

JUNOS Command Line Interface



JuniperTM
NETWORKS



Agenda

Command-Line Interface

- Logging-In & Editing
- Interpret Output & Getting Help

CLI Configuration

- Moving around Hierarchy
- Modify, View, Review & Remove
- Activate, Save, Load & Commit

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Overview

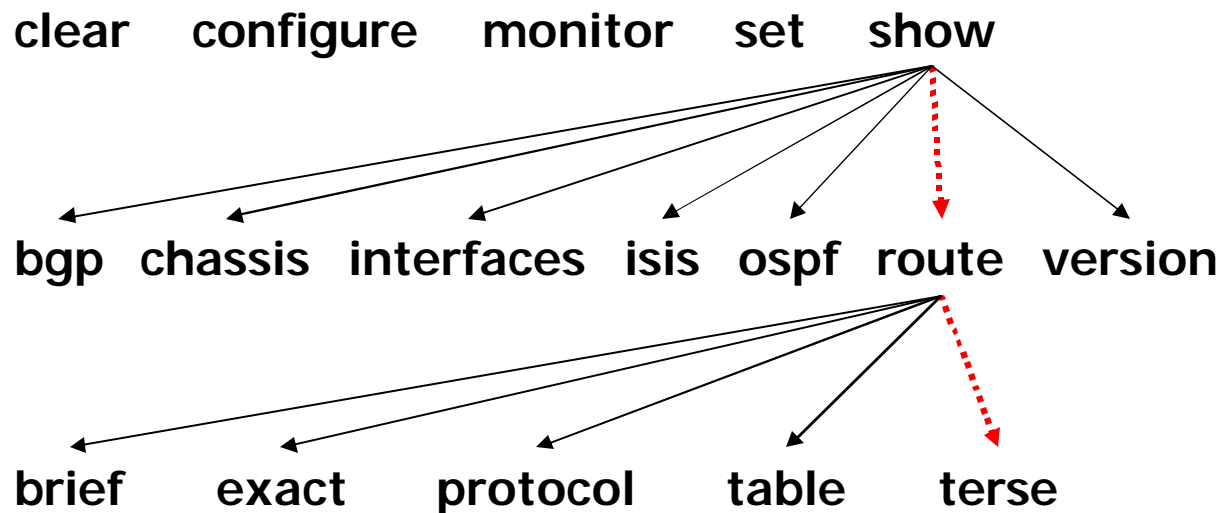
- Universal access to router
 - Console
 - Management port, using Telnet, ssh, RADIUS, TACACS+
- User authentication using login name and password
 - Users have individual accounts
 - Per-user command 'class' permissions
 - Line editor with command history
 - Context-sensitive help
 - Command completion
- UNIX-style pipes

Overview

- Configure
 - Object-based hierarchy
 - Commit changes when done
 - Rollback if necessary
 - Load/save configuration files
- Monitor
 - “show” command hierarchy
- Troubleshoot
 - Traceroute
 - Ping
 - Log and trace file monitoring

Overview

- Command hierarchy



Less Specific



More Specific

Log In

- Router administrator configures login ID and password for each user
- Example session

```
lab2 (ttyd0)
```

```
login: perkins
```

```
Password:
```

```
Last login: Fri Feb 18 19:23:16 on ttyd0
```

```
Copyright (c) 1980, 1983, 1986, 1988, 1990, 1991, 1993, 1994
```

```
The Regents of the University of California.
```

```
---JUNOS 4.0R1 built 2000-02-10 09:29:44 UTC
```

```
perkins@lab2>
```

Log In

- Start the CLI manually

```
lab2 (ttyd0)
```

```
login: root
```

```
Password:
```

```
Last login: Fri Feb 18 19:23:16 on ttyd0
```

```
Copyright (c) 1980, 1983, 1986, 1988, 1990, 1991, 1993, 1994
```

```
The Regents of the University of California.
```

```
---JUNOS 4.0R1 built 2000-02-10 09:29:44 UTC
```

```
# cli
```

```
root@lab2> quit
```

```
# logout
```

```
lab2 (ttyd0)
```

```
login:
```


Log In

- Special treatment for “root” login
 - Can only log in as root from console port
 - Must create additional user with superuser privileges to log in via network ports
 - Be sure to review security implications

Edit Lines

- Move the cursor

Ctrl-B Back one character

Ctrl-F Forward one character

Ctrl-A To beginning of line

Ctrl-E To end of line

- Delete characters

Delete or

backspace key Delete character before cursor

Ctrl-D Delete character under cursor

Ctrl-K Delete from cursor to end of line

Ctrl-U Delete all characters

Ctrl-W Delete entire word to left of cursor



Edit Lines

- Other keys

Ctrl-L Redraw the current line

Ctrl-P Move backwards through command history

Ctrl-N Move forward through command history



Edit Lines

- Command completion saves typing
 - Typing entire command not necessary
 - Type the minimum characters required and press space or tab key
- Completion example

```
root@lab2> sh<space>ow i<space>
```

```
'i' is ambiguous.
```

Possible completions:

```
igmp          Show information about IGMP
```

```
interfaces    Show interface information
```

```
isis          Show information about IS-IS
```

```
root@lab2> show i
```

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Interpret Output

- Error messages
 - ^ displayed under error
 - Message indicates type of error
- Example

```
[edit]
```

```
root@lab2# load config-file<Enter>
```

```
      ^
```

```
syntax error, expecting 'merge', 'override', or 'replace'.
```

```
root@lab2#
```

Interpret Output

- Output does not scroll off screen
 - CLI displays **--- (more) ---** prompt
 - Important key sequences

Space Display next output screen

b Return to previous screen

d Scroll down one-half screen

Enter Display next line of output

/string Search for a string in output

n Repeat search for string

q Return to CLI prompt

h **Show help message for key sequences**



Get Help

- Type '?' anywhere on command line
- Help depends on where you are
 - Beginning of line
 - Shows help for top level of hierarchy
 - End of command
 - Shows help for next level in hierarchy
 - Middle of command
 - Shows list of matching commands at current level in hierarchy

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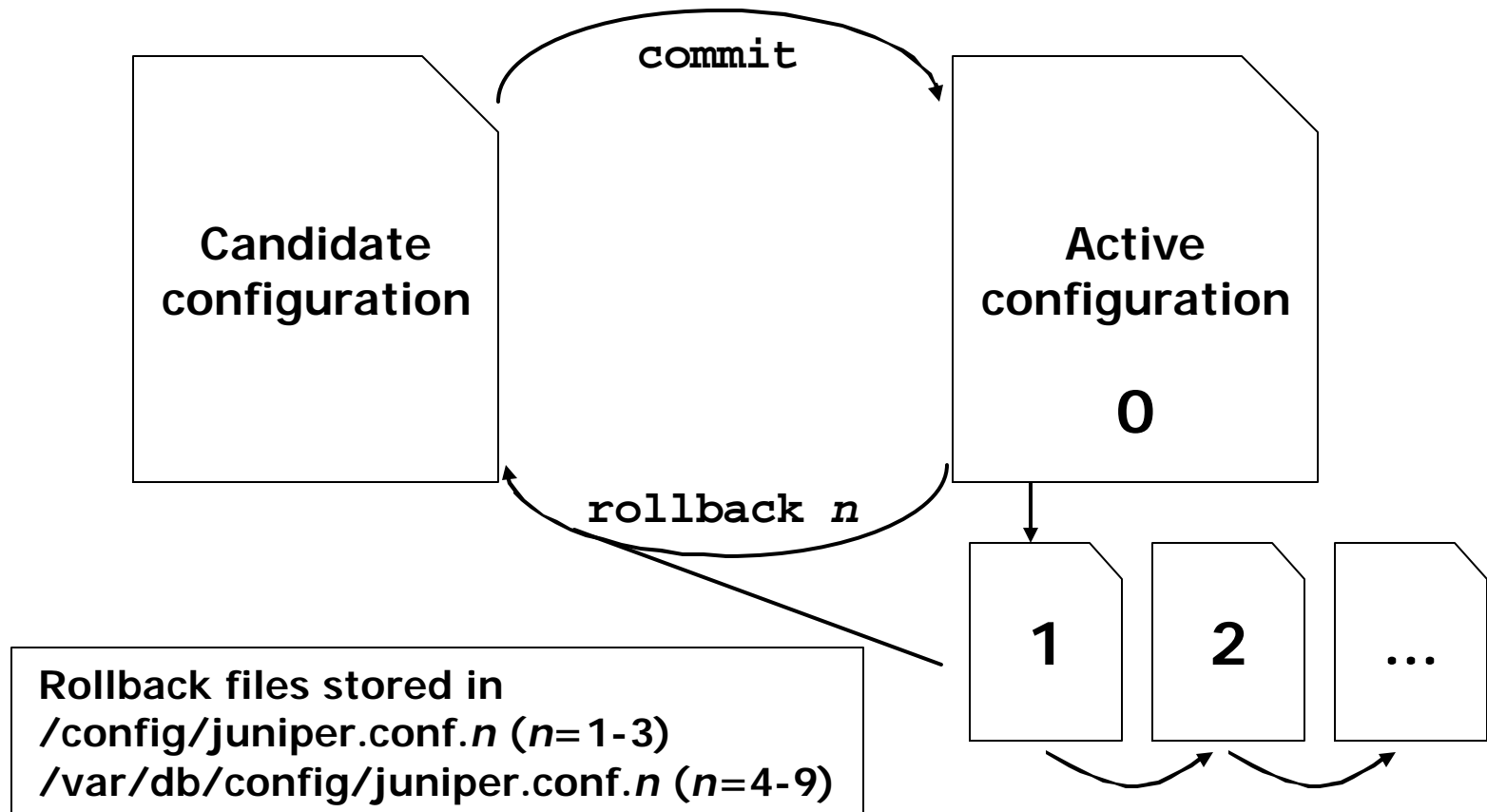
CLI Configuration

- Moving around Hierarchy
- Modify, View, Review & Remove
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Overview

- CLI has separate configuration mode
- You edit a copy of current configuration called the **candidate** configuration
- Changes you make are visible to other CLI users
 - Changes they make might conflict with your changes
- Changes do not take effect until you commit them
- When committed, candidate configuration becomes active and a new candidate is created

Configure the Router: Overview



Enter Configuration Mode

- Type `configure` at the CLI prompt

```
root@lab2> configure
```

```
Entering configuration mode
```

```
[edit]
```

```
root@lab2#
```

- Other users in configuration mode

```
root@lab2> configure
```

```
Entering configuration mode
```

```
Current configuration users:
```

```
  diana terminal d0 on since 1999-10-14 07:11:29 UTC,
```

```
  idle 00:00:49 [edit protocols ospf]
```

```
The configuration has been changed but not committed
```

```
[edit]
```

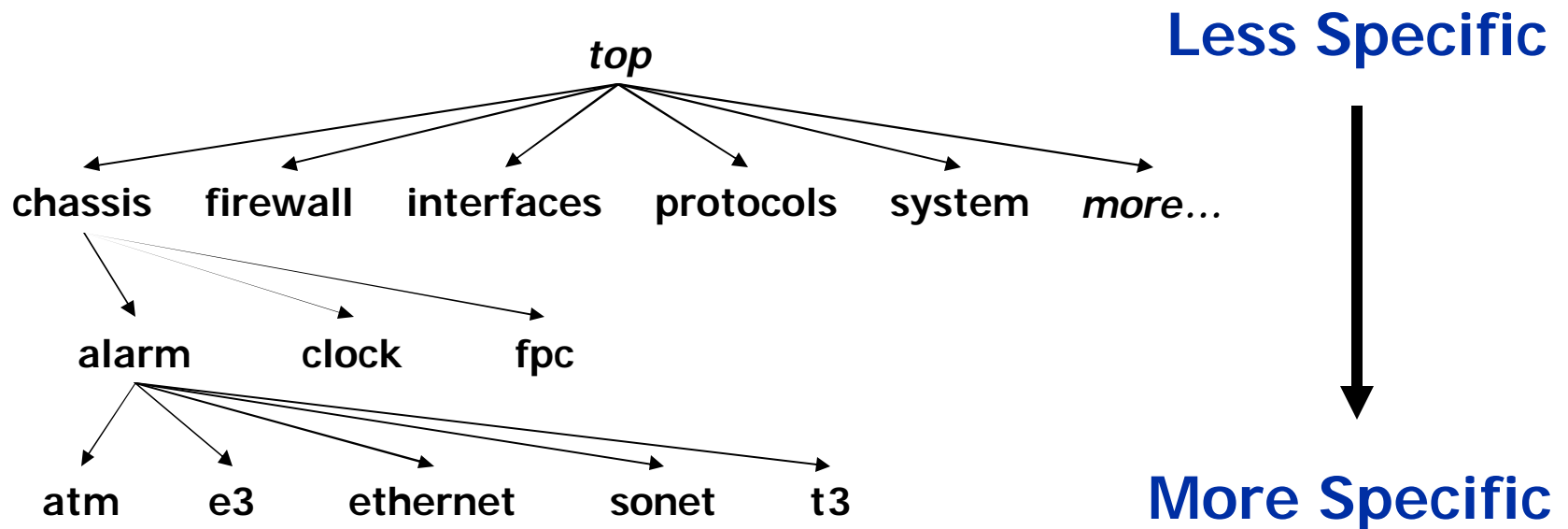
```
root@lab2#
```

10,000–Foot View

- Move around statement hierarchy using `edit` command
 - Like UNIX `cd` command
- Alter configuration using `set` command
- Activate configuration using `commit` command

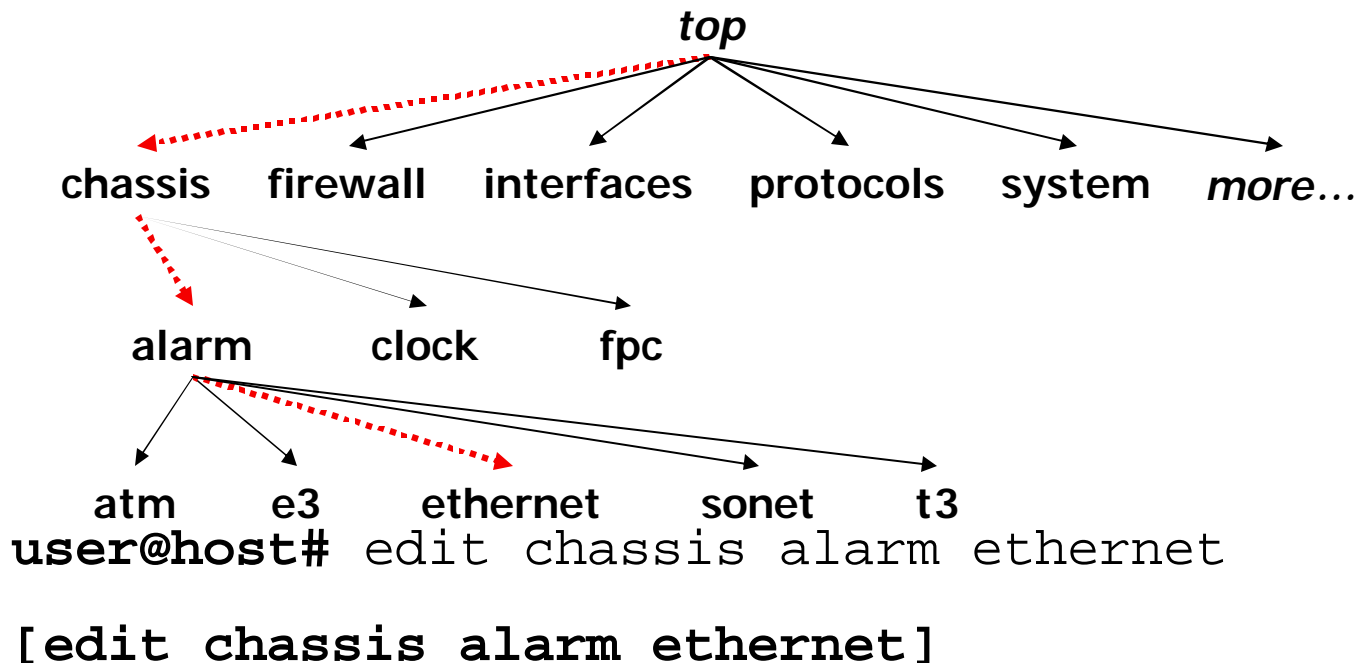
Move around the Hierarchy

- Configuration statements organized as a tree
 - Similar to UNIX/Windows–style directories



Move around the Hierarchy

- Use the `edit` command to focus your attention on a particular part of the hierarchy



Move around the Hierarchy

- Use the `exit` command to move back to where you just were
 - `exit` at the top level exits configuration mode and puts you back into operational mode
 - `exit configuration-mode` exits no matter where you are
- Use the `up` command to move up a level
- Use the `top` command to move to the top of the hierarchy

Move around the Hierarchy

- The question mark is your friend

```
[edit]
```

```
root@lab2# edit ?
```

```
Possible completions:
```

```
> chassis           Chassis configuration
> class-of-service  Class-of-service configuration
> firewall           Define a firewall configuration
> forwarding-options Configure options to control packet sampling
> groups             Configuration groups
> interfaces         Interface configuration
> policy-options     Routing policy option configuration
> protocols          Routing protocol configuration
> routing-options    Protocol-independent routing option configuration
> snmp              Simple Network Management Protocol
> system            System parameters
```

```
[edit]
```

Move around the Hierarchy

```
[edit]
```

```
root@lab2# edit chassis
```

```
[edit chassis]
```

```
root@lab2# edit ?
```

```
Possible completions:
```

<[Enter]>	Execute this command
> alarm	Global alarm settings
> clock	Clock sources
> fpc	FPC card parameters
	Pipe through a command

```
[edit chassis]
```

```
root@lab2#
```

Move around the Hierarchy

```
[edit chassis]
```

```
root@lab2# edit alarm
```

```
[edit chassis alarm]
```

```
root@lab2# edit ?
```

```
Possible completions:
```

```
> atm           ATM alarms
> e3            E3 alarms
> ethernet      Ethernet alarms
> sonet         SONET alarms
> t3            DS3 alarms
```

```
[edit chassis alarm]
```

```
root@lab2# up
```

```
[edit chassis]
```

```
root@lab2# up
```



```
[edit]
```

Juniper *your* Net

Move around the Hierarchy

```
[edit]
```

```
root@lab2# edit chassis alarm
```

```
[edit chassis alarm]
```

```
root@lab2# edit sonet
```

```
[edit chassis alarm sonet]
```

```
root@lab2# exit
```

```
[edit chassis alarm]
```

```
root@lab2# top
```

```
[edit]
```

```
root@lab2#
```

Test Your Knowledge (I)

- What is the result of the final command?

```
[edit]
```

```
root@lab2# edit protocols ospf
```

```
[edit protocols ospf]
```

```
root@lab2# edit area 0
```

```
[edit protocols ospf area 0.0.0.0]
```

```
root@lab2# exit
```

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Modify the Configuration

- Use the `set` command to add or change configuration statements
 - `set` command creates configuration statements, or changes them if they already exist

```
[edit]
```

```
root@lab2# set chassis alarm sonet lol  
red
```

```
[edit]
```

```
root@lab2#
```

Modify the Configuration

- Optionally, move into the alarm hierarchy and save some keystrokes

```
[edit]
```

```
root@lab2# edit chassis alarm sonet
```

```
[edit chassis alarm sonet]
```

```
root@lab2# set lol red
```

```
[edit chassis alarm sonet]
```

```
root@lab2# set los red
```

```
[edit chassis alarm sonet]
```

```
root@lab2# set pll yellow
```

```
[edit chassis alarm sonet]
```

```
root@lab2# up
```

```
[edit chassis alarm]
```


View the Configuration

- Use the `show` command to see the candidate configuration
 - Begins at current hierarchy level
 - You can specify starting level
 - Indented to match each hierarchy level

```
[edit chassis alarm]
```

```
root@lab2# show
```

```
sonet {  
    lol red;  
    los red;  
    pll yellow;  
}
```

```
[edit chassis alarm]
```

```
root@lab2#
```

View the Configuration

```
[edit chassis alarm sonet]
```

```
root@lab2# top
```

```
[edit]
```

```
root@lab2# show chassis
```

```
filter-check 180;
```

```
alarm {
```

```
    sonet {
```

```
        lol red;
```

```
        los red;
```

```
        pll yellow;
```

```
    }
```

```
}
```

```
root@lab2#
```

Remove Statements

```
[edit]
```

```
root@lab2# edit chassis alarm sonet
```

```
[edit chassis alarm sonet]
```

```
root@lab2# delete lol
```

```
[edit chassis alarm sonet]
```

```
root@lab2# delete los
```

```
[edit chassis alarm sonet]
```

```
root@lab2#
```

Remove Statements

```
[edit chassis alarm sonet]
```

```
root@lab2# up
```

```
[edit chassis alarm]
```

```
root@lab2# show
```

```
sonet {  
    pll yellow;  
}
```

```
[edit chassis]
```

```
root@lab2#
```

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Activate a Configuration

- Activate configuration changes using the `commit` command

```
[edit]
```

```
user@host# commit
```

```
commit complete
```

```
[edit]
```

```
user@host#
```

- Checks configuration before activating it
- **System never commits for you**
 - One exception: `commit confirmed`

Activate a Configuration

- Inband configuration has disadvantages
 - Might disrupt connectivity to router
 - Might disrupt inband session
- Avoid disadvantages using `commit confirmed` command
 - Activates configuration for a few minutes (default is 10 minutes)
 - If configuration is not confirmed, router returns to previous configuration automatically
 - Confirm configuration by issuing a second `commit` command

Back out Changes

- Use the `rollback` command to restore one of the last nine previously committed configurations
- `rollback` or `rollback 0` resets the candidate configuration to the currently running configuration, which is the last version committed.
- `rollback 1` loads the configuration before that
- and so on

Commit Dual RE

- When `commit` is entered, the system will only activate the changes in the local RE.
- Use `commit sync` command to make changes to activate in both RE.

Save Configuration Files

- Current candidate configuration **from current hierarchy level and below** can be saved to ASCII file using `save` command

```
[edit]
```

```
cli# save filename
```

```
[edit]
```

```
cli#
```

- File is saved to user's home directory unless full path name is specified
- Filename can be URL or in user@host notation

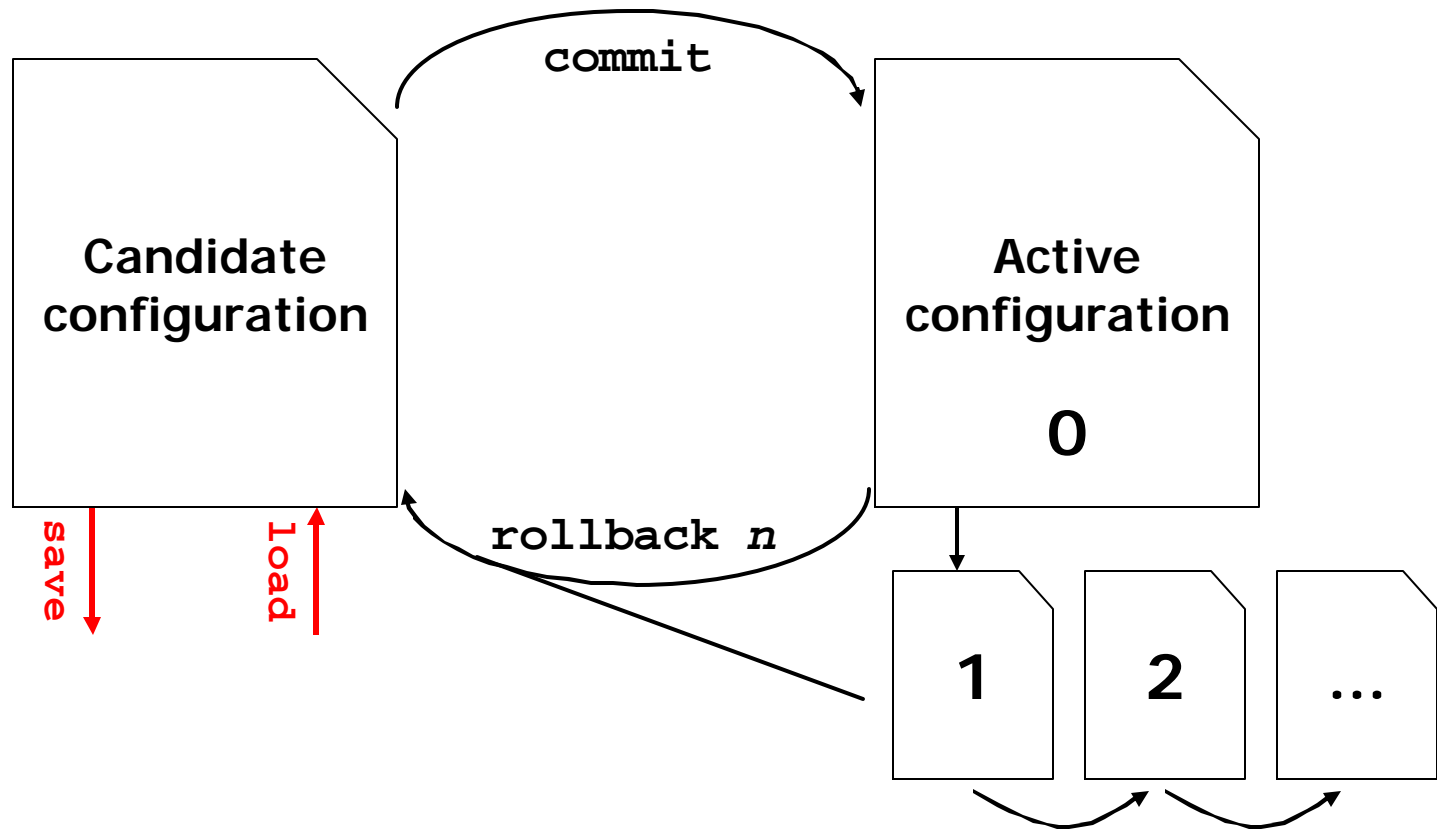
Load a Configuration File

- Configuration information can come from an ASCII file prepared elsewhere
- Use the `load` command to
 - Override an existing configuration
 - Merge new statements into existing configuration
 - Replace existing statements in current configuration

Load a Configuration File

- Syntax
 - `load (replace | merge | override) filename`
- Changes candidate configuration only
- You must `commit` to activate
- Can take input from the terminal

Save and Load Configuration Files



Configuration Command Summary

- Add and modify configuration statements
 - `edit`, `set`, `rename`, and `insert` commands
- Display current configuration
 - `show` command
- Save, validate, and activate a complete configuration
 - `commit` command
- Return to previously saved configuration
 - `rollback` command
- Remove configuration statements
 - `delete` command
- Display other users configuring router
 - `status` command

CLI Commands in Configuration Mode

- You can execute CLI commands from configuration mode

```
[edit protocols isis]
```

```
user@host# run show isis routes
```

```
IS-IS routing table      Current version: L1: 42 L2: 42
```

Prefix	L	Version	Metric	Interface	Via
192.168.1.112/30	1	42	20	so-1/1/3.0	Miami
				so-5/0/0.0	Miami
				so-1/1/1.0	Miami
192.168.1.116/30	1	42	20	so-1/1/3.0	Miami
				so-5/0/0.0	Miami
				so-1/1/1.0	Miami

```
[edit protocols isis]
```

```
user@host#
```

View Log Files

- System keeps log files in `/var/log`
 - `messages` file contains running commentary about system operation
 - Can be tuned to provide minimal to extensive logging
- View with
`show log file-name`
- View in real time with
`monitor start file-name`

View Log Files

- Additional logging can be turned on on a per-module basis
 - use `traceoptions flag keywords`
 - specify file name with `traceoptions file file-name` command
- Example

```
[edit protocols ospf]
```

```
cli# set traceoptions flag errors
```

```
cli# set traceoptions file ospf-log
```

Hands-On Session

Hands-on Session 1

JUNOS CLI Familiarization

A : Commands & On-line Help

- Type `?` List 6 commands on the screen
- Type `c?` List all `show` commands starting with `c`?
- Type `clear ?` List few of remaining command

B : Word Completion

- Type `sh<Space>ow i<Tab>` List remaining command
- Type `sh<Tab>terfaces` What interfaces do you see?

C : CLI Messages & Keystroke shortcuts

- Type `clear route` What message do you see? Why?
- Type `con<Space>figure` Did the prompt change? Why?
- Type `quit` What is the prompt now?

D : Keyboard Sequence

- Type `show interfaces<don't press enter>` Press Ctrl-f, Ctrl-a, Ctrl-b
- Type `sh route` and `sh sys users` Press Ctrl-p, Ctrl-n What happen

E: Command Output

- Type `sh inter detail` What happen when you press space bar?
What happens when you press enter?