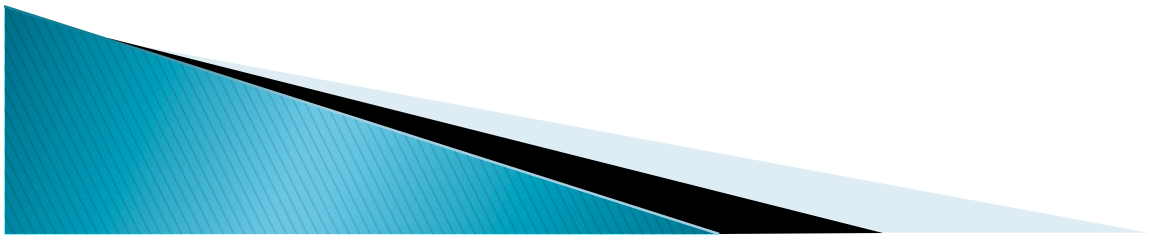
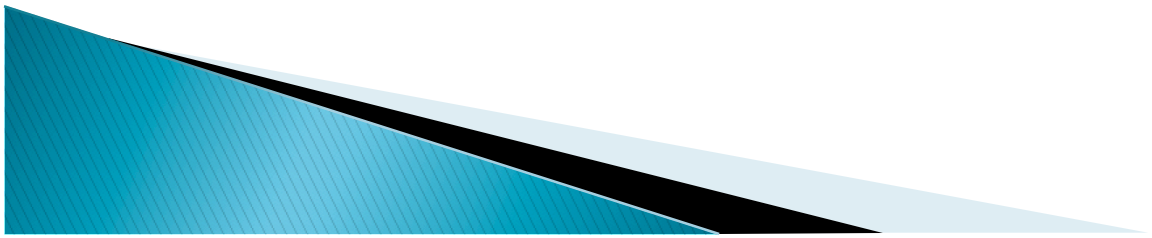
Cisco Device Configuration

(To Facilitate Monitoring)



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)



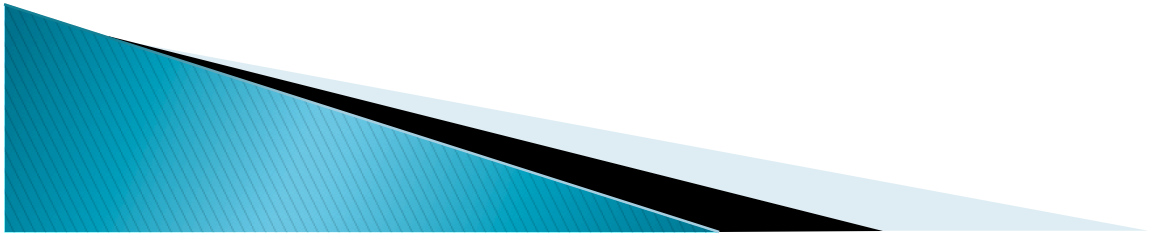
CLI Modes

- 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#
```



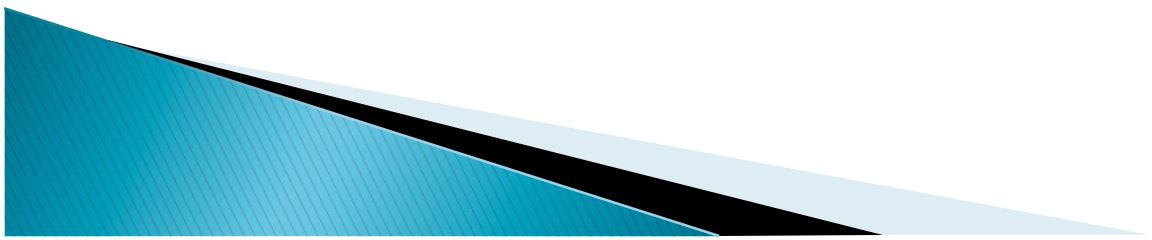
Accessing the configuration

- 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
```

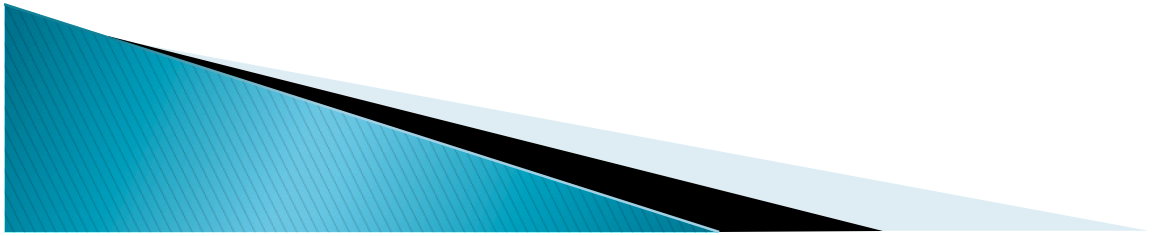
  - *Startup config*
    - Stored in NVRAM (Non-Volatile RAM)

```
rtr# copy running-config startup-config
rtr# show startup-config
```



Basic configuration (hostname and DNS)

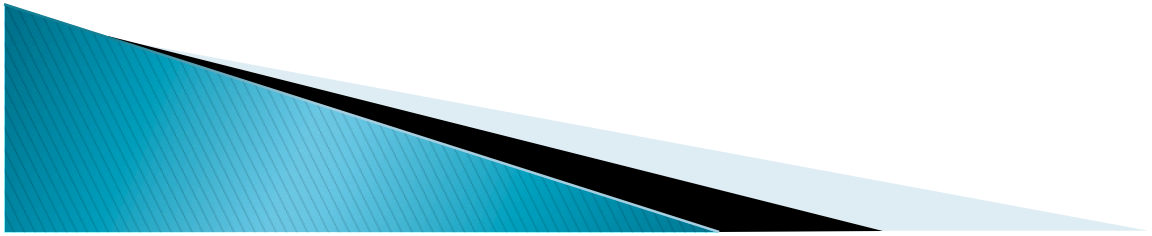
- Assign a name
  - `rtr(config)# hostname pcx-pc1-rtr`
- Assign a domain
  - `rtr(config)# ip domain-name noc.com`
- Assign a DNS server
  - `rtr(config)# ip name-server 192.168.2.20`



Authentication and authorization

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

```
#enable secret 7 wer56$21
#user admin secret 7 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:

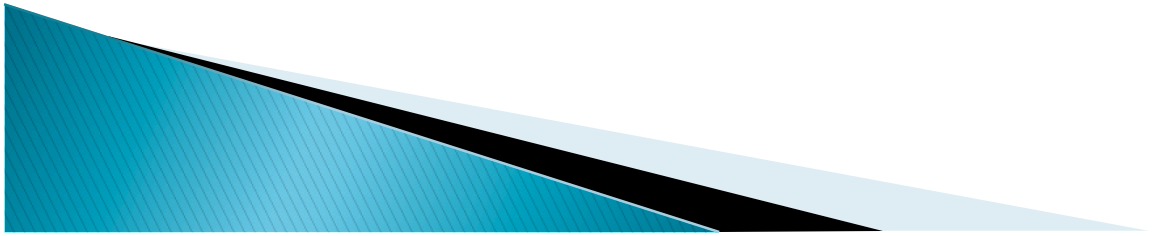
```
#aaa new-model
#crypto key generate rsa modulus 2048
```

- 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 10.0.0.5
```

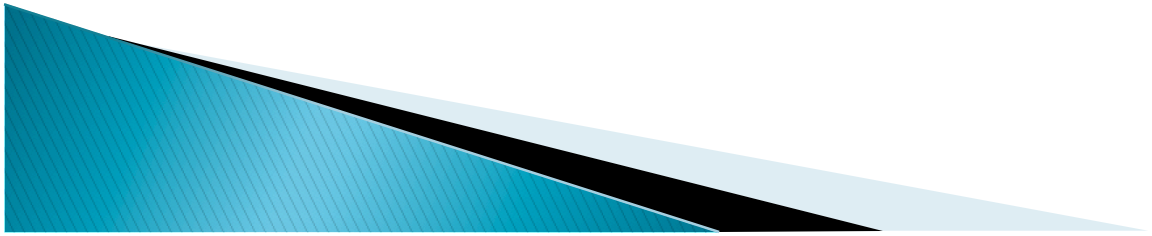
- Identify what channel will be used (local0 to local7):

```
#logging facility local5
```

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

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

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



Time synchronization

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

In config mode:

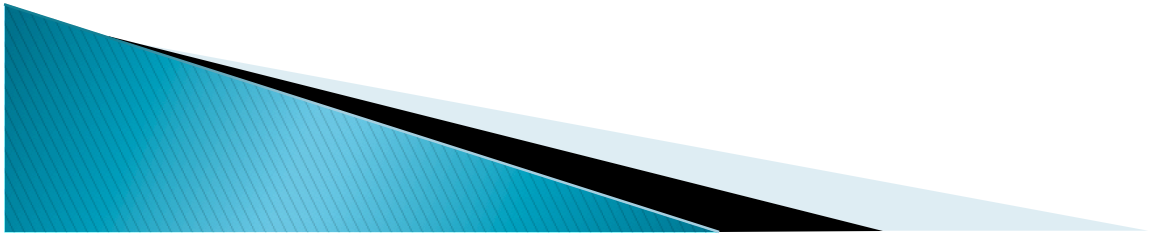
```
# ntp server pool.ntp.org
# clock timezone <timezone>
```

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

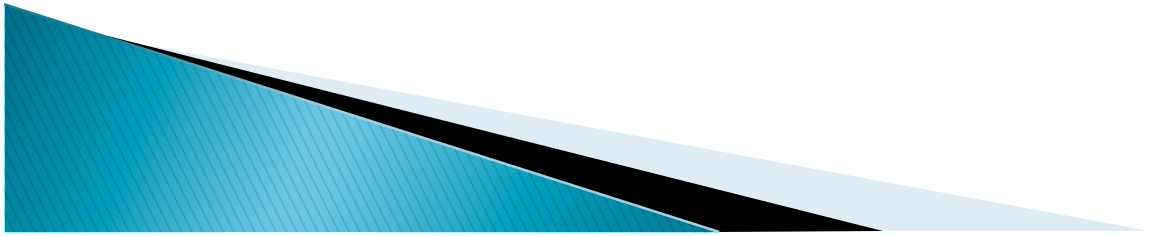
```
# show clock
      11:20:44.470 CMT Tue Aug 3 2010
# show ntp status
      Clock is synchronized, stratum 3, reference is 4.79.132.217
      nominal freq is 250.0000 Hz, actual freq is 249.9999 Hz, precision is 2**18
      reference time is D002CE85.D35E87B9 (11:21:09.825 CMT Tue Aug 3 2010)
      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
```



SNMP Configuration

- Later on, we recommend utilizing SNMP version 3:
  - Has access protection and encryption

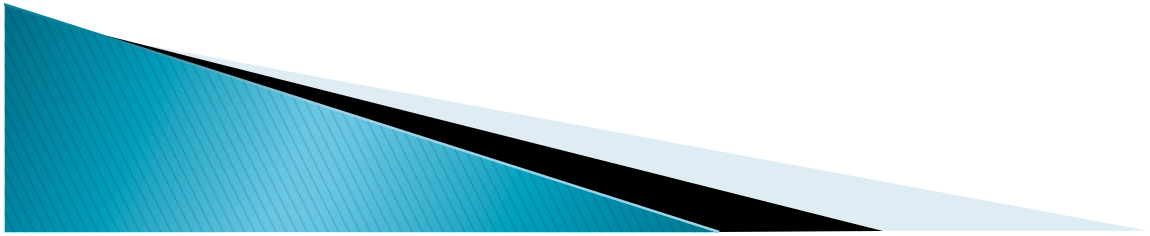
- Configuring SNMP v3:

```
snmp-server view  <view> <MIB family>  included
snmp-server group <group> v3 auth read <view>
snmp-server user  <user> <group> v3 auth <hash>  <password> [ priv des56 <key> ]
```

  - Example:

    Configure a user with complete access to the SNMP tree, read only.
    Password is hashed via MD5 (Auth) and without encrypting the SNMP response:

```
snmp-server view ro-view internet included
snmp-server group ro-group v3 auth read ro-view
snmp-server user  admin ro-group v3 auth md5 nsrc
```

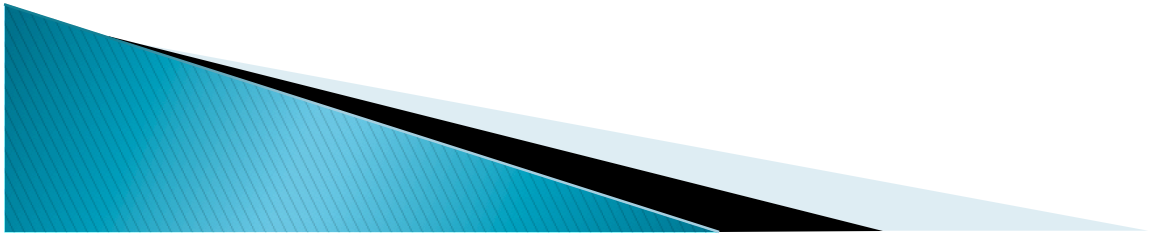


Checking SNMP configuration

- From a Linux machine, try:

```
snmpwalk –v2c –c public sysDescr

snmpwalk -v3 -a MD5 –A nsrc -l authNoPriv -u admin rtr1 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