# Part 1 – Basic Configuration and CLI

The goal of this activity is to gain experience working with PacketTracer and Cisco’s IOS command line interface (CLI). As a general rule, my labs will include detailed instructions the first time we do an activity, but then rely on you to know when to apply them in the future.

To complete the exercise, follow each step:

1. Double click the Router0 icon
2. Turn on Router0 by clicking on the power button in the Physical tab
3. Go to the CLI tab, wait for the router to finish booting, wait for:  
   Would you like to enter the initial configuration dialog?
4. Enter “no”, then wait for:  
   Press RETURN to get started!
5. Press “ctrl-alt-delete” until… no! just press enter to get started!
6. You should see the default router prompt:  
   Router>
7. Use the command “enable” to enter *privileged mode*  
   Router> enable  
   Router#
8. Use the “configure terminal” or “config t” command.  
   Enter configuration commands, one per line. End with CNTL/Z  
   Router(config)#
9. Create an “enable” password to check moving from user to privileged mode (see step 7). Set the enable password to be “cisco”:  
   Router(config)# enable password cisco
10. Return to user mode:  
    Router(config)# end  
    Router#
11. Use the “pipe” operator to show only the password in the running configuration, note that the password shows up in clear text, which is often not good practice:  
    Router# show running-config | include enable

Enable password cisco

1. Use the “secret” command to put a secret, secure-hashed password instead of the plaintext

Router# config t

Router(config)# enable secret cisco

Router(config)# no enable password

1. Next, verify that the password is hashed and not visble

Router(config)# end

Router# show running-config | include enable

enable secret 5 $1$mERr$hx5rVt7rPNoS4wqbXKX7m0

1. Change the Router’s hostname:

Router# config t

Router(config)# hostname Router1  
Router1(config)#

1. Change the login banner to say “Lab 1 Router1” (has to match exactly)  
   Router(config)# banner login “Lab 1 Router1”
2. Change the “message of the day” to say “Welcome to Router1” (has to match exactly)  
   Router(config)# banner motd “Welcome to Router1”
3. Save the configuration so that it’s the “default” at startup (note that this is not done at the global config prompt – time to start pulling out your crutches – how do you get back to normal privileged mode?:

Router# copy running-config startup-config

1. Either power cycle or use the “reload” command to reboot the router and verify that you can log-in and then escalate to the privileged mode.

# Part 2 – Basic Router & IP Configuration

In this activity we will start with two unconfigured Cisco R4321 routers. The goal of this part is to enable them to communicate over the Internet Protocol.

1. Place two ISR4321 routers onto the canvas.
2. Switch to the Connections tab and click on the first lightning bolt symbol, this is the “automatic connection type.” Use this to connect Router0 to Router1.
3. Configure the routers to meet the following requirements:
   1. Change hostname of Router0 to “RouterLA”
   2. Change hostname of Router1 to “RouterNY”
   3. Change banners to be “LA Router” or “NY Router”
   4. Change MOTD to be “Welcome to City of Angles” or “Welcome to New York City”
   5. Change secret passwords on both routers to “cisco”
4. In the canvas display for each router, rename them from Router0 to RouterLA and Router1 to RouterNY.
5. Go back to RouterLA, enter its global configuration, configure its interface:

RouterLA(config)# interface gigabitEthernet 0/0/0

1. Set a description for the interface:

RouterLA(config-if)# description LA side of main trunk

1. Set an IP address:

RouterLA(config-if)# ip address 10.1.1.1 255.255.255.0

1. Turn on the interface:

RouterLA(config-if)# no shutdown

1. Repeat these 3 steps on RouterNY:
   1. Set its description to “NY side of main trunk”
   2. Change its IP address to 10.1.1.2 255.255.255.0
   3. Enable the interface
2. Verify that the link state is operational (note the new command “do”, which allows running non-privileged commands from any privileged level:

RouterNY(config-if)# do show ip interface brief

Interface IP-Address OK? Method Status Protocol

GigabitEthernet0/0/0 10.1.1.2 YES manual up up

GigabitEthernet0/0/1 unassigned YES unset administratively down down

Vlan1 unassigned YES unset administratively down down

RouterNY(config-if)#

1. Use the “ping” command to verify that the routers are communicating:

RouterNY(config-if)# do ping 10.1.1.1

And

RouterLA(config-if)# do ping 10.1.1.2

# Part 3 – Connecting to the CLI from other devices

There are several paths to get through the Cisco command line, in this step, we cover SSH and serial ports.

1. Start with the LA & NY routers from part two.
2. Enter global configuration, and then enter the line configuration:  
   RouterLA(config)# line console 0
3. Set a password  
   RouterLA(config-line)# password cisco
4. Enable login  
   RouterLA(config-line)# login
5. Exit the CLI configuration:  
   RouterLA(config-line)# logout
6. Go to the “[End Devices]” tab, and add a “Laptop” device to the Canvas
7. Go to the “[Connections]” tab and add a “Console” wire (light blue), connect the laptop’s RS232 port to the LA router.
8. Click into the PC, go to the Desktop, and open the Terminal application. The default configuration should match the Router’s console connection 9600 8-N-1 (9600 bits per second, 8 data bits, no parity, and 1 stop bit). There is also no flow control. Click OK, and you should see the same CLI view on the laptop as you did on the router.
9. Cisco routers can also enable remote connections via Secure Shell (SSH). There are a few steps that need to be performed to setup the SSH. On Linux/Windows, these are done for you during installation, but we need to do them manually:
   1. Add a “domain name” to your configuration: “domain.com”

RouterLA(config)# ip domain-name domain.com

* 1. Create a user name and password for remote access:

RouterLA(config)# username admin password cisco

* 1. Generate the public and private RSA crypto-keys:  
     RouterLA(config)# crypto key generate rsa
  2. Enable version 2 of the SSH protocol:  
     RouterLA(config) ip ssh version 2

Repeat previous instructions to generate a sufficiently long key.

* 1. Enable login on first 16 virtual terminals:  
     RouterLA(config)# line vty 0 15  
     RouterLA(config-line)# login local
  2. Enable ssh transport (but do not enable telnet!)  
     RouterLA(config-line)# transport input ssh
  3. Enable encrypted passwords using the “password-encryption service”  
     RouterLA(config)# service password-encryption
  4. Verify you can connect locally before saving the configuration!  
     RouterLA# ssh -l admin 10.1.1.1  
       
     Lab 1 Router1  
       
     Password: <enter cisco>  
       
     Welcome to Router1  
       
     routerLA>

Save your configuration to “startup-config” and repeat these steps on the New York router. Verify you can connect to New York from itself, then use New York to ssh into LA, and use LA to ssh into NY.

# Part 4 – Routers, Switches, PCs, and Servers

In this activity, we explore using different types of devices in Packet Tracer. Configuration steps that we’ve explored are not provided in the same detail.

**Add Routers**

1. Place a Cisco 2811 Router onto the canvas
2. Open the Physical view of the router

**Add Switches**

1. Place two 2960-24TT switches onto the canvas.
2. Connect one switch to each of the routers using the automatic connection tool.

**Add PCs and Servers**

1. Add a PC to one switch/router
2. Add a server to the other switch/router

**Configure Routers**

1. Turn the power off
2. Find the WIC-2T module and drag it onto the upper-left of the four slots
3. Find the HWIC-4ESW module and drag it onto the lower-left of the four slots
4. Turn on the power to the router
5. Close the viewer
6. Use copy and paste to make a new router
7. Go to connections, add a connection between the routers, it should be the red serial type connection. If it is not, delete it, and use the manual “serial dte” connection (looks like a red lightning bolt). Mine are connecting Serial0/3/0 on both routers.
8. Configure one of the routers
   1. Rename the object on the canvas “RouterLA”
   2. Enable secret password “cisco”
   3. Set hostname to “RouterLA”
   4. Set banner login to “LA Router”
   5. Set MOTD to “Welcome to LA!”
   6. Set a description on the serial interface “LA side of trunk”
   7. Set an IP address on the serial interface to 10.0.1.1 with a netmask of 255.255.255.0
   8. Set the IP domain-name “domain.com”
   9. Enable the serial console with a password of cisco
   10. Enable SSH with a 1024-bit key, and a username of admin and a password of cisco
   11. Make sure you turn-on the serial interface
   12. Configure fastEthernet0/0, give it IP address 10.0.2.1 with netmask of 255.255.255.0, and make sure it is not shutdown.
   13. Save your configuration to startup-config
9. Configure the other router, all settings the same as above, except:
   1. Rename the object on the canvas “RouterNY”
   2. Hostname is “RouterNY”
   3. Banner is “NY Router”
   4. MOTD is “Welcome to NYC!”
   5. Set a description of serial interface “NY side of trunk”
   6. Set an IP address on serial interface to 10.0.1.2 with a netmask of 255.255.255.0
   7. Configure fastEthernet0/0, give it IP address 10.0.4.1 with netmask 255.255.255.0

At the conclusion of this step, you have two routers, four IP addresses:

RouterLA can ping itself (10.0.0.1), NY (10.0.0.2), and its Gig port (10.0.2.1)

RouterNY can ping itself (10.0.0.2), LA (10.0.0.1), and its Gig port (10.0.4.1)

But, RouterLA cannot ping NY’s Gig port, nor can RouterNY ping LA’s Gig port

**Configure PC**

1. Click on the PC, use the GUI, and find its "FastEthernet0” entry, make sure its on
2. In the IP Configuration box, make sure static is enabled, and give the PC address 10.0.2.128 and a netmask of 255.255.255.0
3. Go to the Desktop tab, run the Command Prompt
4. Verify PC can ping itself (10.0.2.128)
5. Verify PC can ping router (10.0.2.1)

**Configure Server**

1. Click on the PC, use the GUI, find its FastEthernet0 entry, make sure it is on
2. In the Server’s IP configuration box, choose static, enter an IP address of 10.0.4.64, and a netmask of 255.255.255.0
3. Go to the Desktop tab, run the Command Prompt
4. Verify PC can ping itself (10.0.4.64)
5. Verify PC can ping router (10.0.4.1)

**Make Routers Route Traffic**

1. On the LA router, configure a “static route” to the NY router, providing the network number, the netmask, the destination interface or IP, and the “distance” in # of hops:

Router(config)# ip route 10.0.4.0 255.255.255.0 10.0.1.2 1

1. On the NYC router, configure a static route to the LA router:

Router(config)# ip route 10.0.2.0 255.255.255.0 10.0.1.1 1

1. Verify connectivity:  
     
   From LA router: ping LA router, NY router, and server  
   From NY router: ping NY router, LA router, and PC

But, PC and server don’t respond!

**Use Packet Tracer to … um, trace packets…**

1. On the main window / canvas, change the simulation mode from “realtime” to “simulation”, and then issue the ping command from NY router to LA’s PC. Does the request get to the PC? If not, the routes aren’t working. If it is, does the PC reply? If not, then we have a configuration problem on the PC.

Seriously – see if you can debug whats happening before you go to the next lab step.  
  
  
Really – you’re just missing a great learning opportunity! Look for the dropped packet.

1. OK, so you found that the problem is on the PC, the PC doesn’t know how to get to a machine off of its local subnet. Why? Because we didn’t tell it to. So, go back to the PC’s config window, and in global settings, we can select a default gateway. Make sure its set for static, then the gateway should be the router’s IP address on the PC’s subnet (10.0.2.1). We still don’t have a DNS, so don’t worry about it now.
2. And, if you’ve been paying attention, you’ll find that you’ll need to enter the a gateway on the server, but since its in New York, it will use the NY router’s gateway.

**Use PC to Surf the Web**

1. Use the PC GUI, open the web browser, and browse to “10.0.4.64”, the server’s IP address. It should work and give you a “Cisco Packet Tracer” web page!