

# LPIC-3 Exam 300 Objectives - Linux Professional Institute (LPI)

17-22 minutes

## ***Topic 301: Samba Basics***

### **301.1 Samba Concepts and Architecture (weight: 2)**

**Weight** 2

**Description** Candidates should understand the essential concepts of Samba, including the various Samba server processes and networking protocols used by Samba when acting in various roles. Samba version 4.8 or higher is covered.

#### **Key Knowledge Areas:**

- Understand the roles of the various Samba daemons and components
- Understand key issues regarding heterogeneous networks
- Understand the networking services used with SMB/CIFS and Active Directory, including their ports
- Understand the major features of SMB protocol versions 1.0, 2.0, 2.1 and 3.0
- Understand of Samba 3 and Samba 4 differences
- Awareness of Samba VFS modules
- Awareness of Samba Clustering and CTDB

#### **Partial list of the used files, terms and utilities:**

- smbld, nmbd, samba, winbindd

### **301.2 Samba Configuration (weight: 4)**

**Weight** 4

**Description** Candidates should be able to configure the Samba daemons.

#### **Key Knowledge Areas:**

- Manage Samba server file-based configuration
- Manage of Samba server registry-based configuration
- Manage of Samba configuration parameters and variables
- Understand Samba server roles and security modes
- Configure Samba to use TLS
- Check the validity of a Samba configuration
- Troubleshoot and debug configuration problems with Samba
- Understand Windows tools used to configure a Samba Server

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

- smb.conf
  - security
  - server role
  - server string
  - server services

- tls enabled
- tls keyfile
- tls certfile
- tls dh params file
- tls cafile
- config backend
- registry shares
- include
- vfs objects
- samba-regedit
- HKLM\Software\Samba\
- REG\_SZ, REG\_MULTI\_SZ
- testparm
- net registry (including relevant subcommands)
- Microsoft RSAT Tools
- Microsoft MMC
- Microsoft ADSI Edit
- Microsoft LDP
- Microsoft Regedit

### 301.3 Regular Samba Maintenance (weight: 2)

**Weight** 2

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

#### Key Knowledge Areas:

- Start and stop Samba services on domain controllers and file servers
- Monitor and interact with running Samba daemons
- Backup and restore TDB files
- Backup and restore an Active Directory domain controller
- Understand backup and recovery strategies for Active Directory domain controllers
- Understand the impact of virtualization on Active Directory domain controllers

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

- systemctl
- smbcontrol (including relevant message types)
- smbstatus
- tdbbackup
- tdbrestore
- samba-tool domain backup (including subcommands)
- Virtual Machine Generation Identifier
- Virtual Machine Snapshots

### 301.4 Troubleshooting Samba (weight: 3)

**Weight** 3

**Description** Candidates should be able to analyze and troubleshoot Samba issues. This includes accessing and modifying the LDAP content of a Samba server hosting an Active directory as well as working with trivial database files. Furthermore, candidates should be able to create a renamed clone of an existing Active Directory for debugging.

#### Key Knowledge Areas:

- Configure Samba logging, including setting log levels for specific debug classes and client-specific logging
- Query and modify the Samba password database
- Understand the contents of important TDB files
- List and edit TDB file content
- Identify TDB file corruption
- Access and modify objects in a Samba LDAP directory
- Enable and use the LDAP recycle bin
- Confirm the integrity of a domain controller's database
- Create a renamed clone of a domain controller
- Awareness of Samba eventlog shipping
- Use rpcclient to query information on a Samba server

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

- smb.conf:
  - log level
  - debuglevel
- /var/log/samba/
- smbpasswd
- pdbedit
- registry.tdb
- secrets.tdb
- tdbdump
- tdbtool
- ldbsearch
- ldbmodify
- ldbedit
- ldbadd
- ldbdel
- LDIF
- samba-tool dbcheck
- samba-tool domain backup (including relevant subcommands)
- rpcclient

## ***Topic 302: Samba and Active Directory Domains***

### **302.1 Samba as Active Directory Domain Controller (weight: 5)**

**Weight**      5

**Description**      Candidates should be able to configure Samba as an Active Directory domain controller. This includes managing an Active Directory domain.

#### **Key Knowledge Areas:**

- Understand the concepts of Active Directory
- Understand the principles of the network services used by Active Directory (i.e. DNS, Kerberos, NTP and LDAP and CIFS and MS-RPC)
- Set up a new Active Directory domain using Samba
- Add a Samba domain controller to an existing Active Directory domain
- Demote and remove online and offline domain controllers
- Verify AD replication
- Understand and query the global catalog and the partial attribute set
- Understand and configure domain functional levels
- Understand and configure Active Directory forest and domain trusts
- Understand and configure Active Directory sites, including subnet assignments
- Understand and manage FSMO roles, including their impact in case of an outage

- Configure authentication audit logging
- Configure SYSVOL replication using rsync or robocopy
- Integrate Samba with ntpd
- Awareness of Windows NT4 domains

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

- smb.conf:
  - server role
  - log level
- samba-tool domain (including relevant subcommands)
- samba-tool fsmo (including relevant subcommands)
- samba-tool drs (including relevant subcommands)
- samba-tool sites (including relevant subcommands)
- rsync
- rsync.conf
- /var/lib/samba/sysvol
- robocopy
- ntpd.conf
  - ntpsigndsocket

### **302.2 Active Directory Name Resolution (weight: 2)**

**Weight** 2

**Description** Candidates should be familiar with the internal DNS server of Samba.

**Key Knowledge Areas:**

- Understand and manage DNS for Samba as an AD domain controller
- Manage DNS records in Samba DNS
- DNS forwarding
- Standardized names in an Active Directory
- Multicast DNS
- Awareness of BIND9 DLZ DNS back end
- Awareness of NetBIOS name resolution and WINS

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

- smb.conf:
  - dns forwarder
  - allow dns updates
  - multicst dns register
- samba-tool dns (with subcommands)
- samba\_dnsupdate
- dig
- host
- /etc/resolv.conf

### **302.3 Active Directory User Management (weight: 4)**

**Weight** 4

**Description** Candidates should be able to manage user and group accounts on a standalone server and in a Samba based Active Directory.

**Key Knowledge Areas:**

- Manage user accounts and user group for standalone servers and Samba AD

- Knowledge of user account management tools
- Delegate administrative permissions in AD to specific users / user groups
- Configure password expiration and change requirements
- Manage password policies and password setting objects
- Understand principals and their identification SID (DN, GUID)
- Understand User Principal Name (UPN) and User Principal Name Suffix (UPN Suffix)
- Understand and manage Security and Distribution Groups
- Understand and manage LDAP attributes of security principals
- Understand and manage RFC2307 attributes in a Samba AD
- Map Kerberos service principal names to user accounts
- Export Kerberos keytabs for a specific principal
- Awareness of LDAP Account Manager

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

- samba-tool user (including relevant subcommands)
- samba-tool group (including relevant subcommands)
- samba-tool domain passwordsettings
- samba-tool domain exportkeytab
- samba-tool spn (including relevant subcommands)
- smbpasswd
- pdbsedit
- kinit
- klist

### **302.4 Samba Domain Membership (weight: 4)**

**Weight**      4

Candidates should be able to join a Samba server into an existing Active Directory

**Description** domain and authorize domain users to use the server. This includes installing and configuring the Winbind service.

**Key Knowledge Areas:**

- Join Samba to an existing AD domain
- Configure Winbind service, including ID mapping
- Understand and configure Winbind ID mapping, including various mapping backends
- Configure PAM and NSS to use Winbind

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

- smb.conf:
  - security
  - server role
  - realm
  - workgroup
  - idmap config
  - winbind enumerate users
  - winbind enumerate groups
  - winbind offline logon
  - winbind separator
  - template shell
  - template homedir
  - allow trusted domains
- idmap\_ad
- idmap\_autorid
- idmap\_ldap

- idmap\_rfc2307
- idmap\_rid
- idmap\_tdb
- idmap\_tdb2
- net ads (including relevant subcommands)
- /etc/nsswitch.conf
- /etc/pam.conf
- /etc/pam.d/
- libnss\_winbind
- libpam\_winbind
- getent
- wbinfo

### 302.5 Samba Local User Management (weight: 2)

**Weight** 2

**Description** Candidates should be able to create and manage local user accounts on a stand alone Samba server.

#### Key Knowledge Areas:

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

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

- smb.conf:
  - passdb backend
- /etc/passwd
- /etc/group
- pam\_smbpass.so
- smbpasswd
- pdbedit

**Weight** 4

**Description** Candidates should be able to create and configure CIFS file shares in Samba.

#### Key Knowledge Areas:

- Create and configure CIFS file shares
- Manage Samba share access configuration parameters
- Use registry based share configuration
- Manage profile and user home shares
- Plan file service migration
- Limit access to IPC\$
- Awareness of user shares
- Awareness of existing VFS modules and their general functionality, including modules to support audit logs and snapshots / shadow copies

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

- smb.conf:
  - path
  - browsable
  - writable / write ok / read only

- valid users
- invalid users
- read list
- write list
- guest ok
- hosts allow / allow hosts
- hosts deny / deny hosts
- copy
- hide unreadable
- hide unwritable files
- hide dot files
- hide special files
- veto files
- delete veto files
- [homes]
- [IPC\$]
- smbcquotas

**Weight**        3

**Description**    Candidates should understand file permissions on CIFS shares and on a Linux file system.

**Key Knowledge Areas:**

- Enforce ownership and permissions of files and directories
- Manage ACLs for shares and folders
- Understand POSIX, Extended POSIX and Windows ACLs
- Understand how Samba stores Windows ACLs in Linux ACLs and extended attributes
- Configure ACLs for profile and home folder shares
- Configure encryption of CIFS connections

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

- smb.conf
  - create mask / create mode
  - directory mask / directory mode
  - force create mode
  - force directory mode
  - force user
  - force group / group
  - profile acls
  - inherit acls
  - map acl inherit
  - store dos attributes
  - vfs objects
  - smb encrypt
- chown
- chmod
- getfacl
- setfacl
- getfattr
- smbcacls
- sharesec
- SeDiskOperatorPrivilege
- vfs\_acl\_xattr
- vfs\_acl\_tdb
- samba-tool ntacl (including subcommands)

**Weight** 1

**Description** Candidates should be able to create and manage DFS shares in Samba.

**Key Knowledge Areas:**

- Understand DFS
- Configure DFS shares

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

- smb.conf:
  - host msdfs
  - msdfs root
  - msdfs proxy
- ln

**Weight** 2

**Description** Candidates should be able to create and manage print shares in Samba.

**Key Knowledge Areas:**

- Understand Samba printing, including raw printing
- Create and configure print shares
- Configure integration between Samba and CUPS
- Manage Windows print drivers and configure downloading of print drivers
- Upload printer drivers using 'Add Print Driver Wizard' in Windows
- Preconfigure driver settings
- Configure paper sizes and forms
- Supported driver versions
- Manage GPO options for trusted print servers
- Awareness of spoolssd

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

- smb.conf:
  - printing
  - printable / print ok
  - printcap name / printcap
  - spoolss: architecture = Windows x64
- [printers]
- [print\$]
- CUPS
- cupsd.conf
- /var/spool/samba/
- smbpool
- rpcclient (to execute topic-related commands (enumdrivers, enumprinters, setdriver))
- net (included topic-related subcommands)
- SePrintOperatorPrivilege

## ***Topic 304: Samba Client Configuration***

### **304.1 Linux Authentication Clients (weight: 5)**

**Weight** 5

**Description** Candidates should be familiar with management and authentication of user accounts. This includes configuration and use of NSS, PAM, SSSD and Kerberos for both local



and remote directories and authentication mechanisms as well as enforcing a password policy.

**Key Knowledge Areas:**

- Understand and configure NSS and PAM
- Enforce password complexity policies and periodic password changes
- Create home directories for new users
- Lock accounts automatically after failed login attempts
- Configure NSS and PAM to retrieve information from LDAP
- Configure SSSD authentication against Active Directory, IPA, LDAP and Kerberos domains and the local system's authentication database
- Manage local accounts through SSSD
- Obtain and manage Kerberos tickets

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

- /etc/pam.conf
- /etc/pam.d/
- /etc/nsswitch.conf
- /etc/login.defs
- pam\_ldap.so
- ldap.conf
- pam\_krb5.so
- pam\_cracklib.so
- pam\_tally2.so
- pam\_faillock.so
- pam\_mkhomedir.so
- chage
- faillog
- sssd
- sssd.conf
- sss\_override
- sss\_cache
- sss\_debuglevel
- sss\_user\* and sss\_group\*
- /var/lib/sss/db/
- krb5.conf
- kinit
- klist
- kdestroy

**304.2 Linux CIFS Clients (weight: 3)**

**Weight**      3

**Description**      Candidates should be able to use remote CIFS shares from a Linux client. This includes client-side management of CIFS credentials and managing remote ACLs and quotas.

**Key Knowledge Areas:**

- Access remote CIFS shares from a Linux client
- Mount remote CIFS shares on a Linux client
- Automatically mount home directories
- Store and manage CIFS credentials securely
- Understand and manage permissions and file ownership of remote CIFS shares
- Understand and manage quotas on CIFS shares

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

- smb.conf
- smbclient (including relevant subcommands)
- mount
- mount.cifs
- /etc/fstab
- pam\_mount.so
- pam\_mount.conf.xml
- cifscreds
- getcifsacl
- setcifsacl
- smbquotas
- cifsioat
- smbget
- smbtar

### **304.3 Windows Clients (weight: 3)**

**Weight** 3

**Description** Candidates should be able to access CIFS and print shares from Windows hosts and join such hosts into an Active Directory domain. Furthermore, candidates should be able to manage Windows hosts using GPOs and access remote Windows hosts.

**Key Knowledge Areas:**

- Understand how to set up and use Windows hosts
- Join a Windows host to an Active Directory domain
- Access remote CIFS shares from a Windows client
- Configure printing to remote printers from a Windows client
- Configure file and print shares on a Windows host
- Understand the concept, structure and capabilities of GPOs
- Create and modify GPOs and apply GPOs to machines or users
- Access a remote Windows desktop
- Create and configure logon scripts
- Configure roaming profiles for Active Directory users
- Configure profile folder redirects

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

- smb.conf:
  - logon path
  - logon script
- net (Windows command; including all relevant subcommands)
- samba-tool gpo (including all relevant subcommands)
- gpupdate (Windows command)
- rdesktop

## ***Topic 305: Linux Identity Management and File Sharing***

### **305.1 FreeIPA Installation and Maintenance (weight: 2)**

**Weight** 2

**Description** Candidates should be able to set up and manage a FreeIPA domain using standard settings and default services. This includes setting up replication and joining clients to the domain.

### Key Knowledge Areas:

- Understand the features, architecture as well as server-side and client-side components of FreeIPA
- Install a FreeIPA server
- Set up and manage a FreeIPA domain using standard settings and default services
- Understand replication topology and configure FreeIPA replication
- Join clients to an existing FreeIPA domain
- Awareness of ipa-backup

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

- ipa-server-install
- ipa-replica-prepare
- ipa-replica-install
- ipa-client-install
- ipactl

### 305.2 FreeIPA Entity Management (weight: 4)

**Weight** 4

**Description** Candidates should be able manage users, hosts and services in a FreeIPA domain.

### Key Knowledge Areas:

- Manage user accounts and groups
- Manage hosts, hostgroups and services
- Understand the principle of IPA access control permissions, privileges and roles
- Understand ID views
- Awareness of sudo, autofs, SSH, SELinux and NIS integration as well as host based access control in FreeIPA
- Awareness of the FreeIPA CA

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

- ipa (including relevant user-\*, stageuser-\* and group-\* and idview-\* subcommands)
- ipa (including relevant host-\*, hostgroup-\*, service-\* and getkeytab subcommands)
- ipa (including relevant permission-\*, privilege-\*, and role-\* subcommands)
- ipctl
- ipa-advice

### 305.3 FreeIPA Active Directory Integration (weight: 2)

**Weight** 2

**Description** Candidates should be able to set up a cross-forest trust between a FreeIPA and an Active Directory domain.

### Key Knowledge Areas:

- Understand and set up FreeIPA and Active Directory integration using Kerberos cross-realm trusts
- Configure ID ranges in FreeIPA
- Understand and manage external non-POSIX groups in FreeIPA
- Awareness of Microsoft Privilege Attribute Certificates and how they are handled by FreeIPA
- Awareness of replication based FreeIPA and Active Directory integration

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

- ipa-adtrust-install
- ipa (including relevant trust-\*, idrange-\* and group-\* subcommands)

### 305.4 Network File System (weight: 3)

**Weight** 3

**Description** Candidates should be able to use NFSv4. This includes understanding ID mapping, NFSv4 ACLs and Kerberos authentication for NFS.

#### **Key Knowledge Areas:**

- Understand major NFSv4 features
- Configure and manage an NFSv4 server and clients
- Understand and use the NFSv4 pseudo file system
- Understand and use NFSv4 ACLs
- Use Kerberos for NFSv4 authentication

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

- exportfs
- /etc/exports
- /etc/idmapd.conf
- nfs4\_editfacl
- nfs4\_getfacl
- nfs4\_setfacl
- mount (including common NFS mount options)
- /etc/fstab