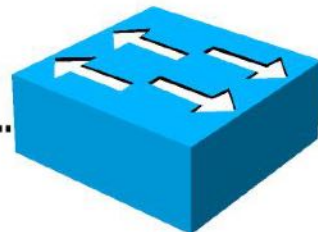


Operating Cisco IOS Software



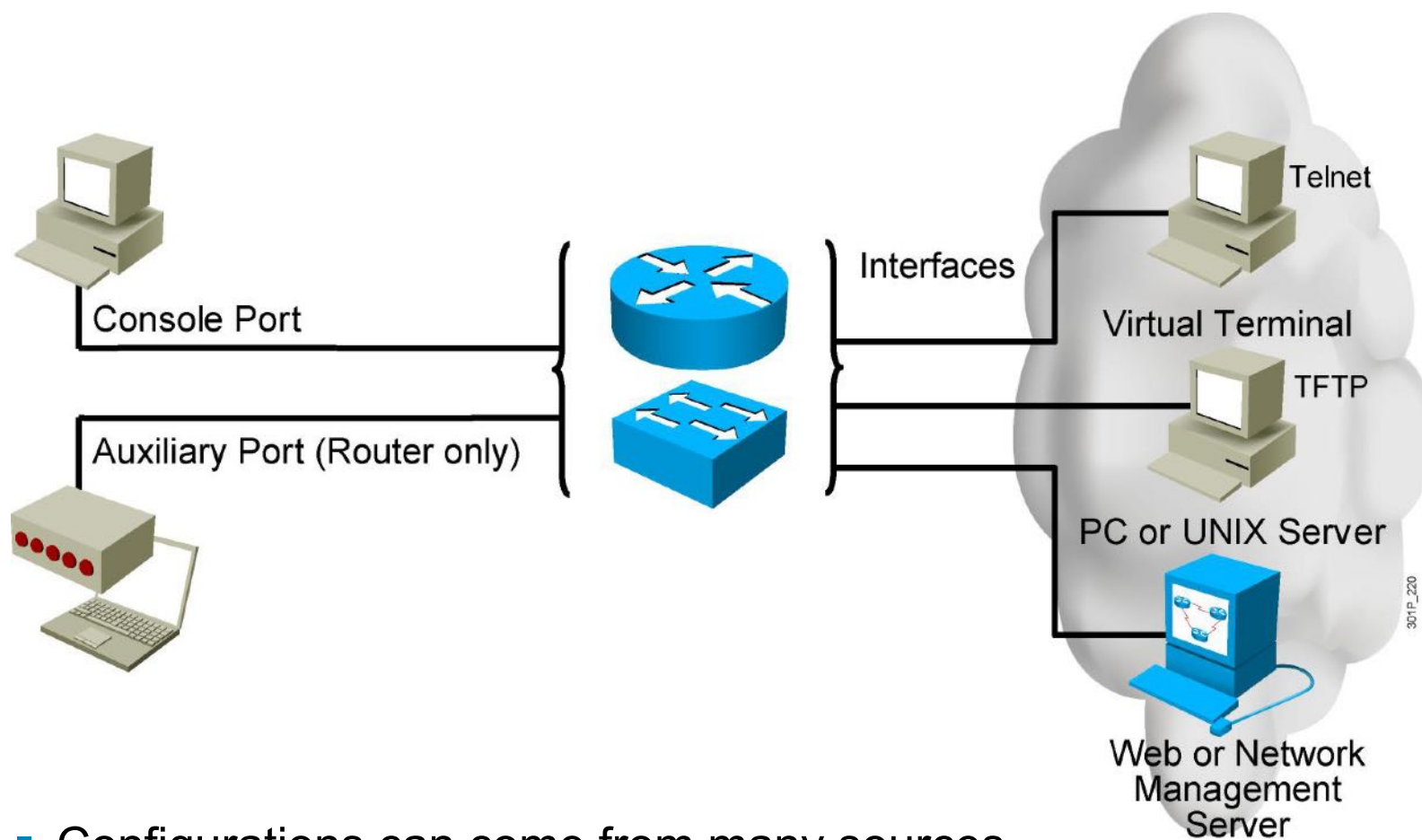
An Overview of Cisco Device Startup

1. Find and check device hardware.
2. Find and load Cisco IOS software image.
3. Find and apply device configurations.



301P_219

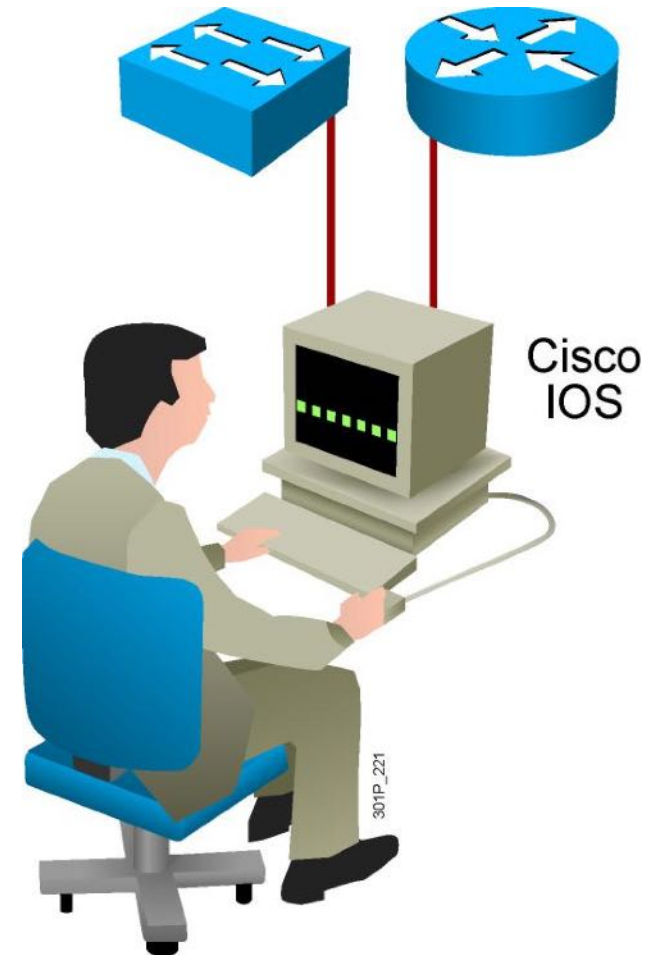
External Configuration Sources



- Configurations can come from many sources.
- Configurations will act in device memory.

Cisco IOS User Interface Functions

- CLI is used to enter commands.
- Operations vary on different internetworking devices.
- Users type or paste entries in the console command modes.
- Command modes have distinctive prompts.
- **Enter** key instructs device to parse and execute the command.
- Two primary EXEC modes are user mode and privileged mode.



Cisco IOS Software EXEC Mode (User)

There are two main EXEC modes for entering commands.

First Mode



User Mode

- Limited examination of switch or router
- Command prompt: **hostname>**

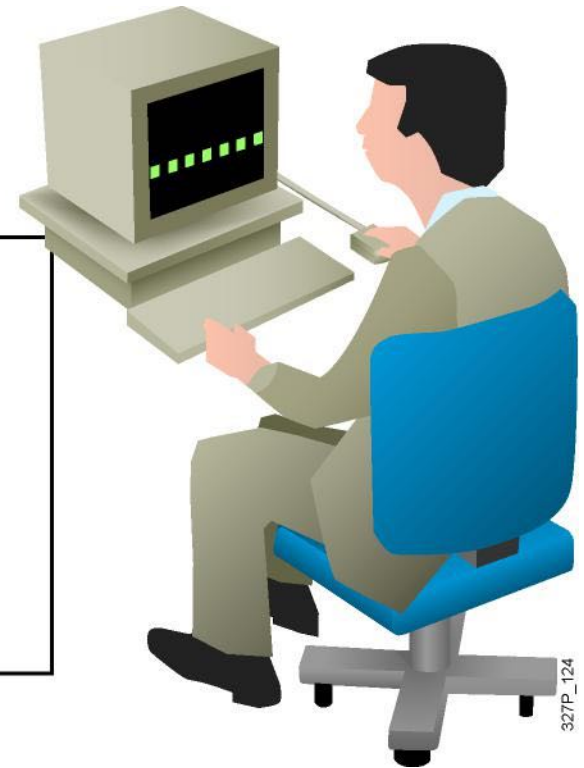
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Cisco IOS Software EXEC Mode (Privileged)

Second Mode (and Most Commonly Used)

Privileged (aka Enabled) Mode

- Detailed examination of switch or router
- Enables configuration and debugging
- Prerequisite for other configuration modes
- Command prompt: **hostname#**



Switch Command-Line Help Facilities

Context-Sensitive Help

Provides a list of commands and the arguments associated with a specific command.

Console Error Messages

Identifies problems with any switch commands that are incorrectly entered so that they can be altered or corrected.

Command History Buffer

Allows recall of long or complex commands or entries for re-entry, review, or correction.

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Context-Sensitive Help

```
SwitchX# clock
Translating "CLOCK"
% Unknown command or computer name, or unable to find computer address

SwitchX# cl?
clear    clock

SwitchX# clock
% Incomplete command.

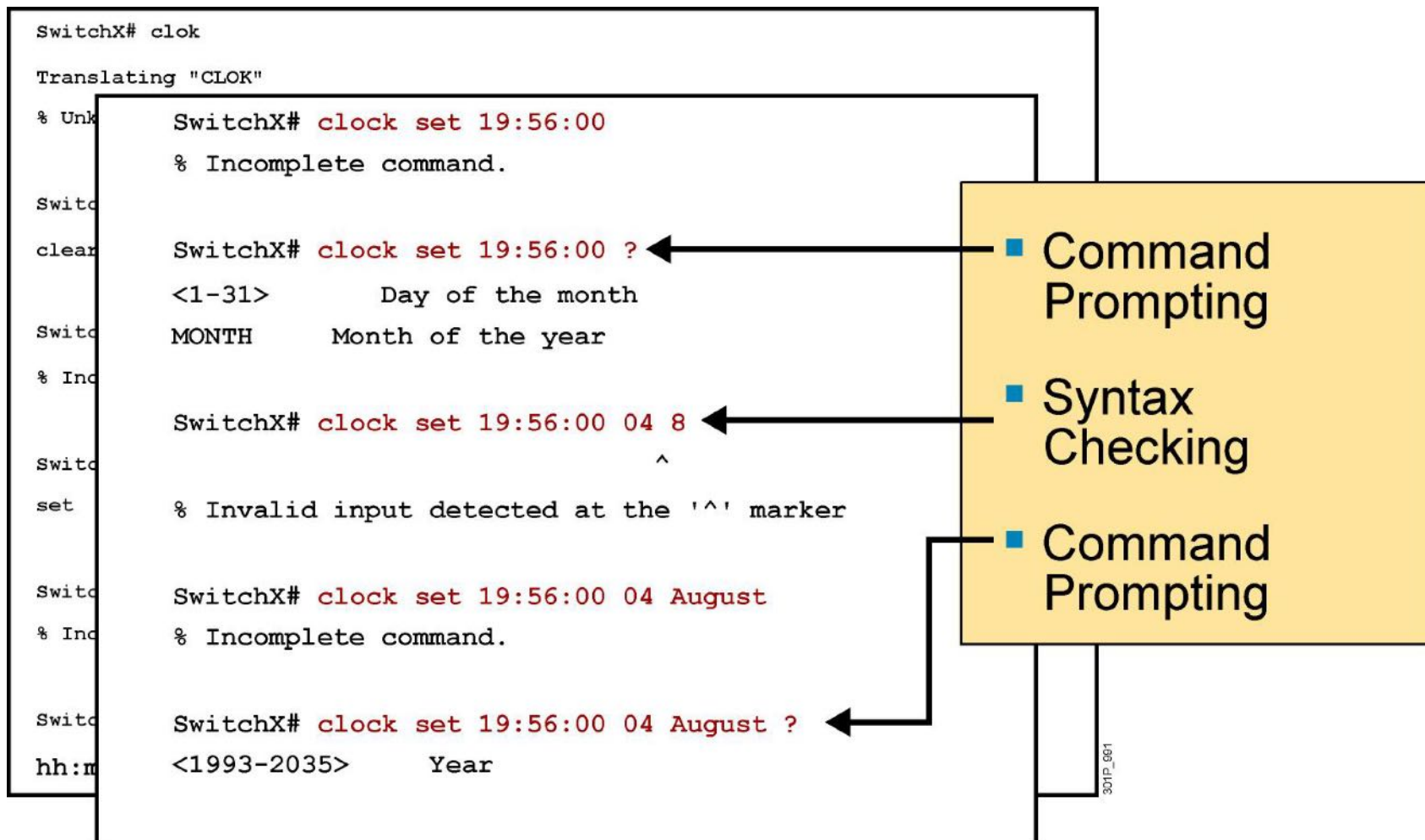
SwitchX# clock ?
set      Set the time and date

SwitchX# clock set
% Incomplete command.

SwitchX# <Ctrl-P> clock set
hh:mm:ss Current Time
```

- Symbolic Translation
- Command Prompting
- Last Command Recall

Context-Sensitive Help (Cont.)



Enhanced Editing Commands

```
SwitchX>Shape the future of internetworking by creating unpreced
```

Shape the future of internetworking by creating unprecedented value for customers, employees, and partners.

Enhanced Editing Commands (Cont.)

SwitchX>\$ value for customers, employees, and partners.

	(Automatic scrolling of long lines)
Ctrl-A	Move to the beginning of the command line.
Ctrl-E	Move to the end of the command line.
Esc-B	Move back one word.
Esc-F	Move forward one word.
Ctrl-B	Move back one character.
Ctrl-F	Move forward one character.
Ctrl-D	Delete a single character.

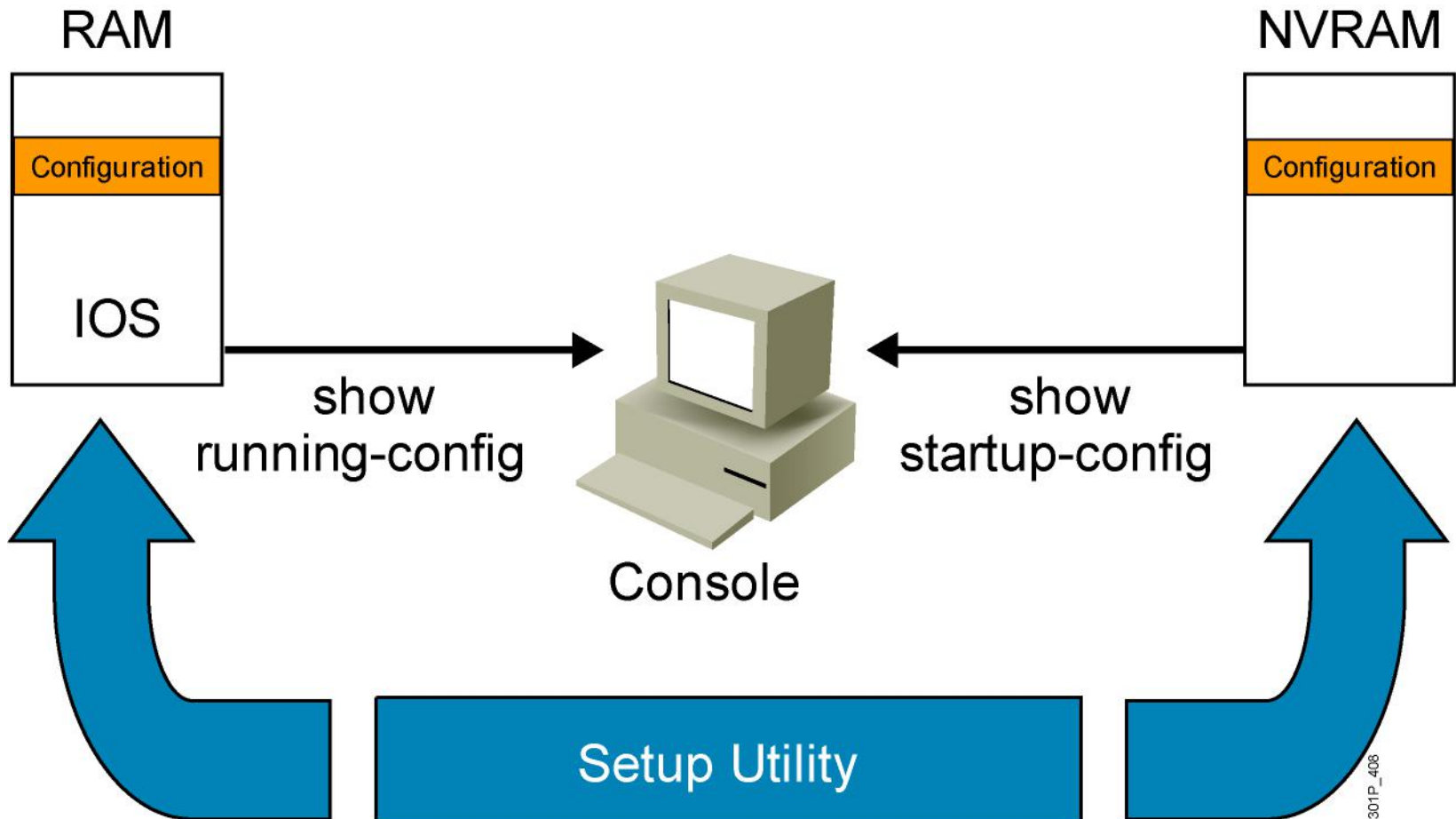
301P_960

Router Command History

Ctrl-P or Up Arrow	Recalls last (previous) commands.
Ctrl-N or Down Arrow	Recalls more recent commands.
<code>show history</code>	Shows command buffer contents.
<code>terminal history size <i>lines</i></code>	Sets session command buffer size.

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Viewing the Configuration



show running-config and show startup-config Commands

In RAM

```
SwitchX#show running-config
Building configuration...??
Current configuration:?  
!?  
version 12.0  
!  
-- More --
```

In NVRAM

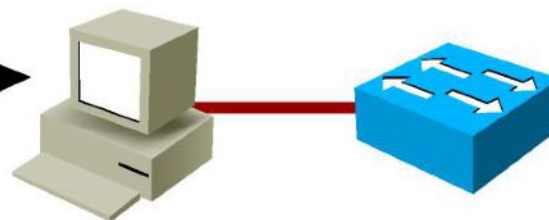
```
SwitchX#show startup-config
Using 1359 out of 32762 bytes  
!  
version 12.0  
!  
-- More --
```

Displays the current and saved configuration

Configuring a Switch Password

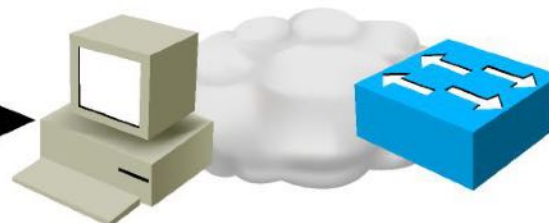
Console Password

```
SwitchX(config)#line console 0  
SwitchX(config-line)#login  
SwitchX(config-line)#password cisco
```



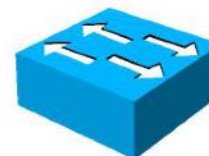
Virtual Terminal Password

```
SwitchX(config)#line vty 0 4  
SwitchX(config-line)#login  
SwitchX(config-line)#password sanjose
```



Enable Password

```
SwitchX(config)#enable password cisco
```



Secret Password

```
SwitchX(config)#enable secret sanfran
```

Service Password-Encryption Commands

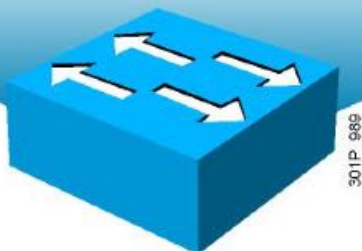
```
SwitchX(config)#service password-encryption  
SwitchX(config)#no service password-encryption
```

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Configuring the Login Banner

- Defines and enables a customized banner to be displayed before the username and password login prompts.

```
SwitchX# banner login " Access for authorized users only. Please enter your  
username and password. "
```



Telnet vs. SSH Access

- Telnet
 - Most common access method
 - Insecure
- SSH-encrypted

```
!- The username command create the username and password for the SSH session
Username cisco password cisco

ip domain-name mydomain.com

crypto key generate rsa

ip ssh version 2

line vty 0 4
 login local
 transport input ssh
```



Configuring Port Security

Cisco Catalyst 2960 Series

```
SwitchX(config-if)#switchport port-security [ mac-address  
mac-address | mac-address sticky [mac-address] | maximum  
value | violation {restrict | shutdown}]
```

```
SwitchX(config)#interface fa0/5  
SwitchX(config-if)#switchport mode access  
SwitchX(config-if)#switchport port-security  
SwitchX(config-if)#switchport port-security maximum 1  
SwitchX(config-if)#switchport port-security mac-address sticky  
SwitchX(config-if)#switchport port-security violation shutdown
```

Verifying Port Security on the Catalyst 2960 Series

```
SwitchX#show port-security [interface interface-id] [address] [ |  
{begin | exclude | include} expression]
```

```
SwitchX#show port-security interface fastethernet 0/5
```

```
Port Security           : Enabled  
Port Status             : Secure-up  
Violation Mode          : Shutdown  
Aging Time              : 20 mins  
Aging Type              : Absolute  
SecureStatic Address Aging : Disabled  
Maximum MAC Addresses   : 1  
Total MAC Addresses     : 1  
Configured MAC Addresses : 0  
Sticky MAC Addresses    : 0  
Last Source Address     : 0000.0000.0000  
Security Violation Count : 0
```

Verifying Port Security on the Catalyst 2960 Series (Cont.)

```
SwitchX#sh port-security address
      Secure Mac Address Table
-----
Vlan    Mac Address          Type                Ports    Remaining Age
        (mins)
-----
  1     0008.dddd.eeee      SecureConfigured   Fa0/5    -
-----
Total Addresses in System (excluding one mac per port) : 0
Max Addresses limit in System (excluding one mac per port) : 1024
```

```
SwitchX#sh port-security
Secure Port  MaxSecureAddr  CurrentAddr  SecurityViolation  Security Action
           (Count)          (Count)          (Count)
-----
      Fa0/5         1             1             0             Shutdown
-----
Total Addresses in System (excluding one mac per port) : 0
Max Addresses limit in System (excluding one mac per port) : 1024
```

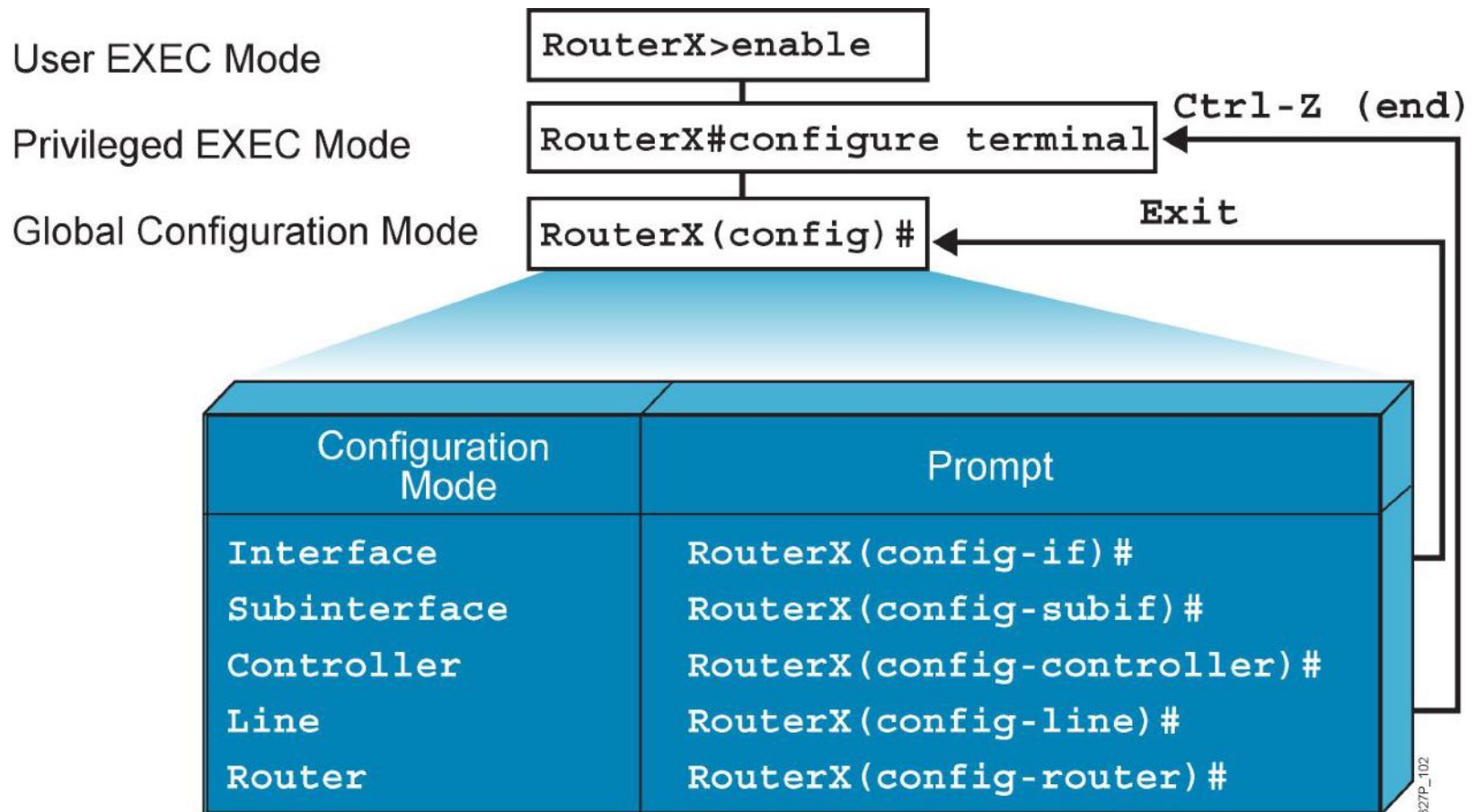
Disabling an Interface (Port)

SwitchX(config-int) #

```
shutdown
```

- To disable an interface, use the **shutdown** command in interface configuration mode.
- To restart a disabled interface, use the **no** form of this command.

Overview of Cisco IOS Configuration Modes



Commands Review Discussion

<code>banner motd</code>	<code>configure terminal</code>	<code>copy running-config startup-config</code>	<code>enable</code>	<code>enable secret password</code>
<code>erase startup-configuration</code>	<code>hostname name</code>	<code>interface interface</code>	<code>ip address address mask</code>	<code>ip default-gateway address</code>
<code>line console 0</code>	<code>line vty 0 4</code>	<code>login</code>	<code>password password</code>	<code>reload</code>
<code>show cdp neighbors</code>	<code>show interfaces</code>	<code>show port-security [interface address]</code>	<code>show running-configuration</code>	<code>show startup-configuration</code>
<code>shutdown/no shutdown</code>	<code>switchport mode access</code>	<code>switchport port-security</code>	<code>switchport port-security mac-address mac</code>	<code>switchport port-security maximum value</code>

- What does the command accomplish?
- From what configuration mode is the command executed?

