CCNA 200-301, Volume 2

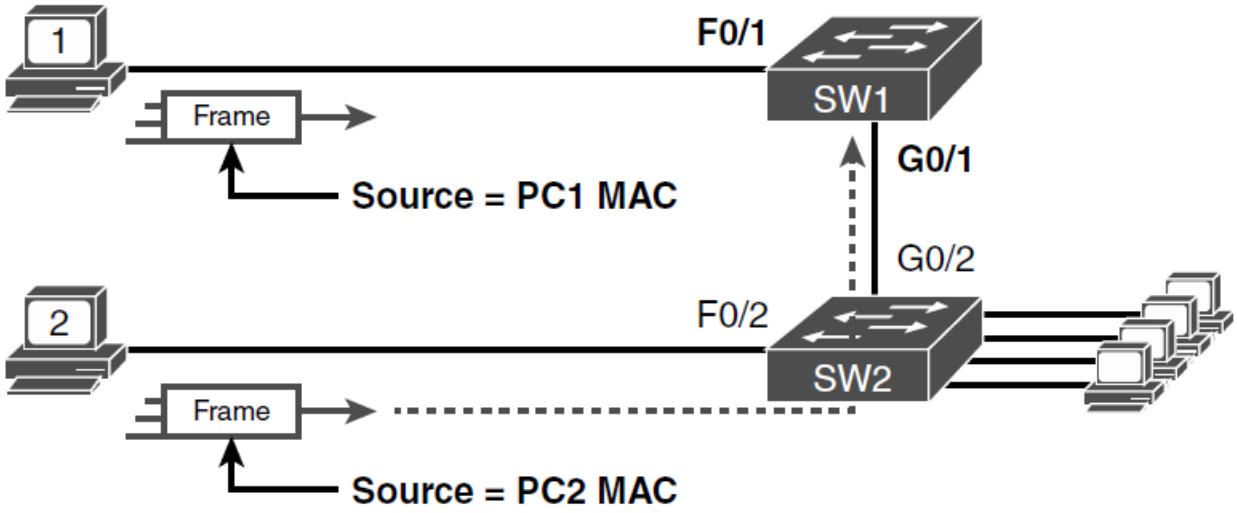
Chapter 6

Implementing Switch Port Security

Objectives

- Configure Layer 2 security features (DHCP snooping, dynamic ARP inspection, and port security)

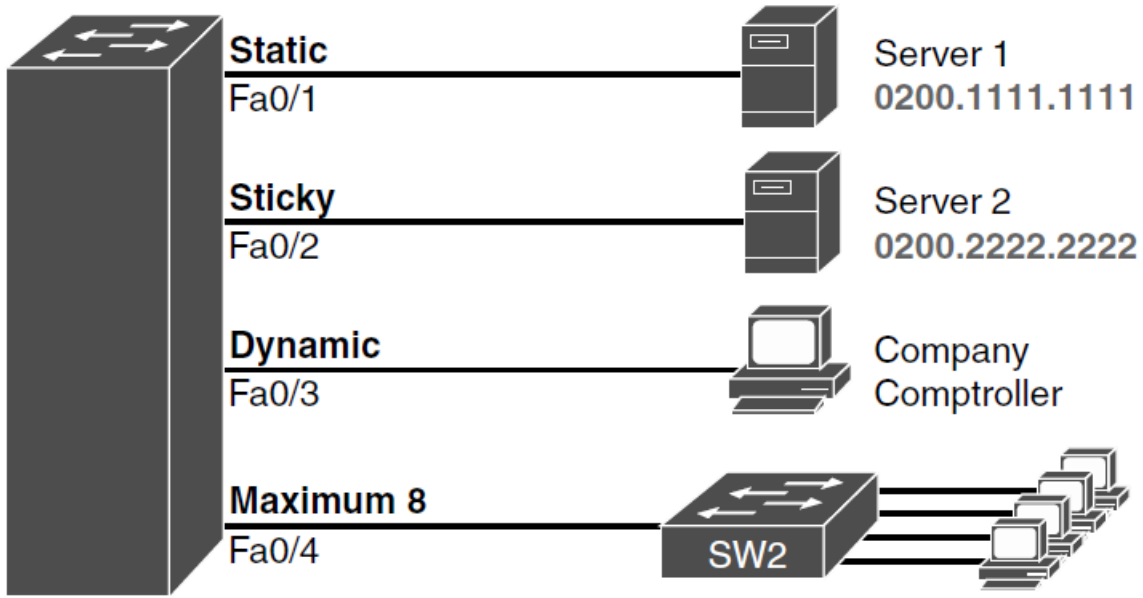
Source MAC Addresses in Frames as They Enter a Switch



Port Security Configuration Steps

1. Use the **switchport mode access** or the **switchport mode trunk** interface subcommand to make the switch interface either a static access or trunk interface.
2. Use the **switchport port-security** interface subcommand to enable port security on the interface.
3. (Optional) Use the **switchport port-security maximum** *number* interface subcommand to override the default maximum number of allowed MAC addresses associated with the interface (1).
4. (Optional) Use the **switchport port-security violation** {**protect** | **restrict** | **shutdown**} interface subcommand to override the default action to take upon a security violation (shutdown).
5. (Optional) Use the **switchport port-security mac-address** *mac-address* interface subcommand to predefine any allowed source MAC addresses for this interface. Use the command multiple times to define more than one MAC address.
6. (Optional) Use the **switchport port-security mac-address sticky** interface subcommand to tell the switch to "sticky learn" dynamically learned MAC addresses.

Port Security Configuration Example



Variations on Port Security Configuration

```
SW1# show running-config
(Lines omitted for brevity)

interface FastEthernet0/1
 switchport mode access
 switchport port-security
 switchport port-security mac-address 0200.1111.1111
!
interface FastEthernet0/2
 switchport mode access
 switchport port-security
 switchport port-security mac-address sticky
!
interface FastEthernet0/3
 switchport mode access
 switchport port-security
!
interface FastEthernet0/4
 switchport mode trunk
 switchport port-security
 switchport port-security maximum 8
```

Configuration Added by the Port Security Sticky Feature

```
SW1# show running-config interface f0/2
Building configuration...
Current configuration : 188 bytes
!
interface FastEthernet0/2
 switchport mode access
 switchport port-security
 switchport port-security mac-address sticky
 switchport port-security mac-address sticky 0200.2222.2222
```

Using Port Security to Define Correct MAC Addresses of Particular Interfaces

```
SW1# show port-security interface fastEthernet 0/1
Port Security              : Enabled
Port Status                : Secure-shutdown
Violation Mode             : Shutdown
Aging Time                 : 0 mins
Aging Type                 : Absolute
SecureStatic Address Aging : Disabled
Maximum MAC Addresses      : 1
Total MAC Addresses        : 1
Configured MAC Addresses   : 1
Sticky MAC Addresses       : 0
Last Source Address:Vlan   : 0013.197b.5004:1
```

Using Port Security to Define Correct MAC Addresses of Particular Interfaces (continued)

```
Security Violation Count    : 1

SW1# show port-security interface fastEthernet 0/2
Port Security              : Enabled
Port Status                : Secure-up
Violation Mode             : Shutdown
Aging Time                 : 0 mins
Aging Type                 : Absolute
SecureStatic Address Aging : Disabled
Maximum MAC Addresses      : 1
Total MAC Addresses        : 1
Configured MAC Addresses   : 1
Sticky MAC Addresses       : 1
Last Source Address:Vlan   : 0200.2222.2222:1
Security Violation Count   : 0
```

Using the **secure** Keyword to See MAC Table Entries When Using Port Security

```
SW1# show mac address-table secure interface F0/2
          Mac Address Table
-------------------------------------------

Vlan    Mac Address       Type          Ports
----    -----------       --------      -----
 1      0200.2222.2222    STATIC        Fa0/2
Total Mac Addresses for this criterion: 1

SW1# show mac address-table dynamic interface f0/2
          Mac Address Table
-------------------------------------------

Vlan    Mac Address       Type          Ports
----    -----------       --------      -----
SW1#
```

Actions When Port Security Violation Occurs

Option on the switchport port-security violation Command	Protect	Restrict	Shutdown
Discards offending traffic	Yes	Yes	Yes
Sends log and SNMP messages	No	Yes	Yes
Disables the interface by putting it in an err-disabled state, discarding all traffic	No	No	Yes

Confirming the Port Security Violation Mode

```
SW1# show port-security
Secure Port  MaxSecureAddr  CurrentAddr  SecurityViolation  Security Action
                 (Count)       (Count)          (Count)
---------------------------------------------------------------------------
     Fa0/13              1            1                  1         Shutdown
---------------------------------------------------------------------------
Total Addresses in System (excluding one mac per port) : 0
Max Addresses limit in System (excluding one mac per port) : 8192
```

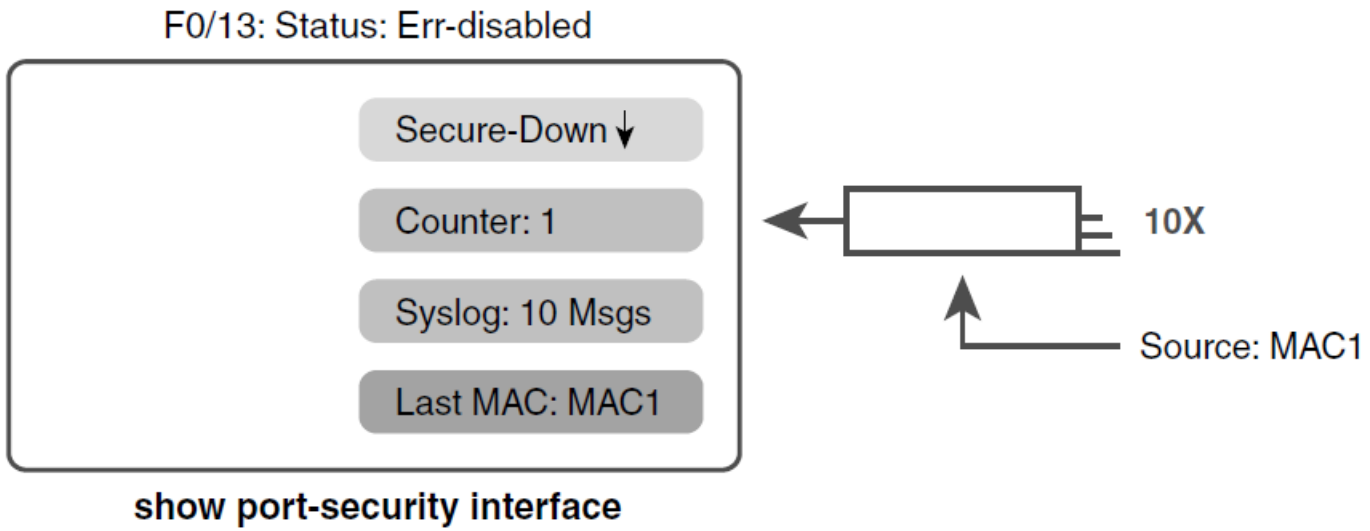
Port Security Status in Shutdown Mode After a Violation

```
! The next lines show the log message generated when the violation occurred.
Jul 31 18:00:22.810: %PORT_SECURITY-2-PSECURE_VIOLATION: Security violation occurred,
caused by MAC address d48c.b57d.8200 on port FastEthernet0/13

! The next command shows the err-disabled state, implying a security violation.
SW1# show interfaces Fa0/13 status

Port     Name                 Status       Vlan   Duplex  Speed  Type
Fa0/13                        err-disabled 1      auto     auto  10/100BaseTX
!
! The next command's output has shading for several of the most important facts.
SW1# show port-security interface Fa0/13
Port Security              : Enabled
Port Status                : Secure-shutdown
Violation Mode             : Shutdown
Aging Time                 : 0 mins
Aging Type                 : Absolute
SecureStatic Address Aging : Disabled
Maximum MAC Addresses      : 1
Total MAC Addresses        : 1
Configured MAC Addresses   : 1
Sticky MAC Addresses       : 0
Last Source Address:Vlan   : 0200.3333.3333:2
Security Violation Count   : 1
```

Summary of Actions: Port Security Violation Mode Shutdown



Port Security Using Protect Mode

```
SW1# show running-config
! Lines omitted for brevity
interface FastEthernet0/13
  switchport mode access
  switchport port-security
  switchport port-security mac-address 0200.1111.1111
  switchport port-security violation protect
! Lines omitted for brevity

SW1# show port-security interface Fa0/13
Port Security              : Enabled
Port Status                : Secure-up
Violation Mode             : Protect
Aging Time                 : 0 mins
Aging Type                 : Absolute
SecureStatic Address Aging : Disabled
Maximum MAC Addresses      : 1
Total MAC Addresses        : 1
Configured MAC Addresses   : 1
Sticky MAC Addresses       : 0
Last Source Address:Vlan   : 0000.0000.0000:0
Security Violation Count   : 0
```

Port Security Using Violation Mode Restrict

```
SW1# show port-security interface fa0/13
Port Security              : Enabled
Port Status                : Secure-up
Violation Mode             : Restrict
Aging Time                 : 0 mins
Aging Type                 : Absolute
SecureStatic Address Aging : Disabled
Maximum MAC Addresses      : 1
Total MAC Addresses        : 1
Configured MAC Addresses   : 1
Sticky MAC Addresses       : 0
Last Source Address:Vlan   : 0200.3333.3333:1
Security Violation Count   : 97
```

```
!
! The following log message also points to a port security issue.
!
01:46:58: %PORT_SECURITY-2-PSECURE_VIOLATION: Security violation occurred, caused by
MAC address 0200.3333.3333 on port FastEthernet0/13.
```

Summary of Actions: Port Security Violation Mode Restrict