



Solutions

Security

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Strategies

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LPIC-3: Mixed Environment

OVERVIEW:

The LPIC-3 certification is the culmination of the multi-level professional certification program of the Linux Professional Institute (LPI). LPIC-3 is designed for the enterprise-level Linux professional and represents the highest level of professional, distribution-neutral Linux certification within the industry. Three separate LPIC-3 specialty certifications are available. Passing any one of the three exams will grant the LPIC-3 certification for that specialty.

The LPIC-3 Enterprise Mixed Environment certification covers the administration of Linux systems enterprise-wide in a mixed environment.

Prerequisites: The candidate must have an active LPIC-2 certification to receive the LPIC-3 certification.

Requirements: Passing the 300 exam. The 90-minute exam is 60 multiple-choice and fill-in-the-blank questions.

Validity period: 5 years

Course Content:

OPENLDAP CONFIGURATION

Description: Candidates should be familiar with the server replication available with OpenLDAP.

Key Knowledge Areas:

- Replication concepts
- Configure OpenLDAP replication
- Analyze replication log files
- Understand replica hubs
- LDAP referrals
- LDAP sync replication

The following is a partial list of the used files, terms and utilities:

- master / slave server
- multi-master replication
- consumer
- replica hub
- one-shot mode
- referral
- syncrepl
- pull-based / push-based synchronization
- refreshOnly and refreshAndPersist
- replot

SECURING THE DIRECTORY

Description: Candidates should be able to configure encrypted access to the LDAP directory, and restrict access at the

firewall level.

Key Knowledge Areas:

- Securing the directory with SSL and TLS
- Firewall considerations
- Unauthenticated access methods
- User / password authentication methods
- Maintenance of SASL user DB
- Client / server certificates

Terms and Utilities:

- SSL / TLS
- Security Strength Factors (SSF)
- SASL
- proxy authorization
- StartTLS
- iptables

OPENLDAP SERVER PERFORMANCE TUNING

Description: Candidates should be capable of measuring the performance of an LDAP server, and tuning configuration directives.

Key Knowledge Areas:

- Measure OpenLDAP performance
- Tune software configuration to increase performance
- Understand indexes

Terms and Utilities:

- index
- DB_CONFIG

LDAP INTEGRATION WITH PAM AND NSS

Description: Candidates should be able to configure PAM and NSS to retrieve information from an LDAP directory.

Key Knowledge Areas:

- Configure PAM to use LDAP for authentication
- Configure NSS to retrieve information from LDAP
- Configure PAM modules in various Unix environments

Terms and Utilities:

- PAM
- NSS
- /etc/pam.d/
- /etc/nsswitch.conf

INTEGRATING LDAP WITH ACTIVE DIRECTORY AND KERBEROS

Description: Candidates should be able to integrate LDAP with Active Directory Services.

Key Knowledge Areas:

- Kerberos integration with LDAP
- Cross platform authentication

- Single sign-on concepts
- Integration and compatibility limitations between OpenLDAP and Active Directory

Terms and Utilities:

- Kerberos
- Active Directory
- single sign-on
- DNS

SAMBA CONCEPTS AND ARCHITECTURE

Description: Candidates should understand the essential concepts of Samba. As well, the major differences between Samba3 and Samba4 should be known.

Key Knowledge Areas:

- Understand the roles of the Samba daemons and components
- Understand key issues regarding heterogeneous networks
- Identify key TCP/UDP ports used with SMB/CIFS
- Knowledge of Samba3 and Samba4 differences

The following is a partial list of the used files, terms and utilities:

- /etc/services
- Samba daemons: smbd, nmbd, samba, winbindd

CONFIGURE SAMBA

Description: Candidates should be able to configure the Samba daemons for a wide variety of purposes.

Key Knowledge Areas:

- Knowledge of Samba server configuration file structure
- Knowledge of Samba variables and configuration parameters
- Troubleshoot and debug configuration problems with Samba

Terms and Utilities:

- smb.conf
- smb.conf parameters
- smb.conf variables
- testparm
- secrets.tdb

REGULAR SAMBA MAINTENANCE

Description: Candidates should know about the various tools and utilities that are part of a Samba installation.

Key Knowledge Areas:

- Monitor and interact with running Samba daemons
- Perform regular backups of Samba configuration and state data

Terms and Utilities:

- smbcontrol
- smbstatus
- tdbbackup

TROUBLESHOOTING SAMBA

Description: Candidates should understand the structure of trivial database files and know how to troubleshoot problems.

Key Knowledge Areas:

- Configure Samba logging
- Backup TDB files
- Restore TDB files
- Identify TDB file corruption
- Edit / list TDB file content

Terms and Utilities:

- /var/log/samba/
- log level
- debuglevel
- smbpasswd
- pdbedit
- secrets.tdb
- tdbbackup
- tdbdump

- tdbrestore
- tdbtool

INTERNATIONALIZATION

Description: Candidates should be able to work with internationalization character codes and code pages.

Key Knowledge Areas:

- Understand internationalization character codes and code pages
- Understand the difference in the name space between Windows and Linux/Unix with respect to share, file and directory names in a non-English environment
- Understand the difference in the name space between Windows and Linux/Unix with respect to user and group naming in a non-English environment
- Understand the difference in the name space between Windows and Linux/Unix with respect to computer naming in a non-English environment

Terms and Utilities:

- internationalization
- character codes
- code pages
- smb.conf
- dos charset, display charset and unix charset

FILE SERVICES

Description: Candidates should be able to create and configure file shares in a mixed environment.

Key Knowledge Areas:

- Create and configure file sharing
- Plan file service migration
- Limit access to IPC\$
- Create scripts for user and group handling of file shares
- Samba share access configuration parameters

Terms and Utilities:

- smb.conf
- [homes]
- smbcquotas
- smbsh
- browseable, writeable, valid users, write list, read list, read only and guest ok
- IPC\$
- mount, smbmount

LINUX FILE SYSTEM AND SHARE/SERVICE PERMISSIONS

Description: Candidates should understand file permissions on a Linux file system in a mixed environment.

Key Knowledge Areas:

- Knowledge of file / directory permission control
- Understand how Samba interacts with Linux file system permissions and ACLs
- Use Samba VFS to store Windows ACLs

Terms and Utilities:

- smb.conf
- chmod, chown
- create mask, directory mask, force create mode, force directory mode
- smbcacls
- getfacl, setfacl
- vfs_acl_xattr, vfs_acl_tdb and vfs objects

PRINT SERVICES

Description: Candidates should be able to create and manage print shares in a mixed environment.

Key Knowledge Areas:

- Create and configure printer sharing
- Configure integration between Samba and CUPS
- Manage Windows print drivers and configure downloading of print drivers

- Configure [print\$]
- Understand security concerns with printer sharing
- Uploading printer drivers for Point'n'Print driver installation using 'Add Print Driver Wizard' in Windows

Terms and Utilities:

- smb.conf
- [print\$]
- CUPS
- cupsd.conf
- /var/spool/samba/.
- smbpool
- rpcclient
- net

MANAGING USER ACCOUNTS AND GROUPS

Description: Candidates should be able to manage user and group accounts in a mixed environment.

Key Knowledge Areas:

- Manager user and group accounts
- Understand user and group mapping
- Knowledge of user account management tools
- Use of the smbpasswd program

- Force ownership of file and directory objects

Terms and Utilities:

- pdbedit
- smb.conf
- samba-tool user (with subcommands)
- samba-tool group (with subcommands)
- smbpasswd
- /etc/passwd
- /etc/group
- force user, force group.
- idmap

AUTHENTICATION, AUTHORIZATION AND WINBIND

Description: Candidates should understand the various authentication mechanisms and configure access control. Candidates should be able to install and configure the Winbind service.

Key Knowledge Areas:

- Setup a local password database
- Perform password synchronization
- Knowledge of different passdb backends

- Convert between Samba passdb backends
- Integrate Samba with LDAP
- Configure Winbind service
- Configure PAM and NSS

Terms and Utilities:

- smb.conf
- smbpasswd, tdbsam, ldapsam
- passdb backend
- libnss_winbind
- libpam_winbind
- libpam_smbpass
- wbinfo
- getent
- SID and foreign SID
- /etc/passwd
- /etc/group

SAMBA AS A PDC AND BDC

Description: Candidates should be able to setup and maintain primary and backup domain controllers. Candidates should be able to manage Windows/Linux client access to the NT-Style domains.

Key Knowledge Areas:

- Understand and configure domain membership and trust relationships

- Create and maintain a primary domain controller with Samba3 and Samba4
- Create and maintain a backup domain controller with Samba3 and Samba4
- Add computers to an existing domain
- Configure logon scripts
- Configure roaming profiles
- Configure system policies

Terms and Utilities:

- smb.conf
- security mode
- server role
- domain logons
- domain master
- logon script
- logon path
- NTConfig.pol
- net
- profiles
- add machine script
- profile acls

SAMBA4 AS AN AD COMPATIBLE DOMAIN CONTROLLER

Description: Candidates should be able to configure Samba 4 as an AD Domain Controller.

Key Knowledge Areas:

- Configure and test Samba 4 as an AD DC
- Using smbclient to confirm AD operation
- Understand how Samba integrates with AD services: DNS, Kerberos, NTP, LDAP

Terms and Utilities:

- smb.conf
- server role
- samba-tool domain (with subcommands)
- samba

CONFIGURE SAMBA AS A DOMAIN MEMBER SERVER

Description: Candidates should be able to integrate Linux servers into an environment where Active Directory is present.

Key Knowledge Areas:

- Joining Samba to an existing NT4 domain
- Joining Samba to an existing AD domain
- Ability to obtain a TGT from a KDC

Terms and Utilities:

- smb.conf
- server role

- server security
- net command
- kinit, TGT and REALM

NetBIOS and WINS

Description: Candidates should be familiar with NetBIOS/WINS concepts and understand network browsing.

Key Knowledge Areas:

- Understand WINS concepts
- Understand NetBIOS concepts
- Understand the role of a local master browser
- Understand the role of a domain master browser
- Understand the role of Samba as a WINS server
- Understand name resolution
- Configure Samba as a WINS server
- Configure WINS replication
- Understand NetBIOS browsing and browser elections
- Understand NETBIOS name types

Terms and Utilities:

- smb.conf
- nmblookup
- smbclient
- name resolve order
- lmhosts

- wins support, wins server, wins proxy, dns proxy
- domain master, os level, preferred master

ACTIVE DIRECTORY NAME RESOLUTION

Description: Candidates should be familiar with the internal DNS server with Samba4.

Key Knowledge Areas:

- Understand and manage DNS for Samba4 as an AD Domain Controller
- DNS forwarding with the internal DNS server of Samba4

Terms and Utilities:

- samba-tool dns (with subcommands)
- smb.conf
- dns forwarder
- /etc/resolv.conf
- dig, host

CIFS INTEGRATION

Description: Candidates should be comfortable working with CIFS in a mixed environment.

Key Knowledge Areas:

- Understand SMB/CIFS concepts

- Access and mount remote CIFS shares from a Linux client
- Securely storing CIFS credentials
- Understand features and benefits of CIFS
- Understand permissions and file ownership of remote CIFS shares

Terms and Utilities:

- SMB/CIFS
- mount, mount.cifs
- smbclient
- smbget
- smbtar
- smbtree
- findsmb
- smb.conf
- smbquotas
- /etc/fstab

- Use of the Windows net utility

Terms and Utilities:

- Windows net command
- smbclient
- control panel
- rdesktop
- workgroup

WORKING WITH WINDOWS CLIENTS

Description: Candidates should be able to interact with remote Windows clients, and configure Windows workstations to access file and print services from Linux servers.

Key Knowledge Areas:

- Knowledge of Windows clients
- Explore browse lists and SMB clients from Windows
- Share file / print resources from Windows
- Use of the smbclient program