Linux Certification Labs Workshop

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Audience Poll Question

Which Linux Certification are you preparing for?

- RHCSA
- LFCS
- Linux+
- LPIC-1
- Other (please mention in group chat)

Audience Poll Question

How far along are you in your preparation?

- just started
- somewhere halfway
- quite far
- almost ready

Audience Poll Question

Where are you from? (Single Answer)

- North/Central America
- South America
- Middle East
- Europe
- India
- Africa
- Asia (other)
- Australia/pacific

Agenda: Scenario List (part 1)

- find and grep
- users
- partitions
- LVM
- Permissions
- Scheduling Jobs
- Virtual Machines
- SSH
- Firewalling
- SELinux

Agenda: Scenarios List - part 2

- Resource restrictions
- Storage management
- Analyzing performance
- Compling software from source
- NFS
- Time
- Systemd
- Logging
- Containers
- TLS

Course Prerequisites

- **Knowledge and experience**
  - You should be almost ready to take the exam of your choice
- **Setup**
  - A virtual machine that runs the operaring system needed for your exam (Ubuntu 22.04, RHEL 9 or equivalent)

Course Expectations

- This course does not reveal any real exam questions
- Any ressemblance of questions in this course to real exam questions is coincidental
- Questions and assignment in this course in general are harder than the real exam questions, to ensure you get the best possible preparation
- If you don't know how to answer specific parts of the assingment, don't worry! You're here to learn!
- The reason for doing this, is that we want you to be really ready for the exam, and have a knowledge level beyond understanding exam topics

Scenario 1: Finding files

Finding Files

- Use the find command to find how many hard links exist on your system. What we need is the number of inodes that have more than one name pointing to it.

Scenario 2: User Management

User Management

- Make sure all users have complex passwords of at least 14 characters, where the new password must have at least 3 bytes that are not present in the old password
- Create users linda, lori and anna who are a member of the group support as a secondary group. All members of this group should have sudo privileges to create and delete users, and reset passwords but NOT the password of the root user

Scenario 3: Partition Management

Creating Partitions

- Add a 20GiB disk to your virtual machine
- Create 5 partitions with a size of 2 GiB each. Do NOT use logical partitions
- Format the first partition with the Ext3 filesystem. Make sure the filesystem uses a journal where all data is committed to the journal before being written to disk
- Mount the filesystem persistently on the directory /files, using its UUID

Scenario 4: Logical Volume Management

Resizing Logical Volumes

- Use the second partition created in the previous exercise in an LVM setup. Based on this partition, create a volume group with the name vgfiles, and in this VG, create a logical volume with the name lvfiles that uses all of the available disk space in the VG. Format the logical volume with the ext4 filesystem and make sure it mounts persistently on the directory /lvfiles. Reboot to verify that the filesystem mounts
- After rebooting, double the size of the filesystem. If necessary, create the resources required to do so

Scenario 5: Permission Management

Managing Permissions

- Create the directory /data/support. Ensure that all users who are a member of the group support can write to this directory
- User lori should NOT be able to list any files in this directory

Scenario 6: Scheduling Jobs

Scheduling Jobs

- As user linda, run a scheduled job every day at 5:15 PM. The job should print the current date, day of the week and time in the format "Weekday dd-mm-yyyy hh:mm". Output should be appended to the file /tmp/lindacron.txt

Scenario 7: Virtual Machines

Virtual Machines

- Use command line utilities to create a virtual machine that is based on the following image: https://cloud-images.ubuntu.com/jammy/current/jammy-server-cloudimg-amd64-disk-kvm.img
- The virtual machine should use 512MiB RAM and have the name "examvm"
- **Note: this task might not work due to restrictions in your environment**

Scenario 8: Secure Shell

Secure Shell

- Configure your SSH server according to the following requirements
- Users linda and anna should only be allowed to log in using SSH keys. Configure keys for these accounts
- User lisa should also be allowed to log in using passwords
- Other users (including the root user) should not have SSH access at all

Scenario 9: Firewalling

Firewalling

- Configure your Linux firewall to forward all packets that are addressed to port 80 to port 9080

Scenario 10: SELinux

Configuring SELinux

- Install the vsftpd service. Edit the /etc/vsftpd/vsftpd.conf file to allow anonymous access, writes and anonymous writes
- Start and enable the vsftpd service
- Install the lftp utility, and use **lftp localhost** to connect to the FTP service
- Try to use **put /etc/hosts** to upload a file in the /pub directory in the FTP document root
- This doesn't work. Use SELinux and everything else that is needed to fix this

Scenario 11: Resource Restrictions

Resource restrictions

- Set the maximum number of processes that user lisa can start to 2,000
- Configure SSHD such that it cannot use more than 128MiB RAM

Scenario 12: Storage Management

Storage Management

- Use the **dd** command to create an empty file with the name "big.log" and a size of 10 MiB anywhere on your system
- Identify all storage devices that have more than 10% of disk space used, and on these devices, delete all files with the extension log, but only if they're bigger than 5MiB

Scenario 13: Analyzing Performance

Analyzing Performance

- Configure your system to handle the identified typical workload in the best possible way

Scenario 14: Compiling Software from Source

Compiling Software

- From the course Git repository in https://github.com/sandervanvugt/examlabs, compile the software in the fingerd directory

Scenario 15: Network File System

Network File System

- Configure an NFS server that meets the following requirements
  - The directory /var is shared and accessible only for clients on the NFS server local network
  - When user root access the share from a client system, root privileges should be taken away
- Configure an NFS client that meets the following requirements
  - The client is configured on the same host as the NFS server
  - The client mounts the host share on the directory /nfs
  - A systemd mount unit is configured to mount this share automatically

Scenario 16: Time Management

Time Management

- Ensure that your server synchronizes time with the server pool.ntp.org
- Manually synchronize your server hardware time with the system time

Scenario 17: Systemd

Systemd

- Create a systemd unit file that starts the **sleep infinity** command. Configure it such that if it is stopped, it will automatically be started again within 30 seconds. Make sure this unit file is started and enabled.

Scenario 18: Logging

Logging

- Configuring Logging, such that the following conditions are met
  - The systemd journal is written persistently
  - A file /var/log/critical is created and only contains message with priority err or higher
  - The file /var/log/critical is rotated every month, and the last 12 versions of this file are kept on disk

Scenario 19: Container Management

Container Management

- If you're running this lab on a system that has SELinux, please use **setenforce 0** to temporarily switch it off
- Use the Dockerfile from the course Git repository at https://github.com/sandervanvugt/examlabs/docker
- Build it, using the image name examlab, and run the resulting image as a container with the name examlab with the following requirements:
  - The host /tmp directory is mounted in the container /tmp directory
  - Memory is restricted to 128 MiB
- Verify that the container creates the file as expected

Scenario 20: Managing TLS Certificates

Managing TLS Certificates

- Identity the common name in the tls.crt file that you can find in the course Git repository at https://github.com/sandervanvugt/examlabs. Copy this certificate to the appropriate directory