Red Hat Syllabus & Contains

Red Hat is a leading global provider of open-source software solutions, best known for Red Hat Enterprise Linux (RHEL), a widely adopted operating system tailored for enterprise environments. Red Hat focuses on delivering reliable, scalable, and secure software solutions that support diverse IT workloads, from cloud and virtualization to automation and Kubernetes-based container management with OpenShift. Its ecosystem includes middleware, storage, and development tools that enable organizations to build, deploy, and manage complex applications. With a strong emphasis on community-driven innovation, Red Hat collaborates with open-source communities to ensure that its solutions are adaptable and continuously evolving to meet enterprise needs.

1. RHCSA (Red Hat Certified System Administrator) Syllabus

RHCSA focuses on foundational Linux skills necessary for system administrators who manage Red Hat Enterprise Linux (RHEL) systems. This certification emphasizes hands-on tasks, basic system management, and security.

1.1 System Basics and Configuration

- Installation and Initial Setup
    - Understand system requirements, installation processes, and partitioning schemes.
    - Set up the system to boot into GUI or CLI as needed.
    - Install RHEL and configure repositories for package management.
- Basic Commands and Directory Navigation
    - Master file and directory manipulation commands like ls, cp, mv, rm.
    - Familiarize with file viewing commands (cat, less, head, tail).
    - Understand file compression utilities (tar, gzip, bzip2).

1.2 User and Group Management

- User Accounts and Permissions:
    - Create, modify, and delete user accounts, set user passwords, and manage group memberships.
    - Understand file permissions (read, write, execute) and use chmod, chown, and chgrp.

- Implement Access Control Lists (ACLs) for advanced file permissions.

➢ Password Policies:

- Set password aging policies, expiration warnings, and account lockout policies.

1.3 Networking Fundamentals

➢ Network Configuration:

- Configure IP addresses, gateways, DNS servers using nmcli and nmtui.
- Set up static IP addresses and troubleshoot network connectivity.

➢ Troubleshooting Tools:

- Use ping, netstat, ss, traceroute, and curl for diagnosing network issues.

1.4 File Systems and Storage Management

➢ Disk Partitioning and Formatting

- Use fdisk, parted, and mkfs commands for creating partitions and filesystems.

➢ Logical Volume Manager (LVM)

- Create volume groups, logical volumes, and manage storage resizing.

➢ Mounting and Unmounting File Systems

- Automate mounting using /etc/fstab and manage file systems (ext4, xfs).

1.5 Process and Service Management

➢ System Processes

- Monitor and manage processes using ps, top, kill, and pkill.

➢ Service Control

- Use systemctl to start, stop, enable, and disable system services.

1.6 Basic Security

➢ Firewalls

- Configure and manage firewalld to control access and secure network services.

➢ SELinux

- Set SELinux modes, view SELinux policies, and troubleshoot SELinux issues.

➢ Secure SSH Access

- Configure SSH daemon for security, manage SSH keys, and control access.

2. RHCE (Red Hat Certified Engineer) Syllabus

RHCE focuses on advanced system administration, network services, and automation. This certification emphasizes enterprise-level skills and Ansible automation, making it ideal for managing large-scale RHEL deployments.

2.1 Advanced System Configuration and Management

- System Boot Process:
  - Troubleshoot GRUB2 boot loader issues, recover from failed boots, and use rescue mode.
- Automating Tasks:
  - Write shell scripts to automate common administration tasks.
  - Use cron and at for scheduling repetitive tasks.

2.2 Automation with Ansible

- Ansible Basics:
  - Install and configure Ansible, create inventory files, and understand basic Ansible commands.
- Writing Playbooks:
  - Create playbooks for configuration management, install packages, and apply settings.
- Roles and Modules:
  - Organize playbooks using roles, utilize Ansible modules for specific tasks, and create reusable code.

2.3 Network Services and Security

- Advanced Network Configuration:
  - Configure network bridging, bonding, VLANs, and link aggregation.
- Network Services Configuration:
  - HTTP/HTTPS: Install and configure Apache/Nginx web servers, enable SSL/TLS.
  - DNS: Configure a caching or forwarding DNS server with bind.
  - FTP and SFTP: Set up FTP servers, secure with SSL/TLS, and configure user access.
  - SMTP: Configure local mail delivery, and manage sendmail/postfix for internal communication.
- Advanced SSH Configuration:
  - Use SSH for remote command execution, configure key-based authentication, and manage port forwarding.

2.4 Security and Access Controls

- Firewalld:
  - Set complex rules and zones in firewalld to secure network traffic.
- SELinux:
  - Advanced SELinux policy configuration, manage SELinux booleans, and troubleshoot access issues.
- System Auditing:
  - Configure auditd for monitoring and tracking system events, set auditing rules.

2.5 Storage and File Systems

- iSCSI and NFS:
  - Configure iSCSI initiator and target for network storage, set up and secure NFS shares.
- Automating Storage Tasks:
  - Use Ansible playbooks for automated storage configuration and logical volume management.
- Stratis and VDO:
  - Configure Stratis for managing pools and file systems, enable VDO for deduplication and compression.

2.6 Monitoring and Performance Tuning

- System Performance Analysis:
  - Analyze CPU, memory, disk usage with top, htop, vmstat, iostat.
- Resource Limits:
  - Set CPU, memory limits for users and groups, control resource usage with ulimit.
- Logging and System Journals:
  - Manage log files with rsyslog, configure log rotation, and understand system journaling with journalctl.

2.7 Troubleshooting and Rescue

- Boot Troubleshooting:
  - Use RHEL rescue mode for system recovery, troubleshoot bootloader issues.
- Diagnostic Tools:
  - Utilize diagnostic tools like dmesg, strace, and lsof to resolve common system issues.