GETTING TO KNOW
RED HAT ENTERPRISE LINUX 7

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Agenda

Review new GUI installer

- Walk through decision points
- Discuss improved features

Hands-on Activities

- Installing a Webserver:
  - Package installation
  - Storage Management with SSM
  - Web Services Configuration (systemd, httpd configuration)
  - Security with SELinux & Firewalld
  - Performance Tuning with “tuned” profiles

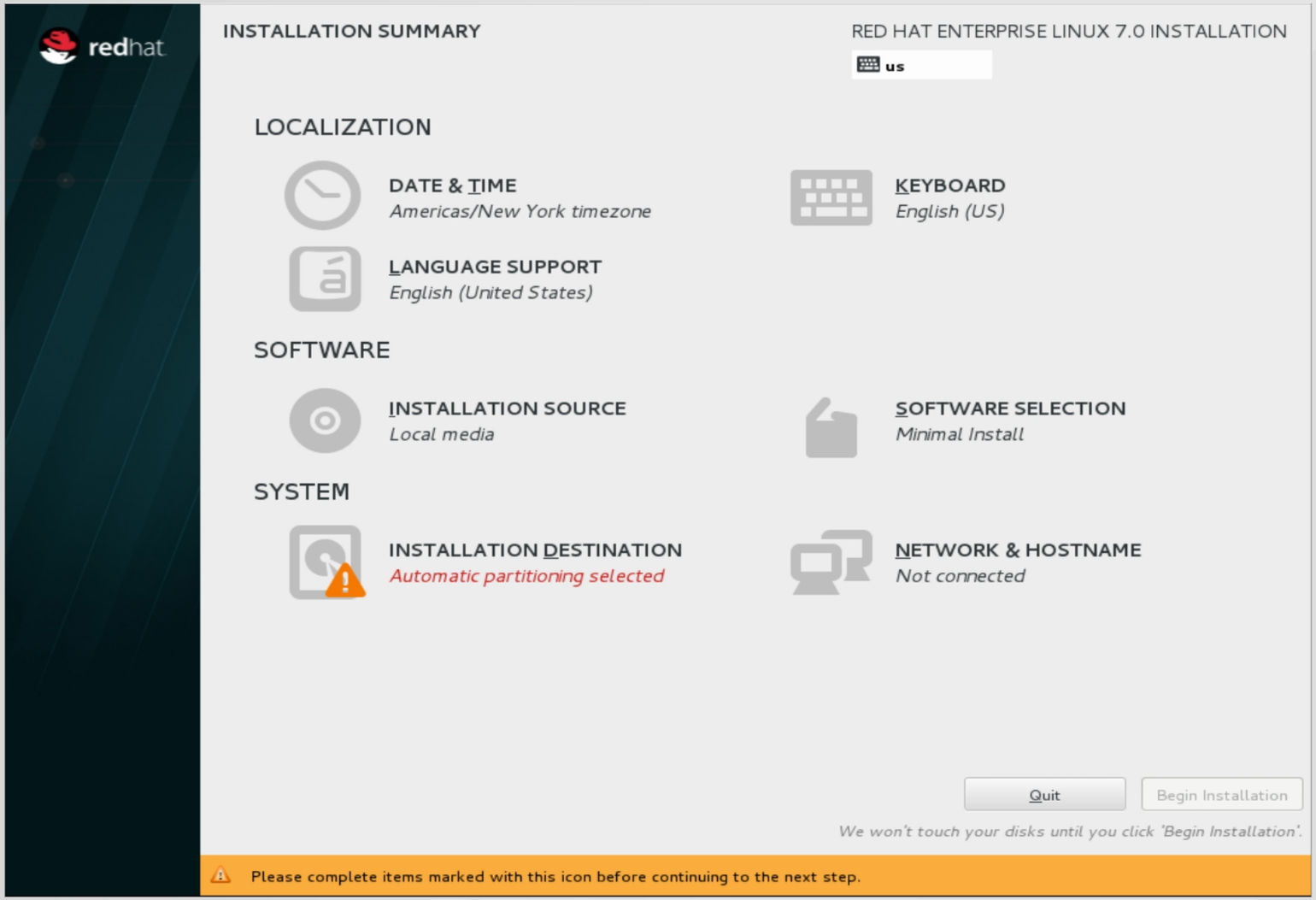
The NEW RHEL 7 Installer

Highlights

- Fewer Questions
- Background Installation
- Support for Complex Network Configurations
- Support for Complex Storage Configurations
- Reset partitioning without rebooting

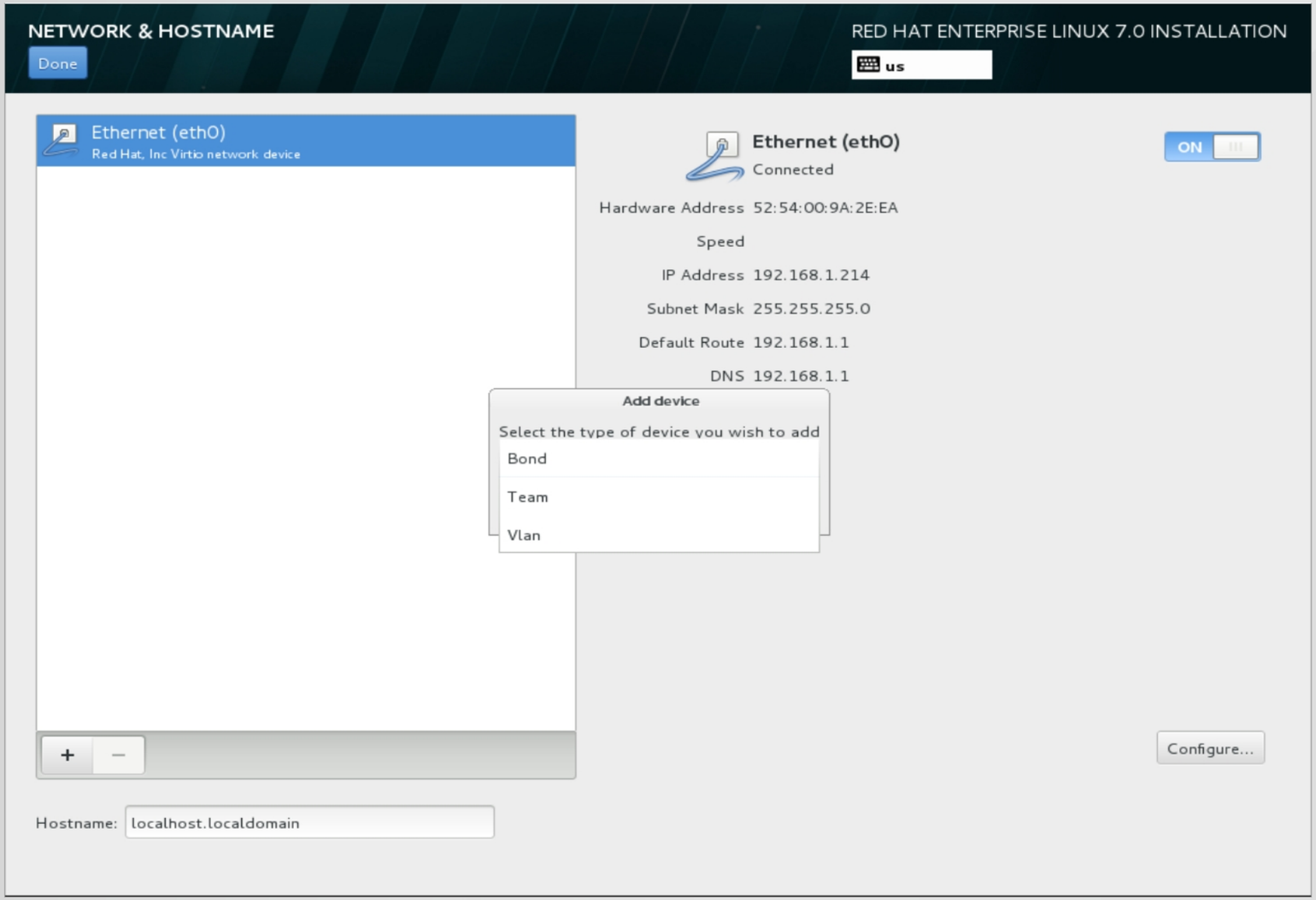
Let's examine a few screenshots...

Installation Summary

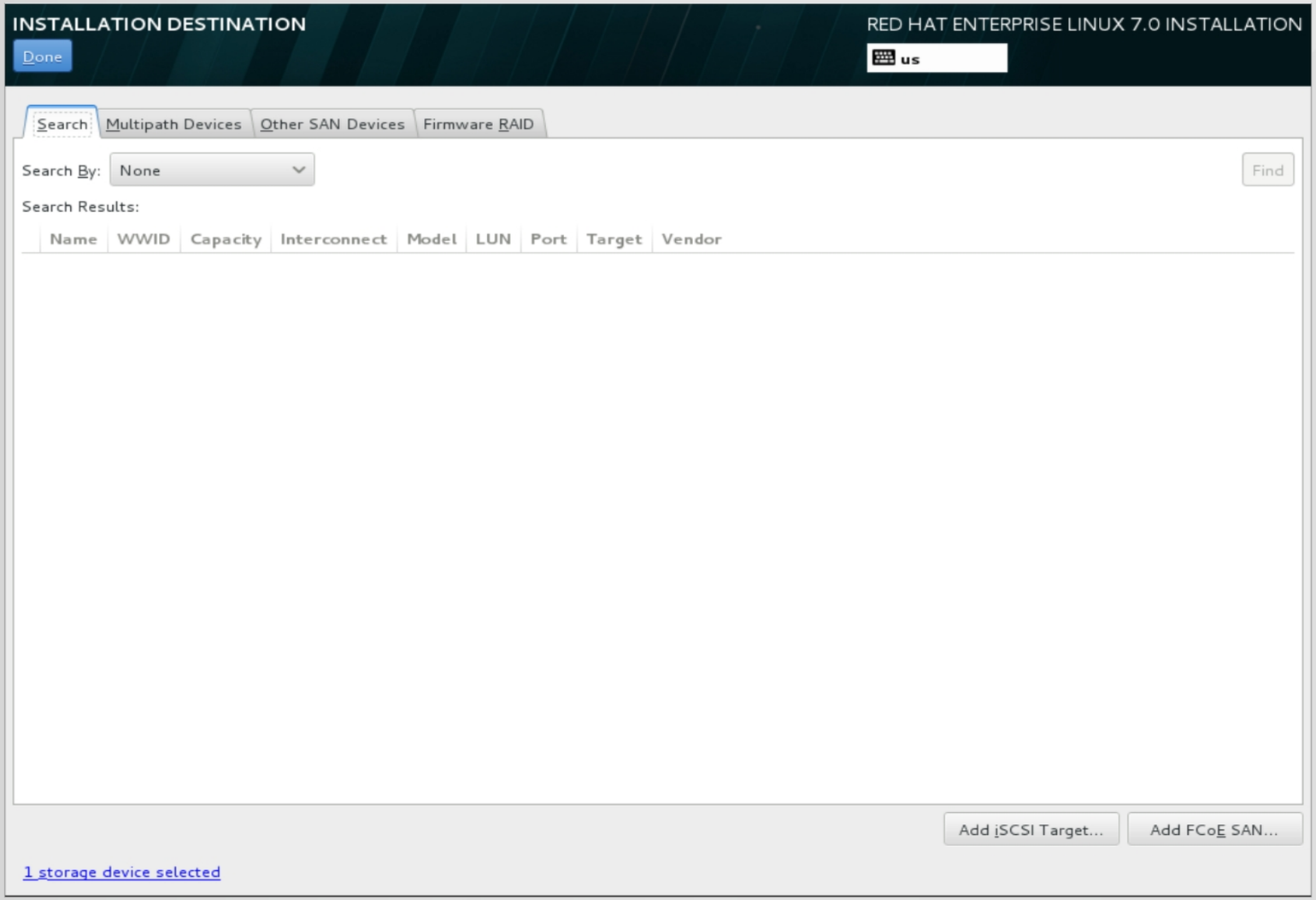


redhat.

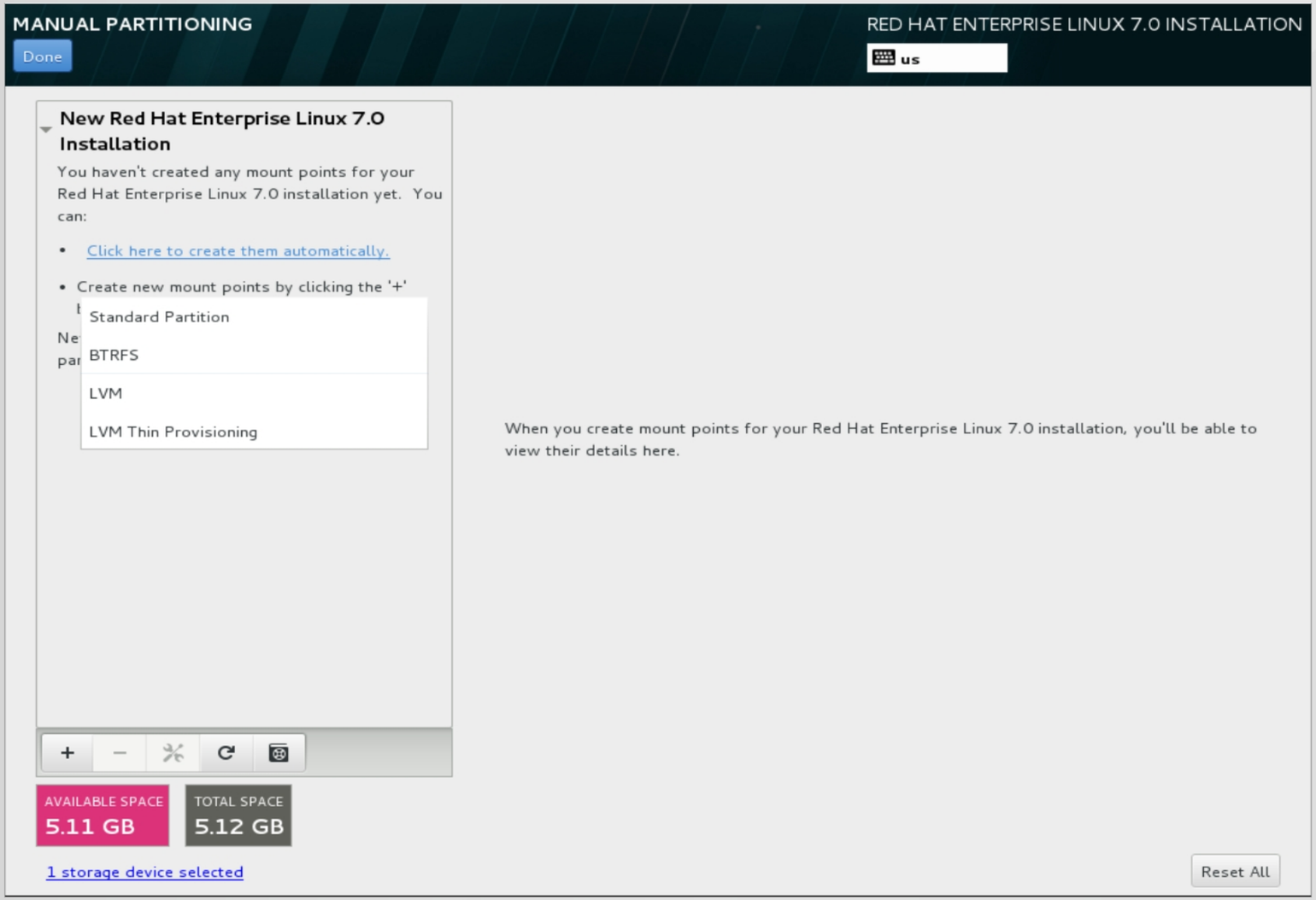
Network



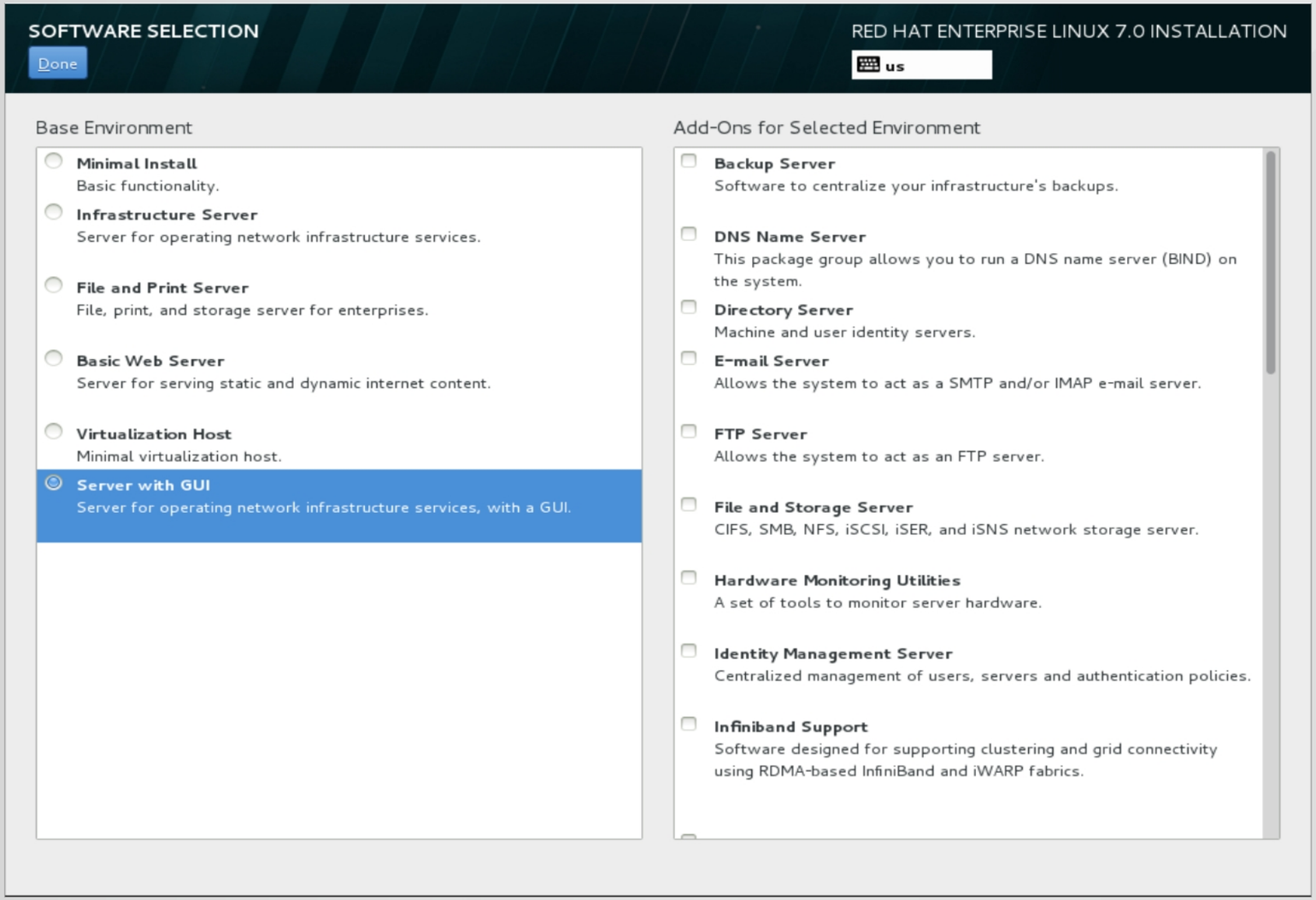
Destination



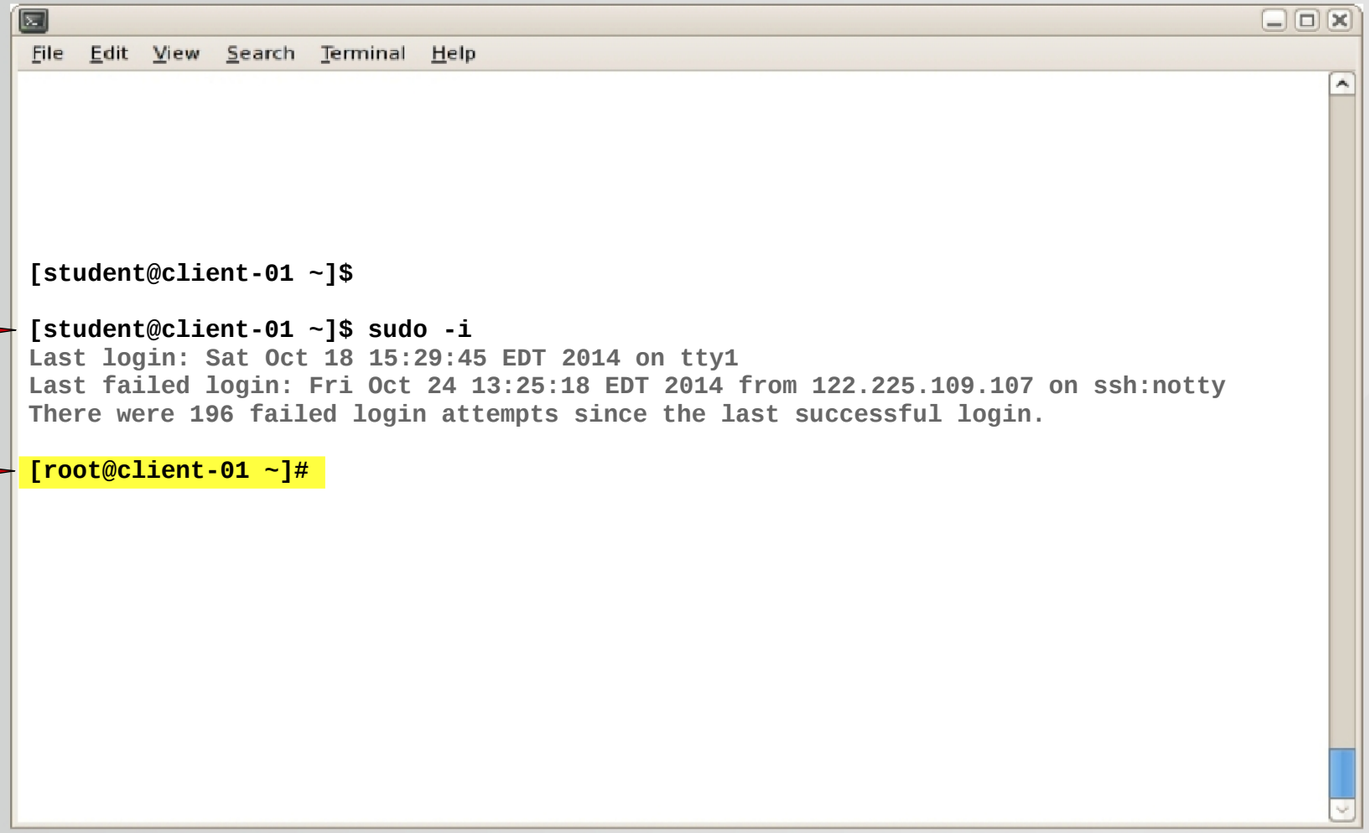
Partitions



Software Selection



Conventions



###

1. Don't like typing? Use the lab helper
   ex: lab-helper-###

2. Consult attendee portal for URL info

   SAMPLE
   Host URL: CLIENT-01
   Login: student
   Password: n0boundaries!

   ** CLIENT-02 provides jumphost option

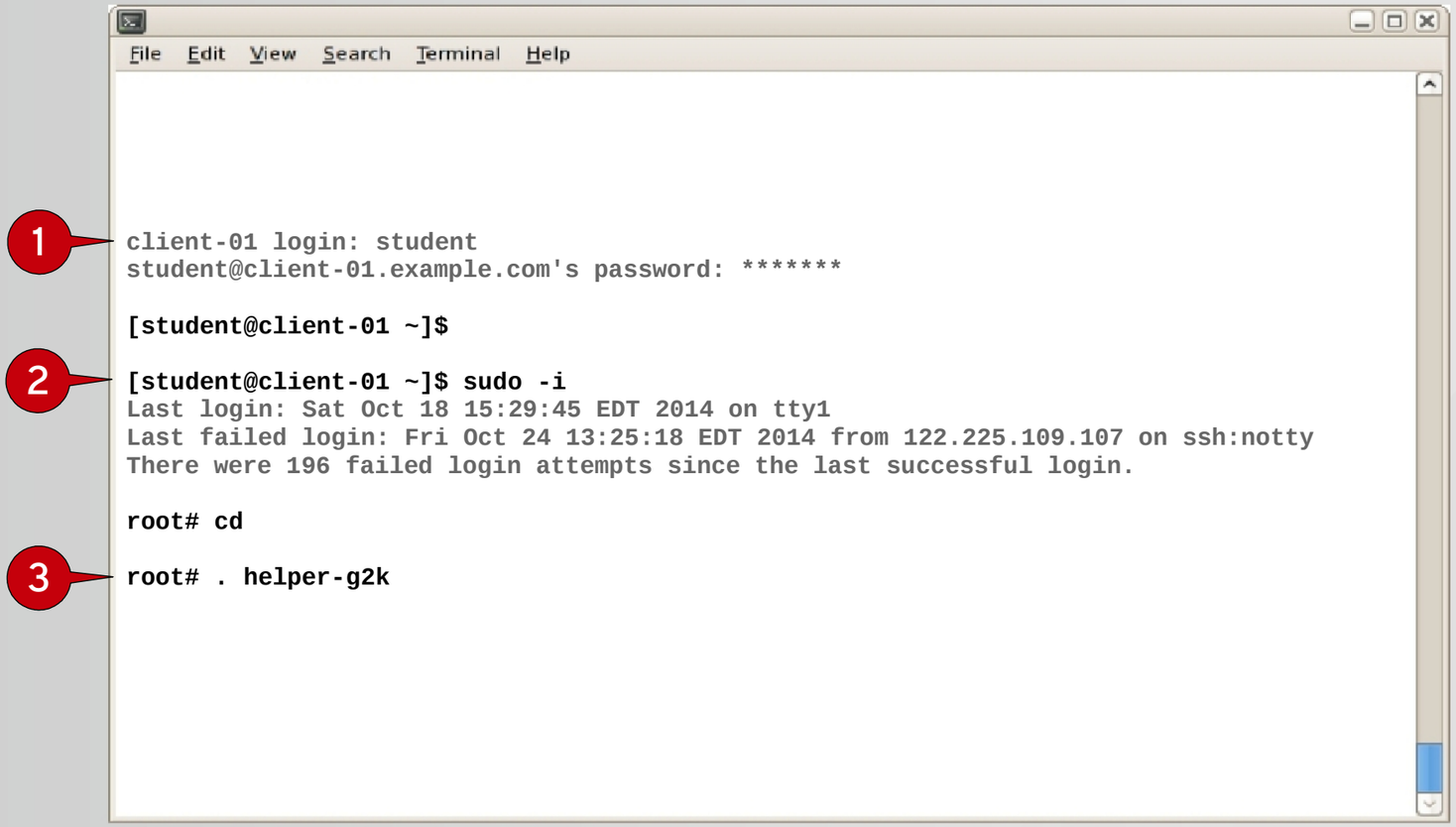
3. **Commands are in BOLD**

4. Call-outs are highlighted in yellow

5. Just about everything we do will be as "root" but keep an eye on the prompt

6. Are you on the right host?

Log In via SIAB / SSH



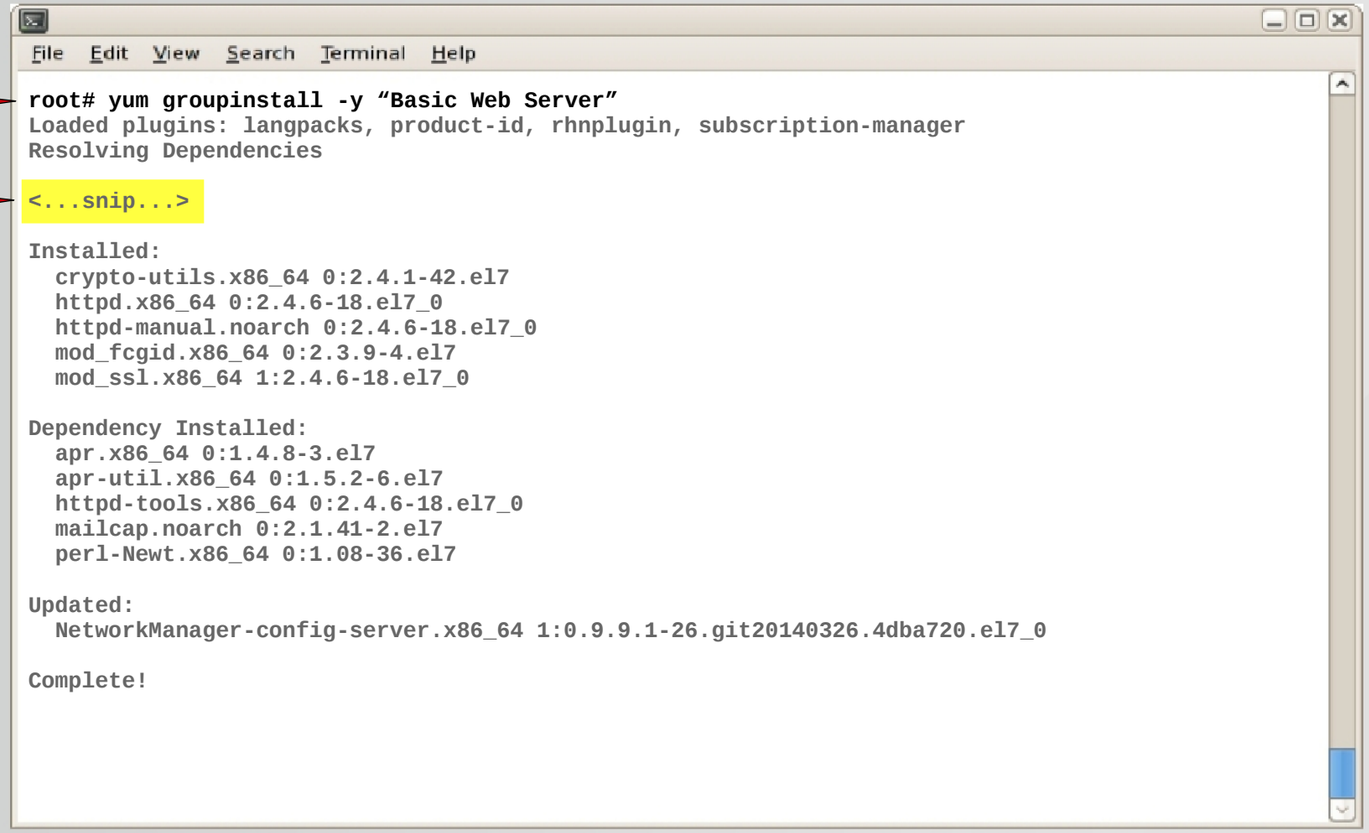
1. CONNECTION INFORMATION
   Host URL: CLIENT-01
   Login: student
   Password: n0boundaries!

2. **Don't forget "sudo -i"**

3. **Source the Lab Helpers**
   *** NOTE **The command starts with a period '.'*

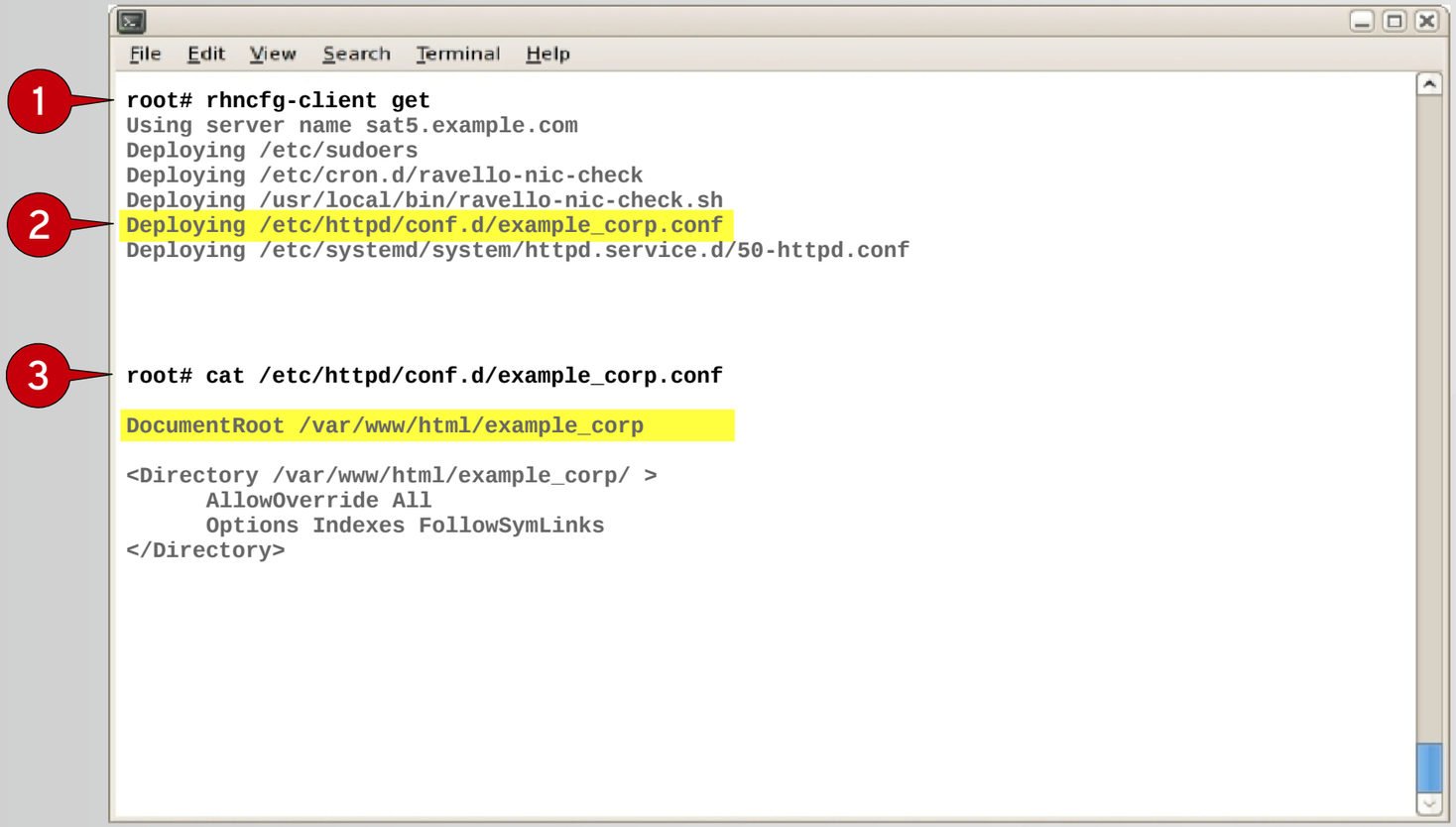
   . helper-g2k

Install Webserver Software



1. Use "yum" to install package group
2. On occasion we will cut out the boring messages with "<...snip...>"

Configure HTTP



1. We are leveraging config file management from a local RH Satellite Server

2. This is the config file we are interested in

3. Inspect the config file

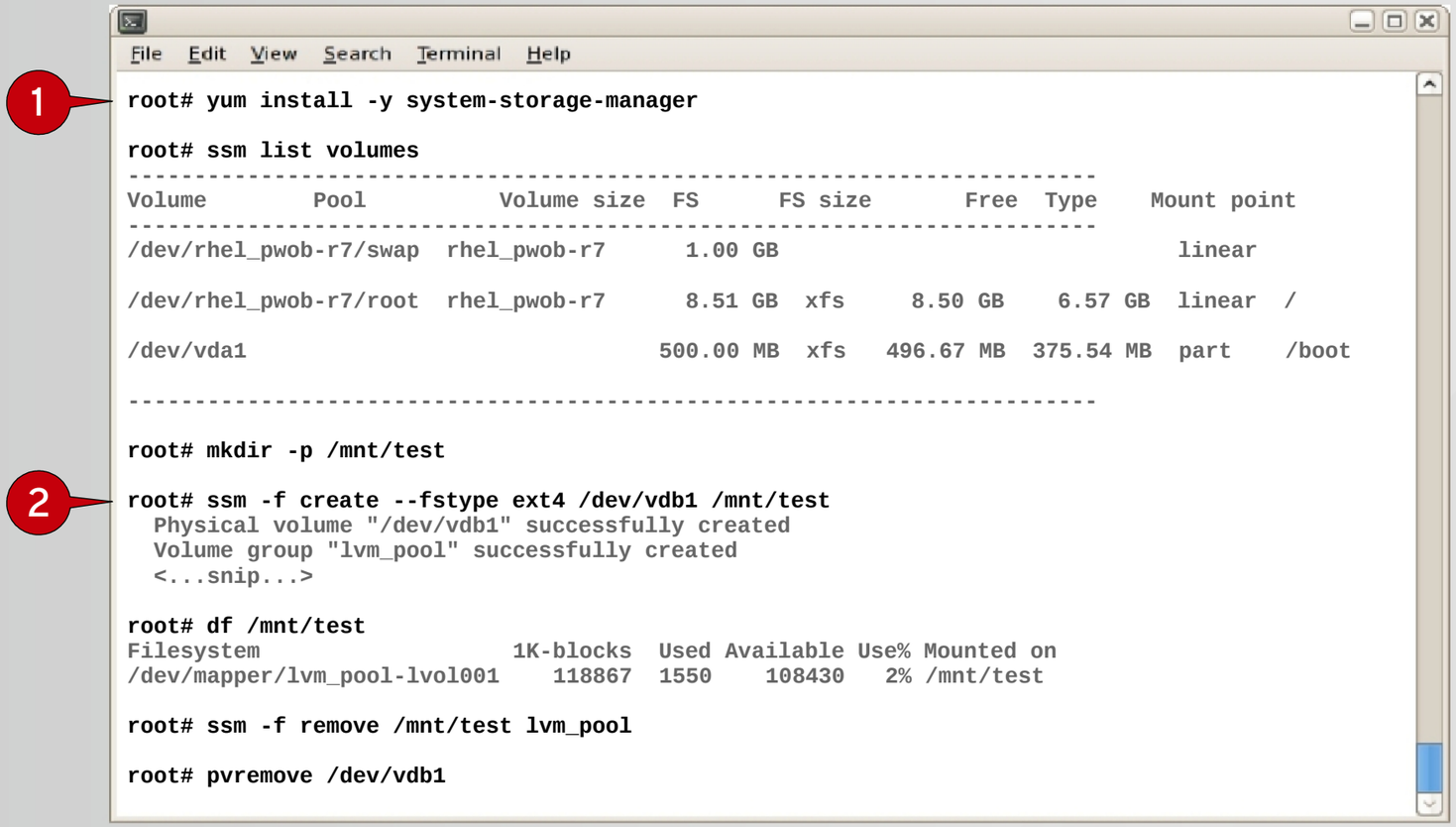
   Defines DocumentRoot as: /var/www/html/example_corp

Understanding SSM

- System Store Manager
- Single CLI to manage storage technologies

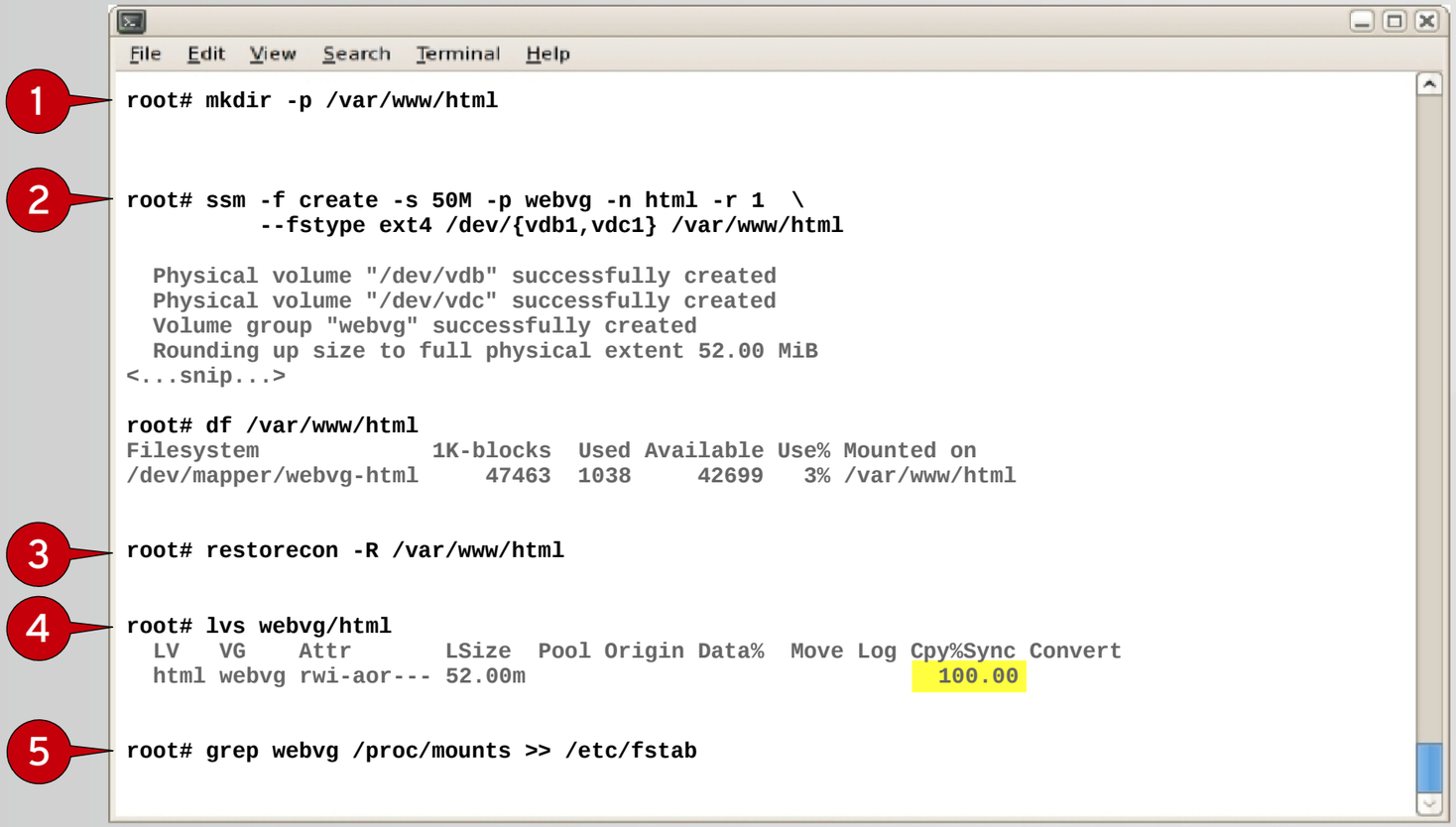
- Examples:
  - Device Mapper (dm), Encryption
  - Logical Volume Manager (LVM), Snapshots
  - Multiple Devices (MD), RAID
  - More...

Exploring SSM



1. Install SSM
2. Single Command:
   - Creates VG/Pool
   - Creates LV
   - Formats FS
   - Mounts FS

Setup HTML Storage with SSM

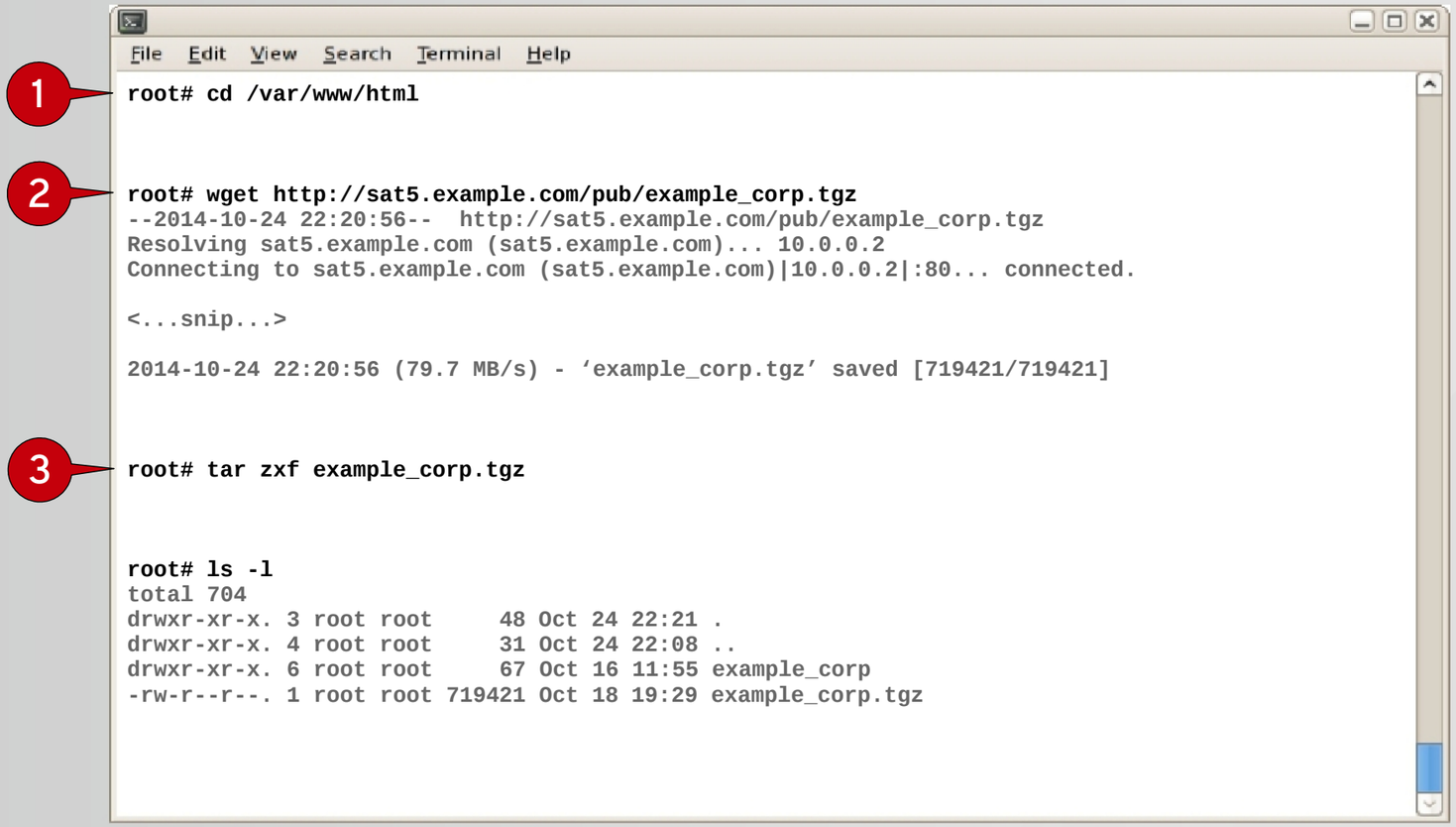


1. Create Mount Point
2. Create Mirrored Filesystem

size	50MB
vg/lv name	webvg/html
raid	1 (mirror)
fstype	ext4
devices	vdb1, vdc1
mount	/var/www/html

3. Restore SELinux contexts
4. Verify RAID Syn+c status
5. Add Mount to fstab

Download HTML Content



1. Change directory to /var/www/html
2. Retrieve HTML content from http://sat5.example.com/pub
3. Don't forget to unpack the tarball

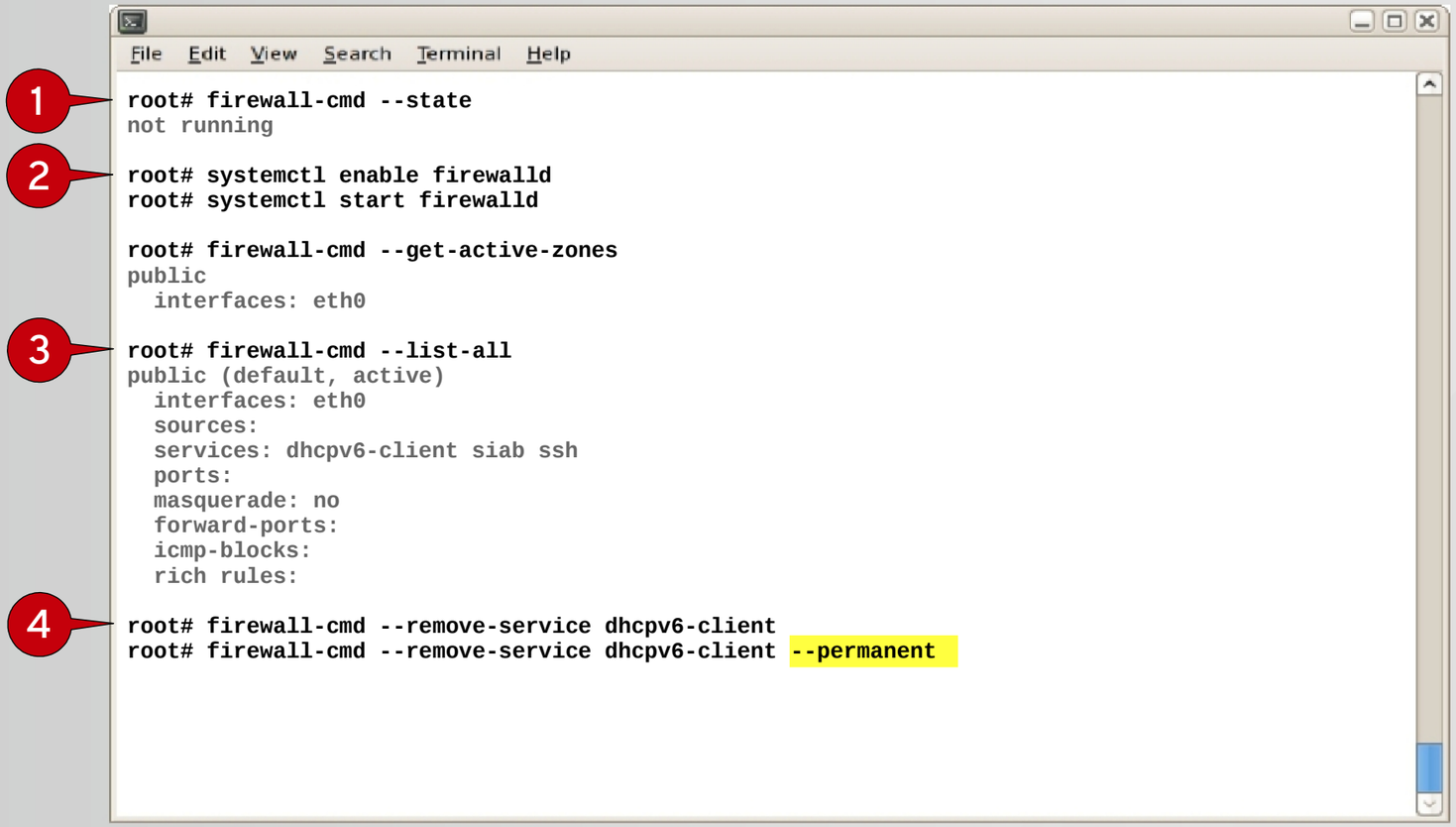
Understanding Firewalld

Still IPTables underneath

Why Firewalld:

- Realtime rule changes without interruption
- Separate network traffic & rules by interface or zones
- GUI and CLI tools
- System configs in /usr/lib/firewalld/*
- Custom config in /etc/firewalld/*

Exploring Firewalld



1. Check firewalld status
2. Enable firewalld service with systemd
3. Show all firewalld services
4. Disable unwanted firewalld service

   add --permanent to persist after system reboot

Secure HTTP with Firewalld

1. Enable http(s) services

   add --permanent to persist after system reboot

2. Check enabled firewalld services

Understanding SELinux

Standard Security = Discretionary Access Controls

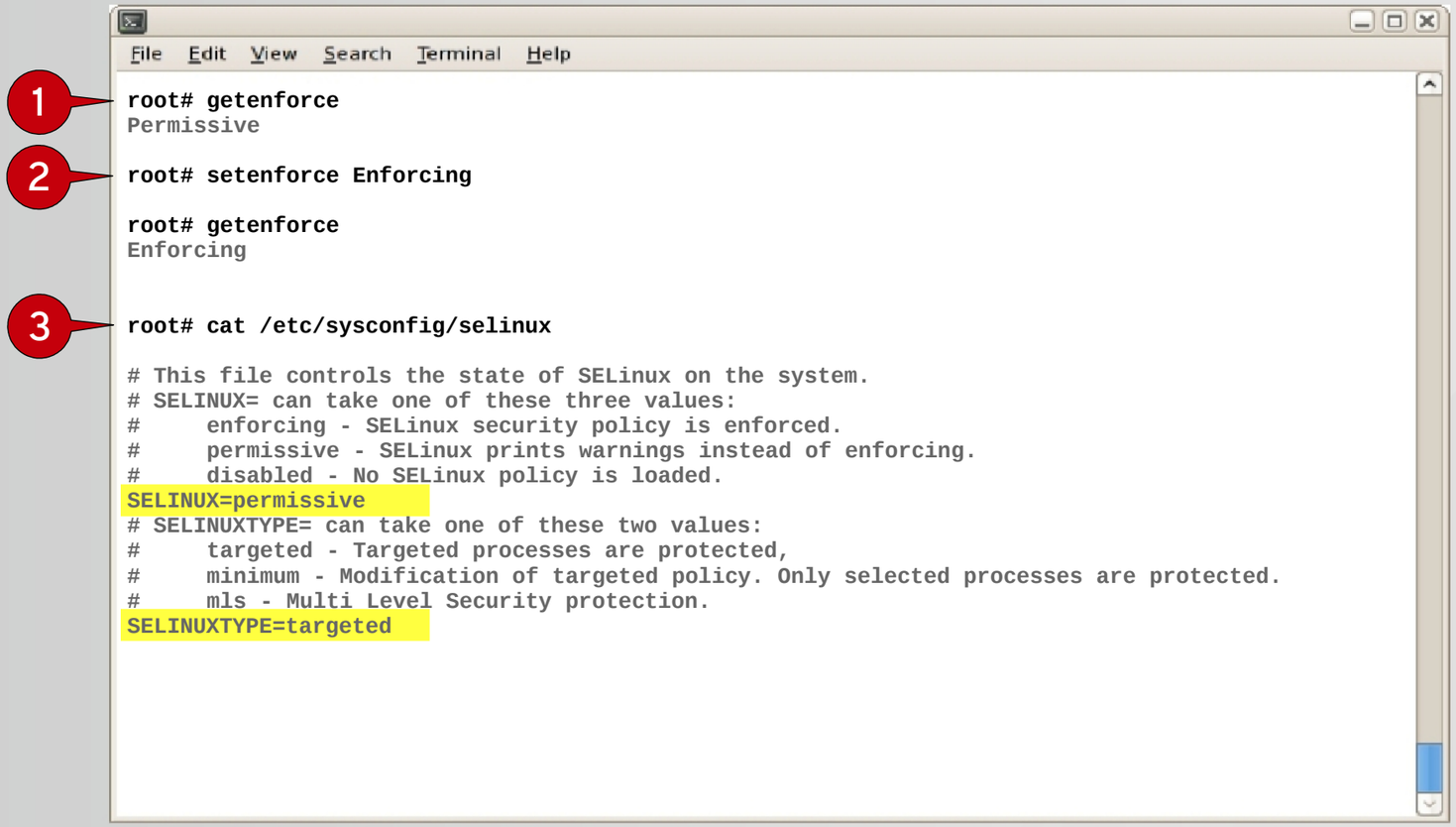
- Owner, group, world/read, write, execute
- Enhanced with Access Control Lists (ACLs)

Security-enhanced Linux = Mandatory Access Controls

- Framework allows definition of permissions for how all processes (called subjects) interact with other parts of the system such as files, devices, sockets, ports, and other processes (called objects in SELinux).

SELinux was introduced in RHEL 4

Exploring SELinux



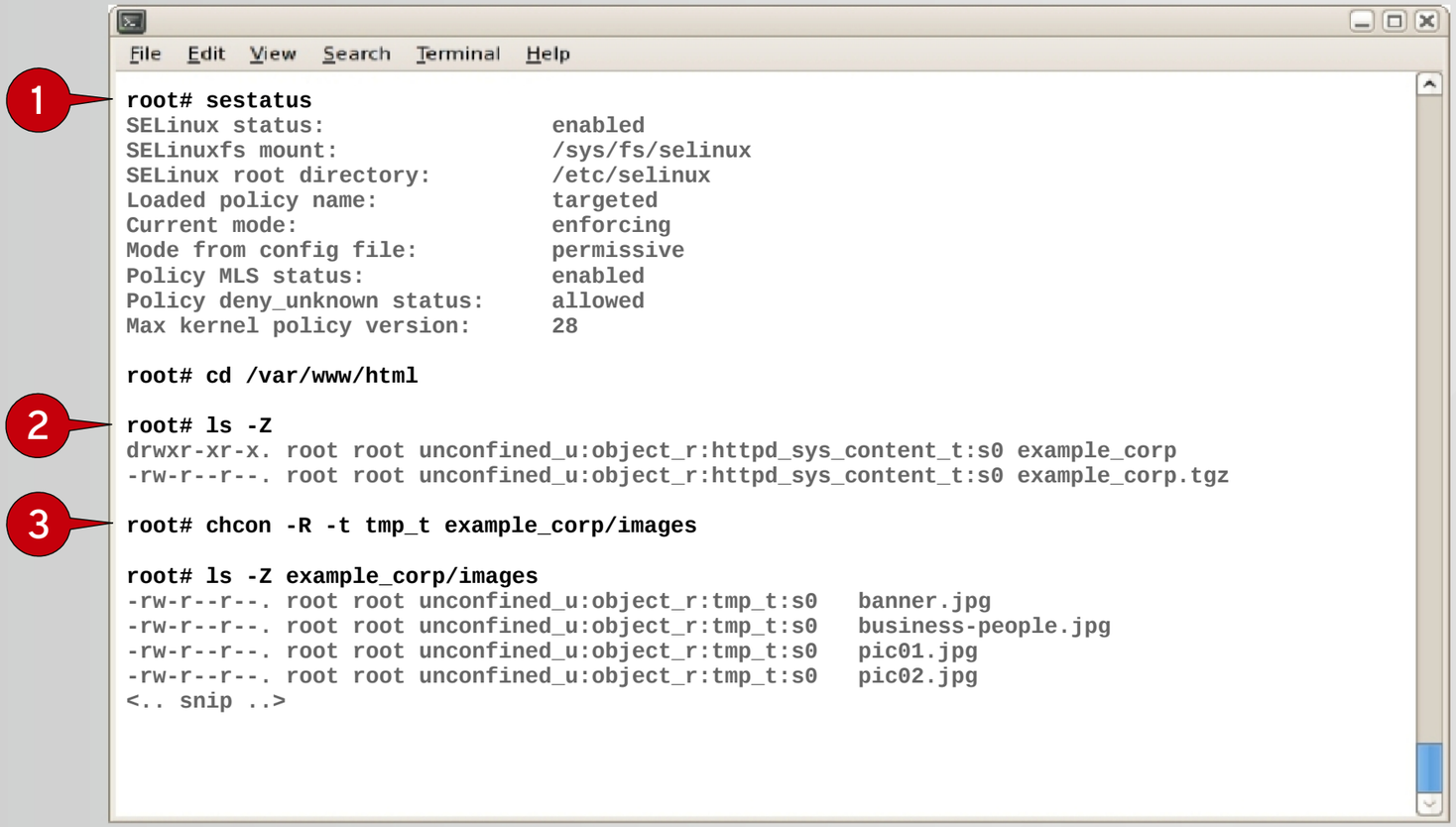
1. Check SELinux Status
2. Set SELinux to Enforcing
3. To set persistant SELinux mode, edit config file /etc/sysconfig/selinux

Note

SELinux Mode

SELinux Type (Policy)

Secure HTTP with SElinux



1. Check SELinux Status

   Note how current and persistant configuration do not match

2. Examine SELinux security contexts

3. Change security context on some files

   changing *httpd_sys_content_t* to *tmp_t*

Understanding Tuned

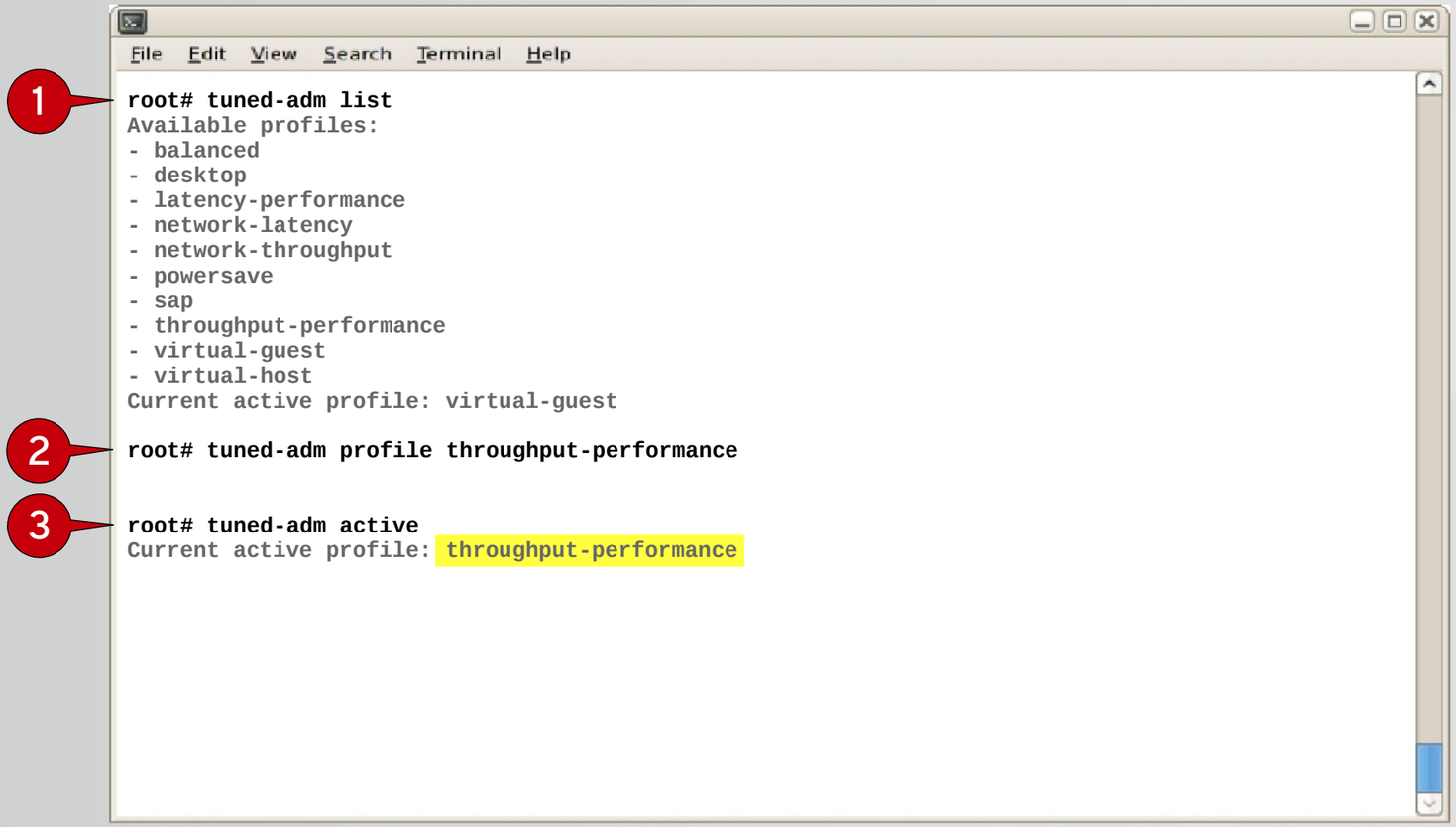
Tuned provides recommended configurations for common workloads

- Easy to apply
- Easy to customize
- Persists across reboots

Installed and enabled with RHEL 7

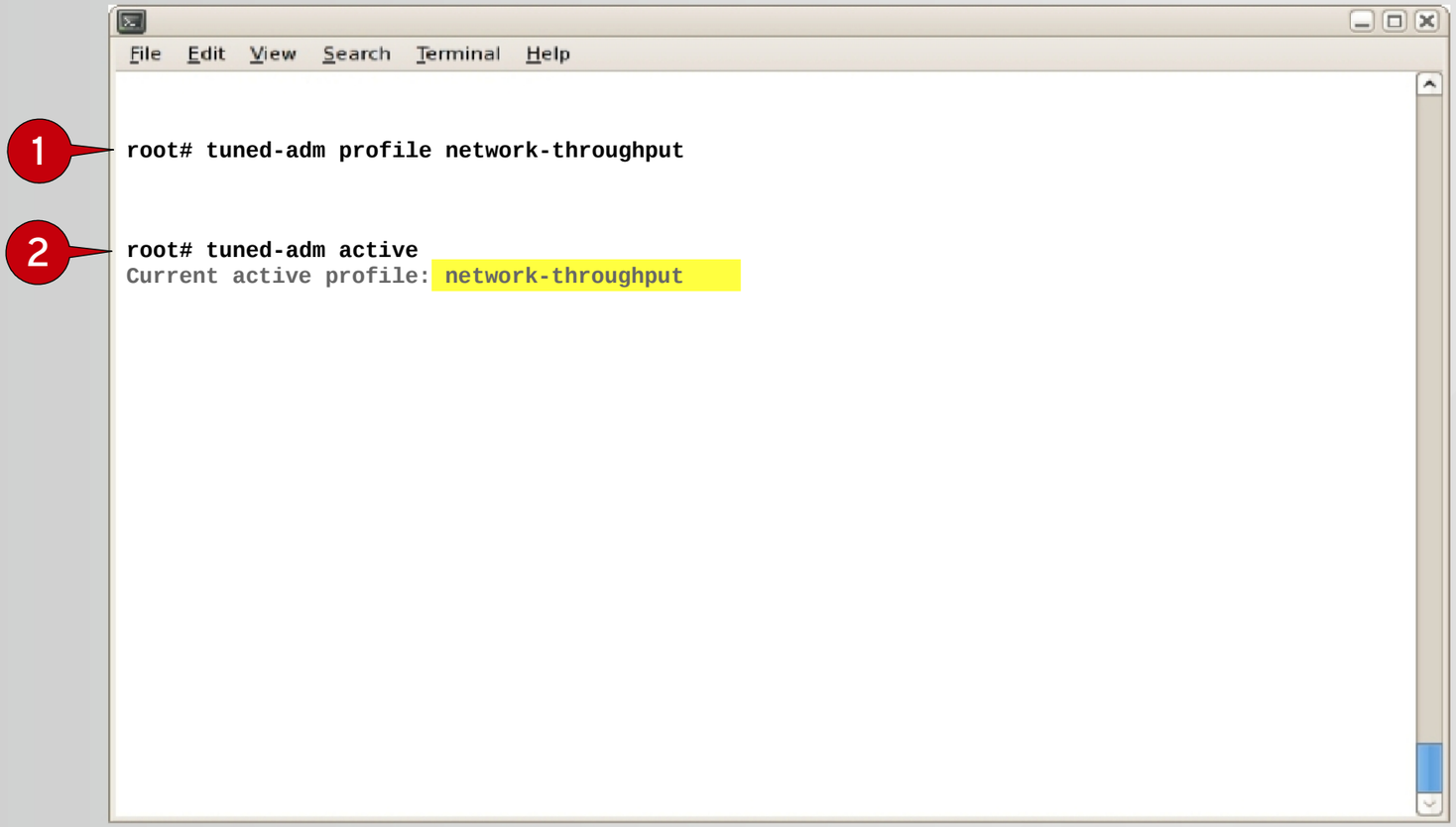
Available for RHEL 6 as well

Exploring Tuned



1. "tuned" provides complete tuning profiles for common work-loads
2. Change the configured tuning profile for the system
3. Verify active profile

Tune HTTP with Tuned



1. Change tuning profile for the system
2. Verify active profile

Understanding Systemd

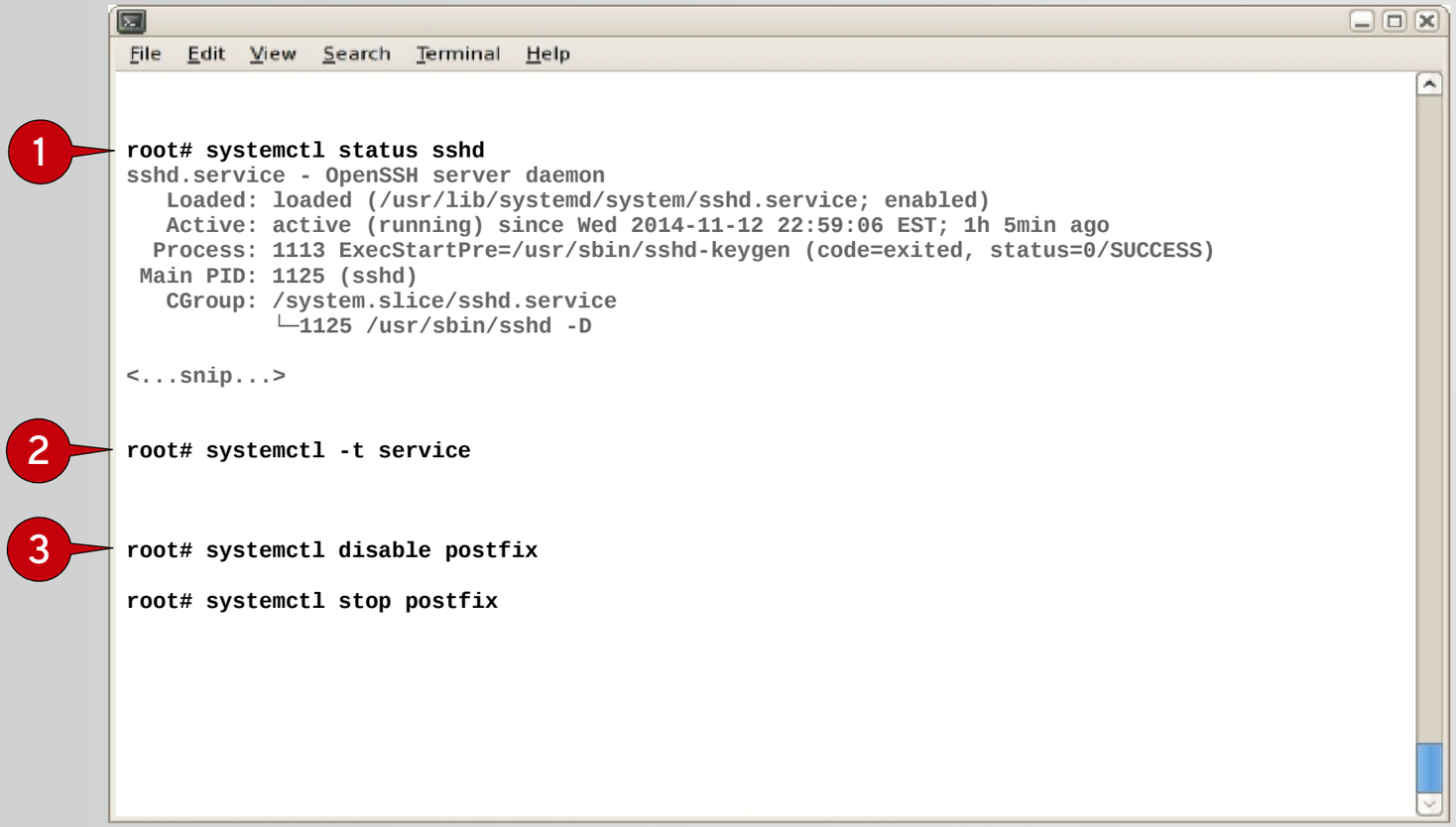
Prior to RHEL 7, you had a SysV Init style”Upstart”

- Remember initd, innittab, rc scripts, run levels and who can forget rc.local?

Systemd replaces SysV Init

- Controls “units” rather than just daemons
- Handles dependency with service information
- Tracks processes with service information
- Services are owned by a cgroup
- Simple to configure “SLAs” based on CPU memory
- Properly kills daemons (zombies are for tv & movies, not the Enterprise)
- Minimize boot times
- Debuggability – no early boot messages are lost
- Easy to learn and backwards compatible.

Exploring Systemd



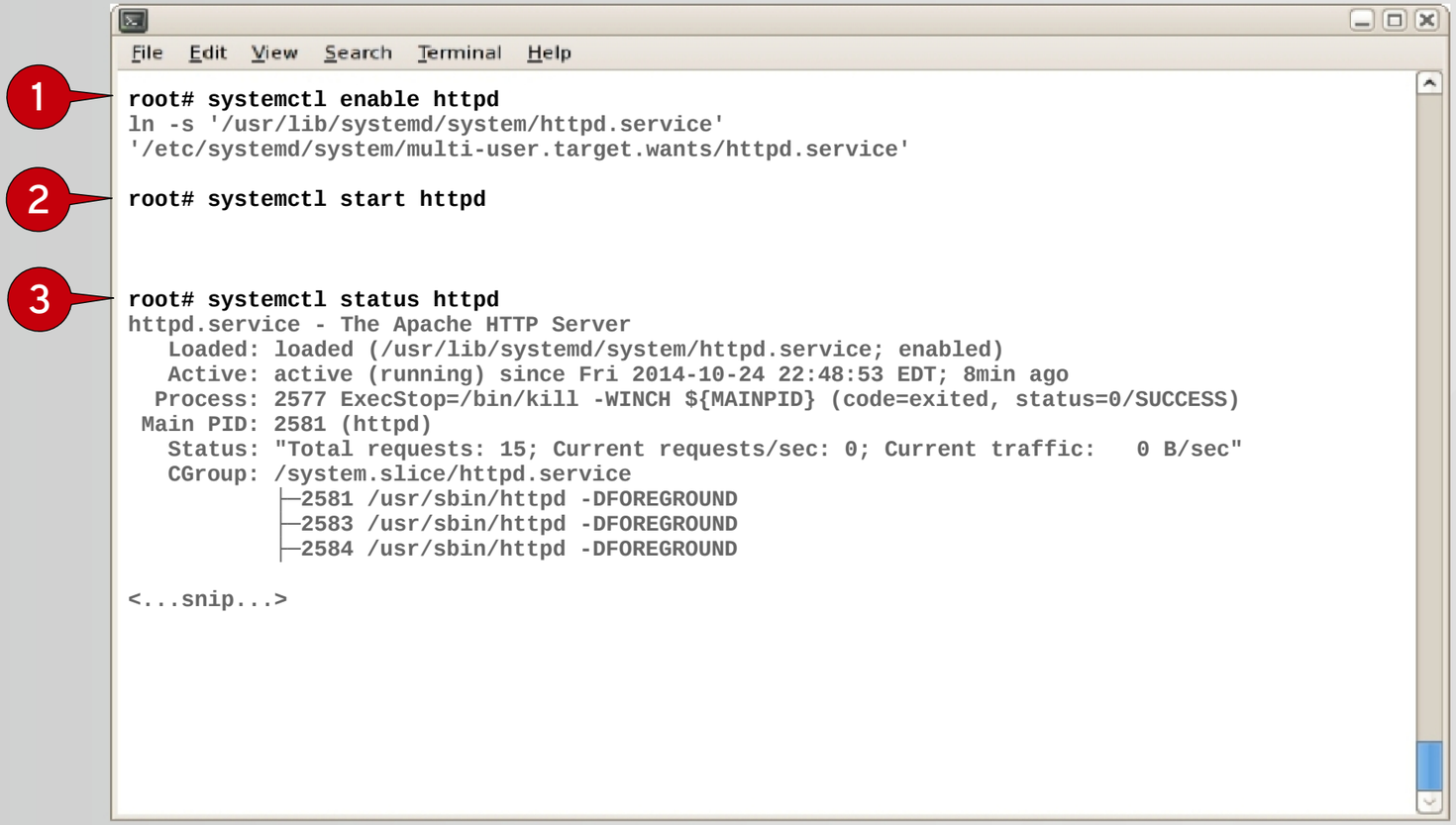
1. Look how much info systemd provides:

   service status
   active since
   pid & ppid
   cgroup info
   more...

2. List configured services

3. Disable an unwanted service (postfix)

Enable HTTP with Systemd



1. Use systemd to enable httpd
2. Use systemd to start httpd
3. Check httpd status

cgroup slice httpd.service

Understanding CGroups

Cgroups provide Resource Management

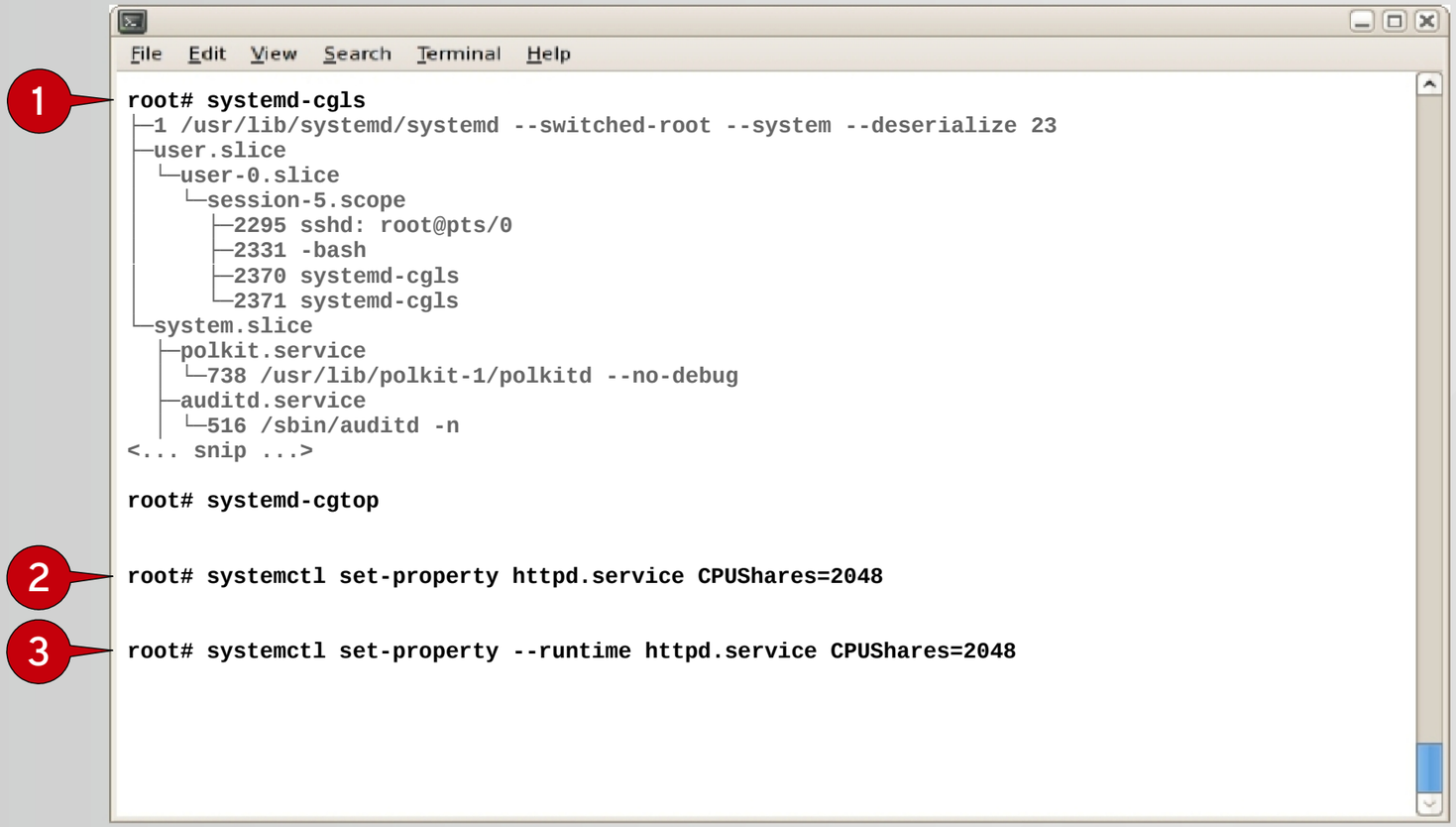
- Manages CPU, Memory, Network and Block i/o consumption
- Reduce process contention, increase throughput and predictability

Systemd replaces SysV Init

- system.slice – contains system services
- user.slice – contains user sessions
- machine.slice – contains virtual machines and containers

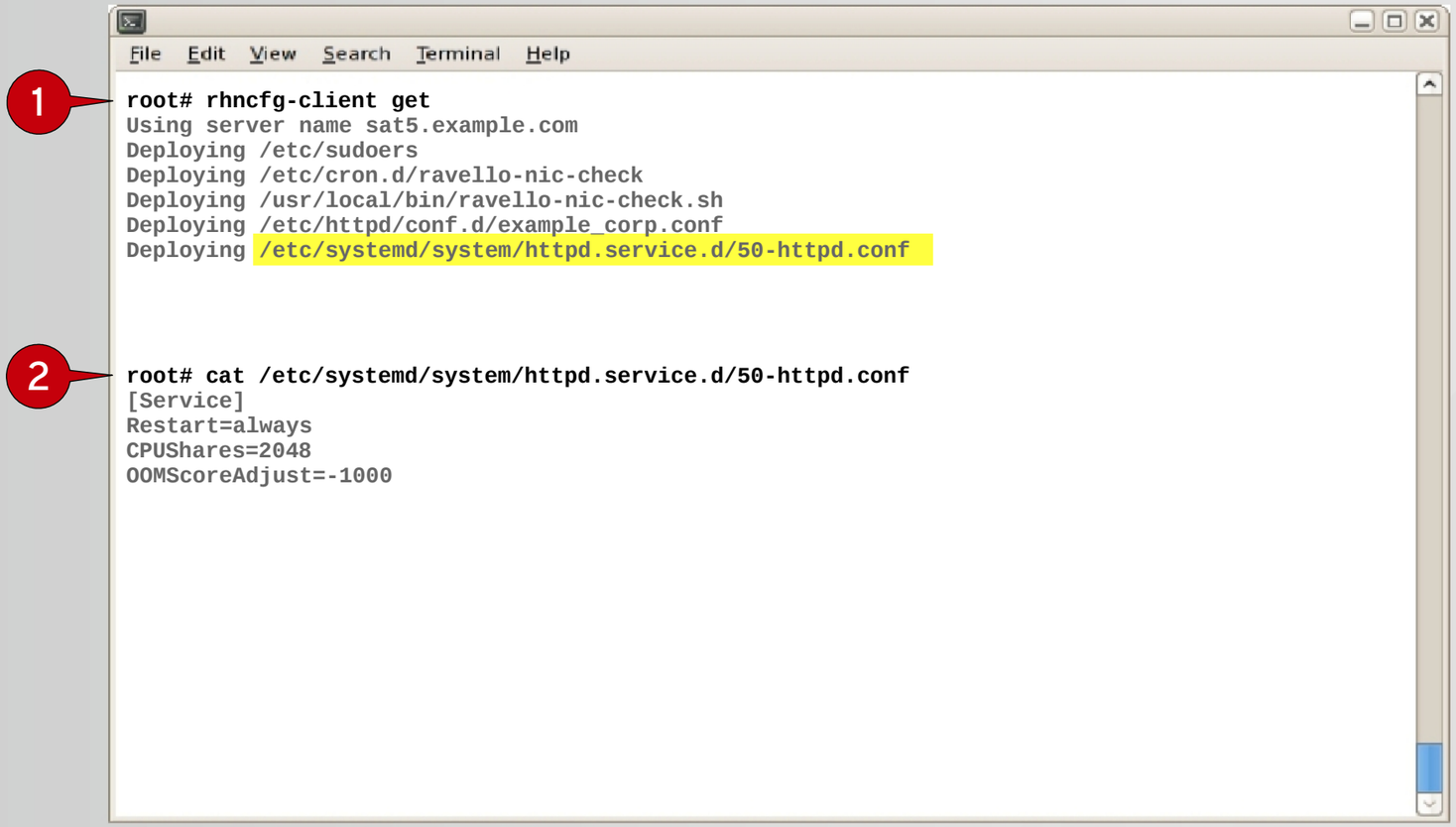
Services can be promoted to their own slice if needed

Exploring CGroups



1. Broad look at cgroup configuration
2. Apply change to subsequent httpd starts
3. Apply change to current running httpd

Configure HTTP with CGroups



1. Download systemd unit file for httpd

   ***Provided here by Satellite Configuration Management*

2. Inspect the unit file

   Restart=Always
   CPUShares=2048
   OOMScoreAdjust=-1000

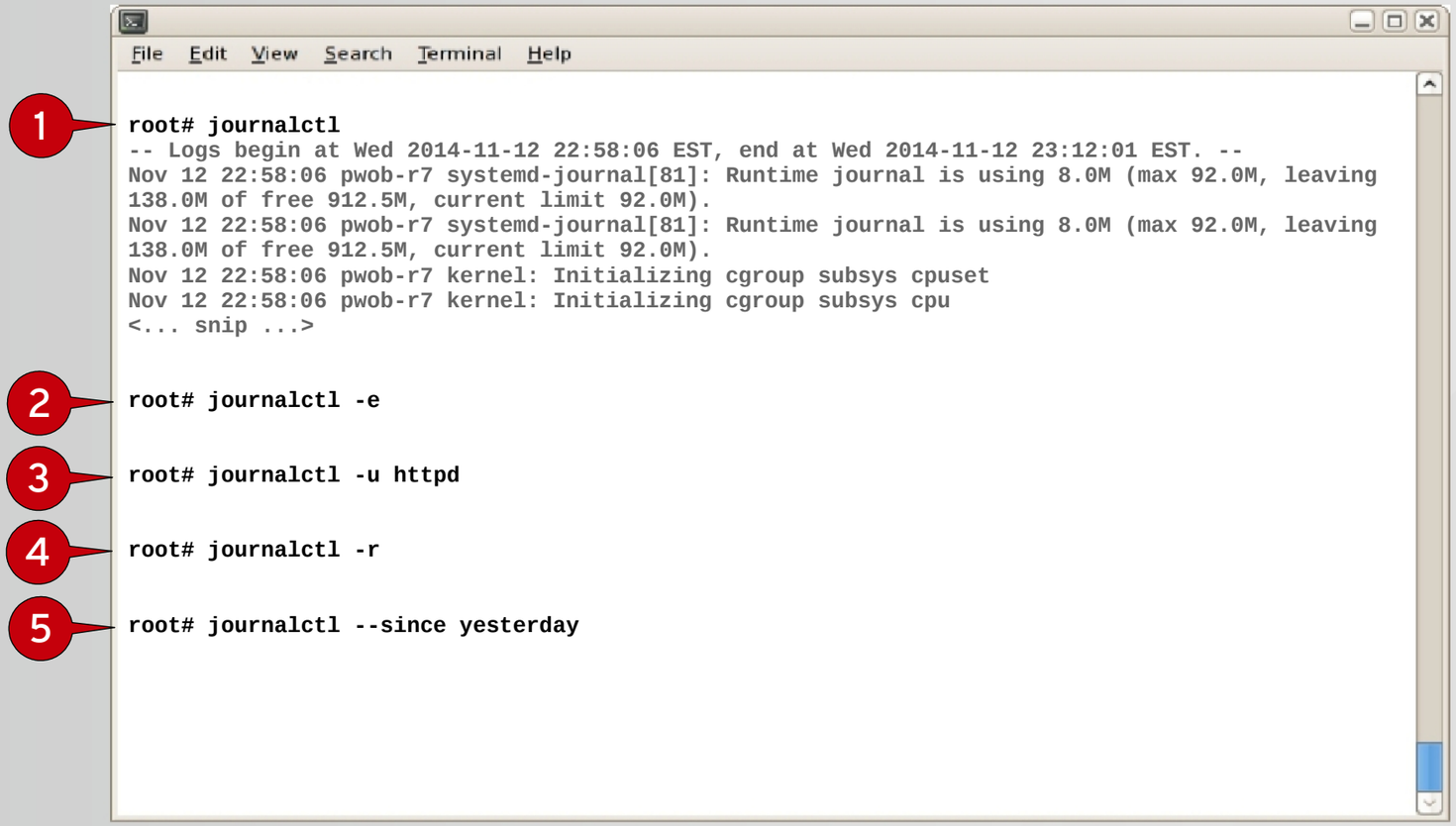
Understanding Journald

- Does NOT replace rsyslog in RHEL 7

  Continue using rsyslog for traditional logging w/ enterprise features

- The journal is not persistent by default
- Collects event metadata
- Stored in key-value pairs
- Simple (or complex) filtering
- Indexed
- Formatted
- Message Verification – source authenticity

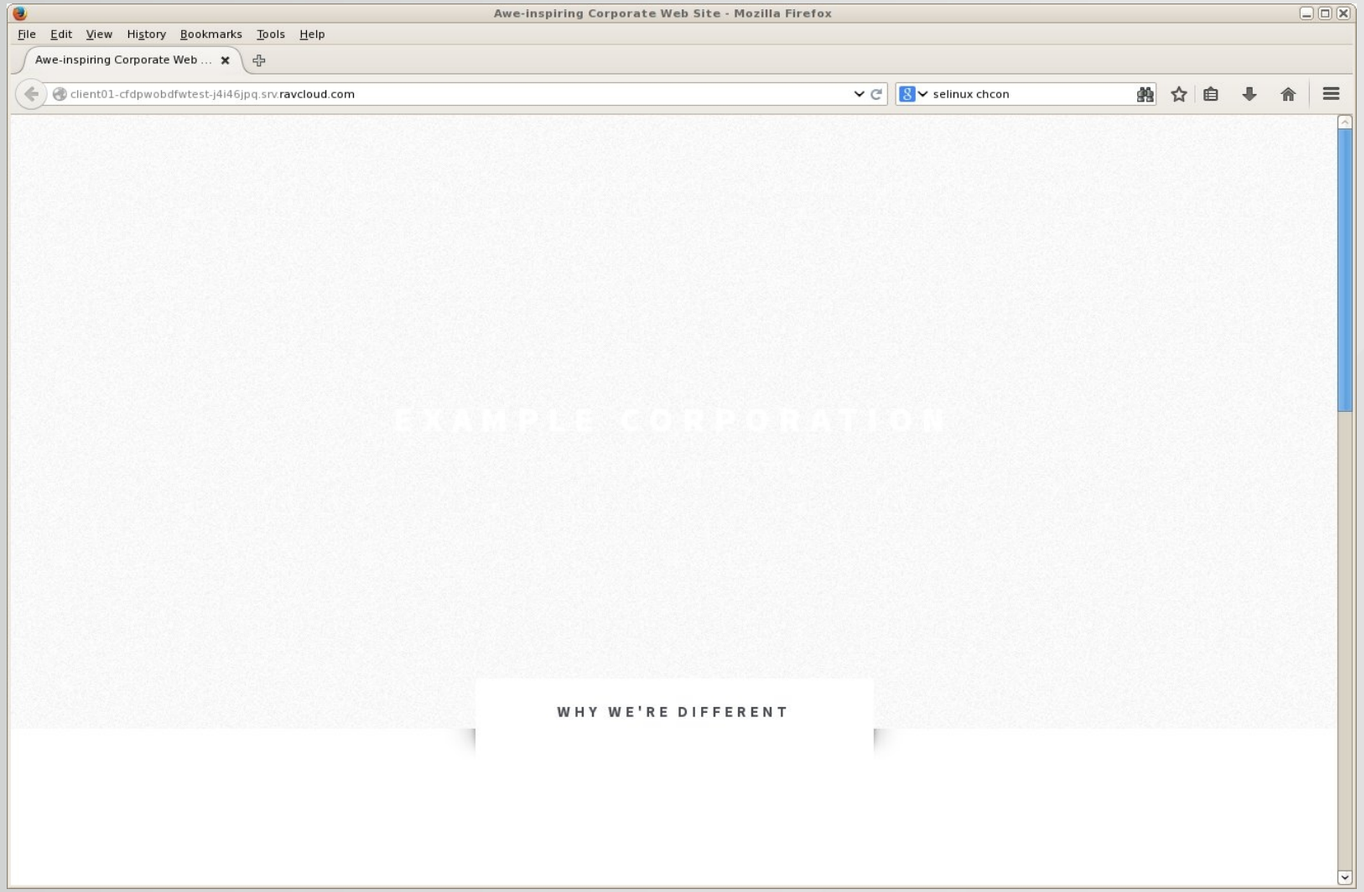
Exploring Journald



1. Display messages in "pager mode" starts at top of log (oldest)
2. Display messages in "pager mode" starts at end of log (newest)
3. Display messages for (unit) httpd
4. Reverse order
5. Since yesterday

Validate Webserver Setup

Use the URL provided



CONNECTION INFORMATION

Host URL: CLIENT-01 AUX

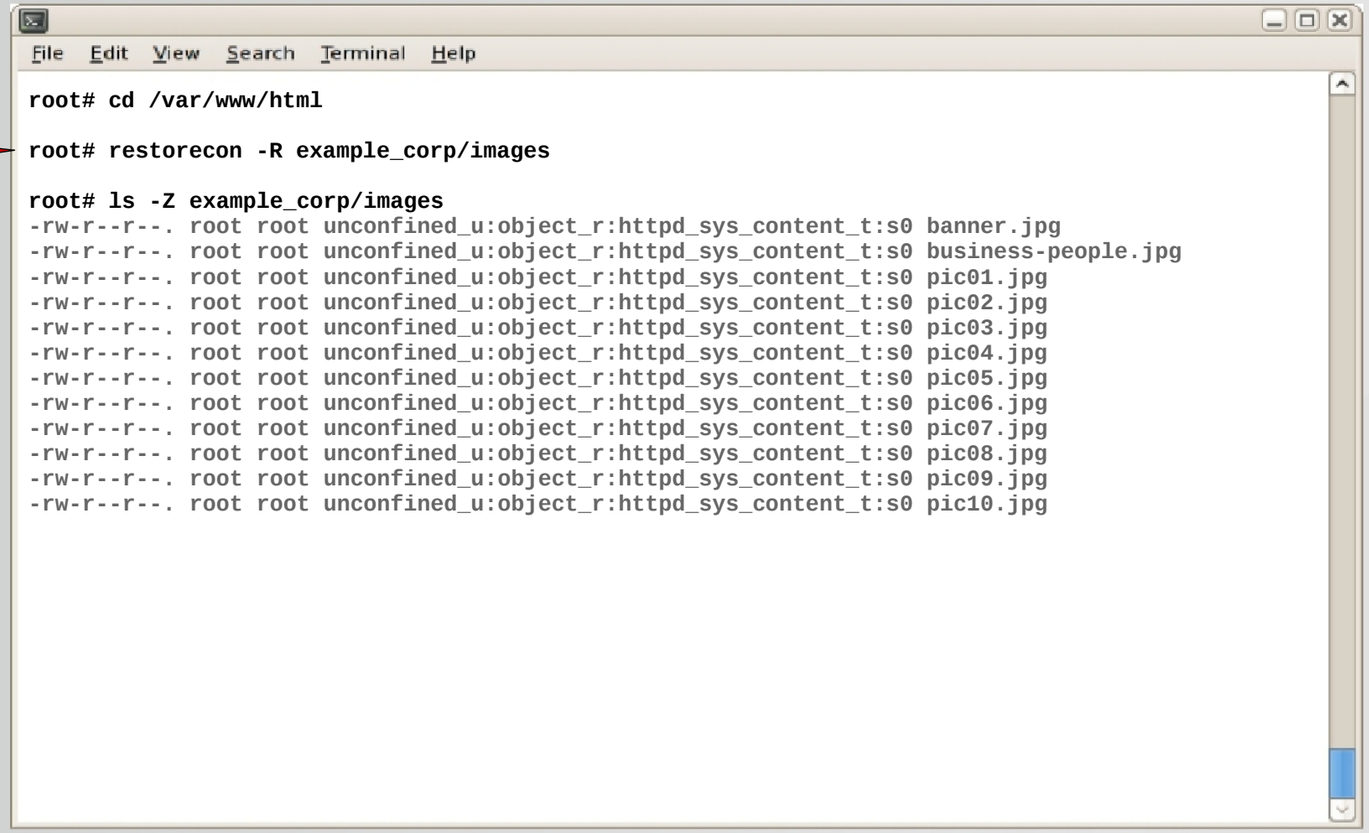
Note

Webpage is incomplete

All of the images are missing

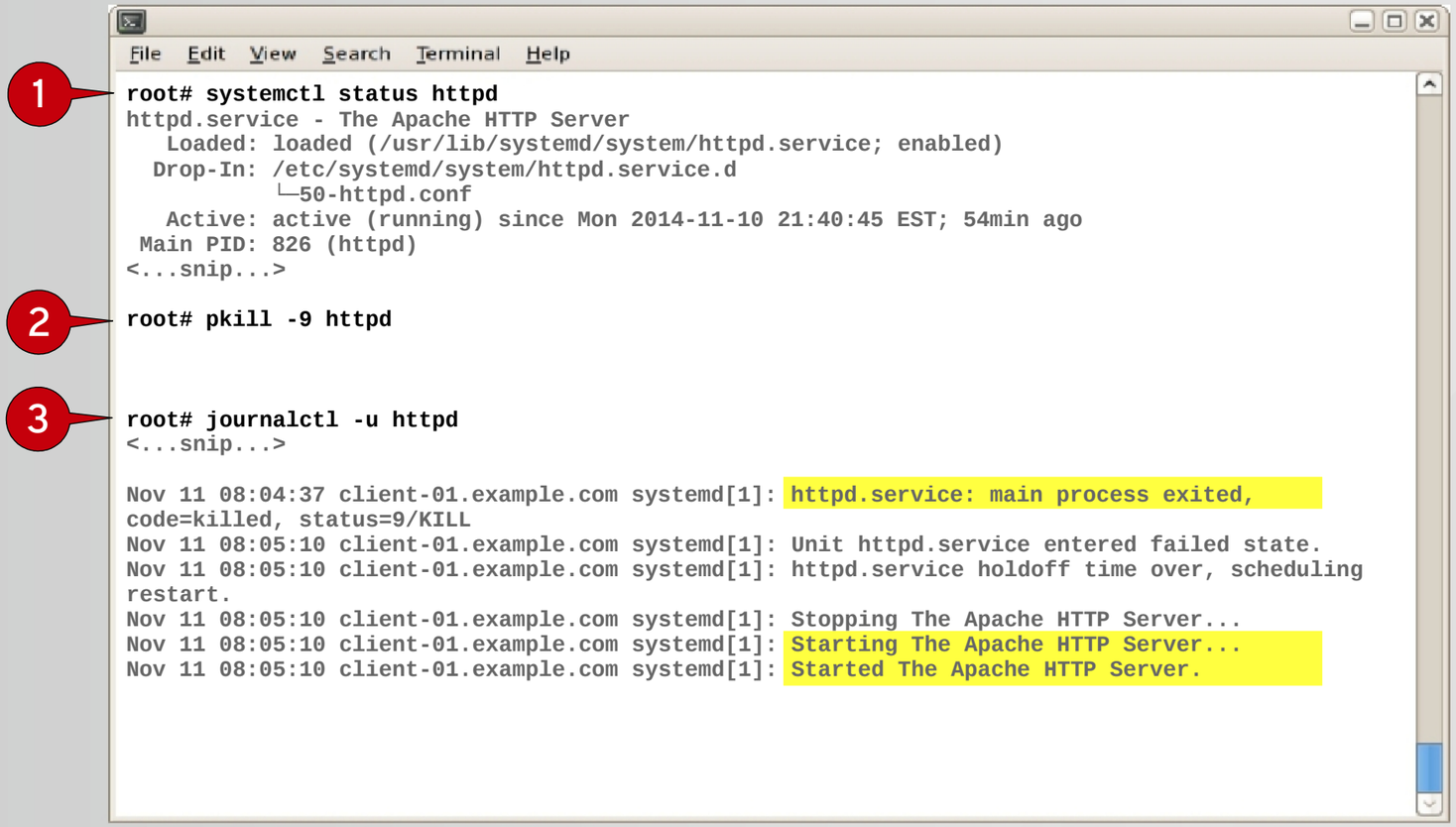
Recall that we changed the security context of the files in the unpacked tarball

Revisiting SELinux



1. Restore SELinux Security Context

Revisiting Systemd



1. Check httpd status with systemd
2. Abruptly kill httpd processes
3. Examine httpd logs with journald

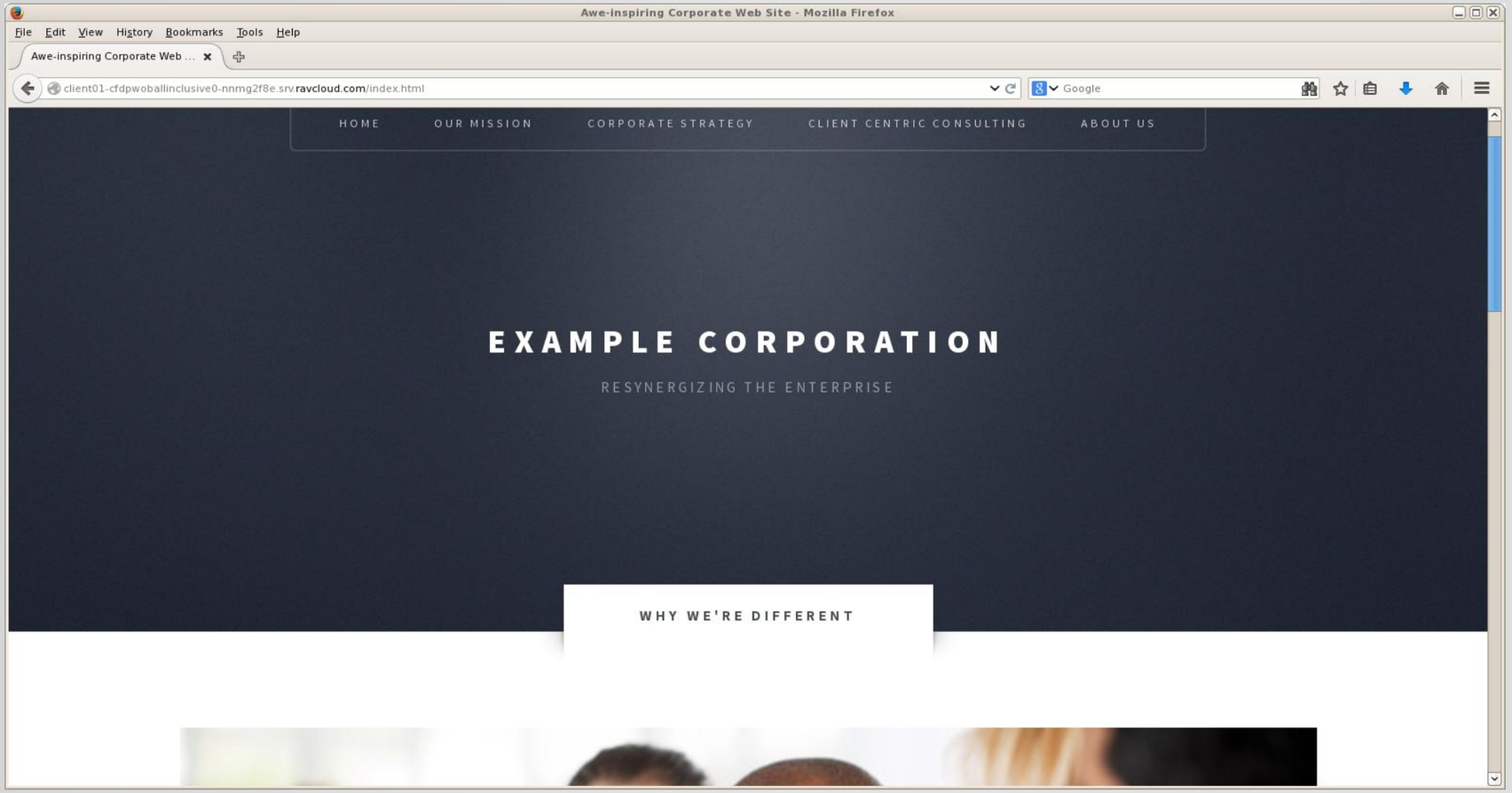
Note

httpd exited
httpd restarted

Now you can reload the web page

Validate Webserver Setup

Use the URL provided



QUESTIONS?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