

GL-275: Red Hat Linux Network Services

Course Length: 5 days

Course Description: The GL275 is an expansive course that covers a wide range of network services useful to every organization. Special attention is paid to the concepts needed to implement these services securely, and to the trouble-shooting skills which will be necessary for real-world administration of these network services. Like all Guru Labs courses, the course material is designed to provide extensive hands-on experience. Topics include: Security with SELinux and Netfilter, DNS concepts and implementation with Bind; LDAP concepts and implementation using OpenLDAP; Web services with Apache; FTP with vsftpd; caching, filtering proxies with Squid; SMB/CIFS (Windows networking) with Samba; and e-mail concepts and implementation with Postfix combined with either Dovecot or Cyrus.

Prerequisites: Students should already be comfortable with basic Linux or Unix administration. Fundamentals such as the Linux filesystem, process management, and how to edit files will not be covered in class. A good understanding of network concepts, the TCP/IP protocol suite is also assumed. These skills are taught in the [GL120 "Linux Fundamentals"](#) and [GL250 "Enterprise Linux Systems Administration"](#) courses.

Distributions: Red Hat Enterprise Linux 8

Course Outline

1 SECURING SERVICES

- 1 Xinetd
- 2 Xinetd Connection Limiting and Access Control
- 3 Xinetd: Resource limits, redirection, logging
- 4 TCP Wrappers
- 5 The /etc/hosts.allow & /etc/hosts.deny Files
- 6 /etc/hosts.{allow,deny} Shortcuts
- 7 Advanced TCP Wrappers
- 8 FirewallD
- 9 Netfilter: Stateful Packet Filter Firewall
- 10 Netfilter Concepts
- 11 Using the iptables Command
- 12 Netfilter Rule Syntax
- 13 Targets
- 14 Common match_specs
- 15 Connection Tracking

LAB TASKS

- 1 Securing xinetd Services
- 2 Enforcing Security Policy with xinetd
- 3 Securing Services with TCP Wrappers
- 4 Securing Services with Netfilter
- 5 FirewallD
- 6 Troubleshooting Practice

2 SELINUX AND LSM

- 1 SELinux Security Framework
- 2 Choosing an SELinux Policy
- 3 SELinux Commands
- 4 SELinux Booleans
- 5 SELinux Policy Tools

LAB TASKS

- 1 SELinux File Contexts

3 DNS CONCEPTS

- 1 Naming Services
- 2 DNS – A Better Way
- 3 The Domain Name Space
- 4 Delegation and Zones
- 5 Server Roles
- 6 Resolving Names
- 7 Resolving IP Addresses
- 8 Basic BIND Administration
- 9 Configuring the Resolver
- 10 Testing Resolution

LAB TASKS

- 1 Configuring a Slave Name Server

4 CONFIGURING BIND

- 1 BIND Configuration Files
- 2 named.conf Syntax
- 3 named.conf Options Block
- 4 Creating a Site-Wide Cache
- 5 rndc Key Configuration
- 6 Zones In named.conf
- 7 Zone Database File Syntax
- 8 SOA – Start of Authority
- 9 A, AAAA, & PTR – Address & Pointer Records
- 10 NS – Name Server
- 11 TXT, CNAME, & MX – Text, Alias, & Mail Host
- 12 SRV – SRV Service Records
- 13 Abbreviations and Gotchas
- 14 \$GENERATE, \$ORIGIN, and \$INCLUDE

LAB TASKS

- 1 Use rndc to Control named
- 2 Configuring BIND Zone Files

5 CREATING DNS HIERARCHIES

- 1 Subdomains and Delegation
- 2 Subdomains
- 3 Delegating Zones
- 4 in-addr.arpa. Delegation
- 5 Issues with in-addr.arpa.
- 6 RFC2317 & in-addr.arpa.

LAB TASKS

- 1 Create a Subdomain in an Existing Domain
- 2 Subdomain Delegation

6 ADVANCED BIND DNS FEATURES

- 1 Address Match Lists & ACLs
- 2 Split Namespace with Views
- 3 Restricting Queries
- 4 Restricting Zone Transfers
- 5 Running BIND in a chroot
- 6 Dynamic DNS Concepts
- 7 Allowing Dynamic DNS Updates
- 8 DDNS Administration with nsupdate
- 9 Common Problems
- 10 Common Problems
- 11 Securing DNS With TSIG

LAB TASKS

- 1 Configuring Dynamic DNS
- 2 Securing BIND DNS

7 USING APACHE

- 1 HTTP Operation
- 2 Apache Architecture
- 3 Dynamic Shared Objects
- 4 Adding Modules to Apache
- 5 Apache Configuration Files
- 6 httpd.conf – Server Settings
- 7 httpd.conf – Main Configuration

- 8 HTTP Virtual Servers
- 9 Virtual Hosting DNS Implications
- 10 httpd.conf – VirtualHost Configuration
- 11 Port and IP based Virtual Hosts
- 12 Name-based Virtual Host
- 13 Apache Logging
- 14 Log Analysis
- 15 The Webalizer

LAB TASKS

- 1 Apache Architecture
- 2 Apache Content
- 3 Configuring Virtual Hosts

8 APACHE SECURITY

- 1 Virtual Hosting Security Implications
- 2 Delegating Administration
- 3 Directory Protection
- 4 Directory Protection with AllowOverride
- 5 Common Uses for .htaccess
- 6 Symmetric Encryption Algorithms
- 7 Asymmetric Encryption Algorithms
- 8 Digital Certificates
- 9 TLS Using mod_ssl.so

LAB TASKS

- 1 Using .htaccess Files
- 2 Using TLS Certificates with Apache
- 3 Use SNI and TLS with Virtual Hosts

9 APACHE SERVER-SIDE SCRIPTING ADMINISTRATION

- 1 Dynamic HTTP Content
- 2 PHP: Hypertext Preprocessor
- 3 Developer Tools for PHP
- 4 Installing PHP
- 5 Configuring PHP
- 6 Securing PHP
- 7 Security Related php.ini Configuration
- 8 Java Servlets and JSP
- 9 Apache's Tomcat
- 10 Installing Java SDK
- 11 Installing Tomcat Manually
- 12 Using Tomcat with Apache

LAB TASKS

- 1 CGI Scripts in Apache
- 2 Apache's Tomcat
- 3 Using Tomcat with Apache
- 4 Installing Applications with Apache and Tomcat

10 IMPLEMENTING AN FTP SERVER

- 1 The FTP Protocol
- 2 Active Mode FTP
- 3 Passive Mode FTP
- 4 ProFTPD
- 5 Pure-FTPd
- 6 vsftpd
- 7 Configuring vsftpd
- 8 Anonymous FTP with vsftpd

LAB TASKS

- 1 Configuring vsftpd

11 THE SQUID PROXY SERVER

- 1 Squid Overview
- 2 Squid File Layout
- 3 Squid Access Control Lists
- 4 Applying Squid ACLs
- 5 Tuning Squid & Configuring Cache Hierarchies
- 6 Bandwidth Metering
- 7 Monitoring Squid

- 8 Proxy Client Configuration

LAB TASKS

- 1 Installing and Configuring Squid
- 2 Squid Cache Manager CGI
- 3 Proxy Auto Configuration
- 4 Configure a Squid Proxy Cluster

12 LDAP CONCEPTS AND CLIENTS

- 1 LDAP: History and Uses
- 2 LDAP: Data Model Basics
- 3 LDAP: Protocol Basics
- 4 LDAP: Applications
- 5 LDAP: Search Filters
- 6 LDIF: LDAP Data Interchange Format
- 7 OpenLDAP Client Tools
- 8 Alternative LDAP Tools

LAB TASKS

- 1 Querying LDAP

13 OPENLDAP SERVERS

- 1 Popular LDAP Server Implementations
- 2 OpenLDAP: Server Architecture
- 3 OpenLDAP: Backends
- 4 OpenLDAP: Replication
- 5 Managing slapd
- 6 OpenLDAP: Configuration Options
- 7 OpenLDAP: Configuration Sections
- 8 OpenLDAP: Global Parameters
- 9 OpenLDAP: Database Parameters
- 10 OpenLDAP Server Tools
- 11 Native LDAP Authentication and Migration
- 12 Enabling LDAP-based Login
- 13 System Security Services Daemon (SSSD)

LAB TASKS

- 1 Building An OpenLDAP Server
- 2 Enabling TLS For An OpenLDAP Server
- 3 Enabling LDAP-based Logins

14 SAMBA CONCEPTS AND CONFIGURATION

- 1 Introducing Samba
- 2 NetBIOS and NetBEUI
- 3 Samba Daemons
- 4 Accessing Windows/Samba Shares from Linux
- 5 Samba Utilities
- 6 Samba Configuration Files
- 7 The smb.conf File
- 8 Mapping Permissions and ACLs
- 9 Mapping Linux Concepts
- 10 Mapping Users
- 11 Sharing Home Directories
- 12 Sharing Printers
- 13 Share Authentication
- 14 Share-Level Access
- 15 User-Level Access
- 16 Samba Account Database
- 17 User Share Restrictions

LAB TASKS

- 1 Samba Share-Level Access
- 2 Samba User-Level Access
- 3 Samba Group Shares
- 4 Handling Symbolic Links with Samba
- 5 Samba Home Directory Shares

15 SMTP THEORY

- 1 SMTP
- 2 SMTP Terminology
- 3 SMTP Architecture

- 4 SMTP Commands
- 5 SMTP Extensions
- 6 SMTP AUTH
- 7 SMTP STARTTLS
- 8 SMTP Session

16 POSTFIX

- 1 Postfix Features
- 2 Postfix Architecture
- 3 Postfix Components
- 4 Postfix Configuration
- 5 master.cf
- 6 main.cf
- 7 Postfix Map Types
- 8 Postfix Pattern Matching
- 9 Advanced Postfix Options
- 10 Virtual Domains
- 11 Postfix Mail Filtering
- 12 Configuration Commands
- 13 Management Commands
- 14 Postfix Logging
- 15 Logfile Analysis
- 16 Postfix, Relaying and SMTP AUTH
- 17 SMTP AUTH Server and Relay Control
- 18 SMTP AUTH Clients
- 19 Postfix / TLS
- 20 TLS Server Configuration
- 21 Postfix Client Configuration for TLS
- 22 Other TLS Clients
- 23 Ensuring TLS Security

LAB TASKS

- 1 Configuring Postfix
- 2 Postfix Virtual Host Configuration
- 3 Postfix Network Configuration
- 4 Postfix SMTP AUTH Configuration
- 5 Postfix STARTTLS Configuration

17 MAIL SERVICES AND RETRIEVAL

- 1 Filtering Email
- 2 Procmail
- 3 SpamAssassin
- 4 Bogofilter
- 5 amavisd-new Mail Filtering
- 6 Accessing Email
- 7 The IMAP4 Protocol
- 8 Dovecot POP3/IMAP Server
- 9 Cyrus IMAP/POP3 Server
- 10 Cyrus IMAP MTA Integration
- 11 Cyrus Mailbox Administration
- 12 Fetchmail
- 13 SquirrelMail
- 14 Mailing Lists
- 15 GNU Mailman
- 16 Mailman Configuration

LAB TASKS

- 1 Configuring Procmail & SpamAssassin
- 2 Configuring Cyrus IMAP
- 3 Dovecot TLS Configuration
- 4 Configuring SquirrelMail
- 5 Base Mailman Configuration
- 6 Basic Mailing List
- 7 Private Mailing List

18 SENDMAIL

- 1 Sendmail Architecture
- 2 Sendmail Components
- 3 Sendmail Configuration
- 4 Sendmail Remote Configuration
- 5 Controlling Access
- 6 Sendmail Mail Filter (milter)
- 7 Configuring Sendmail SMTP AUTH
- 8 Configuring SMTP STARTTLS

LAB TASKS

- 1 Configuring Sendmail
- 2 Sendmail Network Configuration
- 3 Sendmail Virtual Host Configuration
- 4 Sendmail SMTP AUTH Configuration
- 5 Sendmail STARTTLS Configuration

19 NIS

- 1 NIS Overview
- 2 NIS Limitations and Advantages
- 3 NIS Client Configuration
- 4 NIS Server Configuration
- 5 NIS Troubleshooting Aids

LAB TASKS

- 1 Using NIS for Centralized User Accounts
- 2 Configuring NIS
- 3 NIS Slave Server
- 4 NIS Failover
- 5 Troubleshooting Practice: NIS