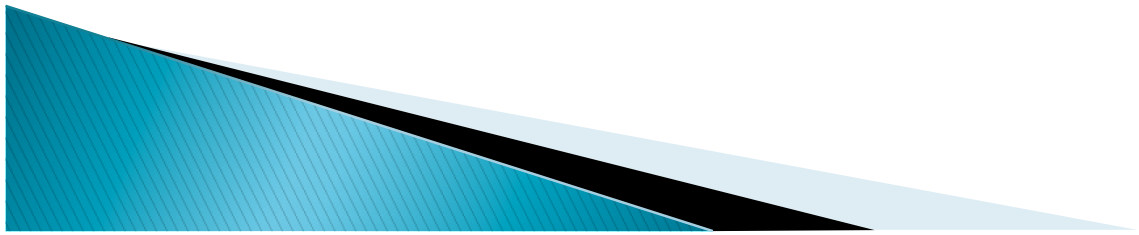
Cisco Device Configuration

(To Facilitate Monitoring)

Network Monitoring and Management
Workshop@APRICOT 2011

Topics

- CLI modes
- Accessing the configuration
- Basic configuration (hostname and DNS)
- Authentication and authorization (AAA)
- Log collection
- Time Synchronization (date/timezone)
- SNMP configuration
- Cisco Discovery Protocol (CDP)



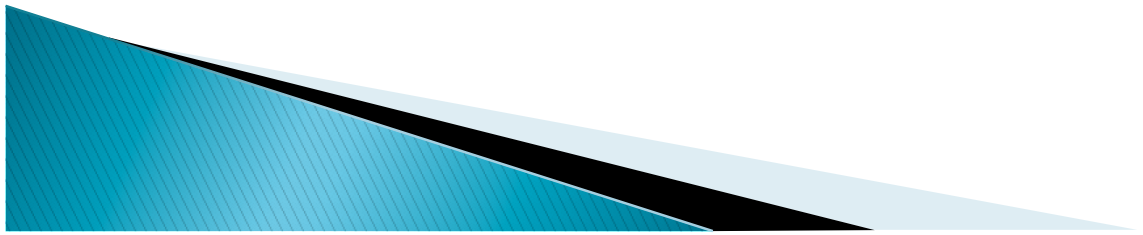
CLI Modes

- User EXEC
  - Limited access to the router
  - Can show some information but cannot view nor change configuration

```
rtr>
```

- Privileged EXEC
  - Full view of the router's status, troubleshooting, manipulate config, etc.

```
rtr> enable
rtr#
```



Accessing the router

- Before setting up SSH
  - telnet 10.10.x.254
  - login “cisco” and “cisco” (user and password)
- Privileged user can go to privileged mode:
  - `rtr>enable  (default password is “cisco”)`
  - `rtr#configure terminal`
  - `rtr(config)#`
- Type in configuration commands
- Exit and save the new configuration
  - `rtr(config)#exit`
  - `rtr#write memory`

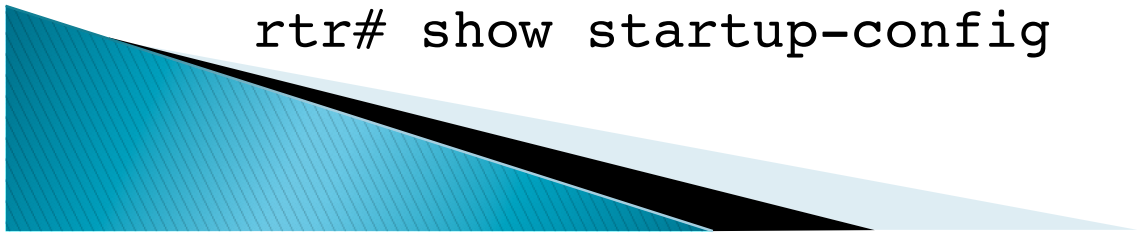
Accessing the configuration

- There are two configurations:
  - *Running config* is the actual configuration that is active on the router
    - Stored in RAM (will be gone if router is rebooted)

```
rtr# configure terminal
rtr(config)# end
rtr# show running-config
```

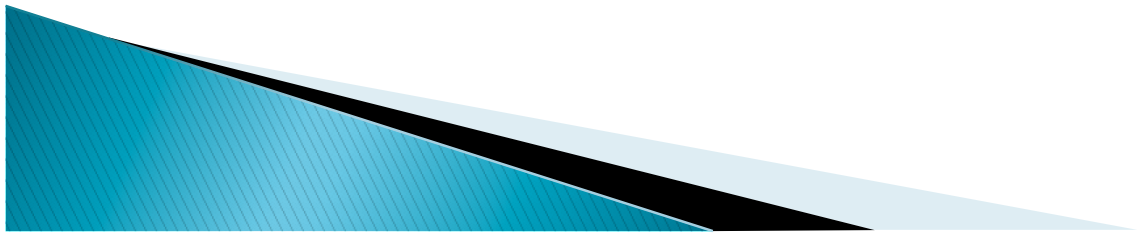
  - *Startup config*
    - Stored in NVRAM (Non-Volatile RAM)

```
rtr# copy running-config startup-config   (or)
rtr# write memory
rtr# show startup-config       (sh start)
```



Basic configuration (hostname and DNS)

- Assign a name
  - `rtr(config)# hostname rtrX`
- Assign a domain
  - `rtr(config)# ip domain-name ws.nsrc.org`
- Assign a DNS server
  - `rtr(config)# ip name-server 10.10.0.241`
- Or, disable DNS resolution
  - `rtr(config)# no ip domain-lookup`

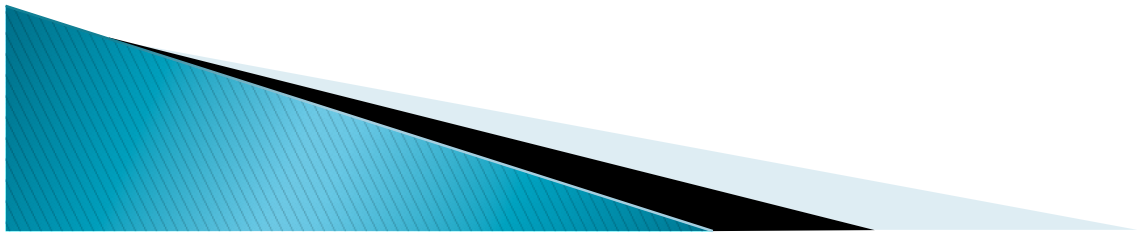


Authentication and authorization

- Configure passwords in the most secure manner.
  - Use the improved method which uses hash function
    - Example:

```
#enable secret 5 wer56$21

#user admin secret 5 sdf!231
```



Authentication and authorization

- Use SSH, disable *telnet* (only use telnet if no other option*)*

```
#line vty 0 4
#transport input ssh
```

- Configuring with a 2048 byte key:

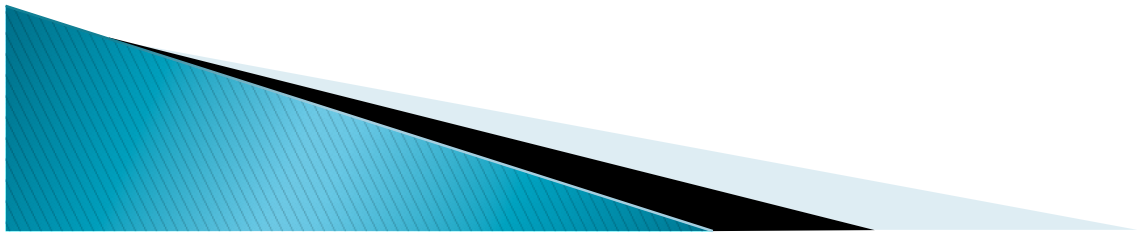
```
#aaa new-model
#crypto key generate rsa modulus 2048
```

- Verify key creation:

```
#show crypto key mypubkey rsa
```

- Restrict to only use SSH version 2. Optionally register events:

```
#ip ssh logging events
#ip ssh version 2
```



Log collection (syslog)

- Send logs to the *syslog* server:

  ```
  #logging 10.10.x.x
  ```

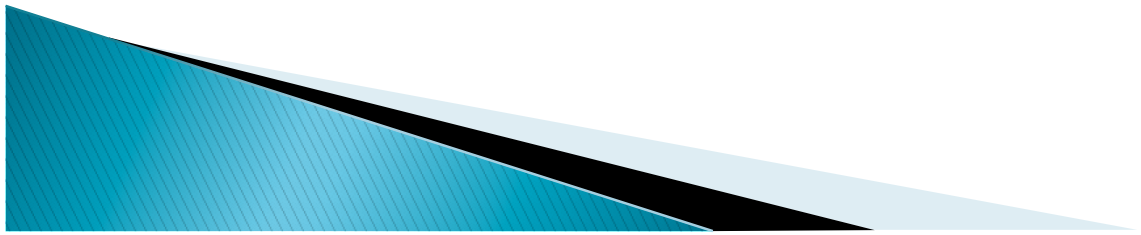
- Identify what channel will be used (local0 to local7):

  ```
  #logging facility local5
  ```

- Up to what priority level do you wish to record?

  ```
  #logging trap <logging_level>
  ```

<0-7>	**Logging severity level**	
emergencies	System is unusable	(severity=0)
alerts	Immediate action needed	(severity=1)
critical	Critical conditions	(severity=2)
errors	Error conditions	(severity=3)
warnings	Warning conditions	(severity=4)
notifications	Normal but significant conditions	(severity=5)
informational	Informational messages	(severity=6)
debugging	Debugging messages	(severity=7)



Time synchronization

It is essential that all devices in our network are time-synchronized

In config mode:

```
# ntp server pool.ntp.org
# clock timezone <timezone>
```

To use UTC time

```
# no clock timezone
```

If your site observes daylight savings time you can do:

```
# clock summer-time recurring last Sun Mar 2:00 last Sun Oct  3:00
```

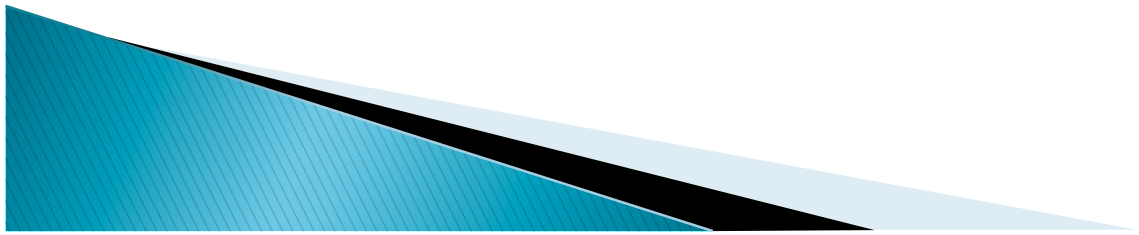
Verify

```
# show clock
      22:30:27.598 UTC Tue Feb 15 2011
# show ntp status
      Clock is synchronized, stratum 3, reference is 4.79.132.217
      nominal freq is 250.0000 Hz, actual freq is 249.9999 Hz, precision is 2**18
      reference time is D002CE85.D35E87B9 (11:21:09.825 CMT Tue Aug 3 2010)
      clock offset is 2.5939 msec, root delay is 109.73 msec
      root dispersion is 39.40 msec, peer dispersion is 2.20 msec
```

SNMP Configuration

- Start with SNMP version 2
  - It's easier to configure and understand
  - Example:

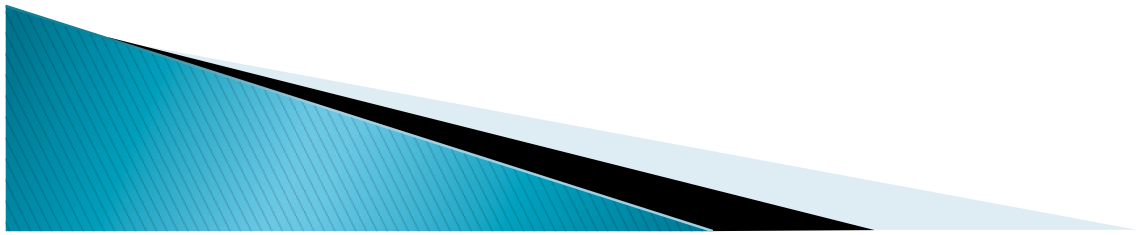
```
rtr(config)#snmp-server community public ro 99
r10(config)#access-list 99 permit 10.10.0.0 0.0.0.255
r10(config)#access-list 99 permit 10.10.254.0 0.0.0.255
```



Checking SNMP configuration

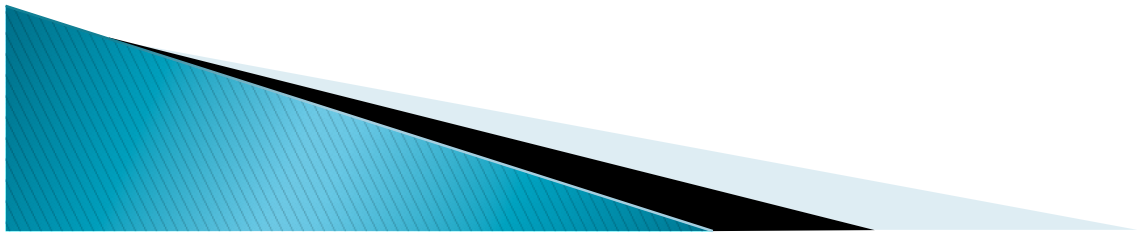
- From a Linux machine (once snmp utils are installed), try:

```
snmpwalk –v2c –c public 10.10.x254 sysDescr
```

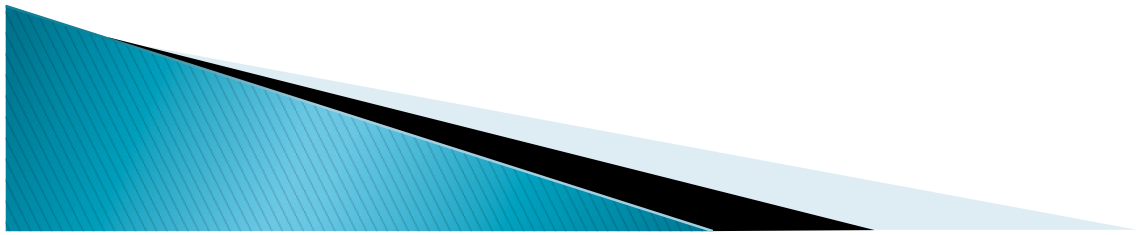


Configuring Cisco Discovery Protocol (CDP)

- Enabled by default in most modern routers
- If it's not enabled:
  - `cdp enable`
  - `cdp run` in older CISCO IOS versions
- To see existing neighbors:
  - `show cdp neighbors`
- Tools to visualize/view CDP announcements:
  - tcpdump
  - cdpr
  - Wireshark



HP Switches

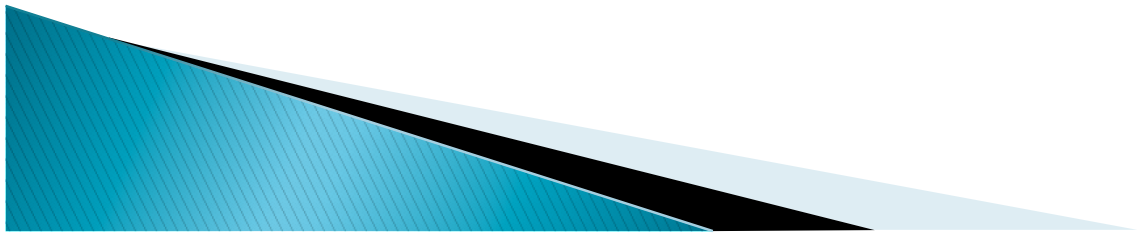


Accessing

- Using telnet or ssh (telnet by default)
- By default, no user, only a password:
- Password: ******
- SW1#
- Menu mode: not all options available!
- Shell mode: similar to Cisco IOS shell
- i.e.: spanning-tree not enabled by default, and cannot be enabled via the menu:
  - `SW1# conf t`
  - `SW1(config)# spanning-tree`

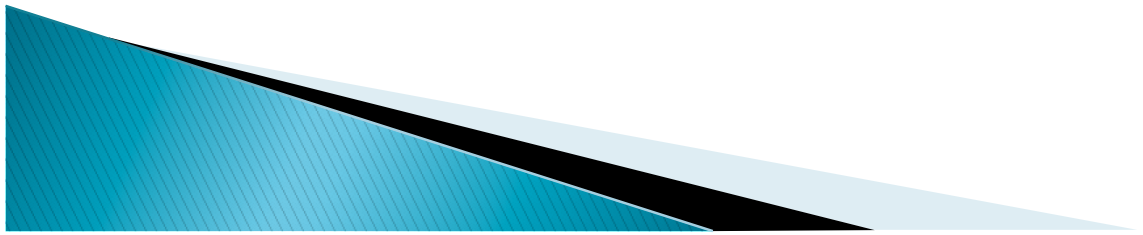
Hostname

- Like Cisco, but specify FQDN:
  - `SW1# conf t`
  - `SW1 (config)# hostname sw1.mgmt`
  - `SW1 (config)# ^Z`
  - `SW1#`



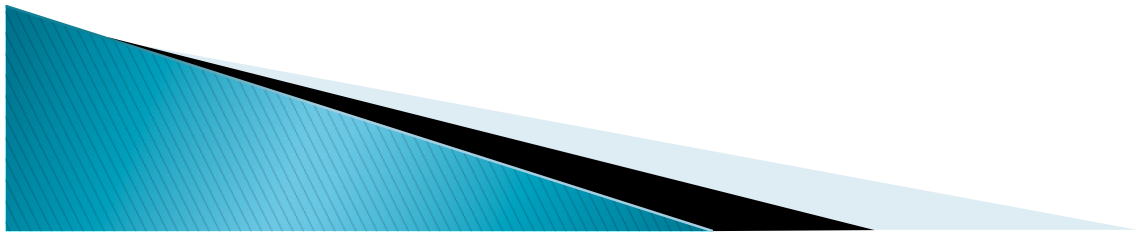
DNS

- HP layer 2 switches don't support DNS resolution



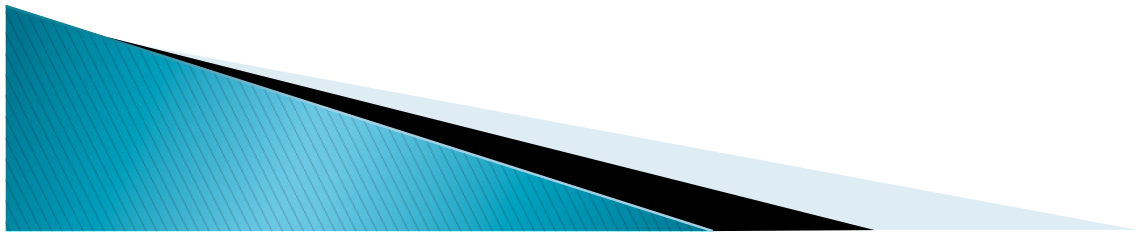
NTP

- SW1# conf t
- SW1 (config)# sntp server 192.168.80.5
- SW1 (config)# sntp server unicast
- SW1 (config)# ^Z
- SW1#



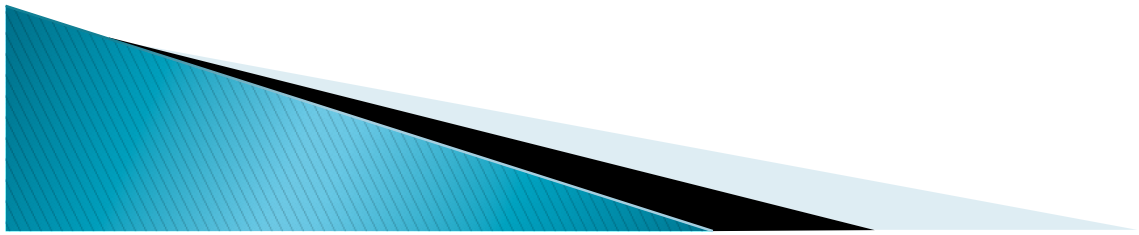
- `SW1 (config)# crypto key generate ssh`
  Installing new RSA key. If the key/ entropy cache is depleted, this could take up to a minute.
- `SW1 (config)# ip ssh`
- `SW1 (config)# no telnet-server`
- `SW1 (config)# ^Z`
- `SW1# write mem`
- `SW1#`

- SSH is now enabled – by default the user you log in as is ignored, only the password matters. TELNET IS DISABLED!



Syslog

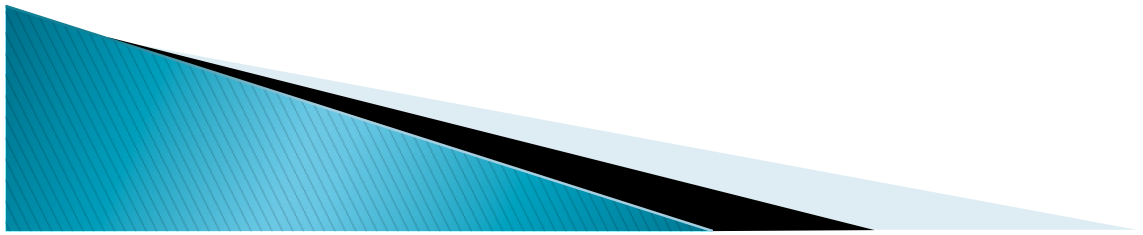
- `SW1 (config)# logging 192.168.10X.30`
- `SW1 (config)# logging facility local5`
- `SW1 (config)# ^Z`
- `SW1# write mem`



snmp

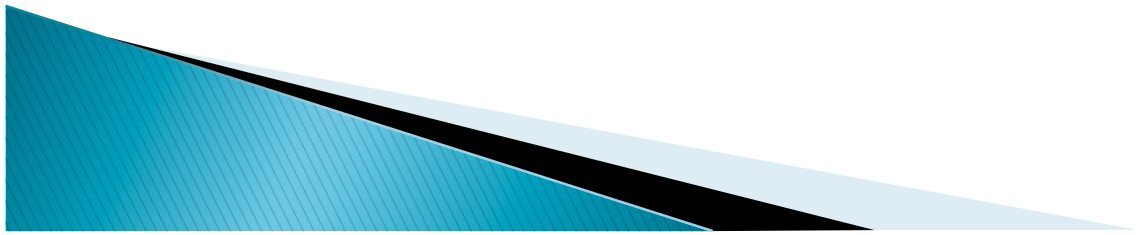
- `SW1 (config)# snmp-server community xxx`
- `SW1 (config)# ^Z`
- `SW1# write mem`

- By default, community is RO (read only)



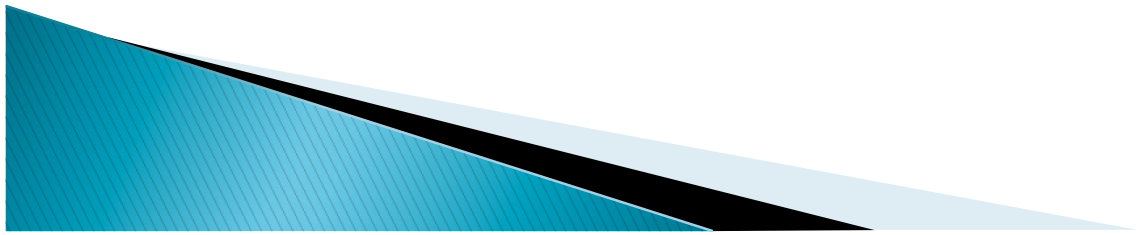
CDP and LLDP/802.1ab

- HP equipmentt supports both Cisco's discovery protocol (CDP) as well as the open standard 802.1ab (LLDP – Link Layer Discovery Protocol)
- By default, CDP is enabled
  - `SW1 (config)# cdp run`
  - `SW1 (config)# cdp enable 1-24`
  - `SW1 (config)# ^Z`
  - `SW1# write mem`



Questions

?



Simple Exercise

- Install Telnet
  - `$ sudo apt-get install telnet`
- Connect to router in your group
  - `$ telnet 10.10.x.254`
  - `username: cisco`
  - `password: cisco`
- Display information about your router
  - `r6.ws.nsrc.org>enable` (default pw “cisco”)
  - `r6.ws.nsrc.org#show run` (space to continue)
  - `r6.ws.nsrc.org#show int FastEthernet0/0`
  - `r6.ws.nsrc.org#show ?` (lists all options)
  - `r6.ws.nsrc.org#exit` (log off router)