

ENGR3821 Network Engineering
NETENG MAJOR ASSIGNMENT

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Table of Contents

Table of Contents	2
Disclaimer	3
Introduction	3
LDAP Server Setup	4
Authentication Setup	5
Overview and Explanation	6
Client Configuration	6
Future Considerations	9
Bibliography	10
Appendices	10
Appendix A: Sample LDIF File	10

Disclaimer

This report and its contents are permitted to be redistributed on behalf of the author for the express purpose of peer review and grading only.

Introduction

This report will cover the configuration of a Ubuntu Linux host to allow user login using a network directory server as an authentication provider, specifically through the use of Pluggable Authentication Modules (PAM). It will also cover the setup and population of a directory server running OpenLDAP with dummy data. When fully configured, any user with valid credentials present within the directory will be able to log in and use the system without any extra effort.

LDAP Server Setup

To get started we need an LDAP server to authenticate off of. For this report we will be using OpenLDAP since it is familiar, though any LDAP server will do. Start by logging in to the host where you will be deploying the LDAP server.

1. Install slapd and some tools that will come in handy later with: `sudo apt install slapd ldap-utils`
 - a. Enter the administrator password for the LDAP server and take note of it, you will need it later
2. Make slapd run at boot with: `sudo systemctl enable slapd`
3. Start slapd with: `sudo systemctl start slapd`

The LDAP server is installed, enabled on startup, and ready to go. Now we need to populate it with some data. A sample LDIF file with dummy company and user data is available on Pastebin here: <https://pastebin.com/raw/pRV3TA6p>. Each user must have the 'posixAccount' object class which also mandates the 'uid', 'uidNumber', 'gidNumber', and 'homeDirectory' attributes^[1]. The sample data has UIDs derived from email addresses, serial numeric UID and GID attributes starting at 10,000, a home directory under '/home/<uid>', and the password 'SecurePassword123' as an SHA1 hash. If you already have an LDIF file containing users with these attributes, feel free to skip to step 5 and use that instead.

4. Run `wget https://pastebin.com/raw/pRV3TA6p -O sample.ldif` to download the sample LDIF file
5. Import the file into the database with: `ldapadd -cxWD cn=admin,dc=nodomain -f sample.ldif`
 - a. When prompted, enter the administrator password you set in step 1a

The LDAP server is now populated with the sample data set. To test it, make a query with `ldapsearch`. A query to find entries with the user ID 'micah5t6' would look like:

```
$ ldapsearch -b "dc=nodomain" -cx "(uid=micah5t6)"
# extended LDIF
#
# LDAPv3
# base <dc=nodomain> with scope subtree
# filter: (uid=micah5t6)
# requesting: ALL
#
```

```
# Micah Thomas, Statistical misinterpretation, Finance,  
Monopolistic Trading Company.nodomain  
dn: cn=Micah Thomas,ou=Statistical  
misinterpretation,ou=Finance,dc=Monopolistic Trading  
Company,dc=nodomain  
objectClass: organizationalPerson  
objectClass: inetOrgPerson  
objectClass: posixAccount  
cn: Micah Thomas  
sn: Thomas  
mail: micah5t6@unimaginableuniversity.com.ki  
uid: micah5t6  
uidNumber: 10022  
gidNumber: 10022  
homeDirectory: /home/micah5t6  
telephoneNumber: +68685311227  
telephoneNumber: +68685311335  
telephoneNumber: +68685311885  
telephoneNumber: +68685311195  
manager: cn=Martin Clarke,ou=Statistical  
misinterpretation,ou=Finance  
  
# search result  
search: 2  
result: 0 Success  
  
# numResponses: 2  
# numEntries: 1
```

Authentication Setup

Overview and Explanation

Before going any further, it is worth understanding the two key components that will be installed in this section. The first is PAM and the `pam_ldap` module, and the second is `nsld` and the `nss_ldap` module.

Pluggable Authentication Modules (PAM) is a modular authentication framework which other services or applications can use for user authentication^[2]. It is modular by design, allowing the system administrator to pick and choose the available authentication methods, the order they occur, and other utilities to facilitate them (e.g. logging or mounting a home directory^[2]). These modules are stackable, meaning that depending on the result of one module, it may pass responsibility on to the next and so on until a final result is reached and the operation is either allowed or disallowed.

The `pam_ldap` module is a PAM module that we will be using to hook the LDAP server into the system's authentication process. By including it within the PAM stack, the system will be able to use LDAP entries as login credentials^[3].

While PAM manages authentication, it does not synchronise users, groups, and other data from the LDAP server to the local machine. This is where `nsswitch` and `nsld` come in. `nsswitch` provides an API for programs to collect 'name-service information' (i.e. users, groups, emails, passwords, etc.) through a common interface^[4]. The `nss_ldap` module allows `nsswitch` to use LDAP as a data source^[5].

`nsld` is "a daemon that will do LDAP queries for local processes that want to do user, group and other naming lookups... or do user authentication, authorisation or password modification"^[6]. For our purposes, `nsld` will query the LDAP server to synchronise the user list, allowing programs like `passwd` and `sshd` to behave normally when provided with LDAP credentials.

Client Configuration

Moving over to the other machine, we will install the PAM and NSS modules to integrate the LDAP server as an authentication method for logging in to the system. Fortunately Ubuntu has several packages that automate the installation process.

1. Install the PAM module, NSS module, and nslcd daemon with:
`sudo apt install ldap-auth-client nslcd`
The installation script will prompt you for the LDAP server details while it is installing. When prompted:
 - a. Set the LDAP URI to 'ldap://<server_ip>'
 - b. Set the search base to 'dc=nodomain'
 - c. Use LDAP version 3
 - d. Select 'Yes' to enable password updates
 - e. Select 'No' when asked about a password to retrieve entries
 - f. For the root bind, enter 'cn=admin,dc=nodomain'
 - g. Enter the LDAP administrator password

That covers the configuration of the ldap-auth-client package. The nslcd package will ask once more for the LDAP URI and search base. These should be the same as the ones set in step 1a and 1b.

- h. Set the LDAP URI to 'ldap://<server_ip>'
 - i. Set the search base to 'dc=nodomain'
2. Set nslcd to run at boot with: `sudo systemctl enable nslcd`
3. Start nslcd with: `sudo systemctl start nslcd`

nsswitch still needs to be configured to use ldap as a provider. To add it to the configuration file:

4. Run `sudo auth-client-config -t nss -p lac_ldap`

Those steps should configure the LDAP connection for both PAM and nslcd to use when retrieving login details. However, the LDAP module is not yet a part of the common PAM chain. To enable it:

5. Run `sudo pam-auth-update`
 - a. Using the arrow keys to move and spacebar to toggle, modify the list so that it looks similar to the image below:

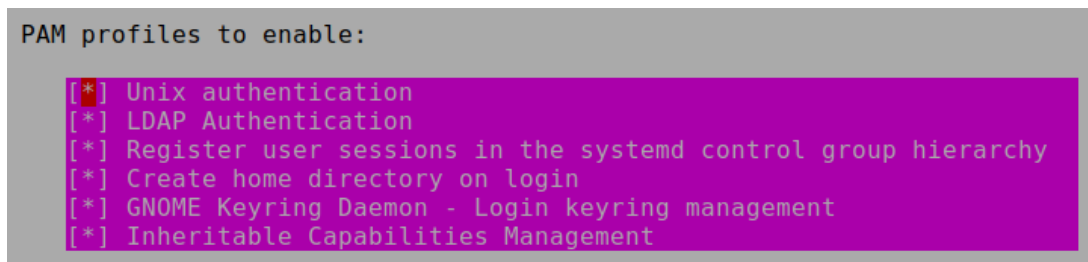


Fig. 1: `pam-auth-update` dialog displaying toggleable PAM modules

NOTE: At the very least, Unix and LDAP authentication should be enabled. It is recommended that you also

enable home directory creation so that users are given a home directory when they log in for the first time.

b. Press enter to apply the changes

6. Refresh the nscd cache with: `sudo systemctl restart nscd`

If all went well, nslcd should have pulled each user entry from the directory. Check it by running `getent passwd`. Below is an excerpt of what the output should look like.

```
$ getent passwd

<45 lines removed for brevity>

mtaylor:*:10001:10001:Magnus Taylor:/home/mtaylor:
mario5l5:*:10002:10002:Mario Lewis:/home/mario5l5:
ml2:*:10003:10003:Magnus Lewis:/home/ml2:
micah5w4:*:10004:10004:Micah Wood:/home/micah5w4:
fc4:*:10005:10005:Francesca Cooper:/home/fc4:
fwilliams:*:10006:10006:Frances Williams:/home/fwilliams:
ft6:*:10007:10007:Fran Thomas:/home/ft6:
mm7:*:10008:10008:Mark Martin:/home/mm7:
fran4e5:*:10009:10009:Fran Evans:/home/fran4e5:
ft9:*:10010:10010:Frances Thompson:/home/ft9:

<38 lines removed for brevity>
```

Test that user login works by logging in as one of them. Run `su - <user>` and enter their password ('SecurePassword123' by default). It should drop you into an `sh` shell as shown in Figure 2. If not, go back and make sure you have not missed any of the steps in this section. Check the journal with `journalctl` and see if any of the services we just configured have errors.

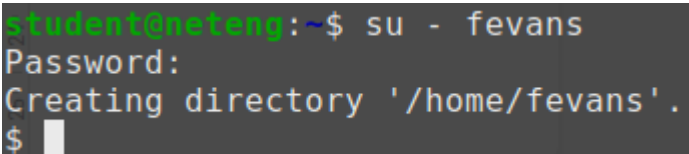
A terminal window showing a user logging in as 'fevans'. The prompt is 'student@neteng:~\$'. The user enters 'su - fevans'. The prompt changes to 'Password:'. The user enters the password. The prompt changes to 'Creating directory '/home/fevans''. The user enters '\$'. The prompt changes to '\$ '.

Fig. 2: Result of logging in as 'fevans'

If the login is successful, log out and try logging in to several other users like in Figure 3. They should all work with the same password by default.

Confirm that UNIX authentication still works by attempting to log in as yourself with `su - <user>`. It should look similar to Figure 4. If it fails, repeat step 5 and make sure to enable 'UNIX authentication'.

```
student@neteng:~$ su - fevans
Password:
$ exit
student@neteng:~$ su - mthompson
Password:
Creating directory '/home/mthompson'.
$ exit
student@neteng:~$ su - murray.robinson
Password:
Creating directory '/home/murray.robinson'.
$ exit
student@neteng:~$ su - mc14
Password:
Creating directory '/home/mc14'.
$ exit
```

Fig. 3: Multiple login attempts to various users. Note that the home directories were created for users that had not logged in.

```
student@neteng:~$ su - student
Password:
student@neteng:~$ █
```

Fig. 4: Result of logging in as a local user

Future Considerations

Currently the credentials for each user are being sent over the network via the 'ldap://' protocol, which is insecure. User details - including passwords - can be easily read from network traffic by an attacker. It is highly recommended to set up encryption with TLS and use the 'ldaps://' protocol in a production environment.

Bibliography

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Appendices

This section is very long due to the LDIF file being quite large. It is the final section of this document. There is only one appendix.

Appendix A: Sample LDIF File

A copy of the sample LDIF file has been included in case the copy hosted on Pastebin becomes unavailable. If available, use the online copy available here: <https://pastebin.com/raw/pRV3TA6p>
Font size has been reduced to minimise the page count.

```
dn: dc=Lanthanide Productions,dc=nodomain
objectClass: dcObject
objectClass: organization
dc: Lanthanide Productions
o: Lanthanide Productions.

dn: dc=Monopolistic Trading Company,dc=nodomain
objectClass: dcObject
objectClass: organization
dc: Monopolistic Trading Company
o: Monopolistic Trading Company.

dn: dc=Monopolistic Used Vehicles,dc=nodomain
objectClass: dcObject
objectClass: organization
dc: Monopolistic Used Vehicles
o: Monopolistic Used Vehicles.

dn: dc=Neo-Imperial Exports,dc=nodomain
objectClass: dcObject
objectClass: organization
dc: Neo-Imperial Exports
```

o: Neo-Imperial Exports.

dn: dc=Unimaginable University,dc=nodomain
objectClass: dcObject
objectClass: organization
dc: Unimaginable University
o: Unimaginable University.

dn: ou=Sub-divisions,dc=Neo-Imperial Exports,dc=nodomain
objectClass: organizationalUnit
ou: Sub-divisions

dn: ou=Pest control,ou=Sub-divisions,dc=Neo-Imperial Exports,dc=nodomain
objectClass: organizationalUnit
ou: Pest control

dn: ou=Consolidation,dc=Lanthanide Productions,dc=nodomain
objectClass: organizationalUnit
ou: Consolidation

dn: ou=Research,ou=Consolidation,dc=Lanthanide Productions,dc=nodomain
objectClass: organizationalUnit
ou: Research

dn: ou=Human resources,ou=Research,ou=Consolidation,dc=Lanthanide
Productions,dc=nodomain
objectClass: organizationalUnit
ou: Human resources

dn: ou=Environmental protection,ou=Research,ou=Consolidation,dc=Lanthanide
Productions,dc=nodomain
objectClass: organizationalUnit
ou: Environmental protection

dn: ou=Misappropriation,dc=Unimaginable University,dc=nodomain
objectClass: organizationalUnit
ou: Misappropriation

dn: ou=Manufacture,ou=Misappropriation,dc=Unimaginable University,dc=nodomain
objectClass: organizationalUnit
ou: Manufacture

dn: ou=Embezzlement,ou=Misappropriation,dc=Unimaginable University,dc=nodomain
objectClass: organizationalUnit
ou: Embezzlement

dn: ou=market punctuation,dc=Monopolistic Used Vehicles,dc=nodomain
objectClass: organizationalUnit
ou: market punctuation

dn: ou=Environmental protection,ou=market punctuation,dc=Monopolistic Used
Vehicles,dc=nodomain
objectClass: organizationalUnit
ou: Environmental protection

dn: ou=Manufacture,ou=Environmental protection,ou=market punctuation,dc=Monopolistic
Used Vehicles,dc=nodomain
objectClass: organizationalUnit
ou: Manufacture

dn: ou=Finance,dc=Monopolistic Trading Company,dc=nodomain

objectClass: organizationalUnit
ou: Finance

dn: ou=Statistical misinterpretation,ou=Finance,dc=Monopolistic Trading
Company,dc=nodomain
objectClass: organizationalUnit
ou: Statistical misinterpretation

dn: cn=Magnus Taylor,ou=Environmental
protection,ou=Research,ou=Consolidation,dc=Lanthanide Productions,dc=nodomain
objectClass: organizationalPerson
objectClass: inetOrgPerson
objectClass: posixAccount
cn: Magnus Taylor
sn: Taylor
mail: mtaylor@monopolistictradingcompany.com.nz
uid: mtaylor
uidNumber: 10001
gidNumber: 10001
homeDirectory: /home/mtaylor
userPassword: {SSHA}DAXvHEcvLGehazVC0zRwnOWBapmyNIkQ

dn: cn=Mario Lewis,ou=Human resources,ou=Research,ou=Consolidation,dc=Lanthanide
Productions,dc=nodomain
objectClass: organizationalPerson
objectClass: inetOrgPerson
objectClass: posixAccount
cn: Mario Lewis
sn: Lewis
mail: mario515@lanthanideproductions.com.nz
uid: mario515
uidNumber: 10002
gidNumber: 10002
homeDirectory: /home/mario515
userPassword: {SSHA}DAXvHEcvLGehazVC0zRwnOWBapmyNIkQ
telephoneNumber: +6589895177
manager: cn=Magnus Taylor,ou=Environmental protection,ou=Research,ou=Consolidation

dn: cn=Magnus Lewis,ou=market punctuation,dc=Monopolistic Used Vehicles,dc=nodomain
objectClass: organizationalPerson
objectClass: inetOrgPerson
objectClass: posixAccount
cn: Magnus Lewis
sn: Lewis
mail: ml2@monopolistictradingcompany.com.nz
uid: ml2
uidNumber: 10003
gidNumber: 10003
homeDirectory: /home/ml2
userPassword: {SSHA}DAXvHEcvLGehazVC0zRwnOWBapmyNIkQ

dn: cn=Micah Wood,ou=market punctuation,dc=Monopolistic Used Vehicles,dc=nodomain
objectClass: organizationalPerson
objectClass: inetOrgPerson
objectClass: posixAccount
cn: Micah Wood
sn: Wood
mail: micah5w4@lanthanideproductions.com.nz
uid: micah5w4
uidNumber: 10004

gidNumber: 10004
homeDirectory: /home/micah5w4
userPassword: {SSHA}DAxvHEcvLGehazVC0zRwnOWBapmyNIkQ
telephoneNumber: +6589895625
telephoneNumber: +6589895482
telephoneNumber: +6589895814
telephoneNumber: +6589895077
manager: cn=Magnus Lewis,ou=market punctuation

dn: cn=Francesca Cooper,ou=Manufacture,ou=Misappropriation,dc=Unimaginable University,dc=nodomain
objectClass: organizationalPerson
objectClass: inetOrgPerson
objectClass: posixAccount
cn: Francesca Cooper
sn: Cooper
mail: fc4@unimaginableuniversity.com.ki
uid: fc4
uidNumber: 10005
gidNumber: 10005
homeDirectory: /home/fc4
userPassword: {SSHA}DAxvHEcvLGehazVC0zRwnOWBapmyNIkQ

dn: cn=Frances Williams,ou=Human resources,ou=Research,ou=Consolidation,dc=Lanthanide Productions,dc=nodomain
objectClass: organizationalPerson
objectClass: inetOrgPerson
objectClass: posixAccount
cn: Frances Williams
sn: Williams
mail: fwilliams@lanthanideproductions.com.nz
uid: fwilliams
uidNumber: 10006
gidNumber: 10006
homeDirectory: /home/fwilliams
userPassword: {SSHA}DAxvHEcvLGehazVC0zRwnOWBapmyNIkQ
manager: cn=Magnus Taylor,ou=Environmental protection,ou=Research,ou=Consolidation

dn: cn=Fran Thomas,ou=Statistical misinterpretation,ou=Finance,dc=Monopolistic Trading Company,dc=nodomain
objectClass: organizationalPerson
objectClass: inetOrgPerson
objectClass: posixAccount
cn: Fran Thomas
sn: Thomas
mail: ft6@neoimperialexports.com.aq
uid: ft6
uidNumber: 10007
gidNumber: 10007
homeDirectory: /home/ft6
userPassword: {SSHA}DAxvHEcvLGehazVC0zRwnOWBapmyNIkQ
telephoneNumber: +672101935

dn: cn=Mark Martin,ou=Embezzlement,ou=Misappropriation,dc=Unimaginable University,dc=nodomain
objectClass: organizationalPerson
objectClass: inetOrgPerson
objectClass: posixAccount
cn: Mark Martin
sn: Martin
mail: mm7@lanthanideproductions.com.nz

```
uid: mm7
uidNumber: 10008
gidNumber: 10008
homeDirectory: /home/mm7
userPassword: {SSHA}DAxvHEcvLGehazVC0zRwnOWBapmyNIkQ
telephoneNumber: +6589895749
telephoneNumber: +6589895275
telephoneNumber: +6589895569
manager: cn=Francesca Cooper,ou=Manufacture,ou=Misappropriation

dn: cn=Fran Evans,ou=Embezzelment,ou=Misappropriation,dc=Unimaginable
University,dc=nodomain
objectClass: organizationalPerson
objectClass: inetOrgPerson
objectClass: posixAccount
cn: Fran Evans
sn: Evans
mail: fran4e5@lanthanideproductions.com.nz
uid: fran4e5
uidNumber: 10009
gidNumber: 10009
homeDirectory: /home/fran4e5
userPassword: {SSHA}DAxvHEcvLGehazVC0zRwnOWBapmyNIkQ
telephoneNumber: +6589895884
telephoneNumber: +6589895991
telephoneNumber: +6589895579
manager: cn=Mark Martin,ou=Embezzelment,ou=Misappropriation

dn: cn=Frances Thompson,ou=Research,ou=Consolidation,dc=Lanthanide
Productions,dc=nodomain
objectClass: organizationalPerson
objectClass: inetOrgPerson
objectClass: posixAccount
cn: Frances Thompson
sn: Thompson
mail: ft9@monopolistictradingcompany.com.nz
uid: ft9
uidNumber: 10010
gidNumber: 10010
homeDirectory: /home/ft9
userPassword: {SSHA}DAxvHEcvLGehazVC0zRwnOWBapmyNIkQ
manager: cn=Mario Lewis,ou=Human resources,ou=Research,ou=Consolidation

dn: cn=Frances Roberts,ou=Sub-divisions,dc=Neo-Imperial Exports,dc=nodomain
objectClass: organizationalPerson
objectClass: inetOrgPerson
objectClass: posixAccount
cn: Frances Roberts
sn: Roberts
mail: frances7r7@monopolistictradingcompany.com.nz
uid: frances7r7
uidNumber: 10011
gidNumber: 10011
homeDirectory: /home/frances7r7
userPassword: {SSHA}DAxvHEcvLGehazVC0zRwnOWBapmyNIkQ
telephoneNumber: +6505679264
telephoneNumber: +6505679521
telephoneNumber: +6505679171

dn: cn=Micah Evans,ou=Sub-divisions,dc=Neo-Imperial Exports,dc=nodomain
objectClass: organizationalPerson
```

```
objectClass: inetOrgPerson
objectClass: posixAccount
cn: Micah Evans
sn: Evans
mail: mevans@lanthanideproductions.com.nz
uid: mevans
uidNumber: 10012
gidNumber: 10012
homeDirectory: /home/mevans
userPassword: {SSHA}DAXvHEcvLGehazVC0zRwnOWBapmyNIkQ
telephoneNumber: +6589895381
manager: cn=Frances Roberts,ou=Sub-divisions

dn: cn=Micah Thompson,ou=Environmental protection,ou=market punctuation,dc=Monopolistic
Used Vehicles,dc=nodomain
objectClass: organizationalPerson
objectClass: inetOrgPerson
objectClass: posixAccount
cn: Micah Thompson
sn: Thompson
mail: mthompson@monopolistictradingcompany.com.nz
uid: mthompson
uidNumber: 10013
gidNumber: 10013
homeDirectory: /home/mthompson
userPassword: {SSHA}DAXvHEcvLGehazVC0zRwnOWBapmyNIkQ
telephoneNumber: +6505679990
telephoneNumber: +6505679422
telephoneNumber: +6505679305
telephoneNumber: +6505679570
manager: cn=Micah Wood,ou=market punctuation

dn: cn=Murray Robinson,ou=Embezzelment,ou=Misappropriation,dc=Unimaginable
University,dc=nodomain
objectClass: organizationalPerson
objectClass: inetOrgPerson
objectClass: posixAccount
cn: Murray Robinson
sn: Robinson
mail: murray.robinson@monopolisticusedvehicles.com.aq
uid: murray.robinson
uidNumber: 10014
gidNumber: 10014
homeDirectory: /home/murray.robinson
userPassword: {SSHA}DAXvHEcvLGehazVC0zRwnOWBapmyNIkQ
telephoneNumber: +672112596
manager: cn=Fran Evans,ou=Embezzelment,ou=Misappropriation

dn: cn=Martin Clarke,ou=Statistical misinterpretation,ou=Finance,dc=Monopolistic Trading
Company,dc=nodomain
objectClass: organizationalPerson
objectClass: inetOrgPerson
objectClass: posixAccount
cn: Martin Clarke
sn: Clarke
mail: mc14@monopolistictradingcompany.com.nz
uid: mc14
uidNumber: 10015
gidNumber: 10015
homeDirectory: /home/mc14
userPassword: {SSHA}DAXvHEcvLGehazVC0zRwnOWBapmyNIkQ
```

telephoneNumber: +6505679010
manager: cn=Fran Thomas,ou=Statistical misinterpretation,ou=Finance

dn: cn=Mario Watson,ou=market punctuation,dc=Monopolistic Used Vehicles,dc=nodomain
objectClass: organizationalPerson
objectClass: inetOrgPerson
objectClass: posixAccount
cn: Mario Watson
sn: Watson
mail: mario.watson@monopolistictradingcompany.com.nz
uid: mario.watson
uidNumber: 10016
gidNumber: 10016
homeDirectory: /home/mario.watson
userPassword: {SSHA}DAxvHEcvLGehazVC0zRwnOWBapmyNIkQ
telephoneNumber: +6505679779
telephoneNumber: +6505679273
telephoneNumber: +6505679750
manager: cn=Micah Wood,ou=market punctuation

dn: cn=Martin James,ou=Research,ou=Consolidation,dc=Lanthanide Productions,dc=nodomain
objectClass: organizationalPerson
objectClass: inetOrgPerson
objectClass: posixAccount
cn: Martin James
sn: James
mail: martin6j5@monopolistictradingcompany.com.nz
uid: martin6j5
uidNumber: 10017
gidNumber: 10017
homeDirectory: /home/martin6j5
userPassword: {SSHA}DAxvHEcvLGehazVC0zRwnOWBapmyNIkQ
telephoneNumber: +6505679736
manager: cn=Magnus Taylor,ou=Environmental protection,ou=Research,ou=Consolidation

dn: cn=Magnus Wood,ou=Pest control,ou=Sub-divisions,dc=Neo-Imperial Exports,dc=nodomain
objectClass: organizationalPerson
objectClass: inetOrgPerson
objectClass: posixAccount
cn: Magnus Wood
sn: Wood
mail: mwood@monopolisticusedvehicles.com.aq
uid: mwood
uidNumber: 10018
gidNumber: 10018
homeDirectory: /home/mwood
userPassword: {SSHA}DAxvHEcvLGehazVC0zRwnOWBapmyNIkQ
telephoneNumber: +672112282
telephoneNumber: +672112962
telephoneNumber: +672112613
telephoneNumber: +672112968
manager: cn=Frances Roberts,ou=Sub-divisions

dn: cn=Murray Walker,ou=Embezzlement,ou=Misappropriation,dc=Unimaginable University,dc=nodomain
objectClass: organizationalPerson
objectClass: inetOrgPerson
objectClass: posixAccount
cn: Murray Walker
sn: Walker
mail: mw18@monopolistictradingcompany.com.nz


```
uid: mw18
uidNumber: 10019
gidNumber: 10019
homeDirectory: /home/mw18
userPassword: {SSHA}DAXvHEcvLGehazVC0zRwnOWBapmyNIkQ
telephoneNumber: +6505679616
manager: cn=Murray Robinson,ou=Embezzelment,ou=Misappropriation

dn: cn=Micah Clarke,ou=Consolidation,dc=Lanthanide Productions,dc=nodomain
objectClass: organizationalPerson
objectClass: inetOrgPerson
objectClass: posixAccount
cn: Micah Clarke
sn: Clarke
mail: micah.clarke@unimaginableuniversity.com.ki
uid: micah.clarke
uidNumber: 10020
gidNumber: 10020
homeDirectory: /home/micah.clarke
userPassword: {SSHA}DAXvHEcvLGehazVC0zRwnOWBapmyNIkQ
manager: cn=Frances Thompson,ou=Research,ou=Consolidation

dn: cn=Magnus Harris,ou=Consolidation,dc=Lanthanide Productions,dc=nodomain
objectClass: organizationalPerson
objectClass: inetOrgPerson
objectClass: posixAccount
cn: Magnus Harris
sn: Harris
mail: magnus6h6@unimaginableuniversity.com.ki
uid: magnus6h6
uidNumber: 10021
gidNumber: 10021
homeDirectory: /home/magnus6h6
userPassword: {SSHA}DAXvHEcvLGehazVC0zRwnOWBapmyNIkQ
telephoneNumber: +68685311493
telephoneNumber: +68685311670
manager: cn=Frances Thompson,ou=Research,ou=Consolidation

dn: cn=Micah Thomas,ou=Statistical misinterpretation,ou=Finance,dc=Monopolistic Trading
Company,dc=nodomain
objectClass: organizationalPerson
objectClass: inetOrgPerson
objectClass: posixAccount
cn: Micah Thomas
sn: Thomas
mail: micah5t6@unimaginableuniversity.com.ki
uid: micah5t6
uidNumber: 10022
gidNumber: 10022
homeDirectory: /home/micah5t6
userPassword: {SSHA}DAXvHEcvLGehazVC0zRwnOWBapmyNIkQ
telephoneNumber: +68685311227
telephoneNumber: +68685311335
telephoneNumber: +68685311885
telephoneNumber: +68685311195
manager: cn=Martin Clarke,ou=Statistical misinterpretation,ou=Finance

dn: cn=Fiona Lee,ou=Misappropriation,dc=Unimaginable University,dc=nodomain
objectClass: organizationalPerson
objectClass: inetOrgPerson
objectClass: posixAccount
```

cn: Fiona Lee
sn: Lee
mail: fl22@unimaginableuniversity.com.ki
uid: fl22
uidNumber: 10023
gidNumber: 10023
homeDirectory: /home/fl22
userPassword: {SSHA}DAXvHEcvLGehazVC0zRwnOWBapmyNIkQ
telephoneNumber: +68685311000
telephoneNumber: +68685311737
telephoneNumber: +68685311986
telephoneNumber: +68685311852
manager: cn=Fran Evans,ou=Embezzelment,ou=Misappropriation

dn: cn=Freda King,ou=Human resources,ou=Research,ou=Consolidation,dc=Lanthanide
Productions,dc=nodomain
objectClass: organizationalPerson
objectClass: inetOrgPerson
objectClass: posixAccount
cn: Freda King
sn: King
mail: fk23@unimaginableuniversity.com.ki
uid: fk23
uidNumber: 10024
gidNumber: 10024
homeDirectory: /home/fk23
userPassword: {SSHA}DAXvHEcvLGehazVC0zRwnOWBapmyNIkQ
telephoneNumber: +68685311652
telephoneNumber: +68685311864
telephoneNumber: +68685311177
manager: cn=Frances Thompson,ou=Research,ou=Consolidation

dn: cn=Francesca Brown,ou=Pest control,ou=Sub-divisions,dc=Neo-Imperial
Exports,dc=nodomain
objectClass: organizationalPerson
objectClass: inetOrgPerson
objectClass: posixAccount
cn: Francesca Brown
sn: Brown
mail: francesca.brown@unimaginableuniversity.com.ki
uid: francesca.brown
uidNumber: 10025
gidNumber: 10025
homeDirectory: /home/francesca.brown
userPassword: {SSHA}DAXvHEcvLGehazVC0zRwnOWBapmyNIkQ
telephoneNumber: +68685311230
telephoneNumber: +68685311021
manager: cn=Micah Evans,ou=Sub-divisions

dn: cn=Fifi Wright,ou=Finance,dc=Monopolistic Trading Company,dc=nodomain
objectClass: organizationalPerson
objectClass: inetOrgPerson
objectClass: posixAccount
cn: Fifi Wright
sn: Wright
mail: fw25@neoimperialexports.com.aq
uid: fw25
uidNumber: 10026
gidNumber: 10026
homeDirectory: /home/fw25
userPassword: {SSHA}DAXvHEcvLGehazVC0zRwnOWBapmyNIkQ

manager: cn=Micah Thomas,ou=Statistical misinterpretation,ou=Finance

dn: cn=Martin Lee,ou=Environmental protection,ou=market punctuation,dc=Monopolistic Used Vehicles,dc=nodomain
objectClass: organizationalPerson
objectClass: inetOrgPerson
objectClass: posixAccount
cn: Martin Lee
sn: Lee
mail: ml26@monopolisticusedvehicles.com.aq
uid: ml26
uidNumber: 10027
gidNumber: 10027
homeDirectory: /home/ml26
userPassword: {SSHA}DAXvHEcvLGehazVC0zRwnOWBapmyNIkQ
manager: cn=Mario Watson,ou=market punctuation

dn: cn=Flora Wood,ou=market punctuation,dc=Monopolistic Used Vehicles,dc=nodomain
objectClass: organizationalPerson
objectClass: inetOrgPerson
objectClass: posixAccount
cn: Flora Wood
sn: Wood
mail: fw27@lanthanideproductions.com.nz
uid: fw27
uidNumber: 10028
gidNumber: 10028
homeDirectory: /home/fw27
userPassword: {SSHA}DAXvHEcvLGehazVC0zRwnOWBapmyNIkQ
telephoneNumber: +6589895724
manager: cn=Micah Wood,ou=market punctuation

dn: cn=Morgan Jones,ou=Consolidation,dc=Lanthanide Productions,dc=nodomain
objectClass: organizationalPerson
objectClass: inetOrgPerson
objectClass: posixAccount
cn: Morgan Jones
sn: Jones
mail: morgan.jones@unimaginableuniversity.com.ki
uid: morgan.jones
uidNumber: 10029
gidNumber: 10029
homeDirectory: /home/morgan.jones
userPassword: {SSHA}DAXvHEcvLGehazVC0zRwnOWBapmyNIkQ
telephoneNumber: +68685311957
telephoneNumber: +68685311577
telephoneNumber: +68685311346
manager: cn=Frances Thompson,ou=Research,ou=Consolidation

dn: cn=Fiona Jones,ou=Statistical misinterpretation,ou=Finance,dc=Monopolistic Trading Company,dc=nodomain
objectClass: organizationalPerson
objectClass: inetOrgPerson
objectClass: posixAccount
cn: Fiona Jones
sn: Jones
mail: fiona5j5@monopolistictradingcompany.com.nz
uid: fiona5j5
uidNumber: 10030
gidNumber: 10030
homeDirectory: /home/fiona5j5

userPassword: {SSHA}DAXvHEcvLGehazVC0zRwnOWBapmyNIkQ
telephoneNumber: +6505679911
telephoneNumber: +6505679509
telephoneNumber: +6505679862
manager: cn=Martin Clarke,ou=Statistical misinterpretation,ou=Finance

dn: cn=Frances Wood,ou=Pest control,ou=Sub-divisions,dc=Neo-Imperial Exports,dc=nodomain
objectClass: organizationalPerson
objectClass: inetOrgPerson
objectClass: posixAccount
cn: Frances Wood
sn: Wood
mail: frances.wood@monopolisticusedvehicles.com.aq
uid: frances.wood
uidNumber: 10031
gidNumber: 10031
homeDirectory: /home/frances.wood
userPassword: {SSHA}DAXvHEcvLGehazVC0zRwnOWBapmyNIkQ
telephoneNumber: +672112928
telephoneNumber: +672112293
telephoneNumber: +672112101
manager: cn=Magnus Wood,ou=Pest control,ou=Sub-divisions

dn: cn=Frances Thomas,ou=market punctuation,dc=Monopolistic Used Vehicles,dc=nodomain
objectClass: organizationalPerson
objectClass: inetOrgPerson
objectClass: posixAccount
cn: Frances Thomas
sn: Thomas
mail: fthomas@unimaginableuniversity.com.ki
uid: fthomas
uidNumber: 10032
gidNumber: 10032
homeDirectory: /home/fthomas
userPassword: {SSHA}DAXvHEcvLGehazVC0zRwnOWBapmyNIkQ
telephoneNumber: +68685311325
manager: cn=Micah Thompson,ou=Environmental protection,ou=market punctuation

dn: cn=Matthew Walker,ou=Statistical misinterpretation,ou=Finance,dc=Monopolistic Trading Company,dc=nodomain
objectClass: organizationalPerson
objectClass: inetOrgPerson
objectClass: posixAccount
cn: Matthew Walker
sn: Walker
mail: mw32@unimaginableuniversity.com.ki
uid: mw32
uidNumber: 10033
gidNumber: 10033
homeDirectory: /home/mw32
userPassword: {SSHA}DAXvHEcvLGehazVC0zRwnOWBapmyNIkQ
telephoneNumber: +68685311090
telephoneNumber: +68685311768
manager: cn=Fifi Wright,ou=Finance

dn: cn=Fran Green,ou=Consolidation,dc=Lanthanide Productions,dc=nodomain
objectClass: organizationalPerson
objectClass: inetOrgPerson
objectClass: posixAccount
cn: Fran Green
sn: Green

mail: fgreen@neoimperialexports.com.aq

uid: fgreen

uidNumber: 10034

gidNumber: 10034

homeDirectory: /home/fgreen

userPassword: {SSHA}DAXvHEcvLGehazVC0zRwnOWBapmyNIkQ

telephoneNumber: +672101020

manager: cn=Magnus Harris,ou=Consolidation

dn: cn=Fiona Smith,ou=Embezzelment,ou=Misappropriation,dc=Unimaginable
University,dc=nodomain

objectClass: organizationalPerson

objectClass: inetOrgPerson

objectClass: posixAccount

cn: Fiona Smith

sn: Smith

mail: fiona.smith@monopolisticusedvehicles.com.aq

uid: fiona.smith

uidNumber: 10035

gidNumber: 10035

homeDirectory: /home/fiona.smith

userPassword: {SSHA}DAXvHEcvLGehazVC0zRwnOWBapmyNIkQ

telephoneNumber: +672112431

telephoneNumber: +672112770

telephoneNumber: +672112726

manager: cn=Murray Robinson,ou=Embezzelment,ou=Misappropriation

dn: cn=Matthew Wilson,ou=Environmental protection,ou=market punctuation,dc=Monopolistic
Used Vehicles,dc=nodomain

objectClass: organizationalPerson

objectClass: inetOrgPerson

objectClass: posixAccount

cn: Matthew Wilson

sn: Wilson

mail: matthew.wilson@monopolisticusedvehicles.com.aq

uid: matthew.wilson

uidNumber: 10036

gidNumber: 10036

homeDirectory: /home/matthew.wilson

userPassword: {SSHA}DAXvHEcvLGehazVC0zRwnOWBapmyNIkQ

manager: cn=Martin Lee,ou=Environmental protection,ou=market punctuation

dn: cn=Murray Johnson,ou=market punctuation,dc=Monopolistic Used Vehicles,dc=nodomain

objectClass: organizationalPerson

objectClass: inetOrgPerson

objectClass: posixAccount

cn: Murray Johnson

sn: Johnson

mail: murray6j7@lanthanideproductions.com.nz

uid: murray6j7

uidNumber: 10037

gidNumber: 10037

homeDirectory: /home/murray6j7

userPassword: {SSHA}DAXvHEcvLGehazVC0zRwnOWBapmyNIkQ

telephoneNumber: +6589895541

telephoneNumber: +6589895039

telephoneNumber: +6589895553

manager: cn=Martin Lee,ou=Environmental protection,ou=market punctuation

dn: cn=Flora Brown,ou=Environmental

protection,ou=Research,ou=Consolidation,dc=Lanthanide Productions,dc=nodomain

objectClass: organizationalPerson
objectClass: inetOrgPerson
objectClass: posixAccount
cn: Flora Brown
sn: Brown
mail: flora5b5@monopolisticusedvehicles.com.aq
uid: flora5b5
uidNumber: 10038
gidNumber: 10038
homeDirectory: /home/flora5b5
userPassword: {SSHA}DAXvHEcvLGehazVC0zRwnOWBapmyNIkQ
telephoneNumber: +672112719
telephoneNumber: +672112368
telephoneNumber: +672112636
telephoneNumber: +672112684
manager: cn=Martin James,ou=Research,ou=Consolidation

dn: cn=Murray Jones,ou=Manufacture,ou=Misappropriation,dc=Unimaginable
University,dc=nodomain
objectClass: organizationalPerson
objectClass: inetOrgPerson
objectClass: posixAccount
cn: Murray Jones
sn: Jones
mail: mjones@neoimperialexports.com.aq
uid: mjones
uidNumber: 10039
gidNumber: 10039
homeDirectory: /home/mjones
userPassword: {SSHA}DAXvHEcvLGehazVC0zRwnOWBapmyNIkQ
telephoneNumber: +672101386
telephoneNumber: +672101249
telephoneNumber: +672101587
manager: cn=Mark Martin,ou=Embezzlement,ou=Misappropriation

dn: cn=Fran Walker,ou=Environmental protection,ou=market punctuation,dc=Monopolistic
Used Vehicles,dc=nodomain
objectClass: organizationalPerson
objectClass: inetOrgPerson
objectClass: posixAccount
cn: Fran Walker
sn: Walker
mail: fwalker@unimaginableuniversity.com.ki
uid: fwalker
uidNumber: 10040
gidNumber: 10040
homeDirectory: /home/fwalker
userPassword: {SSHA}DAXvHEcvLGehazVC0zRwnOWBapmyNIkQ
telephoneNumber: +68685311965
telephoneNumber: +68685311046
telephoneNumber: +68685311009
telephoneNumber: +68685311507
manager: cn=Murray Johnson,ou=market punctuation

dn: cn=Mario Lee,ou=Embezzlement,ou=Misappropriation,dc=Unimaginable
University,dc=nodomain
objectClass: organizationalPerson
objectClass: inetOrgPerson
objectClass: posixAccount
cn: Mario Lee
sn: Lee

mail: mario5l3@unimaginableuniversity.com.ki
uid: mario5l3
uidNumber: 10041
gidNumber: 10041
homeDirectory: /home/mario5l3
userPassword: {SSHA}DAXvHEcvLGehazVC0zRwnOWBapmyNIkQ
telephoneNumber: +68685311535
telephoneNumber: +68685311224
telephoneNumber: +68685311114
telephoneNumber: +68685311903
manager: cn=Fiona Smith,ou=Embezzelment,ou=Misappropriation

dn: cn=Fifi Watson,ou=Human resources,ou=Research,ou=Consolidation,dc=Lanthanide
Productions,dc=nodomain
objectClass: organizationalPerson
objectClass: inetOrgPerson
objectClass: posixAccount
cn: Fifi Watson
sn: Watson
mail: fwatson@neoimperialexports.com.aq
uid: fwatson
uidNumber: 10042
gidNumber: 10042
homeDirectory: /home/fwatson
userPassword: {SSHA}DAXvHEcvLGehazVC0zRwnOWBapmyNIkQ
telephoneNumber: +672101913
telephoneNumber: +672101790
telephoneNumber: +672101517
telephoneNumber: +672101514
manager: cn=Martin James,ou=Research,ou=Consolidation

dn: cn=Fiona Jackson,ou=Statistical misinterpretation,ou=Finance,dc=Monopolistic Trading
Company,dc=nodomain
objectClass: organizationalPerson
objectClass: inetOrgPerson
objectClass: posixAccount
cn: Fiona Jackson
sn: Jackson
mail: fiona5j7@neoimperialexports.com.aq
uid: fiona5j7
uidNumber: 10043
gidNumber: 10043
homeDirectory: /home/fiona5j7
userPassword: {SSHA}DAXvHEcvLGehazVC0zRwnOWBapmyNIkQ
telephoneNumber: +672101916
telephoneNumber: +672101891
telephoneNumber: +672101415
telephoneNumber: +672101277
manager: cn=Micah Thomas,ou=Statistical misinterpretation,ou=Finance

dn: cn=Fleur Lee,ou=Environmental protection,ou=market punctuation,dc=Monopolistic Used
Vehicles,dc=nodomain
objectClass: organizationalPerson
objectClass: inetOrgPerson
objectClass: posixAccount
cn: Fleur Lee
sn: Lee
mail: fleur.lee@neoimperialexports.com.aq
uid: fleur.lee
uidNumber: 10044
gidNumber: 10044

homeDirectory: /home/fleur.lee
userPassword: {SSHA}DAXvHEcvLGehazVC0zRwnOWBapmyNIkQ
telephoneNumber: +672101544
telephoneNumber: +672101468
telephoneNumber: +672101214
manager: cn=Mario Watson,ou=market punctuation

dn: cn=Mario Johnson,ou=Environmental protection,ou=market punctuation,dc=Monopolistic
Used Vehicles,dc=nodomain
objectClass: organizationalPerson
objectClass: inetOrgPerson
objectClass: posixAccount
cn: Mario Johnson
sn: Johnson
mail: mario5j7@neoimperialexports.com.aq
uid: mario5j7
uidNumber: 10045
gidNumber: 10045
homeDirectory: /home/mario5j7
userPassword: {SSHA}DAXvHEcvLGehazVC0zRwnOWBapmyNIkQ
telephoneNumber: +672101267
telephoneNumber: +672101628
telephoneNumber: +672101666
manager: cn=Matthew Wilson,ou=Environmental protection,ou=market punctuation

dn: cn=Fay Evans,ou=Consolidation,dc=Lanthanide Productions,dc=nodomain
objectClass: organizationalPerson
objectClass: inetOrgPerson
objectClass: posixAccount
cn: Fay Evans
sn: Evans
mail: fevans@monopolisticusedvehicles.com.aq
uid: fevans
uidNumber: 10046
gidNumber: 10046
homeDirectory: /home/fevans
userPassword: {SSHA}DAXvHEcvLGehazVC0zRwnOWBapmyNIkQ
manager: cn=Fifi Watson,ou=Human resources,ou=Research,ou=Consolidation

dn: cn=Murray King,ou=Research,ou=Consolidation,dc=Lanthanide Productions,dc=nodomain
objectClass: organizationalPerson
objectClass: inetOrgPerson
objectClass: posixAccount
cn: Murray King
sn: King
mail: mking@lanthanideproductions.com.nz
uid: mking
uidNumber: 10047
gidNumber: 10047
homeDirectory: /home/mking
userPassword: {SSHA}DAXvHEcvLGehazVC0zRwnOWBapmyNIkQ
telephoneNumber: +6589895377
manager: cn=Frances Williams,ou=Human resources,ou=Research,ou=Consolidation

dn: cn=Matthew Smith,ou=Manufacture,ou=Misappropriation,dc=Unimaginable
University,dc=nodomain
objectClass: organizationalPerson
objectClass: inetOrgPerson
objectClass: posixAccount
cn: Matthew Smith
sn: Smith

mail: msmith@monopolistictradingcompany.com.nz
uid: msmith
uidNumber: 10048
gidNumber: 10048
homeDirectory: /home/msmith
userPassword: {SSHA}DAXvHEcvLGehazVCOzRwnOWBapmyNIkQ
manager: cn=Mario Lee,ou=Embezzelment,ou=Misappropriation