GL-314: Linux Troubleshooting

Course Length: 5 days

Course Description

The GL314 is designed to give Linux administrators experience with both common and uncommon system problems. The course is based on the idea that the best way to learn troubleshooting is to perform troubleshooting. Approximately 25% of class time is spent on lecture, leaving 75% for intensive lab content. Class starts with a discussion of effective troubleshooting technique. Tools and topics are gradually introduced over the course of the week. Students practice applying these tools and techniques in self-paced labs. Students can choose from over 120 scenarios organized by topic and difficulty. Because each scenarios is independent of the others, students can choose scenarios according to their interests and experience. Each scenario is designed to help students develop deeper understanding while exploring the problem. All scenarios includes optional hints designed to reflect a realistic troubleshooting process while only gradually revealing the solution. Students find the flexibility and challenge of this course very rewarding.

Prerequisites: This course is designed for intermediate to advanced users. Students should have already taken the GL120, GL250 and GL275, or have equivalent knowledge. A short refresher for each topic will be presented, but will not be discussed in depth.

Distributions: Red Hat Enterprise Linux 8

Course Outline

1 **TROUBLESHOOTING METHODOLOGY**
- 1 The Troubleshooting Mindset
- 2 Evaluating Possible Solutions
- 3 Identifying and Implementing Change
- 4 Define and Follow Policies
- 5 Working with Others
- 6 Finding Documentation
- 7 Finding Help Online

2 **TROUBLESHOOTING TOOLS**
- 1 Common Troubleshooting Tools
- 2 RPM Queries
- 3 RPM Verification
- 4 SRPM and spec Files
- 5 Hardware Discovery Tools
- 6 Configuring New Hardware with hwinfo
- 7 strace and ltrace
- 8 lsof and fuser
- 9 ipcs and ipcrm
- 10 iostat, mpstat, and vmstat
- 11 Using hdparm to Measure
- 12 Troubleshooting with the ip command
- 13 Name Resolution
- 14 ss/netstat and rpcinfo
- 15 nmap
- 16 Netcat
- 17 tcpdump and wireshark

LAB TASKS
- 1 Determining the System's Configuration
- 2 Troubleshooting with rpm
- 3 Process Related Tools
- 4 Network Tools

3 RESCUE ENVIRONMENTS

1. Diagnostic/Recovery Runlevels
2. Rescue Procedures
3. Recovery: mount & chroot
4. Recovery Examples
5. Recovery: Network Utilities

LAB TASKS

1. Recovery Runlevels
2. Recovering Damaged MBR
3. Recover from Deleted Critical Files

4 TOPIC GROUP 1

1. Linux Boot Process
2. System Boot Method Overview
3. systemd System and Service Manager
4. Using systemd
5. Booting Linux on PCs
6. Troubleshooting With GRUB 2
7. Boot Process Troubleshooting
8. Troubleshooting: Linux and Init
9. Process Management
10. Process Management Tools
11. Troubleshooting Processes: top
12. Filesystem Concepts
13. Filesystem Troubleshooting
14. Backup Concepts
15. Backup Troubleshooting
16. Backup Troubleshooting

LAB TASKS

1. Troubleshooting Problems: Topic Group 1

5 TOPIC GROUP 2

1. Networking Tools
2. Linux Network Interfaces
3. Networking Commands Review
4. NetworkManager
5. Networking Troubleshooting
6. Networking Troubleshooting
7. Virtual Interfaces/IP Aliases
8. Network Teaming
9. Xinetd Concepts
10. Xinetd Troubleshooting
11. TCP Wrappers Concepts
12. TCP Wrappers Concepts
13. TCP Wrappers Troubleshooting
14. Netfilter/iptables Concepts
15. Netfilter/iptables Troubleshooting

LAB TASKS

1. Troubleshooting Problems: Topic Group 2

6 TOPIC GROUP 3

1. X11 Concepts
2. X11 Server Operation
3. X11 Troubleshooting
4. Rsyslog Concepts
5. System Logging
6. systemd Journal
7. systemd Journal's journactl
8. Secure Logging with Journal's Log Sealing
9. Syslog Troubleshooting
10. RPM Concepts
11. RPM Troubleshooting
12. Common Unix Printing System (CUPS)
13. CUPS Troubleshooting
14. CUPS Troubleshooting

15 at & cron
16 at & cron Usage
17 at & cron Troubleshooting

LAB TASKS

1 Troubleshooting Problems: Topic Group 3

7 TOPIC GROUP 4

1 Users and Groups
2 Users and Groups Troubleshooting
3 PAM Concepts
4 PAM Troubleshooting
5 Filesystem Quotas
6 Quotas Troubleshooting
7 File Access Control Lists
8 FACL Troubleshooting
9 SELinux Concepts
10 SELinux Troubleshooting
11 SELinux Troubleshooting Continued

LAB TASKS

1 Troubleshooting Problems: Topic Group 4

8 TOPIC GROUP 5

1 Kernel Modules
2 Kernel Modules Troubleshooting
3 Logical Volume Management
4 Creating Logical Volumes
5 LVM Deployment Issues
6 VG Migration, PV Resizing & Troubeshooting
7 Software RAID Overview
8 RAID Troubleshooting
9 Multipathing Overview
10 SAN Multipathing
11 Multipath Configuration
12 Multipathing Best Practices
13 LDAP and OpenLDAP
14 Troubleshooting OpenLDAP
15 NIS and NIS+ (YP)
16 NIS Troubleshooting Aids

LAB TASKS

1 Troubleshooting Problems: Topic Group 5

9 TOPIC GROUP 6

1 DNS Concepts
2 DNS Troubleshooting
3 DNS Troubleshooting
4 Apache Concepts
5 Apache Troubleshooting
6 Apache Troubleshooting
7 FTP Concepts
8 FTP Troubleshooting
9 Squid Concepts
10 Squid Troubleshooting

LAB TASKS

1 Troubleshooting Problems: Topic Group 6

10 TOPIC GROUP 7

1 Samba Concepts
2 Samba Troubleshooting
3 Postfix Concepts
4 Postfix Troubleshooting
5 Postfix Troubleshooting
6 Sendmail Concepts
7 Sendmail Troubleshooting
8 IMAP & POP Concepts
9 IMAP/POP Troubleshooting

LAB TASKS

1 Troubleshooting Problems: Topic Group 7