

Enterprise Linux Network Services (GL275) H7092S

HPE course number	H7092S
Course length	5 days
Delivery mode	ILT, VILT
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This 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 that are necessary for real world administration of these network services. 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 and filtering proxies with Squid, SMB/CIFS (Windows networking) with Samba, and email 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 are not covered in class. A good understanding of network concepts, the TCP/IP protocol suite is also assumed. These skills are taught in the U8583S: Linux Fundamentals (GL120) and H7091S: Enterprise Linux Systems Administration (GL250) courses.

Supported distributions

- Red Hat Enterprise Linux 8
- SUSE Linux Enterprise 15

Course objectives

At the conclusion of this course, you should have the knowledge and skills to setup, configure, and manage the most popular network services available for Red Hat and SUSE Linux systems.

Detailed course outline

1. Securing Services

- Xinetd
- Xinetd connection limiting and access control
- Xinetd: resource limits, redirection, logging
- TCP wrappers
- The /etc/hosts.allow and /etc/hosts.deny files
- /etc/hosts.{allow,deny} shortcuts
- Advanced TCP wrappers
- FirewallD
- Netfilter: stateful packet filter firewall
- Netfilter concepts
- Using the iptables command
- Netfilter rule syntax
- Targets
- Common match_specs
- Extended packet matching modules
- Connection tracking

Lab Tasks

- Securing xinetd services
- Enforcing security policy with xinetd
- Securing services with Netfilter
- FirewallD
- Troubleshooting practice

2. SELINUX and LSM

- AppArmor
- SELinux security framework
- Choosing an SELinux policy
- SELinux commands
- SELinux booleans
- SELinux policy tools

Lab Tasks

- Exploring AppArmor modes
- SELinux file contexts

3. DNS Concepts

- Naming services
- DNS - A Better Way
- The domain name space
- Delegation and zones
- Server roles
- Resolving names
- Resolving IP addresses
- Basic BIND administration
- Configuring the resolver
- Testing Resolution

Lab Tasks

- Configuring a slave name server

4. Configuring Bind

- BIND configuration files
- named.conf syntax
- named.conf options block
- Creating a sitewide cache
- rndc key configuration
- Zones in named.conf
- Zone database file syntax
- Start of authority
- A, AAAA, and PTR - Address & Pointer Records
- Name Server
- TXT, CNAME, and MX - text, alias, and mail host
- SRV - SRV service records
- Abbreviations and gotchas
- \$GENERATE, \$ORIGIN, and \$INCLUDE

Lab Tasks

- Use rndc to control named
- Configuring BIND zone files

5. Creating DNS Hierarchies

- Subdomains and delegation
- Subdomains
- Delegating zones
- in-addr.arpa. delegation
- Issues with in-addr.arpa.
- RFC2317 and in-addr.arpa.

Lab Tasks

- Create a subdomain in an existing domain
 - Subdomain delegation
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6. Advanced Bind DNS Features

- Address match lists and ACLs
- Split namespace with views
- Restricting queries
- Restricting zone transfers
- Running BIND in a chroot
- Dynamic DNS concepts
- Allowing dynamic DNS updates
- DDNS administration with nsupdate
- Common problems
- Securing DNS With TSIG

Lab Tasks

- Configuring dynamic DNS
- Securing BIND DNS

7. Using Apache

- HTTP operation
- Apache architecture
- Dynamic shared objects
- Adding modules to Apache
- Apache configuration files
- httpd.conf server settings
- httpd.conf main configuration
- HTTP virtual servers
- Virtual hosting DNS implications
- httpd.conf VirtualHost configuration
- Port and IP-based virtual hosts
- Name-based virtual host
- Apache logging
- Log analysis
- The Webalizer

Lab Tasks

- Apache architecture
- Apache content
- Configuring virtual hosts

8. Apache Security

- Virtual hosting security implications
- Delegating administration
- Directory protection
- Directory protection with AllowOverride
- Common uses for .htaccess
- Symmetric encryption algorithms
- Asymmetric encryption algorithms
- Digital certificates
- TLS Using mod_ssl.so

Lab Tasks

- Using .htaccess files
- Using TLS certificates with Apache
- Use SNI and TLS with virtual hosts

9. Apache Server-Side Scripting Administration

- Dynamic HTTP content
- PHP: hypertext preprocessor
- Developer tools for PHP
- Installing PHP
- Configuring PHP
- Securing PHP
- Security related php.ini configuration
- Java servlets and JSP
- Apache's Tomcat
- Installing Java SDK
- Installing Tomcat manually
- Using Tomcat with Apache

Lab Tasks

- CGI scripts in Apache
- Apache Tomcat
- Using Tomcat with Apache

10. Implementing an FTP Server

- The FTP protocol
- Active mode FTP
- Passive mode FTP
- ProFTPD
- Pure-FTPd
- vsftpd
- Configuring vsftpd
- Anonymous FTP with vsftpd

Lab Tasks

- Configuring vsftpd

11. The Squid Proxy Server

- Squid overview
- Squid file layout
- Squid access control lists
- Applying Squid ACLs
- Tuning Squid and configuring cache hierarchies
- Bandwidth metering
- Monitoring Squid

- Proxy client configuration

Lab Tasks

- Installing and configuring Squid
- Squid cache manager CGI
- Proxy auto configuration
- Configure a Squid proxy cluster

12. SQL Fundamentals and MariaDB

- Popular SQL databases
- SELECT statements
- INSERT statements
- UPDATE statements
- DELETE statements
- JOIN clauses
- MariaDB
- MariaDB installation and security

- MariaDB user account management
- MariaDB replication

Lab Tasks

- SQL with SQLite3
- Installing and securing MariaDB
- Creating a database in MariaDB
- Create a database backed application

13. LDAP Concepts and Clients

- LDAP: history and uses
- LDAP: data model basics
- LDAP: protocol basics
- LDAP: applications
- LDAP: search filters

- OpenLDAP client tools
- LDIF: LDAP data interchange format
- Alternative LDAP tools

Lab Tasks

- Querying LDAP

14. 389 Directory Server

- Popular LDAP server implementations
- 389 Directory Server (389DS)
- 389 Directory Server features

- 389 Directory Server utilities

Lab Tasks

- Installing and configuring 389DS

15. Samba Concepts and Configuration

- Introducing Samba
- NetBIOS and NetBEUI
- Samba daemons
- Accessing Windows/Samba shares from Linux
- Samba utilities
- Samba configuration files
- The smb.conf File
- Mapping permissions and ACLs
- Mapping Linux concepts
- Mapping users
- Sharing home directories
- Sharing printers

- Share authentication
- Share-level access
- User-level access
- Samba account database
- User share restrictions

Lab Tasks

- Samba share-level access
- Samba user-level access
- Samba group shares
- Handling symbolic links with Samba
- Samba home directory shares

16. SMTP Theory

- SMTP
- SMTP terminology
- SMTP architecture
- SMTP commands

- SMTP extensions
- SMTP AUTH
- SMTP STARTTLS
- SMTP session

17. Postfix

- Postfix features
 - Postfix architecture
 - Postfix components
 - Postfix configuration
 - master.cf
 - main.cf
 - Postfix map types
 - Postfix pattern matching
 - Advanced Postfix options
 - Virtual domains
 - Postfix mail filtering
 - Configuration commands
 - Management commands
 - Postfix logging
 - Logfile analysisp
- Postfix, relaying and SMTP AUTH
 - SMTP AUTH server and relay control
 - SMTP AUTH clients
 - Postfix/TLS
 - TLS server configuration
 - Postfix client configuration for TLS
 - Other TLS clients
 - Ensuring TLS security
- Lab Tasks**
- Configuring Postfix
 - Postfix virtual host configuration
 - Postfix network configuration
 - Postfix SMTP AUTH configuration
 - Postfix STARTTLS configuration
 - SUSE Postfix configuration cleanup

18. Mail Services and Retrieval

- Filtering email
 - Procmal
 - SpamAssassin
 - Bogofilter
 - amavisd-new mail filtering
 - Accessing email
 - The IMAP4 protocol
 - Dovecot POP3/IMAP server
 - Cyrus IMAP/POP3 server
 - Cyrus IMAP MTA integration
 - Cyrus mailbox administration
 - Fetchmail
- Roundcube webmail
 - Mailing lists
 - GNU Mailman
 - Mailman configuration
- Lab Tasks**
- Configuring Procmal and SpamAssassin
 - Configuring Cyrus IMAP
 - Dovecot TLS configuration
 - Configuring Roundcube
 - Base Mailman configuration
 - Basic mailing list
 - Private mailing list

19. NIS

- NIS overview
 - NIS limitations and advantages
 - NIS client configuration
 - NIS server configuration
 - NIS troubleshooting aids
- Lab Tasks**
- Using NIS for centralized user accounts
 - Configuring NIS
 - NIS slave server
 - NIS failover
 - Troubleshooting practice: NIS
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