

Working With Switches, Chassis, Stacks + CLI and More

This article will be an all around guide on how things work specific to Cisco hardware.

What is CLI [↗](#)

- CLI stands for command line interface. More specifically, with Cisco products, the term is Cisco IOS command-line interface. This just means it is the language that you use to interact with their equipment and its Operating System, somewhat like a programming language.

```
*****
*
*   University of Connecticut   *
*
*   Authorized Access Only     *
*
*   Federal/State Laws Enforced *
*
*****

0364_HBL_A66_Student, line 1

local username:Kerberos: No default realm defined for Kerberos!
[cjd21013work
password:

0364_HBL_A66_Student#
```

What CLI Looks like

Helpful Tips Precursor: Shortcuts, Aliases, Tab, and "?" [↗](#)

- When configuring/interfacing with cisco switches, and especially at UConn, there are shortcuts and aliases that can be used in place of the full commands. For example, instead of typing `switchport`, you can just type `sw`. This works because there is no other command in the switch that start with "sw" so the switch knows what command you are trying to use.
- There are also Aliases in use at UConn. An alias is just a string of letters that corresponds to a certain command to increase efficiency. For example, you will see `shint` in use everyday. Shint is just a string that was set to correspond to the full command "show interface status".
- The tab key is a useful tool that you can use when interfacing with Cisco switches. If you type the start of a command, for example: `sw` and press tab, it will complete the command for you.
- Finally, the ? query is very useful when you do not know exactly what comes next in a string of commands. Typing the start of a command and then typing "?" after a space, will show all possible commands or additives that can come next. This is especially helpful when you are doing long strings of commands and cannot remember what comes next. If you do not know a single command, if you start typing the beginnings of it, for example "sw" and then type "?" without a space in between, it will show all possible endings for a command beginning with those letters.

Different Modes [↗](#)

- Cisco Switches have a variety of "Modes" that a user can enter into. These modes have different uses and privileges. Certain modes only have commands that can give you information, some will let you configure the entire switch, and some will let you configure smaller subsets of the switch. You can only use commands from a certain mode IN that

mode. The user can only be in one mode at a time. It is very important to understand how this works and how to move yourself between these modes.

- **Next to the headers of each of these modes, you will see what it looks like to be in each mode.**

User Exec Mode *Hostname>*

- User Exec Mode is the read only mode that you first arrive in when you connect to a Cisco switch. You can do basic commands in this mode to gather information about the switch. You cannot edit or configure anything in this mode. You normally will not see this mode when using telnet to connect to switches as at UConn, it is configured that you start in the next mode.

Privileged Exec Mode *Hostname#*

- This mode allows you to use all non-configuration commands. It allows a much more detailed view and control of the switch you are logged into.
- To enter into Privileged Exec Mode if you are not already in this mode, you use the command `enable` or `en` and typing in the password given to you by a full time employee if the switch is offline. Otherwise when signing in through telnet, you will start in privileged exec mode.
- You will know you are in privileged exec mode when there is a # after the hostname.

Global Configuration Mode *Hostname(config)#*

- This mode will allow you to make changes to the configuration of the switch. In this mode you make changes to the **Running Configuration** on the switch that you can later save to the **Startup Configuration**
- To enter this mode, you use the command `configure terminal` or the shortcut `conf t` from privileged exec mode.
- To get out of this mode and back to privileged executive mode, type `exit`.
- Remember, changes made in this mode are only saved in the running configuration until you explicitly save them to the startup configuration. More on this below...

```
0364_HBL_A66_Student#conf t
Enter configuration commands, one per line. End with CNTL/Z.
0364_HBL_A66_Student(config)#
```

Global Config Mode

Interface Configuration Mode *Hostname(config-if)#*

- This is the mode where you configure a single interface or a range of interfaces. Unlike global configuration mode, where changes are made to the entirety of the switch, interface configuration mode only makes changes to the interfaces you are specifically editing.
- To enter this mode, enter `int gx/x/x` when you are already in global configuration mode. To enter into a range, use: `int g1/1 - 5, g1/10 - 15` for example. This will allow you to edit ports 1 through 5 and 10 through 15.
- You will know you are in Interface Configuration Mode when you see **hostname(config-if)#**
- To get out of this mode and into the previous (Global Config), type `exit` the same way you would to get out of global configuration mode
- If you would like to jump straight back to privileged executive mode, type `end`.

```
0364_HBL_A66_Student(config)#interface g1/0/1
0364_HBL_A66_Student(config-if)#exit
0364_HBL_A66_Student(config)#int g1/0/1
0364_HBL_A66_Student(config-if)#
```

Interface Config Mode

Line Configuration Mode

Hostname(config-line)# [↗](#)

- This mode allows you to change the virtual line settings, as in how you would connect to the switch via SSH or Telnet. We will not touch this mode much as a student worker but know that it exists.

```
0364_HBL_A66_Student(config)#line vty 0
0364_HBL_A66_Student(config-line)#
```

Line Config Mode

Console Configuration Mode

Hostname(config-console)# [↗](#)

- This mode allows you to configure the console interface settings of a Cisco switch. Generally, as a student, you will not be using this mode at all but it is good to know that it exists.

Everyday Commands [↗](#)

Show Interface status (shint) [↗](#)

- `shint`
 - This will be the command you will be using the most. This command expands to `show interface status` and will give you a summary of all ports on the switch. It will show their port type, description, VLAN, and speed. Remember that when you see a-full, auto, or a-1000, this means that the speed and/or duplex is set automatically. If you just see full, half, 100, or some other value without an “a” in the speed or duplex column, it was set manually.
- `shint | i _specify_`
 - This command, which expands to `shint | include x` will show only items in a normal shint command that ***include*** what you specify after the include command. However, sometimes things get messy when you do not use `_underscores_`. For example, if you were to use the command `shint | i 1` to find all VLAN 1’s, it would show you everything that has a “1” in it. This is a problem when you have many ports that have 1, 10, 100, 1000 numbers. They all have “1”, so you would get more than what you are looking for. If you only want ports with the actual number “1”, you need to use the underscores. The resulting command would be `shint | i _1_`.
 - When you are looking to find specific ports with specific VLANs with a show interface status command, the best command to use for this is `““ shint | i _460_ ““`, where the 460 is whatever VLAN you are looking for.
 - **You can use the `| include` command on almost any list command. Keep this in your vocabulary.**
 - **The `|` character is referred to as “pipe”**

Write, Write Memory, Copy Running-Config Startup-Config [↗](#)

- **!! IMPORTANT !!**
- These commands are used to save any changes you make to the running configuration of a switch, chassis, or stack.
- Remember, when you make changes, you make changes to the running configuration **NOT** the startup configuration. This means that when a switch is powered off or restarted, your changes will be wiped.
- So, to save changes made to switches, you need to use one of these commands:
- `Write, Write Memory, Copy Running-Config Startup-Config, Copy start run` all do the same thing. They will write the changes you make to the ***running config to the startup config***.
- You need to be in user exec or priv exec mode to use this command.
- **The fastest way to save your changes is `““ wr ““`**

Show Power Inline [↗](#)

- This is a useful command when you want to see how much power a certain port is drawing. This is super useful when troubleshooting devices that are acting up. Generally, when booting or stuck in a boot loop, devices draw much more power than they would when idle.
- This command’s shortcut is `““ show pow in ““`

- (If you need to narrow results you can use the “mod” or “module” modifier)

Shutdown, No Shutdown [↗](#)

- Shutdown, or no shutdown, is a useful way to cycle a port on a switch
- Shutdown will set the status of a port to administratively down and will not allow any connection, even if there is something connected and powered on. It will also terminate any POE (power over ethernet) which can be very useful when trouble shooting. You can use this to turn off an AP, or another POE device (Which means the device is powered via the ethernet cable from the switch)
- “No shutdown” does just the opposite, it will turn the port back on and reinstate any POE that was being pulled.
- If you are looking to power cycle an AP, it is best to issue a shut command, wait a couple seconds, and then issue another no shut command
- To use these commands, enter global configuration mode with `“conf t”`, then the port you would like to work on with `“int [interface]”`, then `“shut”`, then after a few seconds `“no shut”`.

Description [↗](#)

- **Using the description command is important in keeping the switchport descriptions up to date for much easier troubleshooting.**
- The description command just adds a description to a port when displaying with the `“shint”` command or even `“show int desc”`. There are a multitude of commands you can issue to see descriptions.
- To add a description, enter global configuration mode with `“conf t”`, then the port you would like to work on with `“int [interface]”`, then `“desc [description of interface]”`
- We try to keep the naming convention consistent when changing descriptions
 - If possible input descriptions as such: “FL#_RM#_JK[Label]”
 - FL → Floor Number, RM → Room Number, JK → Jack Label

Show CPD Neighbors [↗](#)

- CDP or Cisco Discovery Protocol is a layer 2 protocol that basically tells all Cisco devices to send information about themselves to their “Neighbors”.
- Around every couple minutes, devices send each other this information. It is useful to view what devices are connected to a switch or what device the switch uplinks to.
- You use this command in `“Privileged Exec Mode”`
 - The output of a show CDP Neighbors command

```
0364_HBL_A66_Student#show cdp neighbors
Capability Codes: R - Router, T - Trans Bridge, B - Source Route Bridge
                  S - Switch, H - Host, I - IGMP, r - Repeater, P - Phone,
                  D - Remote, C - CVTA, M - Two-port Mac Relay

Device ID         Local Intf     Holdtme   Capability   Platform   Port ID
0364_HBL_A-73_X   Gig 1/0/24    163      S I          C9407R     Gig 1/0/28
Hough-303B-COA-STRS
                  Gig 1/0/23    147      R T          AIR-AP181  Gig 0
Total cdp entries displayed : 2
```

Show LLDP Neighbors [↗](#)

- LLDP or Link Layer Discovery Protocol is a layer 2 protocol just like CDP. However, unlike CDP, which is a propriety protocol specific to Cisco devices, LLDP is an IEEE standard and can be used with almost all network devices.

Ping [↗](#)

- This is a useful command that you can use to check if a device is online. It will send a packet to the device and wait for a return. If it does not get a return the device is most likely not online or it is unreachable in your current subnet.
- By default, Cisco devices will send 5 pings, each 100 Bytes.

- In the output of a ping, you will see either a “.” or “!”. The “.” means that there is no reply. The “!” means that there was a good ICMP Echo Reply.
- You can use this command by typing `“ping [IP ADDRESS]”` and the IP of whatever device you want to check.
- **DROP DOWN WITH MORE INFO**

▼ More in Depth

The ping command, uses ICMP Protocol. ICMP protocol requires both an IP address as well as a MAC address. Many times, when you are trying to ping some device, you do not have the MAC address of that device saved in what is called a MAC address-table. So, the device issuing a ping request (ICMP Echo Request) needs to also issue an ARP request. ARP or Address Resolution Protocol, is used to find and match an IP address with the associated MAC address on your network. To do this, it sends out a broadcast request to all devices. Once the device with the correct IP receives the frame, it replies back to the requester with it's own MAC address. For this reason, a lot of times, you will see that the first ping will fail resulting in an output like so: “.!!!!”

Show Interface Status Mod # [↗](#)

- When working with larger chassis, it can be useful to only view parts of the chassis that you need to see.
- `Show Int Stat Mod #` or `Shint Mod #` will perform a basic shint command but only show the “module” or “blade” that you want to see.
- An example would look like:

```
0364_HBL_A66_Student#shint mod 1
Port      Name      Status      Vlan      Duplex  Speed Type
Gi1/0/1   A         connected   92        a-full  a-1000 10/100/1000Ba
seTX
Gi1/0/2   B         connected   92        a-full  a-1000 10/100/1000Ba
seTX
```

Show Int Desc [↗](#)

- Sometimes port descriptions are too long to be shown with a simple `“shint”` command.
- `“show interface description”` or `“sho int desc”` will show you a more expanded version of the shint command with a few extra characters for descriptions

Show Vlan [↗](#)

- The show VLAN command will output all VLANS and what ports are active with the respective VLAN. This can be helpful in troubleshooting
- To display all VLANS, all you have to do is `“show vlan”` in user or privileged exec mode.

Switchport Access Vlan [↗](#)

- This command will help you change the VLAN of a port on a switch.
- To do this first enter global config mode with `“conf t”`
- Then enter the interface you want to change the VLAN with `“int [interface]”`
- Change the VLAN finally with `“sw ac vlan [vlan #]”`
- Make sure to save with `“wr”`

Show Spanning-Tree [↗](#)

- This command can be useful when you want to see how spanning tree protocol may be affecting the switch you are working with or the surrounding switches

test cablediagnostics tdr int [interface] [↗](#)

- This set of commands will show you what the switch sees in terms of the connection of each pair of the ethernet cable. It will show you both the local pairs (the pairs connected to the switch) as well as the remote pairs (the pairs where the run ends).
- It will have a status for each of the pairs. If all is well, the switch will display “normal” for the pairs.
- Note that this test is not always accurate and there can still be issues even though the switch thinks there aren't any.
- To use this command find the port you want to test and use `test cablediagnostics tdr int [interface]`
- After using this command, view the results with `show cablediagnostics tdr int [interface]`

Shpd [↗](#)

- show ip dhcp snooping binding

Shmac [↗](#)

- show mac address-table | include
- This can be a very useful command when you are trying to see what port a specific device reaches a switch at
- You need to know the mac address of the device you want to find for this command to be useful
- To use this command, type shmac followed by whatever you want to search for.
 - For example, if you want to find a mac address that has 5678 in it, type shmac 5678
- This command will then return what port the mac address connects to the switch at

Trad [↗](#)

- This command expands out to `Switchport trunk allowed vlan add`
- It is useful when you are trying to trunk out a port on a switch
- To use this command, it is best to first default the port (*hostname(config) default int gx/x*)
 - Then there are a series of commands that will allow you to trunk your vlans
 - switchport trunk allowed vlan add 3,8,...
 - This command will add the vlans
 - switchport mode trunk
 - This command puts the port into trunk mode
 - switchport nonegotiate
 - s
 - ip dhcp snooping trust
 -

Trem [↗](#)

- switchport trunk allowed vlan remove

Write Erase [↗](#)

- **!CAREFUL!**
- This is a useful command when you are trying to completely wipe a switch
- ONLY use this command if you are sure you want to completely wipe. It will erase the running-config and startup-config files from the switch.

Show Running-config/Startup-config

- Show Running-config and Show Startup-config are commands that show the configurations in different spots in the switches memory
- Show startup-config or “sho start” shows the configuration stored in NVRAM
 - When powered on, a switch will read the configuration from NVRAM and move it to RAM where it is ran for the duration the switch is on.
- Show running-config or “sho run” shows the configuration that is stored in RAM
 - The running config is wiped every time a switch is powered off. When the switch is powered back on, the switch reads the startup config in NVRAM and stores it in RAM as the running config. This means that changes made to a switch while it is running, are not saved to the startup config unless explicitly done so with one of the save commands. This is why the startup config can be different than the running config if changes are not saved.

Show mod

- Use the `show module` command to display information about all installed modules.
 - Displays information such as the module type, bootup status, MAC addresses, serial numbers, software versions, and hardware versions.
- Use the `show module slot_number` command to specify a slot number and display information about a specific supervisor, system controller, line card, or fiber module.