Router Operation

CME451 Tutorial 9

Hao Zhang
(Graduate Teaching Fellow)

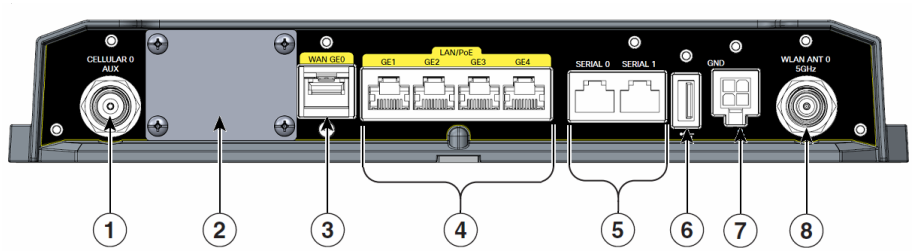
Department of Electrical & Computer Engineering
University of Saskatchewan

Mar 10, 2017

Cisco IR829 Router

Cisco IR829 Router

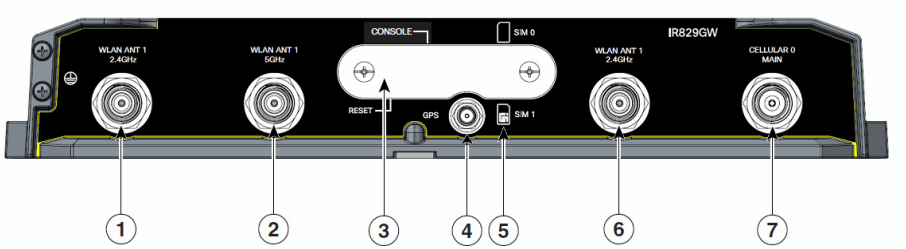
The Front Panel



1	CELLULAR 0 AUX	**5**	Serial Ports
2	Limited Modularity Slot	**6**	USB-A Port
3	Gigabit WAN	**7**	Power Input, Battery, and Ignition connector. Refer to the DC Power section for pin-outs.
4	Gigabit LAN/PoE	**8**	WLAN ANT0 5GHz

Cisco IR829 Router

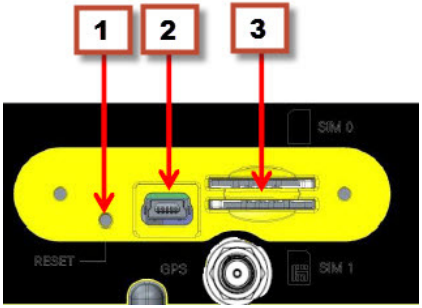
The Back Panel



1	WLAN ANT 0 2.4GHz	**5**	SIM connection 1 (SIM connection 0 is above)
2	WLAN ANT 1 5GHz	**6**	WLAN ANT 1 2.4GHz
3	SIM Door Assembly	**7**	CELLULAR 0 MAIN
4	GPS SMA		

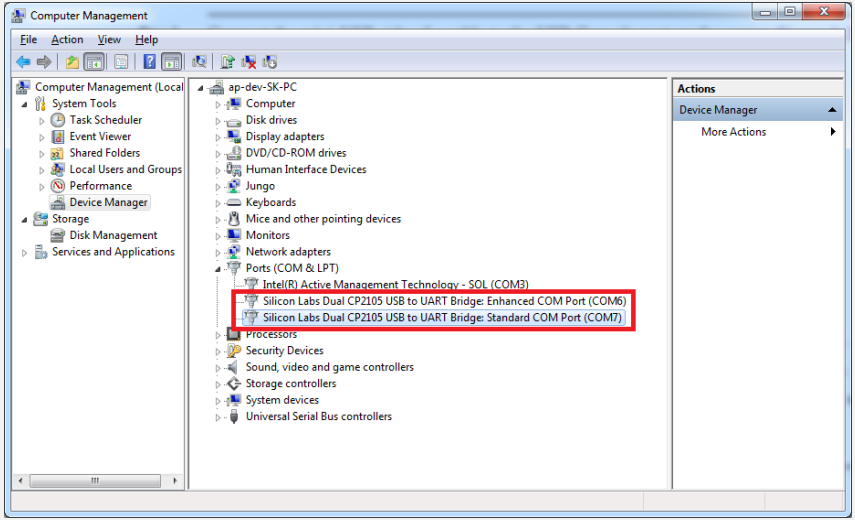
Cisco IR829 Router

The SIM Door



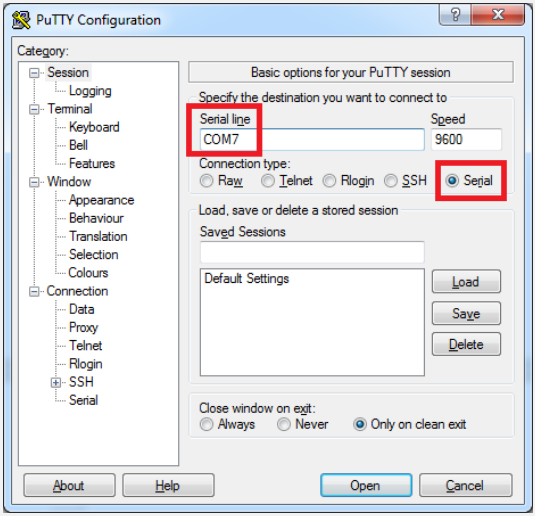
Cisco IR829 Router

Console to PC



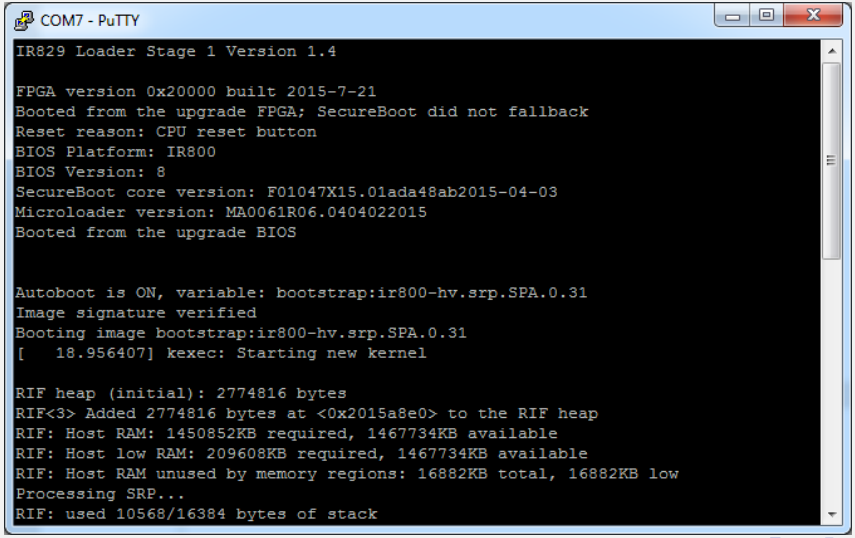
Cisco IR829 Router

Using Putty to Login



Cisco IR829 Router

Using Putty to Login



- Normal Mode

```
IR800>
```

- Privileged EXEC Mode

```
IR800#
```

- Launch the setup command facility:

```
IR800# setup
--- System Configuration Dialog ---
Would you like to enter the initial configuration dialog? [yes/no]:
```

```
At any point you may enter a question mark '?' for help.
Use ctrl-c to abort configuration dialog at any prompt.

Default settings are in square brackets '[]'.

Basic management setup configures only enough connectivity
for management of the system, extended setup will ask you
to configure each interface on the system

Would you like to enter basic management setup? [yes/no]:
```

- Enter the host name:

```
Configuring global parameters:
Enter host name [Router]: CME451IOT
```

- Enter the enable secret key.
- Will be used later to enable privileged EXEC mode.
- Will be encrypted in the configuration.

```
The enable secret is a password used to protect access to
privileged EXEC and configuration modes. This password, after
entered, becomes encrypted in the configuration.
Enter enable secret: cme451iot
```

- Enter the enable password.
- Will be used later to enable privileged EXEC mode if no secret key specified.
- Will not be encrypted in the configuration.

```
The enable password is used when you do not specify an
enable secret password, with some older software versions, and
some boot images.
Enter enable password: cme451ioten
```

- Enter the virtual terminal password.
- Protect network access.

```
The virtual terminal password is used to protect
access to the router over a network interface.
Enter virtual terminal password: cme451iotvt
```

- Simple Network Management Protocol (SNMP).

```
Configure SNMP Network Management? [no]:
```

- Interfaces for connecting the router to the management network.

```
Enter interface name used to connect to the
management network from the above interface summary: GigabitEthernet0
Configuring interface GigabitEthernet0:
Configure IP on this interface? [yes]: yes
IP address for this interface: 172.1.2.3
Subnet mask for this interface [255.255.0.0] : 255.255.0.0
```

- Class A: 1.0.0.1 to 127.255.255.254
  - **Private: 10.0.0.0 to 10.255.255.255**
  - 127.x.x.x reserved for loop back
- Class B: 128.1.0.1 to 191.255.255.254
  - **Private: 172.16.0.0 to 172.31.255.255**
- Class C: 192.0.0.1 to 223.255.254.254
  - **Private: 192.168.0.0 to 192.168.255.255**
- Class D: 224.0.0.0 to 239.255.255.255
  - Reserved for multicasting
- Class E: 240.0.0.0 to 254.255.255.254
  - Reserved for experimental purpose

- Choose to save the configuration or not.

```
[0] Go to the IOS command prompt without saving this config.
[1] Return back to the setup without saving this config.
[2] Save this configuration to nvram and exit.
```

- If you make a mistake while using the setup command facility, you can exit (by press `Ctrl-C`) and run the setup command facility again.

- Configure LAN interface

```
CME451IOT# configure terminal
CME451IOT (config)# interface gigabitEthernet 5
CME451IOT (config-if)# ip address 10.10.10.10 255.255.255.0
CME451IOT (config-if)# no shutdown
CME451IOT (config-if)# exit
CME451IOT (config)# exit
```

- Configure VLAN interface

```
CME451IOT# configure terminal
CME451IOT (config)# interface vlan1
CME451IOT (config-if)# ip address 192.168.0.1 255.255.255.0
CME451IOT (config-if)# no shutdown
CME451IOT (config-if)# exit
CME451IOT (config)# exit
```

Appendix

Numpy

- Core library for scientific computing in Python.
- Array

```
import numpy as np

a = np.array([1, 2, 3])   # Create a rank 1 array
print(type(a))            # Prints "<type 'numpy.ndarray'>"
print(a.shape)            # Prints "(3,)"
print(a[0], a[1], a[2])   # Prints "1 2 3"
a[0] = 5                  # Change an element of the array
print(a)                  # Prints "[5, 2, 3]"

b = np.array([[1,2,3],[4,5,6]])    # Create a rank 2 array
print(b.shape)                     # Prints "(2, 3)"
print(b[0, 0], b[0, 1], b[1, 0])   # Prints "1 2 4"
```

- Array

```
a = np.zeros((2,2))   # Create an array of all zeros
print(a)              # Prints "[[ 0.  0.]
                      #          [ 0.  0.]]"

b = np.ones((1,2))    # Create an array of all ones
print(b)              # Prints "[[ 1.  1.]]"
```

- Array Math

```
np.add(x, y)
np.subtract(x, y)
np.multiply(x, y)    # elementwise product
np.divide(x, y)
np.sqrt(x)
np.dot(x, y)         # inner product/matrix multiplication
```

- The plotting library

```
import numpy as np
import matplotlib.pyplot as plt

# Compute the x and y coordinates for points on a sine curve
x = np.arange(0, 3 * np.pi, 0.1)
y = np.sin(x)

# Plot the points using matplotlib
plt.plot(x, y)
# You must call plt.show() to make graphics appear.
plt.show()
```