LINUX SERVER ADMINISTRATOR EXAM REPORT

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Exam Question

An institute looking to establish a secure and efficient Linux server environment for database management must follow several key steps. Begin by setting up an LDAP server to centralize user authentication. Then, deploy PostgreSQL with LDAP-based authentication to ensure secure database access. Next, configure Joomla to be securely accessible over HTTPS on port 443 using a designated domain name. Additionally, implement a file-sharing service to manage user home directories via FTP with LDAP authentication, and set up an SSH server to authenticate users through LDAP.

Server and Client User and Password

Role	User	Password
LDAP Server	root	Root
LDAP User	Nikhil	-------@123
SSH User	Nikhil	-------@123
Client	root	Root
Client User	Patidar	123
Joomla Admin	admin	-------@123456

Server and Client User and Password

SERVER DETAILS	
OS	Debian 12
IPv4	192.168.169.130
Hostname	ns.armour.local
Domain	armour.local, ns.armour.local www.armour.local
CLIENT DETAILS	
OS	Debian 12
IPv4	192.168.169.132
Hostname	cn.client.local
Domain	client.local cn.client.local

LDAP SERVER Basic Configuration

Machine Name Debian for Exam Linux

Set IP and Gateway

nano /etc/network/interfaces
ip 192.168.169.130
gateway 192.168.169.135

```
root@ns# ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
       valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host noprefixroute
       valid_lft forever preferred_lft forever
2: enp0s3: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000
    link/ether 08:00:27:23:33:22 brd ff:ff:ff:ff:ff:ff
    inet 192.168.169.130/24 brd 192.168.169.255 scope global enp0s3
       valid_lft forever preferred_lft forever
    inet6 2401:4900:55aa:ab11:a00:27ff:fe23:3322/64 scope global dynamic mngtmpaddr
       valid_lft 6815sec preferred_lft 6815sec
    inet6 fe80::a00:27ff:fe23:3322/64 scope link
       valid_lft forever preferred_lft forever
```

Server IP

Hostname Name Set on Ldap Server Site
hostnamectl set-hostname ns.armour.local
reboot

Check
hostname
ns.armour.local

vim /etc/resolv.conf
 # Add this line
nameserver 8.8.8.8
nameserver 8.8.4.4

Disable IPv6
vim /etc/sysctl.conf

 # Add this Line
net.ipv6.conf.all.disable_ipv6 = 1
net.ipv6.conf.default.disable_ipv6 = 1
net.ipv6.conf.lo.disable_ipv6 = 1

Apply Changes Immediaelty
sysctl -p

DEBIAN CLIENT Basic Configuration

Machine Name Debian Client for Exam Linux

Root Credentials :

- **Username :** root
- **Password :** root

User Credentials:

- **Username:** patidar
- **Password:** 123

Set IP and Gateway
vim /etc/network/interfaces
ip 192.168.169.132
gateway 192.168.169.135

```
root@cn:~# ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
       valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host noprefixroute
       valid_lft forever preferred_lft forever
2: enp0s3: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000
    link/ether 08:00:27:56:09:aa brd ff:ff:ff:ff:ff:ff
    inet 192.168.169.132/24 brd 192.168.169.255 scope global enp0s3
       valid_lft forever preferred_lft forever
    inet6 2401:4900:55aa:ab11:a00:27ff:fe56:9aa/64 scope global dynamic mngtmpaddr
       valid_lft 6803sec preferred_lft 6803sec
    inet6 fe80::a00:27ff:fe56:9aa/64 scope link
       valid_lft forever preferred_lft forever
```

Client IP

Hostname Name Set on Client Site

hostnamectl set-hostname cn.client.local

reboot

Check hostname

cn.client.local

vim /etc/resolv.conf

 # Add this line

nameserver 192.168.169.130 //LDAP Server IP

nameserver 8.8.8.8

Disable IPv6

vim /etc/sysctl.conf

#Add this Line

net.ipv6.conf.all.disable_ipv6 = 1

net.ipv6.conf.default.disable_ipv6 = 1

net.ipv6.conf.lo.disable_ipv6 = 1

Apply Changes Immediaelty

sysctl -p

Ldap Server site Configuration

1. Configuration of DNS (Domain Name System)

Step -1. Install DNS Required Packages

apt install bind9 dnsutils

Step -2. Create Zone

vim /etc/bind/named.conf.local

```
root@ns# cat /etc/bind/named.conf.local
//
// Do any local configuration here
//

// Consider adding the 1918 zones here, if they are not used in your
// organization
//include "/etc/bind/zones.rfc1918";
zone "armour.local" {
    type master;
    file "/etc/bind/zones/forward.armour.local";
};
```

Step-3. Create Forward Zone Records

mkdir /etc/bind/zones

vim /etc/bind/zones/forward.server.local

```
$TTL 604800
@   IN  SOA ns.armour.local. root.armour.local. (
              3         ; Serial
              604800    ; Refresh
              86400     ; Retry
              2419200   ; Expire
              604800 )  ; Negative Cache TTL

@       IN  NS  ns.armour.local.
@       IN  A   192.168.169.130
ns      IN  A   192.168.169.130
lldap   IN  A   192.168.169.130
```

named-checkzone armour.local /etc/bind/zones/forward.armour.local

Step -4. Update Hosts

vim /etc/hosts

192.168.169.130 armour.local ns.armour.local ldap.armour.local

Step-5. Restart DNS Services

systemctl restart bind9

systemctl enable named.service

Step-6. Verify Domain Resolution

nslookup server.local 192.168.169.130

nslookup ldap.server.local 192.168.169.130

```
root@ns# nslookup ns.armour.local 192.168.169.130
Server:         192.168.169.130
Address:        192.168.169.130#53

Name:   ns.armour.local
Address: 192.168.169.130

root@ns# nslookup ldap.armour.local 192.168.169.130
Server:         192.168.169.130
Address:        192.168.169.130#53

Name:   ldap.armour.local
Address: 192.168.169.130
```

LDAP (Lightweight Directory Access Protocol) Server Configuration.

Step-1. Package Install

apt install slapd ldap-utils

Administrator Password Set -------@123

Step-2. Reconfigure LDAP

Answer the prompts:

- Omit OpenLDAP server configuration? → No
- DNS Domain Name → armour.local
- Organization name → armour
- Administrator Password → -------@123
- Confirm Password → -------@123
- Do you want the database removed when slapd is purged? → No
- Move old database? → Yes

Step-3. Edit /etc/ldap/ldap.conf

vim /etc/ldap/ldap.conf

 # Add this line

BASE dc=armour, dc=local

URI ldap://ldap.armour.loca

Check LDAP Configuration Checks

- ldapsearch -Q -LLL -Y EXTERNAL -H ldapi:/// -b cn=config dn
- ldapsearch -x -LLL -H ldap:/// -b dc=armour, dc=local dn
- ldapwhoami –x
- ldapwhoami -x -D cn=admin,dc=armour,dc=local –W
- ldapwhoami -Y EXTERNAL -H ldapi:/// -Q

Step -4. Create LDAP User

Genrate Hashed Password

slappasswd

{SSHA}3oeezY66PdwESVU3ZR1H6owK8XPqwdpA (-------@123)

vim users.ldif

add user and groups to LDAP

ldapadd -x -D cn=admin,dc=armour,dc=local -W -f users.ldif

```
dn: ou=People,dc=armour,dc=local
objectClass: organizationalUnit
ou: People

dn: ou=Groups,dc=armour,dc=local
objectClass: organizationalUnit
ou: Groups

dn: cn=teams,ou=Groups,dc=armour,dc=local
objectClass: posixGroup
cn: teams
gidNumber: 5000

dn: uid=nikhil,ou=People,dc=armour,dc=local
objectClass: inetOrgPerson
objectClass: posixAccount
objectClass: top
uid: nikhil
sn: patidar
givenName: nikhil
cn: nikhil patidar
displayName: nikhil patidar
uidNumber: 11000
gidNumber: 5500
userPassword: {SSHA}3oeezY66PdwESVU3ZR1H6owK8XPqwdpA
gecos: nikhil patidar
loginShell: /bin/bash
homeDirectory: /home/nikhil
```

Verify
ldapsearch -x -LLL -b dc=armour,dc=local '(uid=nikhil)' cn gidNumber

Step-5. Edit PAM Auth File
vim /etc/pam.d/common-auth

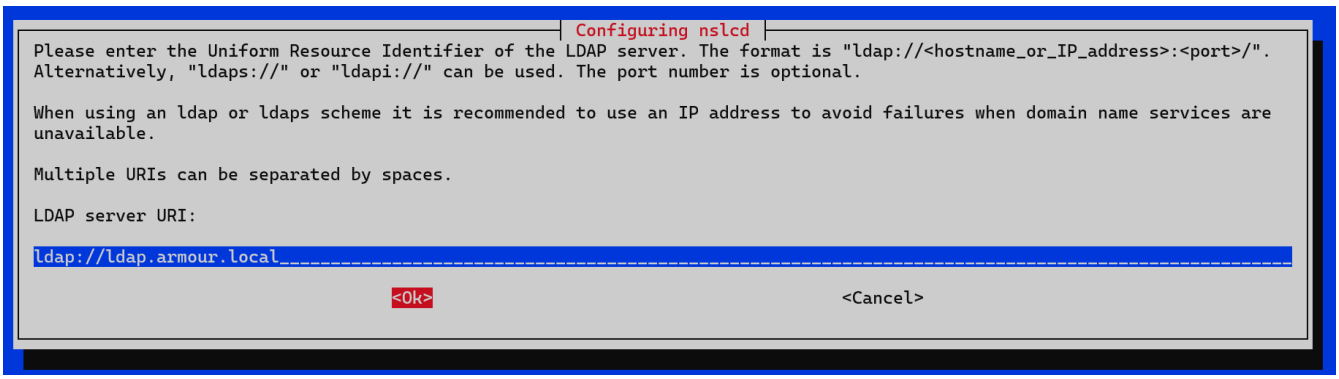
 # Add this line
auth sufficient pam_ldap.so

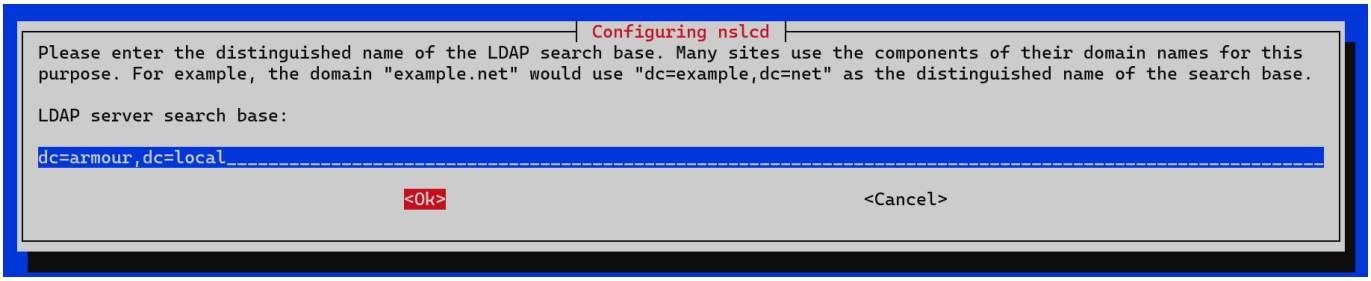
 # Enable Home directory creatioin
vim /etc/pam.d/common-session
add this line
session required pam_mkhomedir.so skel=/etc/skel/ umask=0022

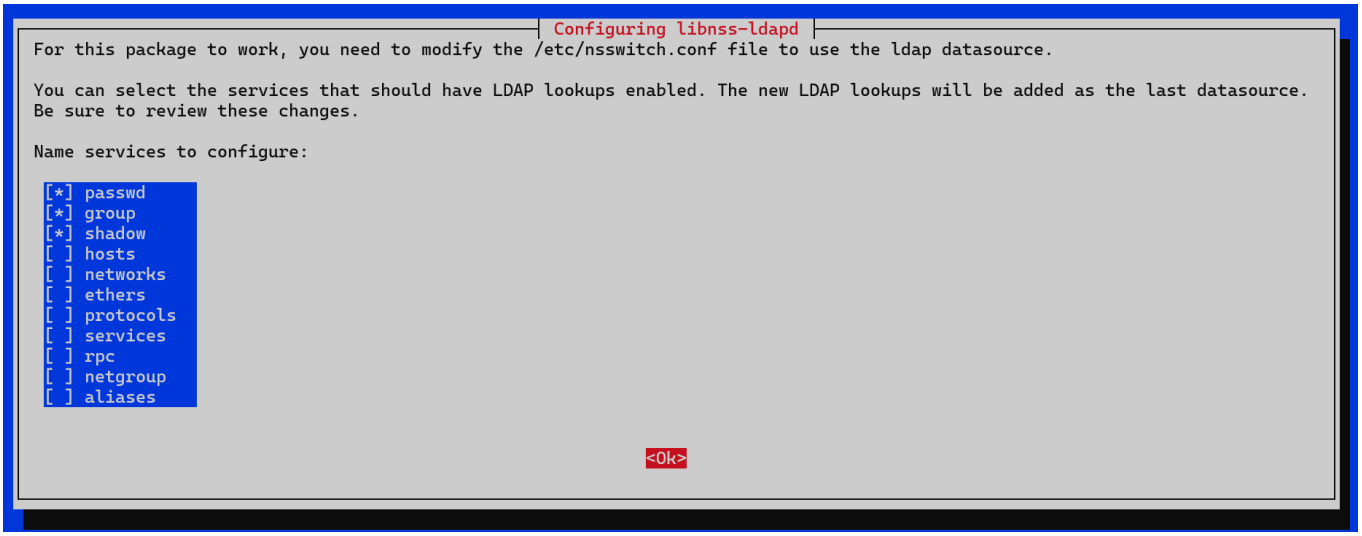
```
#
# /etc/pam.d/common-session - session-related modules common to all services
#
# This file is included from other service-specific PAM config files,
# and should contain a list of modules that define tasks to be performed
# at the start and end of interactive sessions.
#
# As of pam 1.0.1-6, this file is managed by pam-auth-update by default.
# To take advantage of this, it is recommended that you configure any
# local modules either before or after the default block, and use
# pam-auth-update to manage selection of other modules.  See
# pam-auth-update(8) for details.

# here are the per-package modules (the "Primary" block)
session [default=1]                     pam_permit.so
# here's the fallback if no module succeeds
session requisite                       pam_deny.so
# prime the stack with a positive return value if there isn't one already;
# this avoids us returning an error just because nothing sets a success code
# since the modules above will each just jump around
session required                        pam_permit.so
# and here are more per-package modules (the "Additional" block)
session required        pam_unix.so
session [success=ok default=ignore]     pam_ldap.so minimum_uid=1000
session optional        pam_systemd.so
# end of pam-auth-update config
session required        pam_mkhomedir.so skel=/etc/skel/ umask=0022
~
~
~
```

Step-6. Install LDAP PAM Packages
apt install nslcd libpam-ldapd

- LDAP server URI: ldap://ldap.armour.local
- LDAP server search base: dc=armour,dc=local
- Name service to configure: select passwd, group, shadow







Step-7. Add Admin
vim /etc/nslcd.conf

 # Add this line
binddn cn=admin,dc=armour,dc=local
bindpw -------@123

```
# The DN to bind with for normal lookups.
#binddn cn=annonymous,dc=example,dc=net
binddn cn=admin,dc=armour,dc=local
#bindpw secret
bindpw Nikhil@123
```

systemctl restart nslcd.service

getent passwd nikhil
 # Output
nikhil:*:11000:5500:nikhil patidar:/home/nikhil:/bin/bash

id nikhil
 # Output
uid=11000(nikhil) gid=5500 groups=5500

```
root@ns# getent passwd nikhil
nikhil:*:11000:5500:nikhil patidar:/home/nikhil:/bin/bash
root@ns# id nikhil
uid=11000(nikhil) gid=5500 groups=5500
```

LDAP Client Configuration

Step-1. Install Packages on Client
apt install libnss-ldapd libpam-ldapd ldap-utils

Installation Prompts:

- LDAP server URI: ldap://ldap.armour.local
- LDAP search base: dc=armour,dc=local
- Name service to configure: Select → passwd, group, shadow

Step-2. Home Directory Create and Enable
vim /etc/pam.d/common-session

 # Add this Line
session required pam_mkhomedir.so skel=/etc/skel/ umask=0022

```
#
# /etc/pam.d/common-session - session-related modules common to all services
#
# This file is included from other service-specific PAM config files,
# and should contain a list of modules that define tasks to be performed
# at the start and end of interactive sessions.
#
# As of pam 1.0.1-6, this file is managed by pam-auth-update by default.
# To take advantage of this, it is recommended that you configure any
# local modules either before or after the default block, and use
# pam-auth-update to manage selection of other modules.  See
# pam-auth-update(8) for details.

# here are the per-package modules (the "Primary" block)
session [default=1]                     pam_permit.so
# here's the fallback if no module succeeds
session requisite                       pam_deny.so
# prime the stack with a positive return value if there isn't one already;
# this avoids us returning an error just because nothing sets a success code
# since the modules above will each just jump around
session required                        pam_permit.so
# and here are more per-package modules (the "Additional" block)
session required        pam_unix.so
session [success=ok default=ignore]     pam_ldap.so minimum_uid=1000
session optional        pam_systemd.so
# end of pam-auth-update config
session required        pam_mkhomedir.so skel=/etc/skel/ umask=0022
~
~
~
```

 # LDAP User Test Login
su – nikhil

SSH Access for LDAP Users

Step-1. Edit SSH Configuration
vim /etc/ssh/sshd_config

Set to YES
UsePAM yes

Step-2. Restart SSH Service Both Server and Client
systemctl restart sshd

Step-3. SSH into Server Using LDAP User
From Client Machine site
ssh nikhil@192.168.169.130

```
root@cn:~# whoami
root
root@cn:~# ssh nikhil@192.168.169.130
nikhil@192.168.169.130's password:
Linux ns.armour.local 6.1.0-37-amd64 #1 SMP PREEMPT_DYNAMIC Debian 6.1.140-1 (2025-05-22) x86_64

The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
Last login: Sat Jun  7 19:32:09 2025 from 192.168.169.132
nikhil@ns:~$ whoami
nikhil
nikhil@ns:~$ pwd
/home/nikhil
nikhil@ns:~$
```

LDAP USER SSH CONNETION ON CLIENT

FTP Server Configuration with LDAP Intergration

Step-1. Install FTP Packages on Server
apt install vsftpd

Step.2. Configure PAM for vsftpd Authentication
vim /etc/pam.d/vsftpd

 # Add this Lines

- auth required pam_ldap.so
- account required pam_ldap.so
- session required pam_loginuid.so

```
# Standard behaviour for ftpd(8).
auth    required        pam_listfile.so item=user sense=deny file=/etc/ftpusers onerr=succeed

# Note: vsftpd handles anonymous logins on its own. Do not enable pam_ftp.so.

# Standard pam includes
@include common-account
@include common-session
@include common-auth
auth       required     pam_shells.so
auth       required     pam_ldap.so
account    required     pam_ldap.so
session    required     pam_loginuid.so
```

 # Explanation:

- **auth required pam_ldap.so** — Uses LDAP for user authentication.
- **account required pam_ldap.so** — Verifies account details via LDAP.
- **session required pam_loginuid.so** — Manages session logging.

Step-3. FTP Server Main File Configuration
vim /etc/vsftpd.conf

 # Ensure the following Settings

- local_enable=YES
- write_enable=YES
- pam_service_name=vsftpd

 # Explanation:

- local_enable=YES — Allows local (LDAP-authenticated) users to login.
- write_enable=YES — Allows users to upload, modify, and delete files.
- pam_service_name=vsftpd — Uses /etc/pam.d/vsftpd for authentication.

Step-4. Restart the FTP Service

systemctl restart vsftpd

Step-5. Install FTP Client Tool on Both Server and Client

apt install ftp

Step-6. Connet to FTP Server as LDAP User (Client Machine Side)

ftp 192.168.169.130

- **LDAP User** –Nikhil
- **Password**- -------@123

```
root@cn:~# whoami
root
root@cn:~# ftp 192.168.169.130
Connected to 192.168.169.130.
220 (vsFTPd 3.0.3)
Name (192.168.169.130:root): Nikhil
331 Please specify the password.
Password:
230 Login successful.
Remote system type is UNIX.
Using binary mode to transfer files.
ftp> pwd
Remote directory: /home/nikhil
```

PostgreSQL Installation and Configuration

Step-1. Install PostgreSQL

apt update

apt install postgresql postgresql-contrib

Step-2. Check PostgreSQL Service

systemctl status postgresql

Step-3. Configure LDAP Authentication

vim /etc/postgresql/*/main/pg_hba.conf

 # Add this line at the bottom

host all all 0.0.0.0/0 ldap ldapserver=192.168.169.130 ldapbasedn="ou=People,dc=armour,dc=local"

Step-4. Allow External Connections
vim /etc/postgresql/*/main/postgresql.conf

#Uncomment and set:

listen_addresses = '*'

Step-5. Restart and Verify Postgresql Services
systemctl restart postgresql

systemctl status postgresql

```
root@ns# systemctl restart postgresql
systemctl status postgresql
● postgresql.service - PostgreSQL RDBMS
     Loaded: loaded (/lib/systemd/system/postgresql.service; enabled; preset: enabled)
     Active: active (exited) since Sat 2025-06-07 20:57:12 IST; 45ms ago
    Process: 4215 ExecStart=/bin/true (code=exited, status=0/SUCCESS)
   Main PID: 4215 (code=exited, status=0/SUCCESS)
        CPU: 3ms

Jun 07 20:57:12 ns.armour.local systemd[1]: Starting postgresql.service - PostgreSQL RDBMS...
Jun 07 20:57:12 ns.armour.local systemd[1]: Finished postgresql.service - PostgreSQL RDBMS.
```

Step-6. Connect to PostgreSQL via LDAP user

psql -h 192.168.169.130 -U nikhil -d postgres

```
root@ns# psql -h 192.168.169.130 -U nikhil -d postgres
Password for user nikhil:
psql (15.13 (Debian 15.13-0+deb12u1))
SSL connection (protocol: TLSv1.3, cipher: TLS_AES_256_GCM_SHA384, compression: off)
Type "help" for help.

postgres=>
```

PostgreSQL Basic Commands

S.No	Command	Description
1	su – postgres	Access the PostgreSQL system user shell.
2	Psql	Start the PostgreSQL interactive terminal (psql).
3	\l	List all PostgreSQL databases.
4	\c dbname	Connect to a specific database.
5	\du	List all roles and their privileges.
6	\q	Quit the PostgreSQL terminal.
7	\dt	List all tables in the current database.
8	CREATE TABLE tablename (...);	Create a new table.
9	INSERT INTO tablename (...) VALUES (...);	nsert data into a table.
10	SELECT * FROM tablename;	View all data from a table.

Joomla Installation with HTTPS (Post 443)

Step-1. Install Required Packages

apt update

apt install apache2 php php-mysql php-ldap php-xml php-mbstring php-zip php-curl libapache2-mod-php mariadb-server unzip

apt install php-pgsql

Step-2. Restart Apache2

systemctl restart apache2

Step-3. Download and Etract Joomla

cd /var/www/html

mkdir joomla

cd joomla

wget https://downloads.joomla.org/cms/joomla5/5-3-1/Joomla_5-3-1-Stable-Full_Package.zip

unzip Joomla_5-3-1-Stable-Full_Package.zip

chown -R www-data:www-data /var/www/html/joomla

Step-4. Create SSL Certificate for Joomla

mkdir -p /etc/apache2/ssl

 # Genrate Certificate

openssl req -x509 -nodes -days 365 -newkey rsa:2048 -keyout /etc/apache2/ssl/joomla.key -out /etc/apache2/ssl/joomla.crt

Step-5. Configure Virtual Host

vim /etc/apache2/sites-available/joomla.conf

```
<VirtualHost *:443>
    ServerName ns.armour.local
    ServerAlias armour.local
    DocumentRoot /var/www/html

    SSLEngine on
    SSLCertificateFile /etc/apache2/ssl/joomla.crt
    SSLCertificateKeyFile /etc/apache2/ssl/joomla.key

    <Directory /var/www/html/>
        AllowOverride All
        Require all granted
    </Directory>

    ErrorLog ${APACHE_LOG_DIR}/joomla_error.log
    CustomLog ${APACHE_LOG_DIR}/joomla_access.log combined
</VirtualHost>
~
~
```

On Client Windows PC

 # Edit host file this Location
C:\Windows\System32\drivers\etc\hosts

 # Add this line
192.168.169.130 ns.armour.local armour.local www.armour.local

Step-6. Enable SSL and Virual Host

a2enmod ssl

a2enmod rewrite

a2ensite joomla.conf

systemctl reload apache2

 # Final Joomla Access

 # By IP with Https
https://192.168.169.130/joomla

 # By Domain Name with Https
https://www.armour.local/joomla

Joomla Installer 5.3.1

#Succefully Run Joomla this URL
https://www.armour.local/joomla/administrator/

#Joomla Admin Detials:

- **Username:** admin
- **Password:** -------@123456

https://www.armour.local/joomla/

Login Data

Enter the real name of your Super User. *

Nikhil Patidar

Set the username for your Super User account. *

admin

Set the password for your Super User account. *

Nikhil@123456

Password accepted

Enter at least 12 characters.

Enter the email address of the website Super User. *

nikhilpatidar132@gmail.com

Setup Database Connection ›

Database Configuration

Select the database type. *

PostgreSQL (PDO)

Enter the host name, usually "localhost" or a name provided by your host. *

192.168.169.130

Enter the database username you created or a username provided by your host. *

joomla_user

Enter the database password you created or a password provided by your host.

Joomla@123

Enter the database name. *

joomla_db

Enter a table prefix or use the randomly generated one. *

mj048_

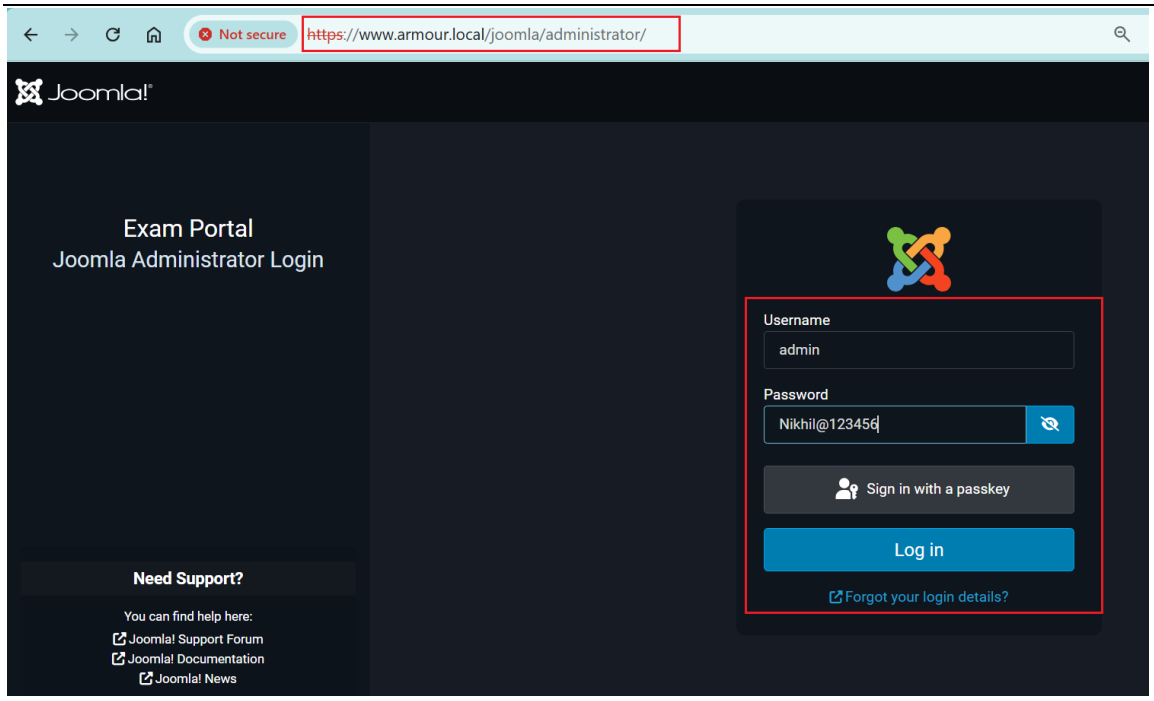
If you are using an existing database with tables with the same prefix, Joomla will rename those existing tables by adding the prefix "bak_".

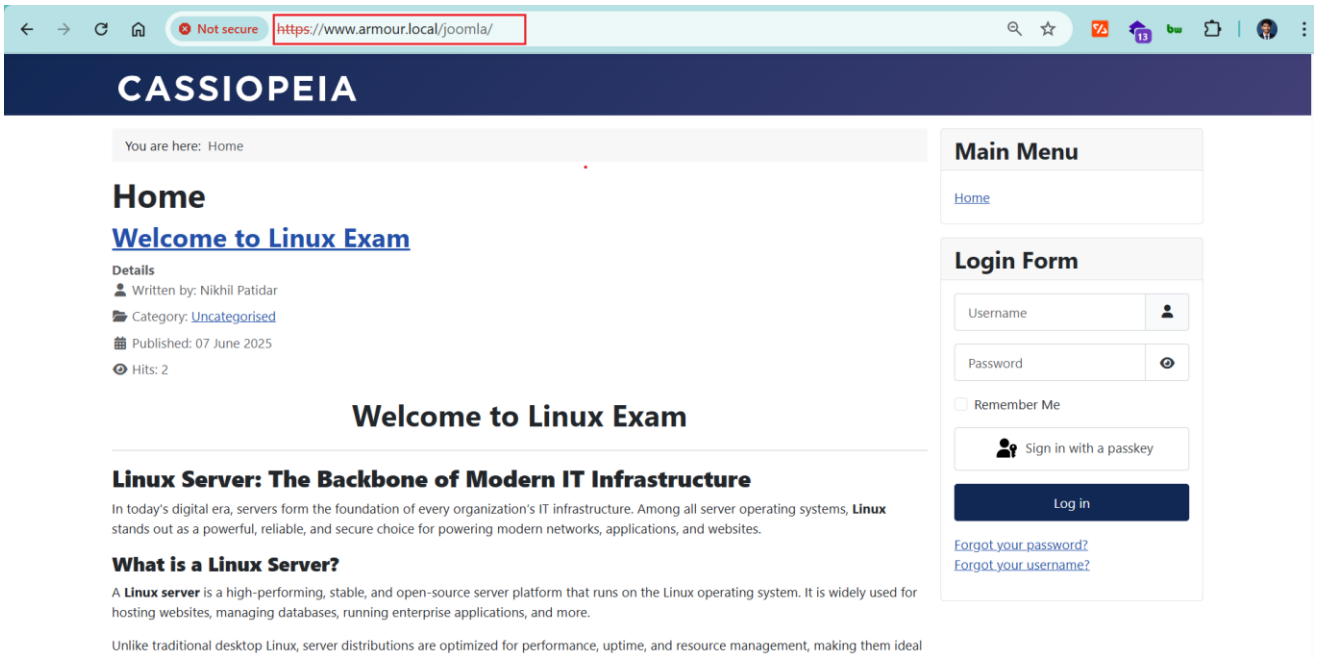
Connection Encryption *

Default (server controlled)

Install Joomla ›


Joomla Installer Joomla! 5.3.1
Congratulations!
Congratulations! Your Joomla site is ready.
Install Additional Languages
These settings are recommended for PHP in order to ensure full compatibility with Joomla.
Directive
Recommended
Actual
Output Buffering
Off
On
GD Available
On
Off
intl Available
On
Off
Open Site
Open Administrator


Not secure
https://www.armour.local/joomla/administrator/
Joomla!
Exam Portal
Joomla Administrator Login
Username
admin
Password
Nikhil@123456
Sign in with a passkey
Log in
Forgot your login details?
Need Support?
You can find help here:
Joomla! Support Forum
Joomla! Documentation
Joomla! News


Not secure
https://www.armour.local/joomla/
CASSIOPEIA
You are here: Home
Home
Welcome to Linux Exam
Details
Written by: Nikhil Patidar
Category: Uncategorised
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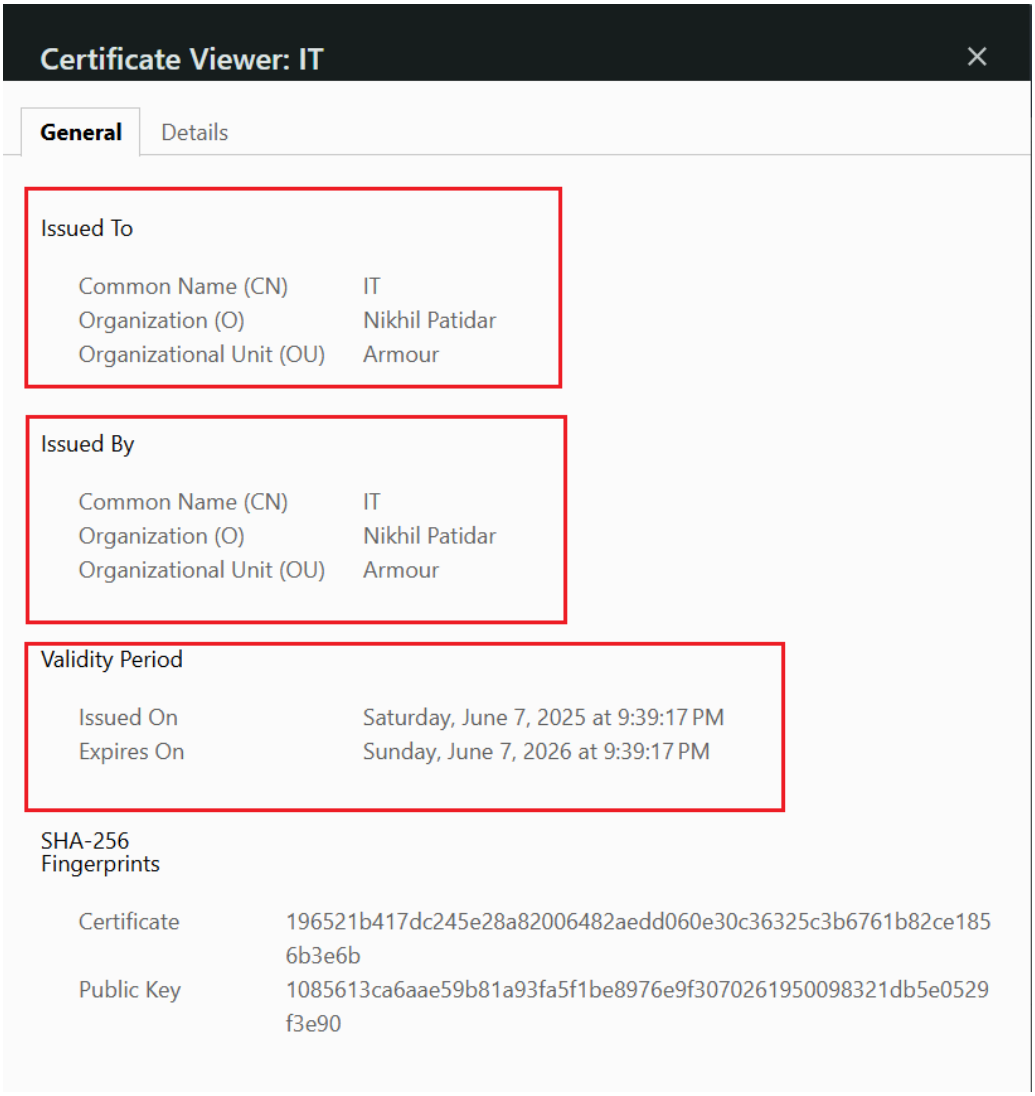
Welcome to Linux Exam
Linux Server: The Backbone of Modern IT Infrastructure
In today's digital era, servers form the foundation of every organization's IT infrastructure. Among all server operating systems, Linux stands out as a powerful, reliable, and secure choice for powering modern networks, applications, and websites.
What is a Linux Server?
A Linux server is a high-performing, stable, and open-source server platform that runs on the Linux operating system. It is widely used for hosting websites, managing databases, running enterprise applications, and more.
Unlike traditional desktop Linux, server distributions are optimized for performance, uptime, and resource management, making them ideal
Main Menu
Home
Login Form
Username
Password
Remember Me
Sign in with a passkey
Log in
Forgot your password?
Forgot your username?



Report Completed

All the necessary components of the Linux server environment have been configured and documented. This marks the successful completion of the server setup exam report.