

Cisco Configuration Introduction

Network Infrastructure Workshop



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Introduction to Cisco devices

Presentation describes components of Cisco routers and switches running Cisco IOS

- IOS is Cisco's Internet Operating System, the software used to control the router or switch

Cisco produces other equipment running other operating systems:

- IOS-XR (high end routers)
- IOS-XE (replacing IOS)
- NX-OS (datacentre & enterprise switches)

Equipment from other vendors uses similar concepts

Where is the configuration?

Router always has two configurations

- **running-config**

- Stored in RAM
- Shows which parameters are currently in use.
- Modified with configure terminal command
- “show running-config”

- **startup-config**

- Stored in NVRAM
- Loaded by router next time it boots
- This is where the running-config is saved
- “show startup-config”

Management input sources

Console:

- Direct access via serial port

Auxiliary Port:

- Access via Modem or other serial devices
- (Also used for accessing other serial devices)

Virtual Terminals (VTY):

- Telnet/SSH

Accessing a Cisco IOS Device

Terminal Emulation Programs

Software available for connecting to a networking device:

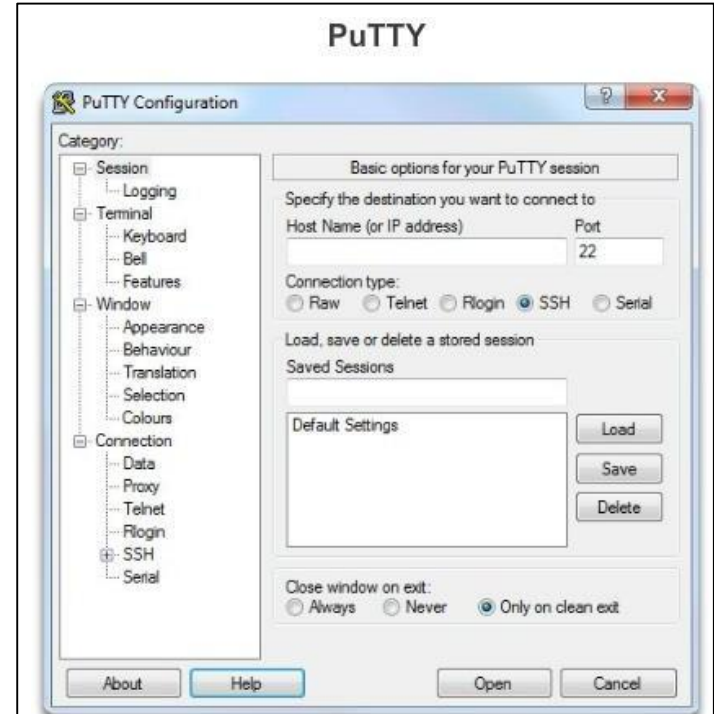
PuTTY

Tera Term

SecureCRT

HyperTerminal

OS X Terminal



Changing the configuration

Commands are implemented immediately

- Be careful when typing!

When working on serial console or via Telnet or SSH, commands can be:

- Copied from a text file and pasted into the terminal
 - Be very careful with cut and paste!
- Copied by SCP or TFTP from a file prepared previously on a SCP or TFTP server

Access Modes



Standard user access:

- Lets users see some of the device status
- Prompt:

```
Router>
```

Privileged user access:

- Full administrative view of the device
- Accessed by:

```
Router> enable  
Router#
```

Configuration mode:

- ```
Router# configure terminal
Router(config)#
```



# Access Modes

## Exiting configuration mode:

```
Router(config)# end (or Ctrl-Z)
Router#
```

## Exiting privileged mode:

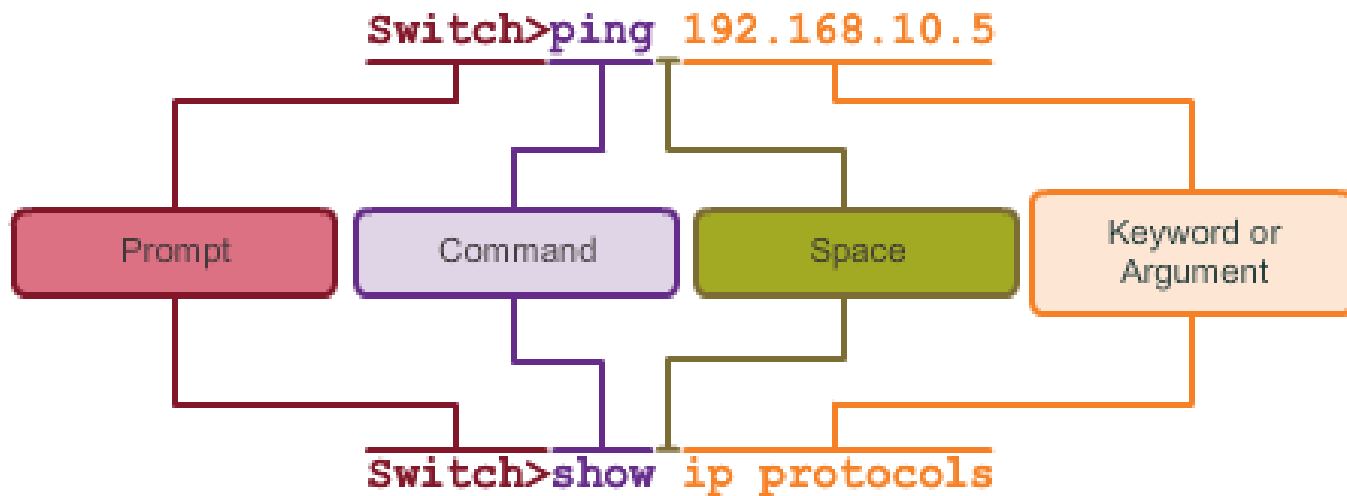
```
Router# disable
Router>
```

## Logging off:

```
Router> exit
```

The Command Structure

# IOS Command Structure



# Saving Configuration

Very important to save the configuration to the device NVRAM after it has been updated

- The device does NOT do it automatically
- Done in privileged mode:

```
Router# write memory
```

- Can be shortened to just:

```
Router# wr
```

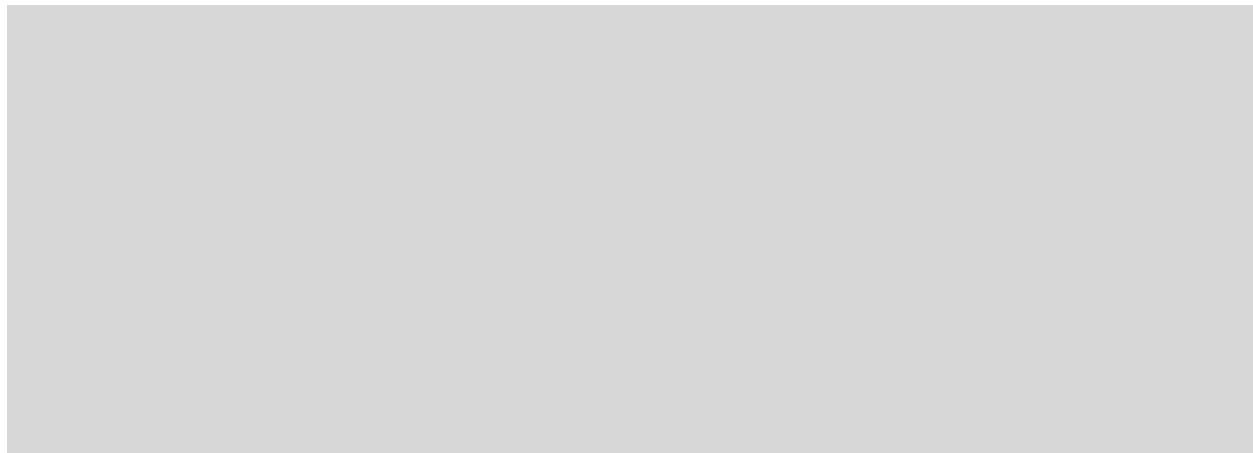
Full long hand form of Cisco command to save configuration:

```
Router# copy running-config startup-config
```

# Saving Configuration

There are many available options for saving the configuration:

- Locally on the device
- On an external server using TFTP or SCP



# Context Help

Use “?” to obtain a list of commands available in your current configuration mode:

```
Router(config)#?
```

```
Configure commands:
```

|                 |                                              |
|-----------------|----------------------------------------------|
| aaa             | Authentication, Authorization and Accounting |
| aal2-profile    | Configure AAL2 profile                       |
| access-list     | Add an access list entry                     |
| alarm-interface | Configure a specific Alarm Interface Card    |
| alias           | Create command alias                         |
| appfw           | Configure the Application Firewall policy    |
| application     | Define application                           |
| archive         | Archive the configuration                    |
| arp             | Set a static ARP entry                       |

# Online Help

Use “?” also to see all possible parameters to an incomplete command:

```
Router(config)#username ?
 WORD User name
Router(config)#username cndlab ?
 password Specify the password for the user
Router(config)#username cndlab password secret-pass

Router#show ?
 aaa Show AAA values
 aal2 Show commands for AAL2
 access-expression List access expression
 access-lists List access lists
 accounting Accounting data for active sessions
```

# Command Completion

Use the Tab key to complete a command:

```
router(config)# int<TAB>
router(config)# interface fa<TAB>
router(config)# interface fastEthernet 0
router(config-if)# ip add<TAB>
router(config-if)# ip address n.n.n.n m.m.m.m
```

# Command Shorthand

## IOS understands shorthand

- Complete command does not need to be typed as long as the initial characters are unique

```
router# sh ip int br
Interface IP-Address OK? Method Status
FastEthernet0 192.168.1.1 YES NVRAM up
```

- Can you work out the full form of the above commands?



# Moving faster around the command line

Move within command history



Previous command Next command



Line editing

 move to the left within a line    move to the right within a line



Ctrl-a    move to beginning of line

Ctrl-e    move to end of line

Ctrl-k    delete until end of line

# Verifying and Troubleshooting

## Checking configuration:

- Need to be in privileged mode to do this:
- Current running configuration

```
Router# show running-config
```

- Saved configuration

```
Router# show startup-config
```

- Or

```
Router# show configuration
```

## Checking specific interface running configuration

```
Router# show run interface Gig0/0
```

# Verifying and Troubleshooting

## Checking interface status:

- Can be in standard or privileged mode to do this:

```
Router# show interface Gig0/0
```

- Checks interface Gigabit 0/0

## Checking status of all interfaces:

- Can be in standard or privileged mode to do this:

```
Router# show interface description
Interface Status Protocol Description
Fa0/0 up up Backbone LAN
Fa0/1 up up Server LAN
Fa1/0 up up Wireless LAN
Fa1/1 up up ISP Link
Lo0 up up Loopback
```

# Verifying and Troubleshooting

Getting a brief list of IPv4 status of all interfaces

```
Router# show ip interface brief
```

Getting a brief list of IPv6 status of all interfaces

```
Router# show ipv6 interface brief
```

Find out about directly attached Cisco devices

- “Cisco Discovery Protocol” – CDP
- Can be in standard or privileged mode to do this:

```
Router# show cdp neighbor
```

# Verifying and Troubleshooting

## Checking logs:

- Need to be privileged mode to do this:

```
Router# show logging
```

## Show software and hardware details of the device:

```
Router# show version
```

- Or

```
Router# show hardware
```

# Verifying and Troubleshooting

Checking device status while inside configuration mode:

```
Router(config)# do show interface Gig0/0
```

- The “do” command lets the operator run all privileged mode commands from within the configuration mode of the router
- Much quicker/easier than exiting configure mode, running the status command, and then returning to configure mode

# Undoing Configuration

To undo IOS configuration:

- Simply negate the configuration command

```
Router# sh run int fa 0/0
interface FastEthernet 0/0
description Link to Core-Router
 ip address 192.168.1.10 255.255.255.224
```

```
Router# conf t
Router(config)# int fa 0/0
Router(config-if)# no ip address
Router(config-if)# end
```

```
Router# sh run int fa 0/0
interface FastEthernet 0/0
description Link to Core-Router
Router#
```

# Poor defaults

For historical reasons, there are some legacy default settings which you will want to change on every device



# Poor defaults (1)

Log messages are sent to console port

- They mix in with whatever you are typing!

```
Router(config-if)#ip address 1.2.3.4 Jun 20 07:53:55.755:
%LINEPROTO-5-UPDOWN: Line protocol on Interface
GigabitEthernet3/0, changed state to down
```

## Solution

```
Router(config)#no logging console
Router(config)#logging buffer 8192 debug
```

Use "show log" to see buffer contents

## Poor defaults (2)

### DNS lookups sent to broadcast address

- Can cause long delays e.g. for reverse lookups

```
Router#ping nsrc.org
Translating "nsrc.org"...domain server (255.255.255.255)
% Unrecognized host or address, or protocol not running.
```

### Solution: disable DNS resolution completely

```
Router(config)#no ip domain-lookup
```

### Alternatively: configure real DNS servers

- But this can also lead to delays when network is down

```
Router(config)#ip name-server 8.8.8.8
Router(config)#ip name-server 8.8.4.4
```



Questions?