 10.0.00/24 subnet is denied. Note that all VPN users are stored under the LOCAL domain. Therefore, it is only meaningful to apply the rules for LOCAL users or object groups that include LOCAL users.

Note IDFW rules can only be applied to VPN filters under group policy and are not available in all of the other group policy features.

```
! Apply VPN-Filter with bypassing access-list check enabled
```

```
sysopt connection permit-vpn
access-list v1 extended permit ip user LOCAL\idfw any 10.0.0.0 255.255.255.0
access-list v2 extended deny ip user LOCAL\user1 any 10.0.0.0 255.255.255.0
username user1 password QkBIIYVi6IFLEsYv encrypted privilege 0 username user1 attributes
    vpn-group-policy group1 vpn-filter value v2
username idfw password eEm2dmjMaopcGozT encrypted
username idfw attributes
    vpn-group-policy testgroup vpn-filter value v1

sysopt connection permit-vpn
access-list v1 extended permit ip user LOCAL\idfw any 10.0.0.0 255.255.255.0 access-list
v1 extended deny ip user LOCAL\user1 any 10.0.0.0 255.255.255.0 group-policy group1
internal
group-policy group1 attributes

    vpn-filter value v1
    vpn-tunnel-protocol ikev1 l2tp-ipsec ssl-client ssl-clientless
```

Monitoring the Identity Firewall

This section includes the following topics:

Monitoring AD Agents

To obtain troubleshooting information for the AD Agent, use one of the following commands:

- **show user-identity ad-agent**
- **show user-identity ad-agent statistics**

These commands display the following information about the primary and secondary AD Agents:

- Status of the AD Agents
- Status of the domains
- Statistics for the AD Agents

Monitoring Groups

To obtain troubleshooting information for the user groups configured for the Identity Firewall, use the **show user-identity group** command.

Monitoring Memory Usage for the Identity Firewall

To obtain troubleshooting information for memory usage for the Identity Firewall, use the **show user-identity memory** command.

The command displays the memory usage in bytes of various modules in the Identity Firewall:

- Users
- Groups
- User Stats
- LDAP

  The ASA sends an LDAP query for the Active Directory groups configured on the Active Directory server. The Active Directory server authenticates users and generates user login security logs.
- AD Agent
- Miscellaneous
- Total Memory Usage

Note How you configure the Identity Firewall to retrieve user information from the AD Agent affects the amount of memory used by the feature. You specify whether the ASA uses on-demand retrieval or full download retrieval. Choosing on-demand retrieval has the benefit of using less memory because only users of received packets are queried and stored. For more information, see the "Configuring Identity Options" section on page 38-14.

Monitoring Users for the Identity Firewall

To obtain troubleshooting information for the AD Agent, enter one of the following commands:

- **show user-identity user all list**
- **show user-identity user active user** *domain\user-name* **list detail**

These commands display the following information for users:

domain\user_name Status (active or inactive) Connections Minutes Idle

domain\user_name Active Connections Minutes Idle

The default domain name can be the real domain name, a special reserved word, or LOCAL. The Identity Firewall uses the LOCAL domain name for all locally defined user groups or locally defined users (users who log in and authenticate by using a VPN or web portal). When the default domain is not specified, the default domain is LOCAL.

The idle time is stored on a per-user basis instead of by the IP address of a user.

If the command **user-identity action domain-controller-down** *domain_name* **disable-user-identity-rule** is configured and the specified domain is down, or if the **user-identity action ad-agent-down disable-user-identity-rule** command is configured and the AD Agent is down, all the logged-in users have the disabled status.

Feature History for the Identity Firewall

Table 38-1 lists the release history for this feature.

Table 38-1 Feature History for the Identity Firewall

Feature Name	Releases	Feature Information
Identity Firewall	8.4(2)	The Identity Firewall feature was introduced. We introduced or modified the following commands: **user-identity enable, user-identity default-domain, user-identity domain, user-identity logout-probe, user-identity inactive-user-timer, user-identity poll-import-user-group-timer, user-identity action netbios-response-fail, user-identity user-not-found, user-identity action ad-agent-down, user-identity action mac-address-mismatch, user-identity action domain-controller-down, user-identity ad-agent active-user-database, user-identity ad-agent hello-timer, user-identity ad-agent aaa-server, user-identity update import-user**, **user-identity static user**, **dns domain-lookup**, **dns poll-timer**, **dns expire-entry-timer**, **object-group user, show user-identity**, **show dns, clear configure user-identity**, **clear dns, debug user-identity**.