Curtin College | in association with Curtin University

CS2000 – Laboratory 03

Install and Configure LDAP and SMB

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Introduction

Today you will be installing and configuring OpenLDAP and Samba on your Ubuntu Server machine, and testing from your Windows device.

Task 1 – Installing and Configuring OpenLDAP Server

LDAP is an acronym for Lightweight Directory Access Protocol; it is a simplified version of the X.500 protocol. The directory setup in this section will be used for authentication. Nevertheless, LDAP can be used in numerous ways: authentication, shared directory (for mail clients), address book, etc. To describe LDAP quickly, all information is stored in a tree structure. With OpenLDAP you have freedom to determine the directory arborescence (the Directory Information Tree: the DIT) yourself. The current LDAP version is LDAPv3.

The LDAP protocol accesses LDAP directories. Here are some key concepts and terms:

1. A LDAP directory is a tree of data *entries* that is hierarchical in nature and is called the Directory Information Tree (DIT).
2. An entry consists of a set of *attributes*.
3. An attribute has a *type* (a name/description) and one or more *values*.
4. Every attribute must be defined in at least one *objectClass*.
5. Attributes and objectclasses are defined in *schemas* (an objectclass is actually considered as a special kind of attribute).
6. Each entry has a unique identifier: its *Distinguished Name* (DN or dn). This, in turn, consists of a *Relative Distinguished Name* (RDN) followed by the parent entry's DN.
7. The entry's DN is not an attribute. It is not considered part of the entry itself.
8. The LDAP directory content and update requests are represented in a plain text file format called LDIF (LDAP Interchange Format).

1. Install the OpenLDAP server daemon slapd and ldap-utils (a package containing LDAP management utilities).
   The installation of slapd will create a working configuration. In particular, it will create a database instance that you can use to store your data.

   sudo apt-get install slapd ldap-utils

```
cisco@CS:/etc$ sudo apt-get install slapd ldap-utils
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following extra packages will be installed:
  libodbc1 libslp1
Suggested packages:
  libmyodbc odbc-postgresql tdsodbc unixodbc-bin slpd openslp-doc
The following NEW packages will be installed:
  ldap-utils libodbc1 libslp1 slapd
0 to upgrade, 4 to newly install, 0 to remove and 3 not to upgrade.
Need to get 1,653 kB of archives.
After this operation, 5,635 kB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://au.archive.ubuntu.com/ubuntu/ trusty/main libodbc1 amd64 2.2.14p2-
ubuntu5 [175 kB]
Get:2 http://au.archive.ubuntu.com/ubuntu/ trusty/main libslp1 amd64 1.2.1-9 [4
.1 kB]
Get:3 http://au.archive.ubuntu.com/ubuntu/ trusty-updates/main slapd amd64 2.4.
1-1+nmu2ubuntu8.1 [1,311 kB]
Get:4 http://au.archive.ubuntu.com/ubuntu/ trusty-updates/main ldap-utils amd64
2.4.31-1+nmu2ubuntu8.1 [122 kB]
Fetched 1,653 kB in 14s (111 kB/s)
```

   - If you have problem opening “au.archive.ubuntu.com”, open the file /etc/resolv.conf and add reliable DNS server like Google:
     - nameserver 8.8.8.8
     - nameserver 8.8.4.4

   During the installation you will be prompted to define administrative credentials.

   Use “*netacad*” for admin password.

2. **Configure the OpenLDAP server**

OpenLDAP 2.3 and later have transitioned to using a dynamic runtime configuration engine, *slapd-config stored in /etc/ldap/slapd.d.*

Slapd.config:

- Is fully LDAP-enabled
- Is managed using the standard LDAP operations
  stores its configuration data in an LDIF database, generally in the /usr/local/etc/ldap/slapd.d directory.

- Allows all of slapd's configuration options to be changed on the fly, generally without requiring a server restart for the changes to take effect.

2a. Add BASE and URI to **/etc/ldap/ldap.conf**

BAS dc=example,dc=com

URI ldap://127.0.0.1

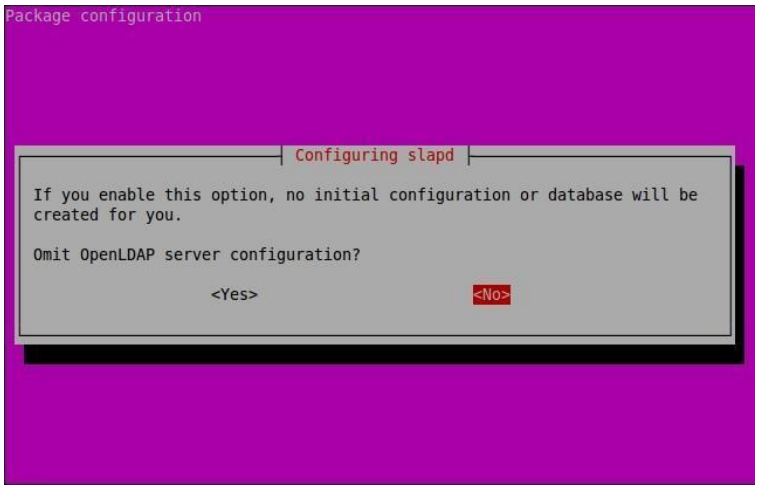
2b. Restart slapd:

sudo service slapd restart

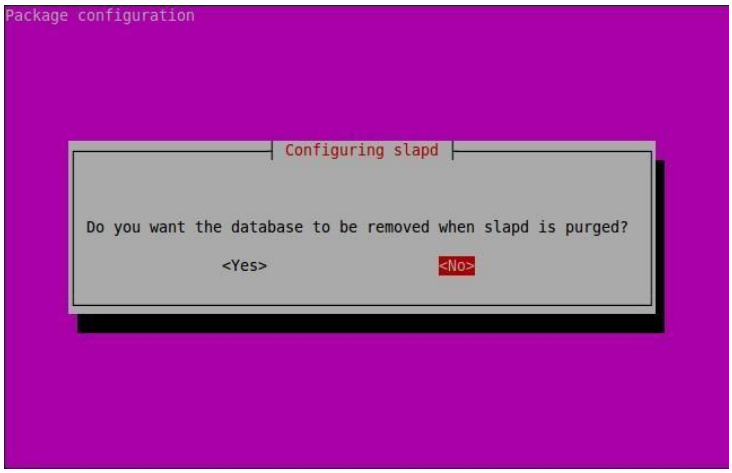
2c. Now we need to reconfigure the slapd with the update values.

sudo dpkg-reconfigure slapd

2d. The following window will open, select “NO” and press Enter



- In next window enter the DNS domain name “example.com”
- Enter the Organization name “Curtin”
- Enter LDAP admin password, which you created in previous step “netacad”.
- Re-Enter the password
- Select the default backup database “HDB”
- In the next window select “NO”

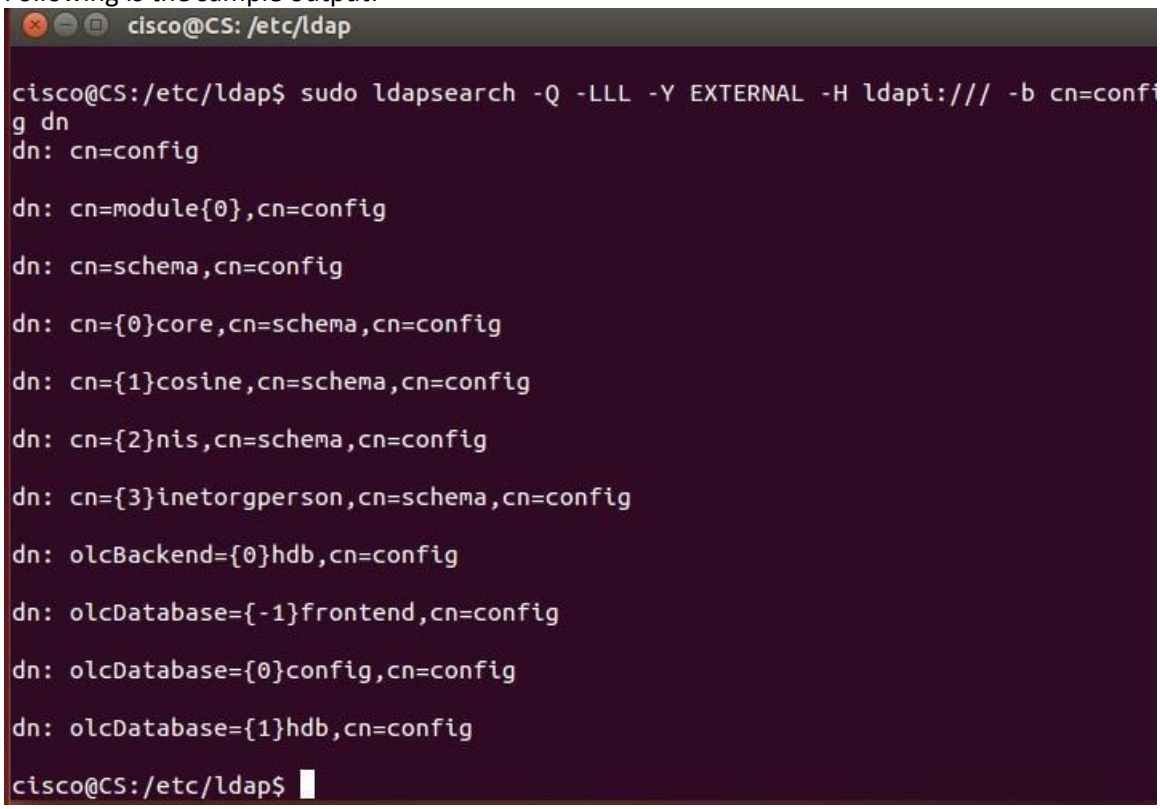


- Select YES to move the old database.
- Do not allow LDAPv2 protocol.

3. To check the slapd.config DIT via LDAP protocol use the following command:

sudo ldapsearch -Q -LLL -Y EXTERNAL -H ldapi:/// -b cn=config dn

Following is the sample output:



Explanation of entries:

1. *cn=config*: global settings
2. *cn=module{0},cn=config*: a dynamically loaded module
3. *cn=schema,cn=config*: contains hard-coded system-level schema
4. *cn={0}core,cn=schema,cn=config*: the hard-coded core schema
5. *cn={1}cosine,cn=schema,cn=config*: the cosine schema
6. *cn={2}nis,cn=schema,cn=config*: the nis schema
7. *cn={3}inetorgperson,cn=schema,cn=config*: the inetorgperson schema
8. *olcBackend={0}hdb,cn=config*: the 'hdb' backend storage type
9. *olcDatabase={-1}frontend,cn=config*: frontend database, default settings for other databases
10. *olcDatabase={0}config,cn=config*: slapd configuration database (cn=config)
11. *olcDatabase={1}hdb,cn=config*: your database instance (dc=examle,dc=com)

Question: What is the output of the following command to check the dc=example,dc=com DIT? Try this command at the end of the lab and record the output again

ldapsearch -x -LLL -H ldap:/// -b dc=example,dc=com dn

4. Modifying/Populating your Database

Add some content to our database.

- a node called *People* (to store users)
- a node called *Groups* (to store groups)
- a group called *miners*
- a user called *john*

4a. Create the following LDIF file (/etc/ldap/slapd.d) and call it add_content.ldif:

cisco@CS:/$cd /etc/ldap/slapd.d

cisco@CS:/etc/ldap/slapd.d$ sudo gedit add_content.ldif

4b. Copy the following content to this file

copy the content from HTTPS://UBUNTU.COM/SERVER/DOCS/SERVICE-LDAP
under the Modifying/Populating your database section

```
dn: ou=People,dc=example,dc=com
objectClass: organizationalUnit
ou: People

dn: ou=Groups,dc=example,dc=com
objectClass: organizationalUnit
ou: Groups

dn: cn=miners,ou=Groups,dc=example,dc=com
objectClass: posixGroup
cn: miners
gidNumber: 5000

dn: uid=john,ou=People,dc=example,dc=com
objectClass: inetOrgPerson
objectClass: posixAccount
objectClass: shadowAccount
uid: john
sn: Doe
givenName: John
cn: John Doe
displayName: John Doe
uidNumber: 10000
gidNumber: 5000
userPassword: {CRYPT}x
gecos: John Doe
loginShell: /bin/bash
homeDirectory: /home/john
```

4c. Load the file:

ldapadd -c -D cn=admin,dc=example,dc=com -W -f add_content.ldif

5. **Check that the information has been correctly added:**

ldapsearch -x -LLL -b dc=example,dc=com 'uid=john' cn gidNumber

Explanation of switches:

1. *-x:* "simple" binding; will not use the default SASL method
2. *-LLL:* disable printing extraneous information
3. *uid=john:* a "filter" to find the john user
4. *cn gidNumber:* requests certain attributes to be displayed (the default is to show all attributes)

6. Add Another entry (uid) and check for added information.

The above instructions on LDAP installation, configuration, and testing was extracted from:

https://ubuntu.com/server/docs/service-ldap

A useful resource is:

https://www.thegeekstuff.com/2015/02/openldap-add-users-groups/

Task 2 - Samba Installation and configuration

Samba is an **Open Source/Free Software** suite that provides seamless file and print services to SMB/CIFS clients." Samba is freely available, unlike other SMB/CIFS implementations, and allows for interoperability between Linux/Unix servers and Windows-based clients.

Follow these steps to install and configure Samba:

1. Install Samba

   sudo apt-get install samba

2. Set samba Password

   sudo smbpasswd –a <user_name>

   Note: user_name = cs

3. Create directory to be shared

   mkdir /home/<user_name>/cssmb

4. Make a safe backup copy of the original smb.conf file to your home folder, in case you make an error

   sudo cp /etc/samba/smb.conf ~

5. Edit the file "/etc/samba/smb.conf"

   sudo gedit /etc/samba/smb.conf

   once "smb.conf" has loaded, add this to the very end of the file:

   [<folder_name>]

   path = /home/<user_name>/<folder_name>
   valid users = <user_name>

   read only = no

   Tip: There should be in the spaces between the lines, and also there should be a single space both before and after each of the equal signs.

6. Restart the samba

sudo service smbd restart

7. Allow Samba traffic on firewall setting

sudo ufw allow Samba

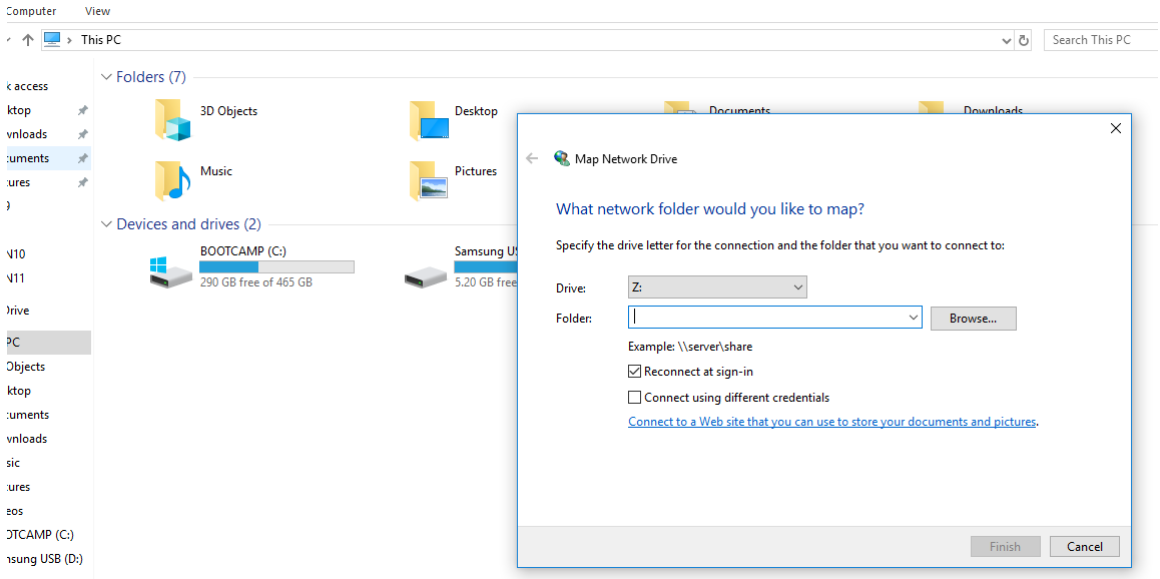
8. Check the firewall status

sudo ufw status

Now the Samba server is ready to add files to samba shared folder. Access this folder from Windows machine.

Connect to a Samba share from Windows 10:

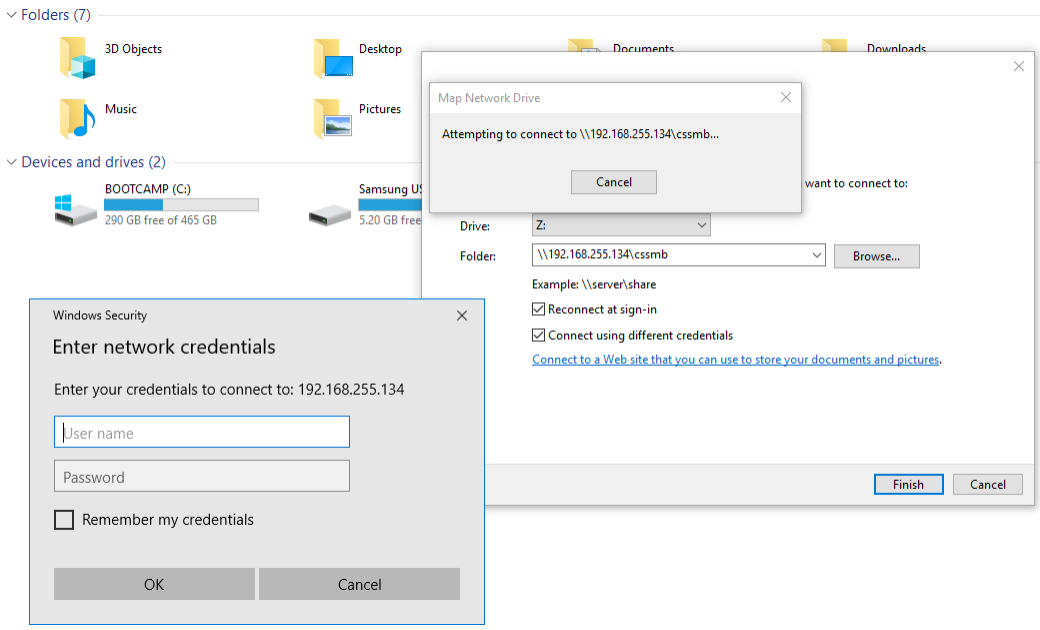
1. Open windows **file explorer** and select **This PC**.
2. Click on **Computer** tab on top and select **Map a network drive** from drop down menu



3. Enter the share name :

   e.g. "\\IP_Address_of_Samba_Server\shared_folder".

4. Check the box for **Connect using different credentials**.
5. Click **Finish**.
6. A window will pop up asking you to input your credentials. Input your Network ID (cs) and password (netacad)into the appropriate fields, then click **OK**.



Now you can browse the shared samba folder on Windows machine.

7. Disconnect from a Samba share
8. Right click on the share location and select **Disconnect** from the menu