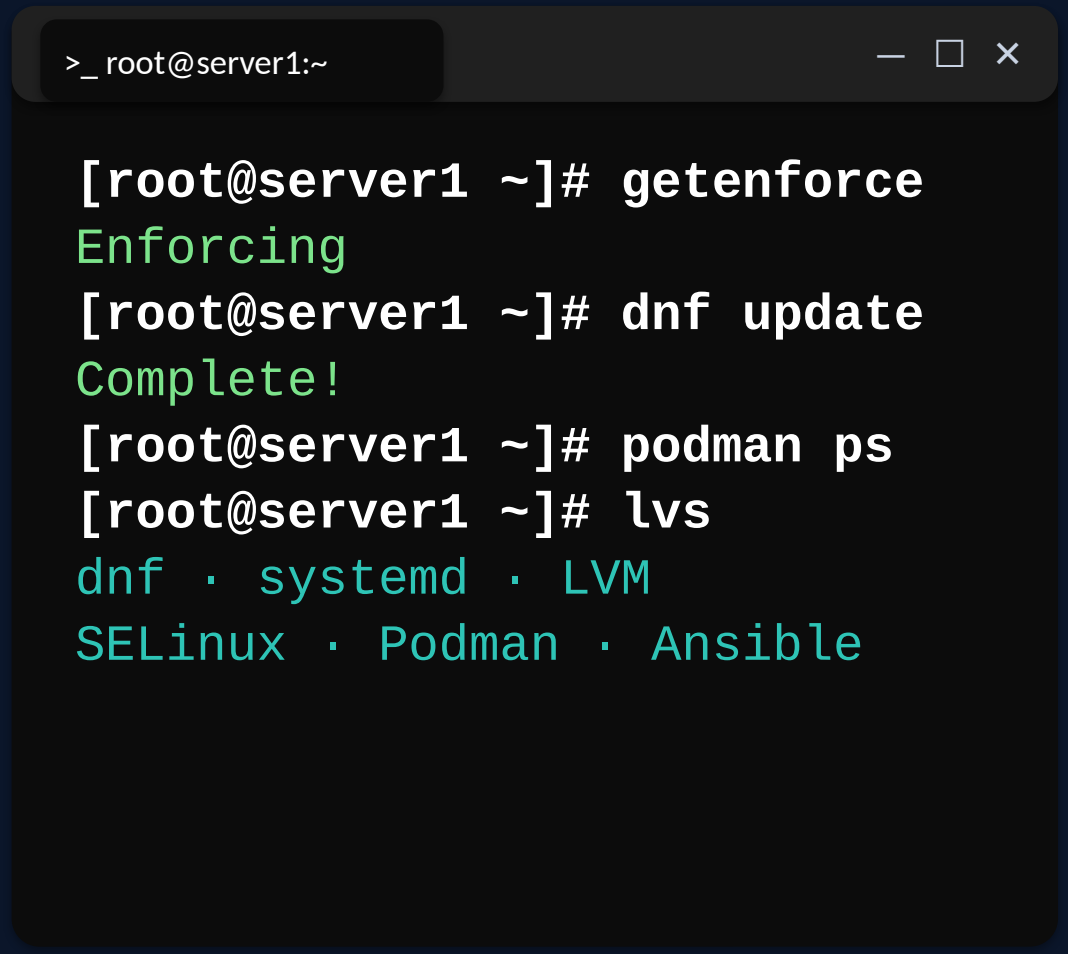


LESSON 12 OF 12

Red Hat Enterprise Linux

RHEL 9 & 10 · Admin · SELinux

Scripting, Ansible, Image Mode, Troubleshooting & RHCSA

Full Course · RHEL 10.3 & 9.9 (Nov 2026)

What You Will Learn in Lesson 12

- Bash scripting: variables, conditions, loops, exit codes
- A real script: a server health report
- Ansible: inventory, ad hoc commands, playbooks
- RHEL system roles
- Image mode (bootc): RHEL as a container image
- A troubleshooting method from boot to application
- The RHCSA and RHCE exams, and what to learn next

Bash Scripting Basics

```
#!/bin/bash
# /usr/local/bin/adduser-batch.sh — create users from a file
set -euo pipefail
file=${1:?usage: $0 users.txt}
if [[ ! -r $file ]]; then
    echo "Cannot read $file" >&2 ; exit 1
fi
while read -r user group; do
    if id "$user" &>/dev/null; then
        echo "skip: $user exists"
    else
        useradd -G "$group" "$user" && echo "added: $user ($group)"
    fi
done < "$file"
```

Script Building Blocks

Element	Example
Variables	name=web01 ; echo "Host: $name" ; today=$(date +%F)
Arguments	$1 $2 … ; $# count ; $@ all ; $0 script name
Exit codes	$? — 0 = success; anything else = failure
Tests	[[-f file]] [[-d dir]] [[$a == $b]] ((n > 5))
Loops	for h in server1 server2; do ssh $h uptime; done
Functions	log() { echo "$(date +%T) $*"; }
Check scripts	bash -n script.sh ; shellcheck script.sh (EPEL)

A Real Script: Server Health Report

```
#!/bin/bash
# /usr/local/bin/health.sh — run daily from cron or a systemd timer
echo "== $(hostname) $(date '+%F %T') =="
echo "Uptime: $(uptime -p)"
echo "Load:   $(cut -d' ' -f1-3 /proc/loadavg)"
df -h --output=target,pcent -x tmpfs | awk 'NR>1 && $2+0 > 80 {print "DISK WARNING:", $0}'
free -m | awk '/Mem/ {printf "Memory used: %d%%\n", $3*100/$2}'
systemctl --failed --no-legend | sed 's/^/FAILED: /'
echo "SELinux: $(getenforce)   Updates waiting: $(dnf -q check-update | grep -c .)"
journalctl -p err --since yesterday --no-pager | tail -5
```

Ansible: Inventory and Ad Hoc Commands

```
[student@server1 ~]$ sudo dnf install -y ansible-core rhel-system-roles
[student@server1 ~]$ mkdir ~/ansible && cd ~/ansible
[student@server1 ansible]$ cat inventory
[web]
server1.lab.local
[files]
server2.lab.local
[student@server1 ansible]$ cat ansible.cfg
[defaults]
inventory = ./inventory
[privilege_escalation]
become = true
[student@server1 ansible]$ ansible all -m ping
[student@server1 ansible]$ ansible files -m dnf -a 'name=htop state=present'
```

A Playbook

```
# web.yml
- name: Configure web servers
  hosts: web
  tasks:
    - name: Install Apache
      ansible.builtin.dnf: { name: httpd, state: latest }
    - name: Home page
      ansible.builtin.copy:
        content: "Managed by Ansible on {{ inventory_hostname }}\n"
        dest: /var/www/html/index.html
    - name: Start and enable
      ansible.builtin.service: { name: httpd, state: started, enabled: true }
    - name: Open firewall
      ansible.posix.firewalld: { service: http, permanent: true, immediate: true, state: enabled }
[student@server1 ansible]$ ansible-playbook web.yml
```

RHEL System Roles

Role	Configures
rhel-system-roles.timesync	chrony time sources
rhel-system-roles.firewall	firewalld zones, services, ports
rhel-system-roles.selinux	Modes, booleans, file contexts, ports
rhel-system-roles.storage	Partitions, LVM, file systems, mounts
rhel-system-roles.network	NetworkManager connections
rhel-system-roles.podman	Containers and Quadlet units
Docs and examples	/usr/share/doc/rhel-system-roles/

Image Mode: RHEL as a Container Image

```
# Containerfile
FROM registry.redhat.io/rhel10/rhel-bootc:10.3
RUN dnf -y install httpd && systemctl enable httpd
COPY index.html /var/www/html/

[student@server1 ~]$ podman build -t registry.lab.local/web-os:1.0 .
[student@server1 ~]$ podman push registry.lab.local/web-os:1.0
# Install: bootc-image-builder makes an ISO, qcow2 or cloud image from it
# On a running image-mode host:
[root@web01 ~]# bootc status
[root@web01 ~]# bootc upgrade       # pull the new image, applied at next reboot
[root@web01 ~]# bootc rollback      # go back to the previous image
```

A Troubleshooting Method

Layer	Ask	Tools
Boot	Does it boot? Which target?	GRUB menu, rd.break, journalctl -b -1
Storage	Full disk? Bad fstab line?	df -h, lsblk, mount -a, emergency mode
Network	Address, gateway, DNS?	ip, ping, dig, nmcli (Lesson 8 steps)
Service	Running? Enabled? Errors?	systemctl status, journalctl -u
Security	Firewall? SELinux? Permissions?	firewall-cmd, ausearch -m AVC, ls -lZ
Resources	CPU, memory, I/O?	top, free, vmstat, iostat (sysstat)
Change	What changed recently?	dnf history, journalctl, git log of configs

RHCSA, RHCE and Next Steps

Item	Details
RHCSA (EX200)	Hands-on exam: real tasks on live systems; this course covers its topics
RHCE (EX294)	Automation with Ansible; requires RHCSA
Practice	Do every homework twice; time yourself; use only man pages
Check before booking	Current exam version and objectives on redhat.com
Free learning	Red Hat Developer, docs.redhat.com, our videos and PDFs
Next courses	Rocky Linux 9/10, Fedora family, Debian/Ubuntu at MyWebUniversity

Course Summary

- Lessons 1–3: versions and lab, installation and Cockpit, the command line
- Lessons 4–6: users and permissions, dnf, systemd, boot and logs
- Lessons 7–9: storage and LVM, networking and firewalld, SELinux
- Lessons 10–11: Apache, NFS, Podman; security, backup, upgrading 9 to 10
- Lesson 12: scripting, Ansible, image mode, troubleshooting, RHCSA
- Final project: rebuild server1 from scratch with one Ansible playbook

Thank You! 🙏

Free videos & PDFs: www.MyWebUniversity.com

Slides for this lesson: MyWebUniversity.com/presentations

YouTube: @MyWebUniversity · @MyWebUniversity-Dari

Wahidullah Lutfy — Founder and Director of IT of MyWebUniversity, and CS teacher

Book: The Direct Path to Linux Ubuntu (Amazon · Barnes & Noble)

Learn it, then pass it on.