

# Lab 1

---

## JUNOS CLI & Initial Configuration

---

### Overview

This lab introduces you to the JUNOS software command-line interface (CLI). In this lab, you will familiarize yourself with various CLI operational-mode and configuration-mode features and capabilities. Also, you will use the CLI to perform initial configuration and basic interface configuration.

All devices are connected to a common management network which facilitates access to the CLI. These exercises assume you already have some basic understanding of the JUNOS CLI interfaces or you have read the IJS documentation or similar.

Note that your *lab* login (password given to you separately) grants you all permissions needed to complete this lab; however, some restrictions have been made to prevent loss of connectivity to the devices. Please be careful, and have fun!

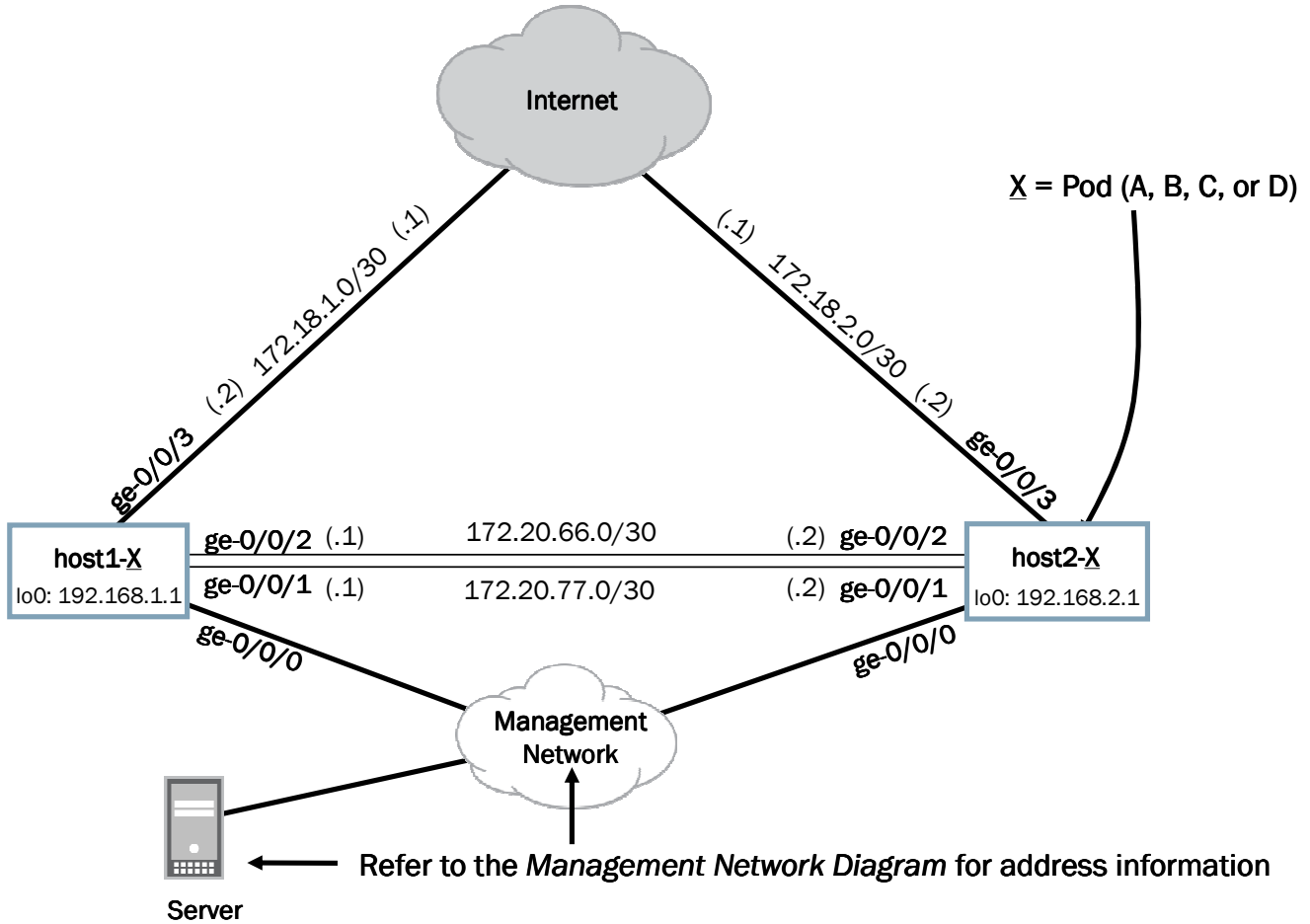
By completing this lab, you will perform the following tasks:

- Log in to the CLI.
- Explore the JUNOS software CLI using both operational and configuration modes.
- Perform initial system configuration.
- Save, delete, and restore a rescue configuration.
- Perform basic interface configuration.

Please refer to the next page lab diagram to perform this exercise:

## Lab Diagram

# Network Diagram



## Key Commands

---

Key *operational* mode commands used in this lab include the following:

```
?  
configure  
help reference  
show chassis  
show configuration  
show interfaces  
show route  
show interfaces terse  
show interfaces detail
```

## Part 1: Logging In Using the CLI

---

The goal of this lab part is to become familiar with the access details for your pod of routers and to log in through the CLI. To do most of this lab you can use only one of the systems that have been assigned to you (either host1-x or host2-x). You only need to configure the other system in the interface section to validate your configs and be able to ping the other end.

---

### Note

---

Please do NOT delete interface ge-0/0/0 as this is your management interface which provides access to your session and the J-Web !!

Do NOT delete either the security section of your configurations. This allows your system to allow any traffic in/out.

---

### Note 2

---

During this lab, your access through the management network will be affected. Ensure that you use the console connection to access your assigned station. Using the console connection ensures persistent connectivity even when the management network access is unavailable. If needed, review the instructions about how to connect to your system using the console port.

---

### Note 3

---

Remember that the exercise proposed in this documentation is generic and the examples given here apply only to one particular pod of devices. Please adapt the example to your assigned set of devices (host1-a & host2-a, or host1-b & host2-b, or host1-c & host2-c, or host1-d & host2-d). Look at you lab diagram and mind the pod of systems that you have been assigned!

---

## Step 1.1

Log in to the system with the username *lab* using the password given to you. Please use the console connection to access your system.

At the CLI prompt, enter *?*. Your station should have a host name assigned.

```
host1-a (tty2)

login: lab
Password:

--- JUNOS 9.6R1.13 built 2009-08-01 09:23:09 UTC
lab@host1-a>
lab@host1-a> ?
Possible completions:

  clear          Clear information in the system
  configure      Manipulate software configuration information
  file           Perform file operations
  help           Provide help information
  load
  monitor        Show real-time debugging information
  mtrace         Trace multicast path from source to receiver
  op             Invoke an operation script
  ping           Ping remote target
  quit           Exit the management session
  request        Make system-level requests
  restart        Restart software process
  save
  set            Set CLI properties, date/time, craft interface message
  show           Show system information
  ssh            Start secure shell on another host
  start          Start shell
  telnet         Telnet to another host
  test           Perform diagnostic debugging
  traceroute     Trace route to remote host

lab@host1-a>
```

◆ Based on the display, what command do you think is used to restart software processes?

---

---

❖ The **restart** command is used to restart software processes on the router.

## Step 1.2

Enter **c?** at the CLI prompt:

```
lab@host1-a> c?
```

Possible completions:

```
clear          Clear information in the system
configure      Manipulate software configuration information
```

- ◆ What command do you think will display all operational mode (that is, nonconfiguration) commands that start with **r**?

- 
- 
- ❖ Enter the sequence **show r?** to display all operational mode commands beginning with the letter **r**.

## Step 1.3

Determine what things can be cleared from the operational mode command prompt.

```
lab@host1-a> clear ?
```

Possible completions:

```
arp          Clear address resolution information
auto-configuration Clear auto-configuration action
bfd          Clear Bidirectional Forwarding Detection information
bgp          Clear Border Gateway Protocol information
chassis      Clear chassis information
diameter     Clear diameter information
dot1x       Clear 802.1X session
esis        Clear end system-to-intermediate system information
ethernet-switching Clear ethernet switching information
firewall     Clear firewall counters
gvrp        Clears Generic VLAN Registration Protocol information
igmp        Clear Internet Group Management Protocol information
igmp-snooping Clear IGMP snooping information
interfaces  Clear interface information
ipv6        Clear IP version 6 information
isdn        Clear Integrated Services Digital Network information
isis        Clear Intermediate System-to-Intermediate System
information
lacp        Clear Link Aggregation Control Protocol information
ldp         Clear Label Distribution Protocol information
log         Clear contents of log file
mld         Clear multicast listener discovery information
mobile-ip   Clear Mobile IP information
mpls        Clear mpls information
msdp        Clear Multicast Source Discovery Protocol information
multicast   Clear multicast information
```

## Introduction to JUNOS Software & Routing Essentials

```
network-access      Clear network-access related information
ospf                 Clear Open Shortest Path First information
ospf3               Clear Open Shortest Path First version 3 information
passive-monitoring  Clear passive monitoring statistics
pgm                 Clear Pragmatic Generalized Multicast information
pim                 Clear Protocol Independent Multicast information
ppp                 Clear PPP information
pppoe               Clear PPP over Ethernet information
rip                 Clear Routing Information Protocol information
ripng               Clear Routing Information Protocol for IPv6 information
rsvp                Clear Resource Reservation Protocol information
security            Clear security information
services            Clear services information
snmp                Clear Simple Network Management Protocol information
spanning-tree       Clear Spanning Tree Protocol information
system              Clear system information
vpls                Clear learned Layer 2 MAC address information
vrrp                Clear Virtual Router Redundancy Protocol statistics

lab@host1-a>
```

- ◆ What command do you use to clear the contents of a system log file?

---

---

- ❖ Use the **clear log log-file-name** command to clear the contents of a particular syslog file.

### Step 1.4

Experiment with command completion by entering **show i<space>**

```
lab@host1-a> show i
                ^
```

'i' is ambiguous.

Possible completions:

```
igmp                Show Internet Group Management Protocol information
igmp-snooping       Show IGMP snooping information
interfaces           Show interface information
ipv6                 Show IP version 6 information
isdn                 Show Integrated Services Digital Network information
isis                 Show Intermediate System-to-Intermediate System information
```

### Step 1.5

Add characters to disambiguate your command so that you can display interface-related information; use the spacebar for automatic command completion.

```
lab@host1-a> show int<space>erfaces
```

```
Physical interface: ge-0/0/0, Enabled, Physical link is Up
```

## Introduction to JUNOS Software & Routing Essentials

```
Interface index: 131, SNMP ifIndex: 118
Description: MGMT Interface - DO NOT DELETE
Link-level type: Ethernet, MTU: 1514, Link-mode: Full-duplex, Speed: 1000mbps,
BPDU Error: None, MAC-REWRITE Error: None, Loopback: Disabled,
Source filtering: Disabled, Flow control: Enabled, Auto-negotiation: Enabled,
Remote fault: Online
Device flags      : Present Running
Interface flags: SNMP-Traps Internal: 0x0
Link flags       : None
CoS queues       : 8 supported, 8 maximum usable queues
Current address: 00:26:88:e9:d2:80, Hardware address: 00:26:88:e9:d2:80
Last flapped    : 2010-06-22 08:32:18 PDT (3w1d 19:55 ago)
Input rate      : 488 bps (0 pps)
Output rate     : 0 bps (0 pps)
Active alarms   : None
Active defects  : None
```

Logical interface ge-0/0/0.0 (Index 68) (SNMP ifIndex 119)

```
Flags: SNMP-Traps Encapsulation: ENET2
Input packets : 1478653
Output packets: 20441
Security: Zone: trust
Allowed host-inbound traffic : bootp bfd bgp dlsw dns dvmrp igmp ldp msdp
nhrp ospf pgm pim rip router-discovery rsvp sap vrrp dhcp finger ftp tftp
ident-reset http https ike netconf ping rlogin rpm rsh snmp snmp-trap ssh
telnet traceroute xnm-clear-text xnm-ssl lsping ntp sip
Protocol inet, MTU: 1500
Flags: Is-Primary
Addresses, Flags: Is-Default Is-Preferred Is-Primary
Destination: 10.210.14.128/27, Local: 10.210.14.131,
Broadcast: 10.210.14.159
```

Physical interface: gr-0/0/0, Enabled, Physical link is Up

```
Interface index: 149, SNMP ifIndex: 135
```

...

- ◆ What types of interfaces are present in your device?

---

---

- ❖ The answer will vary based on your location. Most routers will have Giga Ethernet interfaces and some other logical interfaces
- ◆ List some of the specific information displayed for an interface.

---

---

- ❖ The interface's administrative and link-layer status is displayed, along with its MAC address (as appropriate), operational flags, and logical parameters, such as protocol

families and network-level addressing (when assigned).

## Part 2: CLI Error Messages

---

### Step 2.1

Try to clear routes by entering **clear route**.

```
lab@host1-a> clear route
                    ^
syntax error, expecting <command>.
```

- ◆ What do you suppose the resulting display means?

---

---

- ❖ The display indicates that the command was incomplete as entered. The ^ symbol indicates the area of the problem, and the error message tells you that the system is expecting additional command input.

### Step 2.2

Verify that the CLI will not let you complete invalid commands by trying to enter the command **show ip interface brief**.

```
lab@host1-a> show ip<space>
lab@host1-a> show ipv6
lab@host1-a> show ipinterfacebrief
                    ^
syntax error, expecting <command>.
```

- ◆ What happens when you try to enter this command? Where is the first syntax problem detected?

---

---

- ❖ The system's command completion feature completes a **show ipv6** command in this case because **ipv6** is the only valid completion. If you attempt to continue with invalid syntax, the system informs you of your error. Unlike some CLI implementations, JUNOS Software will not let you waste time typing in an illegitimate command!

## Part 3: Keyboard Sequences

---

### Step 3.1

Enter a **show interfaces** command at the operational mode prompt, but do not hit the Enter key when done typing the command. Enter each key combination identifier below, and answer the corresponding question.

```
lab@host1-a> show interfaces <do not press enter>
```

Press **Ctrl-b**.

- ◆ What happens to the cursor when you enter this keyboard sequence?
- 

- ❖ The cursor moves backwards one character.

Press **Ctrl-f**.

- ◆ What happens to the cursor when you enter this keyboard sequence?
- 

- ❖ The cursor moves forward one character space.

Press **Ctrl-a**.

- ◆ What happens to the cursor when you press this keyboard sequence?
- 

- ❖ The cursor moves to the beginning of the line.

Press **Ctrl-e**.

- ◆ What happens to the cursor when you press this keyboard sequence?
- 

- ❖ The cursor moves to the end of the line.

### Step 3.2

Enter a **show route** command followed by a **show system users** command. You are entering these commands to demonstrate command history recall. When done, enter the keyboard sequences indicated to answer the related questions.

```
lab@host1-a> show route
```

```
inet.0: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both
```

```
10.210.14.128/27  * [Direct/0] 3w0d 21:43:08
> via ge-0/0/0.0
```

```
10.210.14.131/32  *[Local/0] 3w0d 21:43:08  
                  Local via ge-0/0/0.0
```

```
lab@host1-a> show system users
```

```
4:44AM up 26 days, 21 mins, 1 user, load averages: 3.15, 3.08, 3.02  
USER      TTY      FROM          LOGIN@  IDLE WHAT  
lab       u0       -             4:43AM  -  -cli (cli)
```

What happens when you:

- ◆ Enter **Ctrl-p** twice?

---

- ❖ The **show route** command is recalled from the command buffer.

- ◆ Press **Ctrl-n**?

---

- ❖ The next command in the buffer is recalled, which is a **show system users** command in this example.

- ◆ Use the up and down arrows?

---

- ❖ The up and down arrows can function as substitutes for the **Ctrl-p** and **Ctrl-n** sequences when the router is so configured and you are using a VT-100 type of emulation.

## Part 4: Navigating Command Output

---

### Step 4.1

In many cases, the output of a command might exceed one full screen. For example, the **show interfaces ge-0/0/0 extensive** command displays lots of information about the system's out-of-band (OOB) management interface. Enter this command now, and answer the questions below. Use the **h** key to obtain help when CLI output is paused at the `---more---` prompt as needed.

```
lab@host1-a> show interfaces ge-0/0/0 extensive
```

```
Physical interface: ge-0/0/0, Enabled, Physical link is Up  
Interface index: 131, SNMP ifIndex: 118, Generation: 134
```

## Introduction to JUNOS Software & Routing Essentials

```
Description: MGMT Interface - DO NOT DELETE
Link-level type: Ethernet, MTU: 1514, Link-mode: Full-duplex, Speed: 1000mbps,
BPDU Error: None, MAC-REWRITE Error: None, Loopback: Disabled,
Source filtering: Disabled, Flow control: Enabled, Auto-negotiation: Enabled,
Remote fault: Online
Device flags      : Present Running
Interface flags: SNMP-Traps Internal: 0x0
Link flags       : None
CoS queues       : 8 supported, 8 maximum usable queues
Hold-times       : Up 0 ms, Down 0 ms
Current address: 00:26:88:e9:d2:80, Hardware address: 00:26:88:e9:d2:80
Last flapped    : 2010-06-22 08:32:18 PDT (3w1d 20:15 ago)
Statistics last cleared: 2010-06-22 09:07:39 PDT (3w1d 19:40 ago)
Traffic statistics:
Input bytes      :                91101003                232 bps
Output bytes     :                5692202                  0 bps
Input packets    :                1479795                  0 pps
Output packets   :                 20586                    0 pps
Input errors:
  Errors: 0, Drops: 0, Framing errors: 0, Runts: 0, Policed discards: 65729,
  L3 incompletes: 0, L2 channel errors: 0, L2 mismatch timeouts: 0,
---(more)---
```

- ◆ What effect does pressing the press the Space bar have?

---

- ❖ The Space bar causes the display to scroll forward to display the next screen of output

- ◆ What effect does pressing the Enter key have on the paused output?

---

- ❖ The Enter key causes the display to scroll forward by one line.

- ◆ What effect does the B key have?

---

- ❖ The B key causes the display to scroll backwards by one full screen, up to the point where the first full screen of information is displayed.

- ◆ What key would you enter to search forward through a display that consists of multiple screens of output?

---

- ❖ To search forward, you use the forward slash (/) character followed by the search pattern.

## Step 4.2

Use the pipe (|) and match functions of the JUNOS software CLI to list all interfaces that are physically down.

```
lab@host1-a> show interfaces | match down
Physical interface: ge-0/0/5, Enabled, Physical link is Down
Device flags      : Present Running Down
Interface flags: Hardware-Down SNMP-Traps Internal: 0x0
Physical interface: ge-0/0/6, Enabled, Physical link is Down
Device flags      : Present Running Down
Interface flags: Hardware-Down SNMP-Traps Internal: 0x0
Physical interface: ge-0/0/7, Enabled, Physical link is Down
Device flags      : Present Running Down
Interface flags: Hardware-Down SNMP-Traps Internal: 0x0
Physical interface: ge-0/0/8, Enabled, Physical link is Down
Device flags      : Present Running Down
Interface flags: Hardware-Down SNMP-Traps Internal: 0x0
Physical interface: ge-0/0/9, Enabled, Physical link is Down
Device flags      : Present Running Down
Interface flags: Hardware-Down SNMP-Traps Internal: 0x0
Physical interface: ge-0/0/10, Enabled, Physical link is Down
Device flags      : Present Running Down
Interface flags: Hardware-Down SNMP-Traps Internal: 0x0
Physical interface: ge-0/0/11, Enabled, Physical link is Down
Device flags      : Present Running Down
Interface flags: Hardware-Down SNMP-Traps Internal: 0x0
Physical interface: ge-0/0/12, Enabled, Physical link is Down
Device flags      : Present Running Down
Interface flags: Hardware-Down SNMP-Traps Internal: 0x0
Physical interface: ge-0/0/13, Enabled, Physical link is Down
Device flags      : Present Running Down
Interface flags: Hardware-Down SNMP-Traps Internal: 0x0
Physical interface: ge-0/0/14, Enabled, Physical link is Down
Device flags      : Present Running Down
Interface flags: Hardware-Down SNMP-Traps Internal: 0x0
Physical interface: ge-0/0/15, Enabled, Physical link is Down
Device flags      : Present Running Down
Interface flags: Hardware-Down SNMP-Traps Internal: 0x0
```

- ◆ Are any of your interfaces listed as Down?

---

---

- ❖ In this example, the answer is yes, several interfaces are listed as down.

- ◆ Can you think of a way to have JUNOS software count the number of interfaces that are physically down? (Hint: Remember that the results of one pipe can be used as input to another pipe operation.)

---

---

- ❖ To count the number of down interfaces, pipe the results of the previous command to the CLI's count function. In this example, an extra match function is included to ensure that interfaces that are down both logically and physically are not counted twice:

```
lab@host1-a> show interfaces | match down | match Physical | count
Count: 11 lines
```

## Part 5: Online Documentation

---

### Step 5.1

A large portion of the JUNOS software documentation is available directly from the CLI. You can retrieve high-level topics using the **help topic** command, while detailed configuration-related information is made available with the **help reference** command.

Use the **help reference** command along with the CLI question-mark operator (?) to find detailed information about interface loopbacks.

- ◆ What CLI command displays reference information about configuration of the system's hostname?

---

---

- ❖ The **help reference interfaces host-name** command displays a wealth of information regarding system hostnames, some of which is shown here:

```
lab@host1-a> help reference system host-name
                                     host-name

Syntax
host-name hostname;

Hierarchy Level
[edit system]

Release Information
Statement introduced before JUNOS Release 7.4.
```

Statement introduced in JUNOS Release 9.0 for EX Series switches.

Description

Set the hostname of the router or switch.

Options

hostname--Name of the router or switch.

Required Privilege Level

system--To view this statement in the configuration.

system-control--To add this statement to the configuration.

Related Topics

\* Configuring the Hostname of the Router

## Part 6: Navigate the Configuration Hierarchy, and View the Candidate Configuration

---

### Step 6.1

Enter configuration mode.

```
lab@host1-a> configure
Entering configuration mode

[edit]
lab@host1-a#
```

- ◆ What happens to your prompt?

---

---

- ❖ The > symbol is replaced with a hash key (#), and a configuration hierarchy banner is displayed.

- ◆ According to the prompt, what is your position in the configuration hierarchy?

---

---

- ❖ The display indicates that you are now at the [edit] hierarchy, which is the root of the configuration tree.

**Step 6.2**

Display the current configuration.

```
[edit]
lab@host1-a# show

## Last changed: 2010-07-15 02:36:04 PDT
version 9.6R1.13;
system {
  host-name host1-a;
  time-zone America/Los_Angeles;
  root-authentication {
    encrypted-password "$1$KI99zGk6$MbYFuBbpLffu9tn2.sI7l1"; ## SECRET-DATA
    ssh-dsa "ssh-dss
AAAAB3NzaC1kc3MAAACBAMQrfP2bZyBXJ6PC7XXZ+MzErI8Jl6jah5L4/O8BsfP2hC7EvRfNoX7MqbrtCX
/9gUH9gChVuBCB+ERULMdgRvM5uGhC/gS4UX+4dBbfBgKYYwgmiS8EoT25m7qI8ybp12YZvHNznvO8h7k
r4kpYuQEpkvgsTdh/Jle4Uqnjv7DAAAAFQDZaqA6QAgbW30/zveaLCIDj6p0dwAAAIB1iL+krWrXiD8NPp
Y+w4dWXEqaV3bnobzPC4eyxQKBUCOr80Q5YBlWXVBHx9elwBWZwj0SF4hLKHznExnLerVsMuTMA846RbQm
Sz62vM6kGM13HFonWeQvWia0TDr78+rOEgWF2KHBSIxL51lMIDW8Gq19hJfD/Dr/NKP97w3L0wAAAIeAr3
FkWU8XbYytQYEKxsIN9P1UQ1ERXB3G40YwqFO484SlyKyYCFaz+yNsaAJu2C8UebDIR3GieyNcOAKf3inC
G8jQwjLvZskuZwrVlsz/xtcxSoAh9axJcdUfSJYMW/g+mD26JK1C1iw5rwp2nH9kUrJxeI7IRedp4egNkM
4i15o= configurator@server1.he"; ## SECRET-DATA
  }
  login {
    user instructor {
      uid 2001;
      class super-user;
      authentication {
        encrypted-password "$1$vl0siQ8P$J4n2ccc/XxqdAT.jxggff0"; ##
SECRET-DATA
      }
    }
    user lab {
      uid 2000;
      class super-user;
      authentication {
        encrypted-password "$1$mKkMA9pa$AUZPO2UJ9rWwOfp4Kb2/a1"; ##
SECRET-DATA
      }
    }
  }
  services {
    ssh;
    telnet;
    web-management {
      http;
    }
  }
  syslog {
    user * {
      any emergency;
    }
    file messages {
```

```
        any any;
        authorization info;
    }
    file interactive-commands {
        interactive-commands any;
    }
}
ntp {
    boot-server 10.210.14.130;
    server 10.210.14.130;
}
}
interfaces {
    ge-0/0/0 {
        description "MGMT Interface - DO NOT DELETE";
        unit 0 {
            family inet {
                address 10.210.14.131/27;
            }
        }
    }
}
security {
    zones {
        security-zone trust {
            interfaces {
                all {
                    host-inbound-traffic {
                        system-services {
                            all;
                        }
                        protocols {
                            all;
                        }
                    }
                }
            }
        }
    }
    policies {
        default-policy {
            permit-all;
        }
    }
}
[edit]
lab@host1-a#
```

### Step 6.3

Now display only the `interfaces` portion of the configuration.

```
[edit]
lab@host1-a# show interfaces
ge-0/0/0 {
  description "MGMT Interface - DO NOT DELETE";
  unit 0 {
    family inet {
      address 10.210.14.131/27;
    }
  }
}
```

### Step 6.4

Position yourself at the [edit interfaces] configuration hierarchy.

```
[edit]
lab@host1-a# edit interfaces
[edit interfaces]
lab@host1-a#
```

- ◆ What happens to the banner?

---

---

- ❖ The banner now correctly shows that the user is parked at the [edit interfaces] portion of the configuration hierarchy.

- ◆ What is the result of a **show** command now?

---

---

- ❖ A **show** command only displays information pertaining to configuration statements at and below the current hierarchy. In this case, only the configuration statements for the router's ge-0/0/0 interface is displayed:

```
[edit interfaces]
lab@host1-a# show
ge-0/0/0 {
  description "MGMT Interface - DO NOT DELETE";
  unit 0 {
    family inet {
      address 10.210.14.131/27;
    }
  }
}
```

## Step 6.5

Move to the `[edit protocols ospf]` portion of the hierarchy. This requires that you first visit the root of the hierarchy, as you cannot jump directly between branches. You can do this with a single command in the form of `top edit protocols`, however:

```
[edit interfaces]
lab@host1-a# top edit protocols

[edit protocols]
lab@host1-a# edit ospf

[edit protocols ospf]
lab@host1-a#
```

- ◆ What commands could you now enter to reposition yourself at the `[edit protocols]` portion of the hierarchy?
- 

- ❖ You can issue an `up` command, or an `up 1` command. You can also issue a `top` command followed by an `edit protocols` command.

```
[edit protocols ospf]
lab@host1-a# up

[edit protocols]
lab@host1-a#
```

## Part 7: Configure a System Service

---

### Step 7.1

Position yourself at the root of the configuration hierarchy, and enable the Telnet service.

```
[edit protocols]
lab@host1-a# top

[edit]
lab@host1-a# set system services telnet

[edit]
lab@host1-a#
```

- ◆ What other system services can you configure?
- 

- ❖ You can configure SSH, Finger, FTP, and XML-related services:

```
lab@host1-a# set system services ?

Possible completions:
```

<[Enter]>	Execute this command
+ apply-groups	Groups from which to inherit configuration data
+ apply-groups-except	Don't inherit configuration data from these groups
> dhcp	Configure DHCP server
> finger	Allow finger requests from remote systems
> ftp	Allow FTP file transfers
> netconf	Allow NETCONF connections
> service-deployment	Configuration for Service Deployment (SDXD) management
> ssh	Allow ssh access
> telnet	Allow telnet login
> web-management	Web management configuration
> xnm-clear-text	Allow clear text-based JUNOScript connections
> xnm-ssl	Allow SSL-based JUNOScript connections
	Pipe through a command

### Step 7.2

Configure basic OSPF by entering the command shown at the [edit] hierarchy:

```
[edit]
lab@host1-a# set protocols ospf area 0 interface all
```

### Step 7.3

Associate the OSPF process with an export policy called *test*. The purpose of this step will become evident in subsequent lab steps.

```
[edit]
lab@host1-a# set protocols ospf export test
```

### Step 7.4

Change to the [edit protocols ospf] hierarchy.

```
[edit]
lab@host1-a# edit protocols ospf
```

```
[edit protocols ospf]
lab@host1-a#
```

---

## Part 8: Run Operational Mode Commands from within Configuration

### Step 8.1

Try to display the status of chassis alarms with the **show chassis alarms** operational command while parked at the [edit protocols ospf] hierarchy.

```
[edit protocols ospf]
lab@host1-a# show chassis alarms
                    ^
syntax error.
```

### Step 8.2

Now try preceding the operational mode command with the keyword **run**. You might try entering the sequence **Ctrl-p**, **Ctrl-a** to speed things up.

- ◆ Are the results any different?
- 

- ❖ The command should now execute normally; being able to execute operational commands without leaving the configuration mode is a real time saver!

```
lab@host1-a# run show chassis alarms  
  
No alarms currently active  
  
[edit protocols ospf]  
lab@host1-a#
```

## Part 9: Commit Your Candidate Configuration, and Use Rollback to Recover from Mistakes

---

### Step 9.1

The changes you have made to the configuration are not yet active. Try to commit your candidate configuration.

```
[edit protocols ospf]  
lab@host1-a# commit  
  
Policy error: Policy test referenced but not defined  
error: configuration check-out failed
```

- ◆ What is preventing your candidate from becoming the active configuration?
- 
- 

- ❖ The presence of an undefined export policy called *test* is preventing your changes from being put into effect. The commit sanity check is designed to prevent the activation of configurations that are internally inconsistent. Note that the sanity check will not catch all possible configuration mistakes, but it does catch quite a few.

### Step 9.2

The candidate configuration will not commit because an undefined policy is being referenced. Remove the reference to this policy, and try to commit your changes again.

```
[edit protocols ospf]  
lab@host1-a# delete export  
  
[edit protocols ospf]  
lab@host1-a# commit  
  
commit complete
```

### Step 9.3

Make a serious mistake by entering the command `delete system syslog` at the [edit] hierarchy. Please *do not* commit your changes at this time !!!!!

```
[edit protocols ospf]
lab@host1-a# top

[edit]
lab@host1-a#

[edit]
lab@host1-a# delete system syslog
```

### Step 9.4

Use the CLI's pipe and `compare` functions to display the differences between the active and candidate configurations.

```
[edit]
lab@host1-a# show | compare
```

- ◆ Are any differences noted?

- 
- ❖ The display should call out the fact that the interfaces stanza is missing from the current candidate configuration:

```
lab@host1-a# show | compare
[edit system]
-   syslog {
-       user * {
-           any emergency;
-       }
-       file messages {
-           any any;
-           authorization info;
-       }
-       file interactive-commands {
-           interactive-commands any;
-       }
-   }
```

### Step 9.5

Commit your change, and display your configuration. You should now have a system with very few configuration statements.

```
lab@host1-a# commit
commit complete

[edit]
lab@host1-a# # show
```

## Introduction to JUNOS Software & Routing Essentials

```
## Last changed: 2010-07-15 06:18:43 PDT
version 9.6R1.13;
system {
  host-name host1-a;
  time-zone America/Los_Angeles;
  root-authentication {
    encrypted-password "$1$KI99zGk6$MbyFuBbpLffu9tn2.sI7l1"; ## SECRET-DATA
    ssh-dsa "ssh-dss
AAAAB3NzaC1kc3MAAACBAMQrfP2bZyBXJ6PC7XXZ+MzErI8Jl6jah5L4/O8BsfP2hC7EvRfNoX7MqbrtCX
/9gUH9gChVuBCB+ERULMdgRvM5uGhC/gS4UX+4dBbfBgKYYwgmisM8EoT25m7qI8ybp12YZvHNzvnvO8h7k
r4kpYuQEpkvgsTdh/Jle4Uqnjv7DAAAAFQDZaqA6QAgbW3O/zveaLCIDj6p0dwAAAIB1iL+krWrXiD8NPp
Y+w4dWXEqaV3bnobzPC4eyxQKBUCOr80Q5YBlWXVBHx9elwBWZwj0SF4hLKHznExnLerVsMuTMA846RbQm
Sz62vM6kGM13HFonWeQvWia0TDr78+rOEgWF2KHBSIxL51lmIDW8Gq19hJfD/Dr/NKP97w3L0wAAAIEAr3
FkWU8XbYytQYEkxsIN9P1UQ1ERXB3G40YwqFO484SlyKyYcfaz+yNsaAJu2C8UebDIR3GieyNcOAKf3inC
G8jQwjLvZskuZwrVlsz/xtcxSoAh9axJcdUfSJYMW/g+mD26JK1Cliw5rwp2nH9kUrJxeI7IREdp4egNkM
4i15o= configurator@server1.he"; ## SECRET-DATA
  }
  login {
    user instructor {
      uid 2001;
      class super-user;
      authentication {
        encrypted-password "$1$vloSiQ8P$J4n2ccc/XxqdAT.jxggff0"; ##
SECRET-DATA
      }
    }
    user lab {
      uid 2000;
      class super-user;
      authentication {
        encrypted-password "$1$mKkMA9pa$AUZPO2UJ9rWwOfp4Kb2/a1"; ##
SECRET-DATA
      }
    }
  }
  services {
    ssh;
    telnet;
    web-management {
      http;
    }
  }
  ntp {
    boot-server 10.210.14.130;
    server 10.210.14.130;
  }
}
interfaces {
  ge-0/0/0 {
    description "MGMT Interface - DO NOT DELETE";
    unit 0 {
      family inet {
        address 10.210.14.131/27;
      }
    }
  }
}
```

```
    }
  }
  protocols {
    ospf {
      area 0.0.0.0 {
        interface all;
      }
    }
  }
  security {
    zones {
      security-zone trust {
        interfaces {
          all {
            host-inbound-traffic {
              system-services {
                all;
              }
              protocols {
                all;
              }
            }
          }
        }
      }
    }
  }
  policies {
    default-policy {
      permit-all;
    }
  }
}
```

- ◆ What command can you enter to quickly recover from such a mistake?

- 
- ❖ A **rollback 1** command, which must be entered at the root of the configuration hierarchy, restores the previously committed configuration. Remember that you must commit the rollback before the candidate configuration becomes active.

## Step 9.6

Use the command identified in the previous answer to recover from your mistake.

```
[edit]
lab@host1-a# rollback 1

load complete

[edit]
lab@host1-a# commit

commit complete

[edit]
```

## Introduction to JUNOS Software & Routing Essentials

```
lab@host1-a# show
## Last changed: 2010-07-15 06:18:43 PDT
version 9.6R1.13;
system {
  host-name host1-a;
  time-zone America/Los_Angeles;
  root-authentication {
    encrypted-password "$1$KI99zGk6$MbYFuBbpLffu9tn2.sI7l1"; ## SECRET-DATA
    ssh-dsa "ssh-dss
AAAAB3NzaC1kc3MAAACBAMQrfP2bZyBXJ6PC7XXZ+MzErI8Jl6jah5L4/O8BsfP2hc7EvRfNoX7MqbrtCX
/9gUH9gChVuBCB+ERULMdgRvM5uGhC/gS4UX+4dBbfBgKYYwgmiSM8EoT25m7qI8ybp12YZvHNzvnO8h7k
r4kpYuQEpkvgsTdh/Jle4Uqnjv7DAAAAFQDZaqA6QAgbW3O/zveaLCIDj6p0dwAAAIB1iL+krWrXiD8NPp
Y+w4dWXEqaV3bnobzPC4eyxQKBUCOr80Q5YBlWXVBHx9elwBWZwj0SF4hLKHznExnLerVsMuTMA846RbQm
Sz62vM6kGM13HFonWeQvWia0TDr78+rOEgWF2KHBSIxL51lmIDW8Gq19hJfD/Dr/NKP97w3L0wAAAIEAr3
FkWU8XbYytQYEKxsIN9P1UQ1ERXB3G40YwqFO484SlyKyYCFaz+yNsaAJu2C8UebDIR3GieyNcOAKf3inC
G8jQwjLvZskuZwrVlsz/xtcxSoAh9axJcdUfSJYMW/g+mD26JK1C1iw5rwp2nH9kUrJxeI7IREdP4egNkM
4i15o= configurator@server1.he"; ## SECRET-DATA
  }
  login {
    user instructor {
      uid 2001;
      class super-user;
      authentication {
        encrypted-password "$1$vloSiQ8P$J4n2ccc/XxqdAT.jxggff0"; ##
SECRET-DATA
      }
    }
    user lab {
      uid 2000;
      class super-user;
      authentication {
        encrypted-password "$1$mKkMA9pa$AUZPO2UJ9rWwOfp4Kb2/a1"; ##
SECRET-DATA
      }
    }
  }
}
services {
  ssh;
  telnet;
  web-management {
    http;
  }
}
syslog {
  user * {
    any emergency;
  }
  file messages {
    any any;
    authorization info;
  }
  file interactive-commands {
    interactive-commands any;
  }
}
```

## Introduction to JUNOS Software & Routing Essentials

```
ntp {
  boot-server 10.210.14.130;
  server 10.210.14.130;
}
interfaces {
  ge-0/0/0 {
    description "MGMT Interface - DO NOT DELETE";
    unit 0 {
      family inet {
        address 10.210.14.131/27;
      }
    }
  }
}
protocols {
  ospf {
    area 0.0.0.0 {
      interface all;
    }
  }
}
security {
  zones {
    security-zone trust {
      interfaces {
        all {
          host-inbound-traffic {
            system-services {
              all;
            }
            protocols {
              all;
            }
          }
        }
      }
    }
  }
  policies {
    default-policy {
      permit-all;
    }
  }
}
}
```

### Step 9.7

Get rid of the ospf portion of your configuration and commit your configuration

```
[edit]
lab@host1-a# delete protocols ospf
```

```
[edit]
lab@host1-a# commit
```

## Step 9.8

Pipe your current configuration through the CLI's **display set** functionality to provide yourself with a cheat sheet of the command syntax.

```
[edit]
lab@host1-a# show | display set

set version 9.6R1.13
set system host-name host1-a
set system time-zone America/Los_Angeles
set system root-authentication encrypted-password
"$1$KI99zGk6$MbYFuBbpLffu9tn2.sI7l1"
set system root-authentication ssh-dsa "ssh-dss
AAAAB3NzaC1kc3MAAACBAMQrfP2bZyBXJ6PC7XXZ+MzErI8Jl6jah5L4/O8BsfP2hc7EvRfNoX7MqbrtCX
/9gUH9gChVuBCB+ERULMdgRvM5uGhC/gS4UX+4dBbfBgKYYwgmiS8EoT25m7qI8ybp12YZvHNznvO8h7k
r4kpYuQEpkVgsTdH/Jle4Uqnjv7DAAAAFQDZaqA6QAgbW30/zveaLCIDj6p0dwAAAIB1iL+krWrXiD8NPp
Y+w4dWXEqaV3bnobzPC4eyxQKBUCOr80Q5YBlWXVBHx9elwBWZwj0SF4hLKHznExnLerVsMuTMA846RbQm
Sz62vM6kGM13HFonWeQvWia0TDr78+rOegWF2KHBSIxL51lmIDW8Gq19hJfD/Dr/NKP97w3L0wAAIEAr3
FkWU8XbYytQYEKxsIN9P1UQ1ERXB3G40YwqFO484SlyKyYCFaz+yNsaAJu2C8UebDIR3GieyNcOAKf3inC
G8jQwjLvZskuZwrVlsz/xtcxSoAh9axJcdUfSJYMW/g+mD26JK1Clw5rwp2nH9kUrJxeI7IRedp4egNkM
4i15o= configurator@server1.he"
set system login user instructor uid 2001
set system login user instructor class super-user
set system login user instructor authentication encrypted-password
"$1$vl0siQ8P$J4n2ccc/XxqdAT.jxggff0"
set system login user lab uid 2000
set system login user lab class super-user
set system login user lab authentication encrypted-password
"$1$mKkMA9pa$AUZPO2UJ9rWwOfp4Kb2/a1"
set system services ssh
set system services telnet
set system services web-management http
set system syslog user * any emergency
set system syslog file messages any any
set system syslog file messages authorization info
set system syslog file interactive-commands interactive-commands any
set system ntp boot-server 10.210.14.130
set system ntp server 10.210.14.130
set interfaces ge-0/0/0 description "MGMT Interface - DO NOT DELETE"
set interfaces ge-0/0/0 unit 0 family inet address 10.210.14.131/27
set security zones security-zone trust interfaces all host-inbound-traffic system-
services all
set security zones security-zone trust interfaces all host-inbound-traffic
protocols all
set security policies default-policy permit-all
```

```
[edit]
lab@host1-a# quit

Exiting configuration mode
```

## Part 10: Saving, Displaying and Loading a Rescue Configuration

---

The objective of this lab part is to save, display, load, and delete a rescue configuration using the JUNOS Software CLI

---

### Note

---

During this lab, ensure that you maintain the console connection to access your assigned station. Using the console connection ensures persistent connectivity even when the management network access is unavailable.

---

### Step 10.1

Save the active configuration as the rescue configuration.

```
lab@host1-a> request system configuration rescue save
```

### Step 10.2

Display the contents of the recently saved rescue configuration.

```
lab@host1-a> file show /config/rescue.conf.gz
## Last changed: 2010-07-15 07:56:40 PDT
version 9.6R1.13;
system {
  host-name host1-a;
  time-zone America/Los_Angeles;
  root-authentication {
    encrypted-password "$1$KI99zGk6$MbYFuBbpLffu9tn2.sI7l1"; ## SECRET-DATA
    ssh-dsa "ssh-dss
AAAAB3NzaC1kc3MAAACBAMQrfP2bZyBXJ6PC7XXZ+MzErI8Jl6jah5L4/O8BsfP2hC7EvRfNoX7MqbrtCX
/9gUH9gChVuBCB+ERULMdgRvM5uGhC/gS4UX+4dBbfBgKYYwgmisM8EoT25m7qI8ybp12YZvHNznvO8h7k
r4kpYuQEpKvgsTdH/Jle4Uqnjv7DAAAAFQDZaqA6QAgbW30/zveaLCIDj6p0dwAAAIB1iL+krWrXiD8NPp
Y+w4dWXEqaV3bnobzPC4eyxQKBUCOr80Q5YBlWXVBHx9elwBWZwj0SF4hLKHznExnLerVsMuTMA846RbQm
Sz62vM6kGM13HFonWeQvWia0TDr78+rOEgWF2KHBSIxL51lmIDW8Gq19hJfD/Dr/NKP97w3L0wAAAIEAr3
FkWU8XbYytQYEKxsIN9P1UQ1ERXB3G40YwqFO484SlyKyYCFaz+yNsaAJu2C8UebDIR3GieyNcOAKf3inC
G8jQwjLvZskuZwrVlsz/xtcxSoAh9axJcdUfSJYMW/g+mD26JK1C1iw5rwp2nH9kUrJxeI7IReDp4egNkM
4i15o= configurator@server1.he"; ## SECRET-DATA
  }
  login {
    user instructor {
      uid 2001;
      class super-user;
      authentication {
        encrypted-password "$1$vl0siQ8P$J4n2ccc/XxqdAT.jxggff0"; ##
SECRET-DATA
      }
    }
    user lab {
```

```
        uid 2000;
        class super-user;
        authentication {
            encrypted-password "$1$mKkMA9pa$AUZPO2UJ9rWwOfp4Kb2/a1"; ##
SECRET-DATA
        }
    }
}
services {
    ssh;
    telnet;
    web-management {
        http;
    }
}
syslog {
    user * {
        any emergency;
    }
    file messages {
        any any;
        authorization info;
    }
    file interactive-commands {
        interactive-commands any;
    }
}
ntp {
    boot-server 10.210.14.130;
    server 10.210.14.130;
}
}
interfaces {
    ge-0/0/0 {
        description "MGMT Interface - DO NOT DELETE";
        unit 0 {
            family inet {
                address 10.210.14.131/27;
            }
        }
    }
}
security {
    zones {
        security-zone trust {
            interfaces {
                all {
                    host-inbound-traffic {
                        system-services {
                            all;
                        }
                    }
                    protocols {
                        all;
                    }
                }
            }
        }
    }
}
```

```
        }
    }
}
policies {
    default-policy {
        permit-all;
    }
}
}
```

- ◆ Does the rescue configuration match the recently created active configuration?

---

---

- ❖ Yes, the rescue configuration should match the recently created active configuration.

- ◆ What CLI command could you issue to compare the active and rescue configuration files?

---

---

- ❖ Use the **file compare files /config/juniper.conf.gz /config/rescue.conf.gz** command to compare the active and rescue configurations. As shown in the following sample capture, the files do not contain any differences:

```
lab@host1-a> file compare files /config/juniper.conf.gz /config/rescue.conf.gz
```

```
lab@host1-a>
```

### Step 10.3

Return to configuration mode and delete the [edit system services] hierarchy level. Activate the change.

```
lab @host1-a> configure
Entering configuration mode
[edit]
lab @host1-a# delete system services
[edit]
lab @host1-a# commit
commit complete
```

## Step 10.4

Verify the `[edit system services]` hierarchy level is empty and then load the rescue configuration.

```
[edit]
lab@host1-a# show system services

[edit]
lab@host1-a# rollback rescue

load complete
```

## Step 10.5

Verify that the `[edit system services]` hierarchy level once again contains the `ssh`, `telnet`, and `web-management services`.

```
[edit]
lab@host1-a# show system services
ssh;
telnet;
web-management {
  http;
}
```

- ◆ Did the rescue configuration successfully load? Are the services enabled now? If not, why not?

---

---

- ❖ Yes, the rescue configuration loaded successfully and restored the statements at the `[edit system services]` hierarchy level. However, the software did not enable the services. Remember, to enable the rescue configuration, or any other candidate configuration, you must commit!

## Step 10.6

Activate the rescue configuration and return to operational mode.

```
[edit]
lab@host1-a# commit and-quit
commit complete
Exiting configuration mode
```

---

## Part 11: Configuring Interfaces and Verifying Operational State

---

The objective of this lab part is to perform interface configuration and verify the operational state of interfaces using the JUNOS Software CLI.

**Step 11.1**

Refer to the network diagram for this lab and configure the listed interfaces. Use logical unit 0 on all specified interfaces and a /30 as a subnet mask for each of the interfaces, except from the lo0 (/32)

```
[edit]
lab@host1-a# edit interfaces

[edit interfaces]
lab@host1-a# set ge-0/0/1 unit 0 family inet address 172.20.77.1/30

[edit interfaces]
lab@host1-a# set ge-0/0/2 unit 0 family inet address 172.20.66.1/30

[edit interfaces]
lab@host1-a# set ge-0/0/3 unit 0 family inet address 172.18.1.2/30

[edit interfaces]
lab@host1-a# set lo0 unit 0 family inet address 192.168.1.1/32

[edit interfaces]
lab@host1-a#
```

Your configuration should look like this example taken from host1-a

```
[edit interfaces]
lab@host1-a# show

ge-0/0/0 {
  description "MGMT Interface - DO NOT DELETE";
  unit 0 {
    family inet {
      address 10.210.14.131/27;
    }
  }
}
ge-0/0/1 {
  unit 0 {
    family inet {
      address 172.20.77.1/30;
    }
  }
}
ge-0/0/2 {
  unit 0 {
    family inet {
      address 172.20.66.1/30;
    }
  }
}
ge-0/0/3 {
  unit 0 {
    family inet {
      address 172.18.1.2/30;
    }
  }
}
```

```
    }  
  }  
}  
lo0 {  
  unit 0 {  
    family inet {  
      address 192.168.1.1/32;  
    }  
  }  
}
```

## Step 11.2

Activate the configuration and return to operational mode.

```
[edit interfaces]  
lab@host1-a# commit and-quit  
  
commit complete  
Exiting configuration mode  
lab@host1-a>
```

---

### Note

---

Please log into the other device assigned to you (host1-b) and configure the relevant interfaces too!

---

## Step 11.2

Issue the **show interfaces terse** CLI command to verify the state of the configured interfaces.

```
lab@host1-a> show interfaces terse
```

Interface	Admin	Link	Proto	Local	Remote
ge-0/0/0	up	up			
ge-0/0/0.0	up	up	inet	10.210.14.131/27	
...TRIMMED...					
ge-0/0/1	up	up			
ge-0/0/1.0	up	up	inet	172.20.77.1/30	
ge-0/0/2	up	up			
ge-0/0/2.0	up	up	inet	172.20.66.1/30	
ge-0/0/3	up	up			
ge-0/0/3.0	up	up	inet	172.18.1.2/30	
ge-0/0/4	up	up			
ge-0/0/5	up	down			
ge-0/0/6	up	down			
ge-0/0/7	up	down			
ge-0/0/8	up	down			
ge-0/0/9	up	down			
ge-0/0/10	up	down			

```
ge-0/0/11          up    down
ge-0/0/12          up    down
ge-0/0/13          up    down
ge-0/0/14          up    down
ge-0/0/15          up    down
gre                up    up
ipip               up    up
lo0                up    up
lo0.0              up    up    inet    192.168.1.1    --> 0/0
...TRIMMED ...
```

- ◆ What is the Admin and Link state of the recently configured interfaces?

---

---

- ❖ All configured interfaces should show an Admin and Link state of up, as shown in the sample capture.

### Step 11.3

Test your interfaces and their IP configuration using the **ping** command. The **ping** command bounces packets off a remote address and tells you how long it takes them to make the round trip. Ping each of your neighboring routers; the lack of an IGP prevents pings to non-directly connected neighbors (including the neighbor's loopback addresses).

- ◆ Were the pings to all directly connected neighbors successful?

---

---

- ❖ The output sample shows that you can successfully ping all directly connected neighbor interfaces

```
lab@host1-a> ping 172.20.77.2 count 3
PING 172.20.77.2 (172.20.77.2): 56 data bytes
64 bytes from 172.20.77.2: icmp_seq=0 ttl=64 time=1.261 ms
64 bytes from 172.20.77.2: icmp_seq=1 ttl=64 time=1.153 ms
64 bytes from 172.20.77.2: icmp_seq=2 ttl=64 time=1.153 ms
--- 172.20.77.2 ping statistics ---
3 packets transmitted, 3 packets received, 0% packet loss
round-trip min/avg/max/stddev = 1.153/1.189/1.261/0.051 ms
```

```
lab@host1-a> ping 172.20.66.2 count 3
```

## Introduction to JUNOS Software & Routing Essentials

```
PING 172.20.66.2 (172.20.66.2): 56 data bytes
64 bytes from 172.20.66.2: icmp_seq=0 ttl=64 time=1.235 ms
64 bytes from 172.20.66.2: icmp_seq=1 ttl=64 time=1.135 ms
64 bytes from 172.20.66.2: icmp_seq=2 ttl=64 time=1.180 ms
--- 172.20.66.2 ping statistics ---
3 packets transmitted, 3 packets received, 0% packet loss
round-trip min/avg/max/stddev = 1.135/1.183/1.235/0.041 ms
```

```
lab@host1-a> ping 172.18.1.1 count 3
```

```
PING 172.18.1.1 (172.18.1.1): 56 data bytes
64 bytes from 172.18.1.1: icmp_seq=0 ttl=64 time=2.323 ms
64 bytes from 172.18.1.1: icmp_seq=1 ttl=64 time=3.618 ms
64 bytes from 172.18.1.1: icmp_seq=2 ttl=64 time=4.274 ms
--- 172.18.1.1 ping statistics ---
3 packets transmitted, 3 packets received, 0% packet loss
round-trip min/avg/max/stddev = 2.323/3.405/4.274/0.811 ms
lab@host1-a>
```

### Step 11.4

Issue a show route command to confirm that your configured interfaces appear as Direct or Local in the routing table inet.0

```
lab@host1-a> show route
```

```
inet.0: 9 destinations, 9 routes (9 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both
10.210.14.128/27    *[Direct/0] 05:44:13
                   > via ge-0/0/0.0
10.210.14.131/32    *[Local/0] 05:44:13
                   Local via ge-0/0/0.0
172.18.1.0/30      *[Direct/0] 00:31:17
                   > via ge-0/0/3.0
172.18.1.2/32      *[Local/0] 00:31:17
                   Local via ge-0/0/3.0
172.20.66.0/30     *[Direct/0] 00:31:17
                   > via ge-0/0/2.0
172.20.66.1/32     *[Local/0] 00:31:17
                   Local via ge-0/0/2.0
172.20.77.0/30     *[Direct/0] 00:31:17
                   > via ge-0/0/1.0
172.20.77.1/32     *[Local/0] 00:31:17
                   Local via ge-0/0/1.0
192.168.1.1/32     *[Direct/0] 00:31:17
                   > via lo0.0
```



**You have completed Lab 1 !**