ASA/PIX: Configure Active/Active Failover in Transparent Mode

Contents

Introduction

The failover configuration requires two identical security appliances connected to each other through a dedicated failover link and, optionally, a stateful failover link. The health of the active interfaces and units is monitored to determine if specific failover conditions are met. If those conditions are met, failover occurs.

The security appliance supports two failover configurations:

- Active/Active Failover
- Active/Standby Failover

Each failover configuration has its own method to determine and perform failover. With Active/Active Failover, both units can pass network traffic. This lets you configure load balancing on your network. Active/Active Failover is only available on units that run in multiple context mode. With Active/Standby Failover, only one unit passes traffic while the other unit waits in a standby state. Active/Standby Failover is available on units that run in either single or multiple context mode. Both failover configurations support stateful or stateless (regular) failover.

A transparent firewall, is a Layer 2 firewall that acts like a *bump in the wire*, or a *stealth firewall*, and is not seen as a router hop to connected devices. The security appliance connects the same network on its inside and outside ports. Because the firewall is not a routed hop, you can easily introduce a transparent firewall into an existing network; it is unnecessary to readdress IP. You can set the adaptive security appliance to run in the default routed firewall mode or transparent firewall mode. When you change modes, the adaptive security appliance clears the configuration because many commands are not supported in both modes. If you already have a populated configuration, be sure to back up this configuration before you change the mode; you can use this backup configuration for reference when you create a new configuration. Refer to Transparent Firewall Configuration Example for more information on the configuration of the firewall appliance in Transparent mode.

This document focuses on how to configure an Active/Active Failover in Transparent Mode on the ASA Security Appliance.

Note: VPN failover is not supported on units that run in **multiple context** mode. VPN failover is available for **Active/Standby Failover** configurations only.

Cisco recommends that you do not use the management interface for failover, especially for stateful failover in which the security appliance constantly sends the connection information from one security appliance to the other. The interface for failover must be at least of the same capacity as the interfaces that pass regular traffic, and while the interfaces on the ASA 5540 are gigabit, the management interface is FastEthernet only. The management interface is designed for management traffic only and is specified as management0/0. But, you can use the **management-only** command in order to configure any interface to be a management-only interface. Also, for Management 0/0, you can disable management-only mode so the interface can pass through traffic just like any other interface. Refer to Cisco Security Appliance Command Reference, Version 8.0 for more information about the **management-only** command.

This configuration guide provides a sample configuration to include a brief introduction to the ASA/PIX 7.x Active/Standby technology. Refer to the ASA/PIX Command Reference Guide for a more in-depth sense of the theory based behind this technology.

Prerequisites

Requirements

Hardware Requirement

The two units in a failover configuration must have the same hardware configuration. They must be the same model, have the same number and types of interfaces, and the same amount of RAM.

Note: The two units do not need to have the same size Flash memory. If you use units with different Flash memory sizes in your failover configuration, make sure the unit with the smaller Flash memory has enough space to accommodate the software image files and the configuration files. If it does not, configuration synchronization from the unit with the larger Flash memory to the unit with the smaller Flash memory fails.

Software Requirement

The two units in a failover configuration must be in the operational modes (routed or transparent, single or multiple context). They must have the same major (first number) and minor (second number) software version, but you can use different versions of the software within an upgrade process; for example, you can upgrade one unit from Version 7.0(1) to Version 7.0(2) and have failover remain active. Cisco recommends that you upgrade both units to the same version to ensure long-term compatibility.

Refer to the Performing Zero Downtime Upgrades for Failover Pairs section of *Cisco Security Appliance Command Line Configuration Guide, Version 8.0* for more information on how to upgrade the software on a failover pair.

License Requirements

On the ASA security appliance platform, at least one of the units must have an **unrestricted (UR) license**.

Note: It might be necessary to upgrade the licenses on a failover pair in order to obtain additional features and benefits. Refer to License Key Upgrade on a Failover Pair for more information.

Note: The licensed features (such as SSL VPN peers or security contexts) on both security appliances that participate in failover must be identical.

Components Used

The information in this document is based on these software and hardware versions:

- ASA Security Appliance with 7.x version and later

The information in this document was created from the devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If your network is live, make sure that you understand the potential impact of any command.

Related Products

This configuration can also be used with these hardware and software versions:

- PIX Security Appliance with 7.x version and later

Conventions

Refer to the Cisco Technical Tips Conventions for more information on document conventions.

Active/Active Failover

This section describes Active/Standby Failover and includes these topics:

- Active/Active Failover Overview
- Primary/Secondary Status and Active/Standby Status
- Device Initialization and Configuration Synchronization
- Command Replication
- Failover Triggers
- Failover Actions

Active/Active Failover Overview

Active/Active failover is only available to security appliances in multiple context mode. In an Active/Active failover configuration, both security appliances can pass network traffic.

In Active/Active failover, you divide the security contexts on the security appliance into failover groups. A failover group is simply a logical group of one or more security contexts. You can create a maximum of two failover groups on the security appliance. The admin context is always a member of failover group 1. Any unassigned security contexts are also members of failover group 1 by default.

The failover group forms the base unit for failover in Active/Active failover. Interface failure monitoring, failover, and active/standby status are all attributes of a failover group rather than the unit. When an active failover group fails, it changes to the standby state while the standby failover group becomes active. The interfaces in the failover group that becomes active assume the MAC and IP addresses of the interfaces in the failover group that failed. The interfaces in the failover group that is now in the standby state take over the standby MAC and IP addresses.

Note: A failover group failing on a unit does not mean that the unit has failed. The unit can still have another failover group that passes traffic on it.

Primary/Secondary Status and Active/Standby Status

As in Active/Standby failover, one unit in an Active/Active failover pair is designated the primary unit, and the other unit the secondary unit. Unlike Active/Standby failover, this designation does not indicate which unit becomes active when both units start simultaneously. Instead, the primary/secondary designation does two things:

- Determines which unit provides the running configuration to the pair when they boot simultaneously.
- Determines on which unit each failover group appears in the active state when the units boot simultaneously. Each failover group in the configuration is configured with a primary or secondary unit preference. You can configure both failover groups be in the active state on a single unit in the pair, with the other unit that contains the failover groups in the standby state. But, a more typical configuration is to assign each failover group a different role preference to make each one active on a different unit, and distribute the traffic across the devices.**Note:** The security appliance **does not** provide load balancing services. Load balancing must be handled by a router passing traffic to the security appliance.

Which unit each failover group becomes active on is determined as shown

- When a unit boots while the peer unit is not available, both failover groups become active on the unit.
- When a unit boots while the peer unit is active (with both failover groups in the active state), the failover groups remain in the active state on the active unit regardless of the primary or secondary preference of the failover group until one of these occurrences:A failover occurs.You manually force the failover group to the other unit with the **no failover active** commandYou configured the failover group with the **preempt** command, which causes the failover group to automatically become active on the preferred unit when the unit becomes available.
- When both units boot at the same time, each failover group becomes active on its preferred unit after the configurations have been synchronized.

Device Initialization and Configuration Synchronization

Configuration synchronization occurs when one or both units in a failover pair boot. The configurations are synchronized as shown:

- When a unit boots while the peer unit is active (with both failover groups active on it), the booting unit contacts the active unit to obtain the running configuration regardless of the primary or secondary designation of the booting unit.
- When both units boot simultaneously, the secondary unit obtains the running configuration from the primary unit.

When the replication starts, the security appliance console on the unit that sends the configuration displays the message `"Beginning configuration replication: Sending to mate,"` and when it is complete, the security appliance displays the message `"End Configuration Replication to mate."` During replication, commands entered on the unit that sends the configuration cannot replicate properly to the peer unit, and commands entered on the unit that receive the configuration can be overwritten by the configuration that is received. Do not commands on either unit in the failover pair during the configuration replication process. The replication, which depends upon the size of the configuration, can take from a few seconds to several minutes.

On the unit that receives the configuration, the configuration exists only in running memory. In order to save the configuration to Flash memory after synchronization, enter the **write memory all** command in the system execution space on the unit that has failover group 1 in the active state. The command is replicated to the peer unit, which proceeds to write its configuration to Flash memory. The use of the **all** keyword with this command causes the system and all context configurations to be saved.

Note: Startup configurations saved on external servers are accessible from either unit over the network and do not need to be saved separately for each unit. Alternatively, you can copy the contexts configuration files from the disk on the primary unit to an external server, and then copy them to disk on the secondary unit, where they become available when the unit reloads.

Command Replication

After both units are running, commands are replicated from one unit to the other as shown:

- Commands entered within a security context are replicated from the unit on which the security context appears in the active state to the peer unit.**Note:** context is considered in the active state on a unit if the failover group to which it belongs is in the active state on that unit.
- Commands entered in the system execution space are replicated from the unit on which failover group 1 is in the active state to the unit on which failover group 1 is in the standby state.
- Commands entered in the admin context are replicated from the unit on which failover group 1 is in the active state to the unit on which failover group 1 is in the standby state.

All configuration and file commands (**copy, rename, delete, mkdir, rmdir,** and so on) are replicated, with these exceptions. The **show, debug, mode, firewall,** and **failover lan unit** commands are not replicated.

Failure to enter the commands on the appropriate unit for command replication to occur causes the configurations to be out of synchronization. Those changes are possibly lost the next time the initial configuration synchronization occurs.

You can use the **write standby** command to resynchronize configurations that have become out of sync. For Active/**write standby**Active failover, the **write standby** command behaves as shown:

- If you enter the **write standby** command in the system execution space, the system configuration and the configurations for all of the security contexts on the security appliance is written to the peer unit. This includes configuration information for security contexts that are in the standby state. You must enter the command in the system execution space on the unit that has failover group 1 in the active state.**Note:** If there are security contexts in the active state on the peer unit, the **write standby** command causes active connections through those contexts to be terminated. Use the **failover active** command on the unit that provides the configuration to make sure all contexts are active on that unit before entering the **write standby** command.
- If you enter the **write standby** command in a security context, only the configuration for the security context is written to the peer unit. You must enter the command in the security context on the unit where the security context appears in the active state.

Replicated commands are not saved to the Flash memory when replicated to the peer unit. They are added to the running configuration. To save replicated commands to Flash memory on both units, use the **write memory** or **copy running-config startup-config** command on the unit that you made the changes on. The command is replicated to the peer unit and cause the configuration to be saved to Flash memory on the peer unit.

Failover Triggers

In Active/Active failover, failover can be triggered at the unit level if one of these events occurs:

- The unit has a hardware failure.
- The unit has a power failure.
- The unit has a software failure.
- The **no failover active** or the **failover active** command is entered in the system execution space.

Failover is triggered at the failover group level when one of these events occurs:

- Too many monitored interfaces in the group fail.
- The **no failover active group group_id** or **failover active group group_id** command is entered.

Failover Actions

In an Active/Active failover configuration, failover occurs on a failover group basis, not a system basis. For example, if you designate both failover groups as active on the primary unit, and failover group 1 fails, then failover group 2 remains active on the primary unit while failover group 1 becomes active on the secondary unit.

Note: When you configure the Active/Active failover, make sure that the combined traffic for both units is within the capacity of each unit.

This table shows the failover action for each failure event. For each failure event, the policy, whether or not failover occurs, actions for the active failover group, and actions for the standby failover group are given.

Failure Event	**Policy**	**Active Group Action**	**Standby Group Action**	**Notes**
A unit experiences a power or software failure	Failover	Become standby Mark as failed	Become standby. Mark active as failed	When a unit in a failover pair fails, any active failover groups on that unit are marked as failed and become active on the peer unit.
Interface failure on active failover group above threshold	Failover	Mark active group as failed	Become active	None
Interface	No	No	Mark	When the standby failover

failure on standby failover group above threshold	failover	action	standby group as failed	group is marked as failed, the active failover group does not attempt to fail over, even if the interface failure threshold is surpassed.
Formerly active failover group recovers	No failover	No action	No action	Unless configured with the **preempt** command, the failover groups remain active on their current unit.
Failover link failed at startup	No failover	Become active	Become active	If the failover link is down at startup, both failover groups on both units become active.
Stateful Failover link failed	No failover	No action	No action	State information becomes out of date, and sessions are terminated if a failover occurs.
Failover link failed during operation	No failover	n/a	n/a	Each unit marks the failover interface as failed. You should restore the failover link as soon as possible because the unit cannot fail over to the standby unit while the failover link is down.

Regular and Stateful Failover

The security appliance supports two types of failover, regular and stateful. This section includes these topics:

- Regular Failover
- Stateful Failover

Regular Failover

When a failover occurs, all active connections are dropped. Clients need to re-establish connections when the new active unit takes over.

Stateful Failover

When stateful failover is enabled, the active unit continually passes per-connection state information to the standby unit. After a failover occurs, the same connection information is available at the new active unit. Supported end-user applications are not required to reconnect to keep the same communication session.

The state information passed to the standby unit includes these:

- The NAT translation table
- The TCP connection states
- The UDP connection states
- The ARP table
- The Layer 2 bridge table (when it runs in the transparent firewall mode)
- The HTTP connection states (if HTTP replication is enabled)
- The ISAKMP and IPSec SA table
- The GTP PDP connection database

The information that is not passed to the standby unit when stateful failover is enabled includes these:

- The HTTP connection table (unless HTTP replication is enabled)
- The user authentication (uauth) table
- The routing tables
- State information for security service modules

Note: If failover occurs within an active Cisco IP SoftPhone session, the call remains active because the call session state information is replicated to the standby unit. When the call is terminated, the IP SoftPhone client loses connection with the Call Manager. This occurs because there is no session information for the CTIQBE hang-up message on the standby unit. When the IP SoftPhone client does not receive a response back from the Call Manager within a certain time period, it considers the Call Manager unreachable and unregisters itself.

Failover Configuration Limitations

You cannot configure failover with these types of IP addresses:

- IP addresses obtained through DHCP
- IP addresses obtained through PPPoE
- IPv6 addresses

Additionally, these restrictions apply:

- Stateful Failover is not supported on the ASA 5505 adaptive security appliance.
- Active/Active failover is not supported on the ASA 5505 adaptive security appliance.
- You cannot configure failover when Easy VPN Remote is enabled on the ASA 5505 adaptive security appliance.
- VPN failover is not supported in multiple context mode.

Unsupported Features

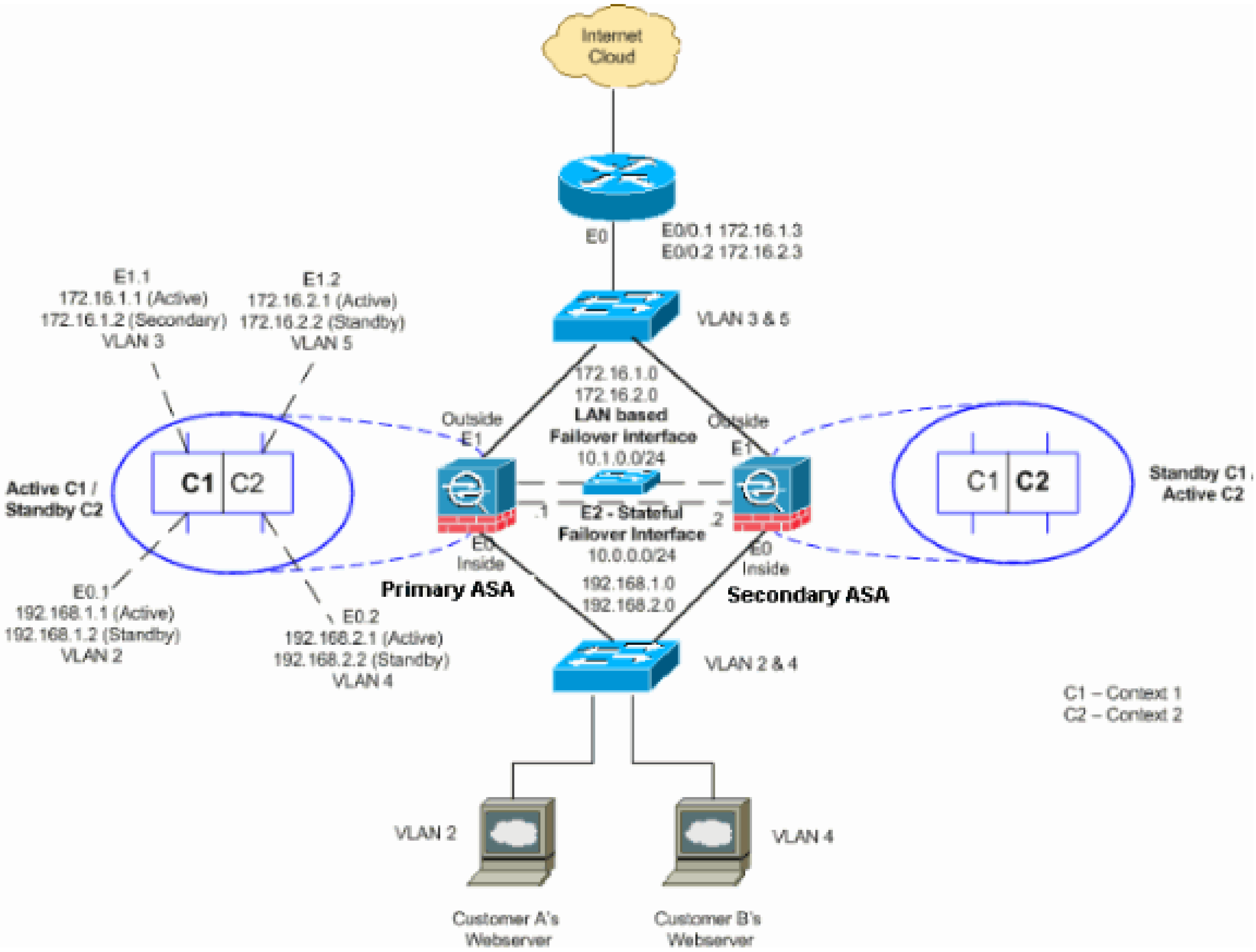
Multiple context mode does not support these features:

- Dynamic routing protocolsSecurity contexts support only static routes. You cannot enable OSPF or RIP in multiple context mode.
- VPN
- Multicast

LAN-Based Active/Active Failover Configuration

Network Diagram

This document uses this network setup:



This section describes how to configure Active/Active failover with an Ethernet failover link. When you configure LAN-based failover, you must bootstrap the secondary device to recognize the failover link before the secondary device can obtain the running configuration from the primary device.

Note: Instead of a crossover Ethernet cable to directly link the units, Cisco recommends that you use a dedicated switch between the primary and secondary units.

This section includes the topics as shown:

- Primary Unit Configuration
- Secondary Unit Configuration

Primary Unit Configuration

Complete these steps in order to configure the primary unit in an Active/Active failover configuration:

1. If you have not done so already, configure the active and standby IP addresses for each data

interface (routed mode), for the management IP address (transparent mode), or for the management-only interface. The standby IP address is used on the security appliance that is currently the standby unit. It must be in the same subnet as the active IP address.You must configure the interface addresses from within each context. Use the **changeto context** command to switch between contexts. The command prompt changes to hostname/context(config-if)#, where context is the name of the current context. In transparent firewall mode, you must enter a management IP address for each context.**Note:** Do not configure an IP address for the Stateful Failover link if you use a dedicated Stateful Failover interface. You use the **failover interface ip** command in order to configure a dedicated Stateful Failover interface in a later step.hostname/context(config-if)#**ip address** *active_addr* **netmask standby** *standby_addr*In the example, the outside interface for context1 of the primary ASA is configured this way:ASA/context1(config)#**ip address 172.16.1.1 255.255.255.0 standby 172.16.1.2** For Context2:ASA/context2(config)#**ip address 192.168.2.1 255.255.255.0 standby 192.168.2.2** In routed firewall mode and for the management-only interface, this command is entered in interface configuration mode for each interface. In transparent firewall mode, the command is entered in global configuration mode.

2. Configure the basic failover parameters in the system execution space.(PIX security appliance only) Enable LAN-based failover:hostname(config)#**failover lan enable** Designate the unit as the primary unit:hostname(config)#**failover lan unit primary** Specify the failover link:hostname(config)#**failover lan interface** *if_name phy_if*In this example, we use the interface ethernet 3 as LAN based failover interface.ASA(config)#**failover lan interface LANFailover ethernet3** The if_name argument assigns a logical name to the interface specified by the phy_if argument. The phy_if argument can be the physical port name, such as Ethernet1, or a previously created subinterface, such as Ethernet0/2.3. On the ASA 5505 adaptive security appliance, the phy_if specifies a VLAN. This interface should not be used for any other purpose (except, optionally, the Stateful Failover link).Specify the failover link active and standby IP addresses:hostname(config)#**failover interface ip** *if_name ip_addr* **mask standby** *ip_addr*For this example, we use 10.1.0.1 as active and 10.1.0.2 as standby IP addresses for failover interface.ASA(config)#**failover interface ip LANFailover 10.1.0.1 255.255.255.0 standby 10.1.0.2** The standby IP address must be in the same subnet as the active IP address. You do not need to identify the standby IP address subnet mask. The failover link IP address and MAC address do not change at failover. The active IP address always stays with the primary unit, while the standby IP address stays with the secondary unit.

Secondary Unit Configuration

When you configure LAN-based Active/Active failover, you need to bootstrap the secondary unit in order to recognize the failover link. This allows the secondary unit to communicate with and receive the running configuration from the primary unit.

Complete these steps in order to bootstrap the secondary unit in an Active/Active failover configuration:

1. (PIX security appliance only) Enable LAN-based failover.hostname(config)#**failover lan enable**
2. Define the failover interface. Use the same settings as you used for the primary unit:Specify

the interface to be used as the failover interface.`hostname(config)#failover lan interface if_name phy_if``ASA(config)#failover lan interface LANFailover ethernet3`The if_name argument assigns a logical name to the interface specified by the phy_if argument. The phy_if argument can be the physical port name, such as Ethernet1, or a previously created subinterface, such as Ethernet0/2.3. On the ASA 5505 adaptive security appliance, the phy_if specifies a VLAN.Assign the active and standby IP address to the failover link:`hostname(config)#failover interface ip if_name ip_addr mask standby ip_addr``ASA(config)#failover interface ip LANFailover 10.1.0.1 255.255.255.0 standby 10.1.0.2` **Note:** Enter this command exactly as you entered it on the primary unit when you configured the failover interface.The standby IP address must be in the same subnet as the active IP address. You do not need to identify the standby address subnet mask.Enable the interface.`hostname(config)#interface phy_if hostname(config-if)#no shutdown`

3. Designate this unit as the secondary unit:`hostname(config)#failover lan unit secondary` **Note:** This step is optional because by default units are designated as secondary unless previously configured otherwise.
4. Enable failover.`hostname(config)#failover` After you enable failover, the active unit sends the configuration in running memory to the standby unit. As the configuration synchronizes, the messages **Beginning configuration replication: Sending to mate and End Configuration Replication to mate** appear on the active unit console.**Note:** Issue the **failover** command on the primary device first, and then issue it on the secondary device. After you issue the **failover** command on the secondary device, the secondary device immediately pulls the configuration from the primary device and sets itself as *standby*. The primary ASA stays up and passes traffic normally and marks itself as the *active* device. From that point on, whenever a failure occurs on the active device, the standby device comes up as active.
5. After the running configuration has completed replication, enter this command to save the configuration to Flash memory:`hostname(config)#copy running-config startup-config`
6. If necessary, force any failover group that is active on the primary to the active state on the secondary unit. To force a failover group to become active on the secondary unit, enter this command in the system execution space on the primary unit:`hostname#no failover active group group_id` The group_id argument specifies the group you want to become active on the secondary unit.

Configurations

This document uses these configurations:

Primary ASA - Context1 Configuration

```
ASA/context1(config)#show running-config : Saved : ASA
Version 7.2(3) <context> ! hostname context1 enable
password 8Ry2YjIyt7RRXU24 encrypted names ! interface
inside_context1 nameif inside security-level 100 !---
Configure the active and standby IP's for the logical
inside !--- interface of the context1. ip address
192.168.1.1 255.255.255.0 standby 192.168.1.2 !
interface outside_context1 nameif outside security-level
0 !--- Configure the active and standby IP's for the
logical outside !--- interface of the context1. ip
address 172.16.1.1 255.255.255.0 standby 172.16.1.2 !
passwd 2KFQnbNIdI.2KYOU encrypted access-list 100
extended permit tcp any host 172.16.1.1 eq www pager
lines 24 mtu inside 1500 mtu outside 1500 monitor-
```

```
interface inside monitor-interface outside icmp
unreachable rate-limit 1 burst-size 1 asdm image
flash:/asdm-522.bin no asdm history enable arp timeout
14400 static (inside,outside) 172.16.1.1 192.168.1.5
netmask 255.255.255.255 access-group 100 in interface
outside route outside 0.0.0.0 0.0.0.0 172.16.1.3 1
timeout xlate 3:00:00 timeout conn 1:00:00 half-closed
0:10:00 udp 0:02:00 icmp 0:00:02 timeout sunrpc 0:10:00
h323 0:05:00 h225 1:00:00 mgcp 0:05:00 mgcp-pat 0:05:00
timeout sip 0:30:00 sip_media 0:02:00 sip-invite 0:03:00
sip-disconnect 0:02:00 timeout uauth 0:05:00 absolute no
snmp-server location no snmp-server contact telnet
timeout 5 ssh timeout 5 ! class-map inspection_default
match default-inspection-traffic ! ! policy-map type
inspect dns preset_dns_map parameters message-length
maximum 512 policy-map global_policy class
inspection_default inspect dns preset_dns_map inspect
ftp inspect h323 h225 inspect h323 ras inspect netbios
inspect rsh inspect rtsp inspect skinny inspect esmtp
inspect sqlnet inspect sunrpc inspect tftp inspect sip
inspect xdmcp ! service-policy global_policy global
Cryptochecksum:00000000000000000000000000000000 : end
```

Primary ASA - Context2 Configuration

```
ASA/context2(config)#show running-config : Saved : ASA
Version 7.2(3) <context> ! hostname context2 enable
password 8Ry2YjIyt7RRXU24 encrypted names ! interface
inside_context2 nameif inside security-level 100 !---
Configure the active and standby IP's for the logical
inside !--- interface of the context2. ip address
192.168.2.1 255.255.255.0 standby 192.168.2.2 !
interface outside_context2 nameif outside security-level
0 !--- Configure the active and standby IP's for the
logical outside !--- interface of the context2. ip
address 172.16.2.1 255.255.255.0 standby 172.16.2.2 !
passwd 2KFQnbNIdI.2KYOU encrypted access-list 100
extended permit tcp any host 172.16.2.1 eq www pager
lines 24 mtu inside 1500 mtu outside 1500 monitor-
interface inside monitor-interface outside icmp
unreachable rate-limit 1 burst-size 1 asdm image
flash:/asdm-522.bin no asdm history enable arp timeout
14400 static (inside,outside) 172.16.2.1 192.168.2.5
netmask 255.255.255.255 access-group 100 in interface
outside route outside 0.0.0.0 0.0.0.0 172.16.2.3 1
timeout xlate 3:00:00 timeout conn 1:00:00 half-closed
0:10:00 udp 0:02:00 icmp 0:00:02 timeout sunrpc 0:10:00
h323 0:05:00 h225 1:00:00 mgcp 0:05:00 mgcp-pat 0:05:00
timeout sip 0:30:00 sip_media 0:02:00 sip-invite 0:03:00
sip-disconnect 0:02:00 timeout uauth 0:05:00 absolute no
snmp-server location no snmp-server contact telnet
timeout 5 ssh timeout 5 ! class-map inspection_default
match default-inspection-traffic ! ! policy-map type
inspect dns preset_dns_map parameters message-length
maximum 512 policy-map global_policy class
inspection_default inspect dns preset_dns_map inspect
ftp inspect h323 h225 inspect h323 ras inspect netbios
inspect rsh inspect rtsp inspect skinny inspect esmtp
inspect sqlnet inspect sunrpc inspect tftp inspect sip
inspect xdmcp ! service-policy global_policy global
Cryptochecksum:00000000000000000000000000000000 : end
```

Primary ASA

```
ASA(config)#show running-config : Saved : ASA Version
7.2(3) <system> ! !--- Use the firewall transparent
```

```
command !--- in global configuration mode in order to !-
-- set the firewall mode to transparent mode. firewall
transparent hostname ASA enable password
8Ry2YjIyt7RRXU24 encrypted no mac-address auto !
interface Ethernet0 ! interface Ethernet0.1 vlan 2 !
interface Ethernet0.2 vlan 4 ! interface Ethernet1 !
interface Ethernet1.1 vlan 3 ! interface Ethernet1.2
vlan 5 ! !--- Configure "no shutdown" in the stateful
failover interface as well as !--- LAN Failover
interface of both Primary and secondary ASA/PIX.
interface Ethernet2 description STATE Failover Interface
! interface Ethernet3 description LAN Failover Interface
! interface Ethernet4 shutdown ! interface Ethernet5
shutdown ! class default limit-resource All 0 limit-
resource ASDM 5 limit-resource SSH 5 limit-resource
Telnet 5 ! ftp mode passive pager lines 24 failover
failover lan unit primary !--- Command to assign the
interface for LAN based failover failover lan interface
LANFailover Ethernet3 !--- Configure the
Authentication/Encryption key failover key *****
failover link stateful Ethernet2 !--- Configure the
active and standby IP's for the LAN based failover
failover interface ip LANFailover 10.1.0.1 255.255.255.0
standby 10.1.0.2 failover interface ip stateful 10.0.0.1
255.255.255.0 standby 10.0.0.2 failover group 1 failover
group 2 secondary no asdm history enable arp timeout
14400 console timeout 0 admin-context admin context
admin config-url flash:/admin.cfg ! context context1
allocate-interface Ethernet0.1 inside_context1 allocate-
interface Ethernet1.1 outside_context1 config-url
flash:/context1.cfg join-failover-group 1 ! context
context2 allocate-interface Ethernet0.2 inside_context2
allocate-interface Ethernet1.2 outside_context2 config-
url flash:/context2.cfg join-failover-group 2 ! prompt
hostname context
Cryptochecksum:d41d8cd98f00b204e9800998ecf8427e : end
```

Secondary ASA

```
ASA#show running-config failover failover lan unit
secondary failover lan interface LANFailover Ethernet3
failover key ***** failover interface ip LANFailover
10.1.0.1 255.255.255.0 standby 10.1.0.2
```

Verify

Use of the show failover Command

This section describes the **show failover** command output. On each unit, you can verify the failover status with the **show failover** command.

Primary ASA

```
ASA(config-subif)#show failover Failover On Cable status: N/A - LAN-based failover
enabled Failover unit Primary Failover LAN Interface: LANFailover Ethernet3 (up) Unit
Poll frequency 15 seconds, holdtime 45 seconds Interface Poll frequency 5 seconds,
holdtime 25 seconds Interface Policy 1 Monitored Interfaces 4 of 250 maximum Version:
Ours 7.2(3), Mate 7.2(3) Group 1 last failover at: 06:12:45 UTC Jan 17 2009 Group 2
last failover at: 06:12:43 UTC Jan 17 2009 This host: Primary Group 1 State: Active
Active time: 359610 (sec) Group 2 State: Standby Ready Active time: 3165 (sec)
context1 Interface inside (192.168.1.1): Normal context1 Interface outside
```

```
(172.16.1.1): Normal context2 Interface inside (192.168.2.2): Normal context2
Interface outside (172.16.2.2): Normal Other host: Secondary Group 1 State: Standby
Ready Active time: 0 (sec) Group 2 State: Active Active time: 3900 (sec) context1
Interface inside (192.168.1.2): Normal context1 Interface outside (172.16.1.2):
Normal context2 Interface inside (192.168.2.1): Normal context2 Interface outside
(172.16.2.1): Normal Stateful Failover Logical Update Statistics Link : stateful
Ethernet2 (up) Stateful Obj xmit xerr rcv rerr General 48044 0 48040 1 sys cmd 48042
0 48040 1 up time 0 0 0 0 RPC services 0 0 0 0 TCP conn 0 0 0 0 UDP conn 0 0 0 0 ARP
tbl 2 0 0 0 Xlate_Timeout 0 0 0 0 Logical Update Queue Information Cur Max Total Recv
Q: 0 1 72081 Xmit Q: 0 1 48044
```

Secondary ASA

```
ASA(config)#show failover Failover On Cable status: N/A - LAN-based failover enabled
Failover unit Secondary Failover LAN Interface: LANFailover Ethernet3 (up) Unit Poll
frequency 15 seconds, holdtime 45 seconds Interface Poll frequency 5 seconds,
holdtime 25 seconds Interface Policy 1 Monitored Interfaces 4 of 250 maximum Version:
Ours 7.2(3), Mate 7.2(3) Group 1 last failover at: 06:12:46 UTC Jan 17 2009 Group 2
last failover at: 06:12:41 UTC Jan 17 2009 This host: Secondary Group 1 State:
Standby Ready Active time: 0 (sec) Group 2 State: Active Active time: 3975 (sec)
context1 Interface inside (192.168.1.2): Normal context1 Interface outside
(172.16.1.2): Normal context2 Interface inside (192.168.2.1): Normal context2
Interface outside (172.16.2.1): Normal Other host: Primary Group 1 State: Active
Active time: 359685 (sec) Group 2 State: Standby Ready Active time: 3165 (sec)
context1 Interface inside (192.168.1.1): Normal context1 Interface outside
(172.16.1.1): Normal context2 Interface inside (192.168.2.2): Normal context2
Interface outside (172.16.2.2): Normal Stateful Failover Logical Update Statistics
Link : stateful Ethernet2 (up) Stateful Obj xmit xerr rcv rerr General 940 0 942 2
sys cmd 940 0 940 2 up time 0 0 0 0 RPC services 0 0 0 0 TCP conn 0 0 0 0 UDP conn 0
0 0 0 ARP tbl 0 0 2 0 Xlate_Timeout 0 0 0 0 Logical Update Queue Information Cur Max
Total Recv Q: 0 1 1419 Xmit Q: 0 1 940
```

Use the **show failover state** command to verify the state.

Primary ASA

```
ASA(config)#show failover state State Last Failure Reason Date/Time This host -
Primary Group 1 Active None Group 2 Standby Ready None Other host - Secondary Group 1
Standby Ready None Group 2 Active None ====Configuration State=== Sync Done
====Communication State=== Mac set
```

Secondary unit

```
ASA(config)#show failover state State Last Failure Reason Date/Time This host -
Secondary Group 1 Standby Ready None Group 2 Active None Other host - Primary Group 1
Active None Group 2 Standby Ready None ====Configuration State=== Sync Done - STANDBY
====Communication State=== Mac set
```

In order to verify the IP addresses of the failover unit, use the **show failover interface**command.

Primary unit

```
ASA(config)#show failover interface interface stateful Ethernet2 System IP Address:
10.0.0.1 255.255.255.0 My IP Address : 10.0.0.1 Other IP Address : 10.0.0.2 interface
LANFailover Ethernet3 System IP Address: 10.1.0.1 255.255.255.0 My IP Address :
10.1.0.1 Other IP Address : 10.1.0.2
```

Secondary unit

```
ASA(config)#show failover interface interface LANFailover Ethernet3 System IP
```

```
Address: 10.1.0.1 255.255.255.0 My IP Address : 10.1.0.2 Other IP Address : 10.1.0.1
interface stateful Ethernet2 System IP Address: 10.0.0.1 255.255.255.0 My IP Address
: 10.0.0.2 Other IP Address : 10.0.0.1
```

View of Monitored Interfaces

In order to view the status of monitored interfaces: In single context mode, enter the `show monitor-interface` command in global configuration mode. In multiple context mode, enter the `show monitor-interface` within a context.

Note: In order to enable health monitoring on a specific interface, use the **monitor-interface** command in global configuration mode:

```
monitor-interface <if_name>
```

Primary ASA

```
ASA/context1(config)#show monitor-interface This host: Secondary - Active Interface
inside (192.168.1.1): Normal Interface outside (172.16.1.1): Normal Other host:
Secondary - Standby Ready Interface inside (192.168.1.2): Normal Interface outside
(172.16.1.2): Normal
```

Secondary ASA

```
ASA/context1(config)#show monitor-interface This host: Secondary - Standby Ready
Interface inside (192.168.1.2): Normal Interface outside (172.16.1.2): Normal Other
host: Secondary - Active Interface inside (192.168.1.1): Normal Interface outside
(172.16.1.1): Normal
```

Note: If you do not enter a failover IP address, the **show failover** command displays 0.0.0.0 for the IP address, and monitoring of the interfaces remains in a `waiting` state. You must set a failover IP address for failover to work. Refer to show failover for more information about different states for failover.

Display of the Failover Commands in the Running Configuration

In order to view the failover commands in the running configuration, enter this command:

```
hostname(config)#show running-config failover
```

All of the **failover** commands are displayed. On units that run in multiple context mode, enter the `show running-config failover` command in the system execution space. Enter the **show running-config all failover** command to display the failover commands in the running configuration and include commands for which you have not changed the default value.

Failover Functionality Tests

Complete these steps in order to test failover functionality:

1. Test that your active unit or failover group passes traffic as expected with FTP, for example, to send a file between hosts on different interfaces.
2. Force a failover to the standby unit with this command:For Active/Active failover, enter this command on the unit where the failover group, which contains the interface that connects

your hosts is active:`hostname(config)#`**`no failover active group`** *`group_id`*

3. Use FTP in order to send another file between the same two hosts.
4. If the test was not successful, enter the **show failover command** in order to check the failover status.
5. When you are finished, you can restore the unit or failover group to active status with this command:For Active/Active failover, enter this command on the unit where the failover group, which contains the interface that connects your hosts is active:`hostname(config)#`**`failover active group`** *`group_id`*

Forced Failover

In order to force the standby unit to become active, enter one of these commands:

Enter this command in the system execution space of the unit where the failover group is in the standby state:

```
hostname#failover active group group_id
```

Or, enter this command in the system execution space of the unit where the failover group is in the active state:

```
hostname#no failover active group group_id
```

When you enter this command in the system, execution space causes all failover groups to become active:

```
hostname#failover active
```

Disabled Failover

In order to disable failover, enter this command:

```
hostname(config)#no failover
```

If you disable failover on an Active/Standby pair, it causes the active and standby state of each unit to be maintained until you restart. For example, the standby unit remains in standby mode so that both units do not start to pass traffic. In order to make the standby unit active (even with failover disabled), see the Forced Failover section.

If you disable failover on an Active/Active pair, it causes the failover groups to remain in the active state on whichever unit they are currently active on, no matter which unit they are configured to prefer. The **no failover** command can be entered in the system execution space.

Restoration of a Failed Unit

In order to restore a failed Active/Active failover group to an unfailed state, enter this command:

```
hostname(config)#failover reset group group_id
```

If you restore a failed unit to an unfailed state, it does not automatically make it active; restored units or groups remain in the standby state until made active by failover (forced or natural). An exception is a failover group configured with the **preempt** command. If previously active, a failover group becomes active if it is configured with the **preempt** command and if the unit on which it failed is its preferred unit.

Troubleshoot

When a failover occurs, both security appliances send out system messages. This section includes these topics:

1. Failover System Messages
2. Debug Messages
3. SNMP

Failover System Messages

The security appliance issues a number of system messages related to failover at priority level 2, which indicates a critical condition. In order to view these messages, refer to the Cisco Security Appliance Logging Configuration and System Log Messages to enable logging and to see descriptions of the system messages.

Note: Within switchover, failover logically shuts down and then brings up interfaces, which generates syslog **411001** and **411002** messages. This is normal activity.

Primary Lost Failover communications with mate on interface interface_name

This failover message is displayed if one unit of the failover pair can no longer communicate with the other unit of the pair. Primary can also be listed as Secondary for the secondary unit.

(Primary) Lost Failover communications with mate on interface interface_name

Verify that the network that is connected to the specified interface functions correctly.

Debug Messages

In order to see debug messages, enter the **debug fover** command. Refer to the Cisco Security Appliance Command Reference, Version 7.2 for more information.

Note: Because debugging output is assigned high priority in the CPU process, it can drastically affect system performance. For this reason, use the **debug fover** commands only to troubleshoot specific problems or within troubleshooting sessions with Cisco technical support staff.

SNMP

In order to receive SNMP syslog traps for failover, configure the SNMP agent to send SNMP traps to SNMP management stations, define a syslog host, and compile the Cisco syslog MIB into your SNMP management station. Refer to the **snmp-server** and **logging** commands in the Cisco Security Appliance Command Reference, Version 7.2 for more information.

Failover Polltime

In order to specify the failover unit poll and hold times, issue the **failover polltime** command in global configuration mode.

The `failover polltime unit msec [time]` represents the time interval to check the existence of the standby unit by polling hello messages.

Similarly, the `failover holdtime unit msec [time]` represents the time period during which a unit must receive a hello message on the failover link, after which the peer unit is declared to have failed.

Refer to failover polltime for more information.

WARNING: Failover message decryption failure.

Error message:

```
Failover message decryption failure. Please make sure both units have the
same failover shared key and crypto license or system is not out of memory
```

This problem occurs due to failover key configuration. In order to resolve this issue, remove the failover key, and configure the new shared key.

Related Information

- **Cisco ASA 5500 Series Adaptive Security Appliances**
- **Cisco PIX Firewall Software**
- **Firewall Services Module (FWSM) Failover Configuration**
- **FWSM Failover Troubleshooting**
- **How Failover Works on the Cisco Secure PIX Firewall**
- **Technical Support & Documentation - Cisco Systems**