# 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 | Nikhil@123 |
| SSH User | Nikhil | Nikhil@123 |
| Client | root | Root |
| Client User | Patidar | 123 |
| Joomla Admin | admin | Nikhil@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 Nikhil@123

**Step-2. Reconfigure LDAP**

**Answer the prompts:**

- Omit OpenLDAP server configuration? → No
- DNS Domain Name → armour.local
- Organization name → armour
- Administrator Password → Nikhil@123
- Confirm Password → Nikhil@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 (Nikhil@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

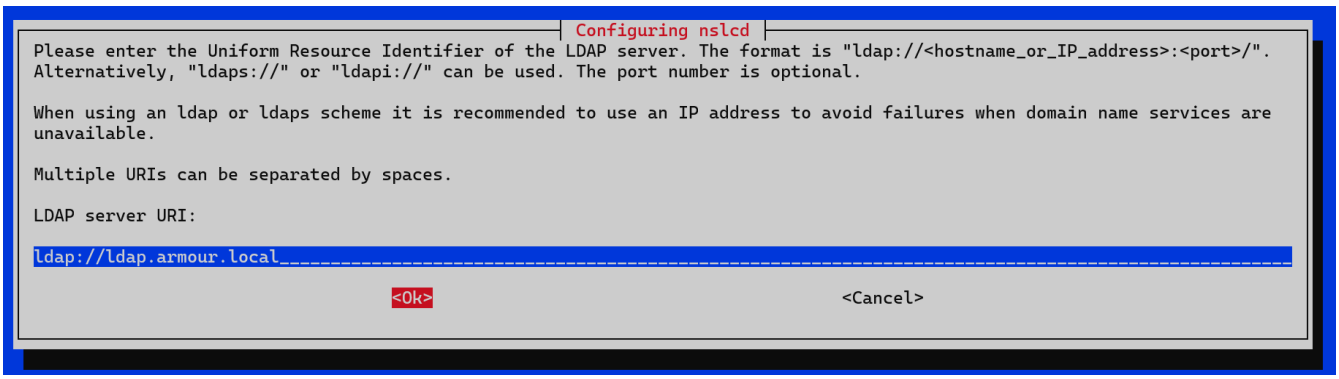
**# Add this line**
auth sufficient pam_ldap.so

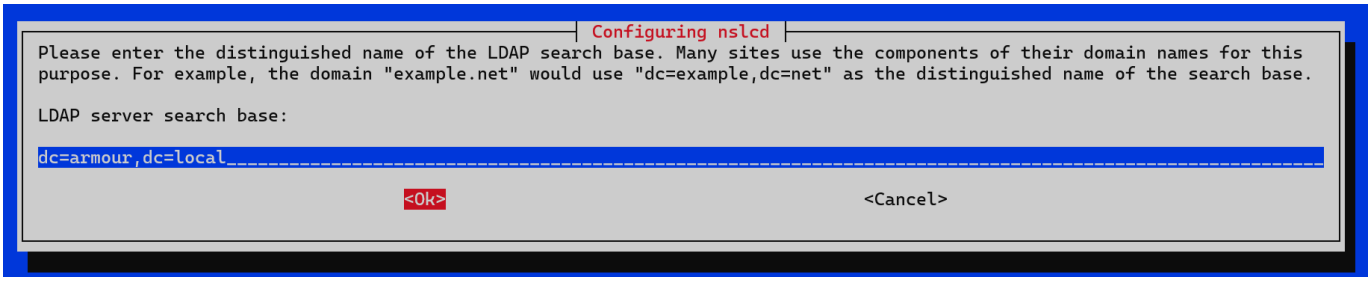
**# Enable Home directory creatioin**
vim /etc/pam.d/common-session
add this line
session required pam_mkhomedir.so skel=/etc/skel/ umask=0022

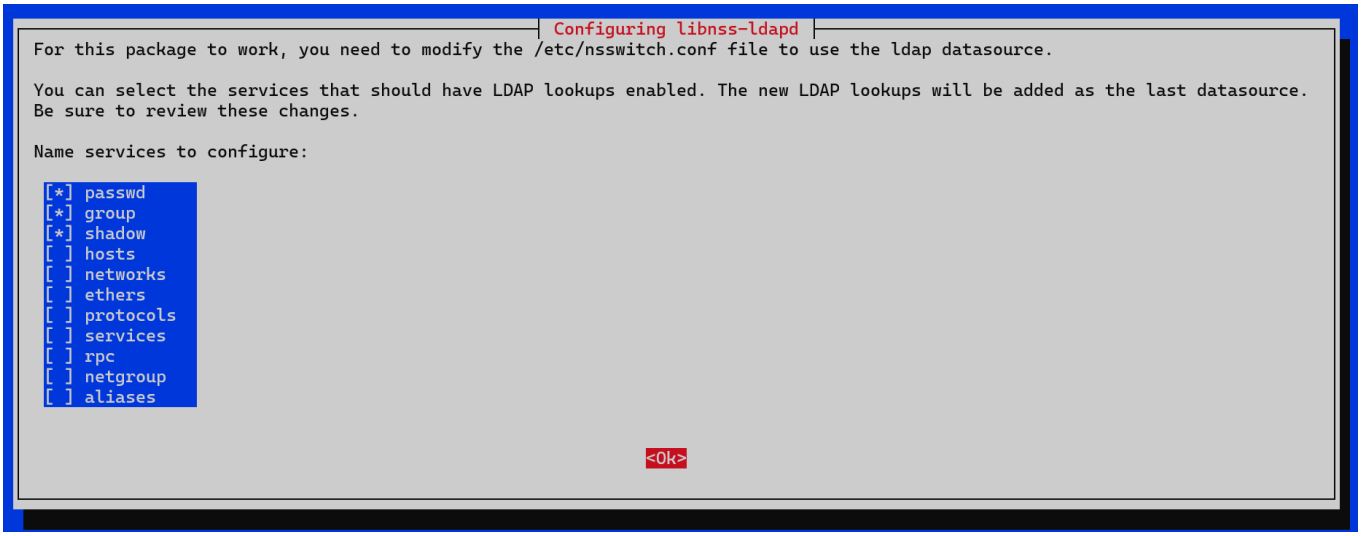
```
#
# /etc/pam.d/common-session - session-related modules common to all services
#
# This file is included from other service-specific PAM config files,
# and should contain a list of modules that define tasks to be performed
# at the start and end of interactive sessions.
#
# As of pam 1.0.1-6, this 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 Nikhil@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

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# 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**- Nikhil@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:** Nikhil@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_

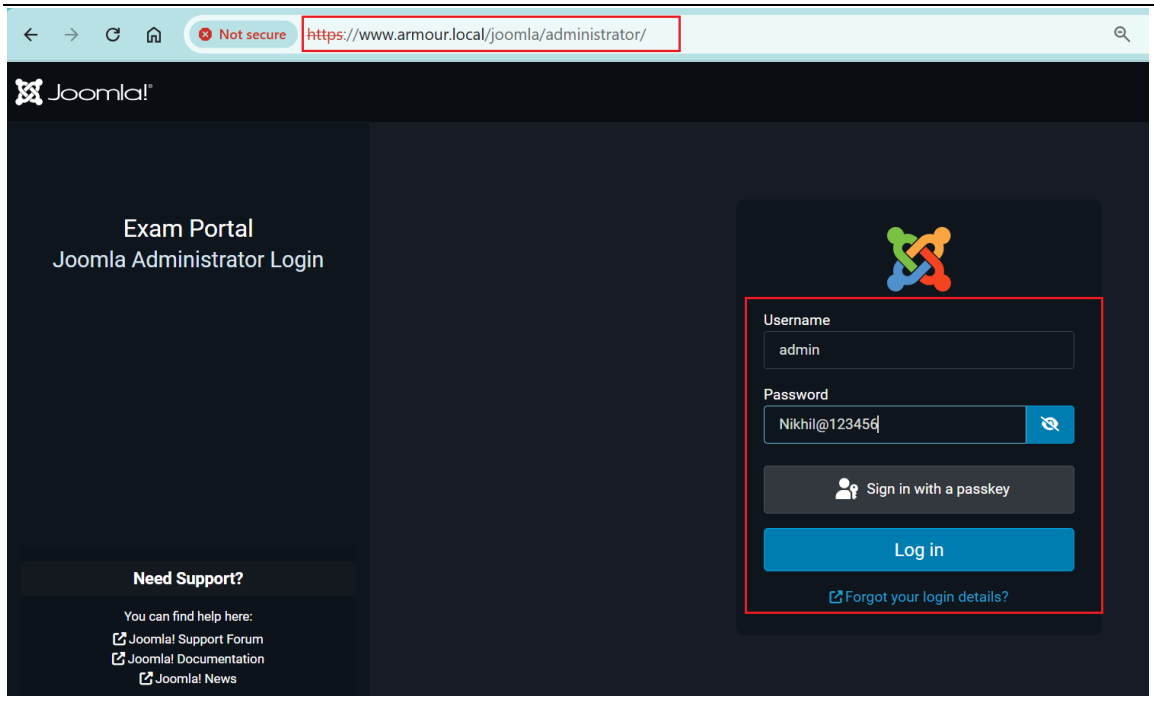
If you are using an existing database with tables with the same prefix, Joomla will rename those existing tables by adding the prefix "bak_".

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
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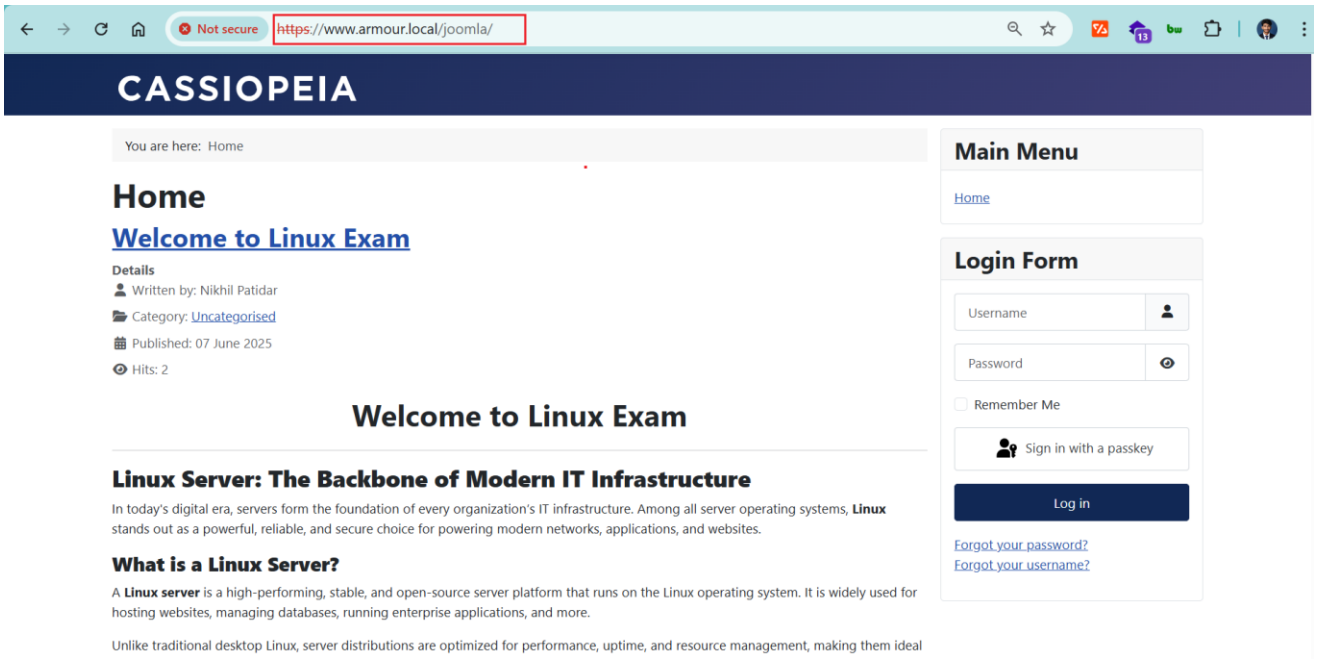
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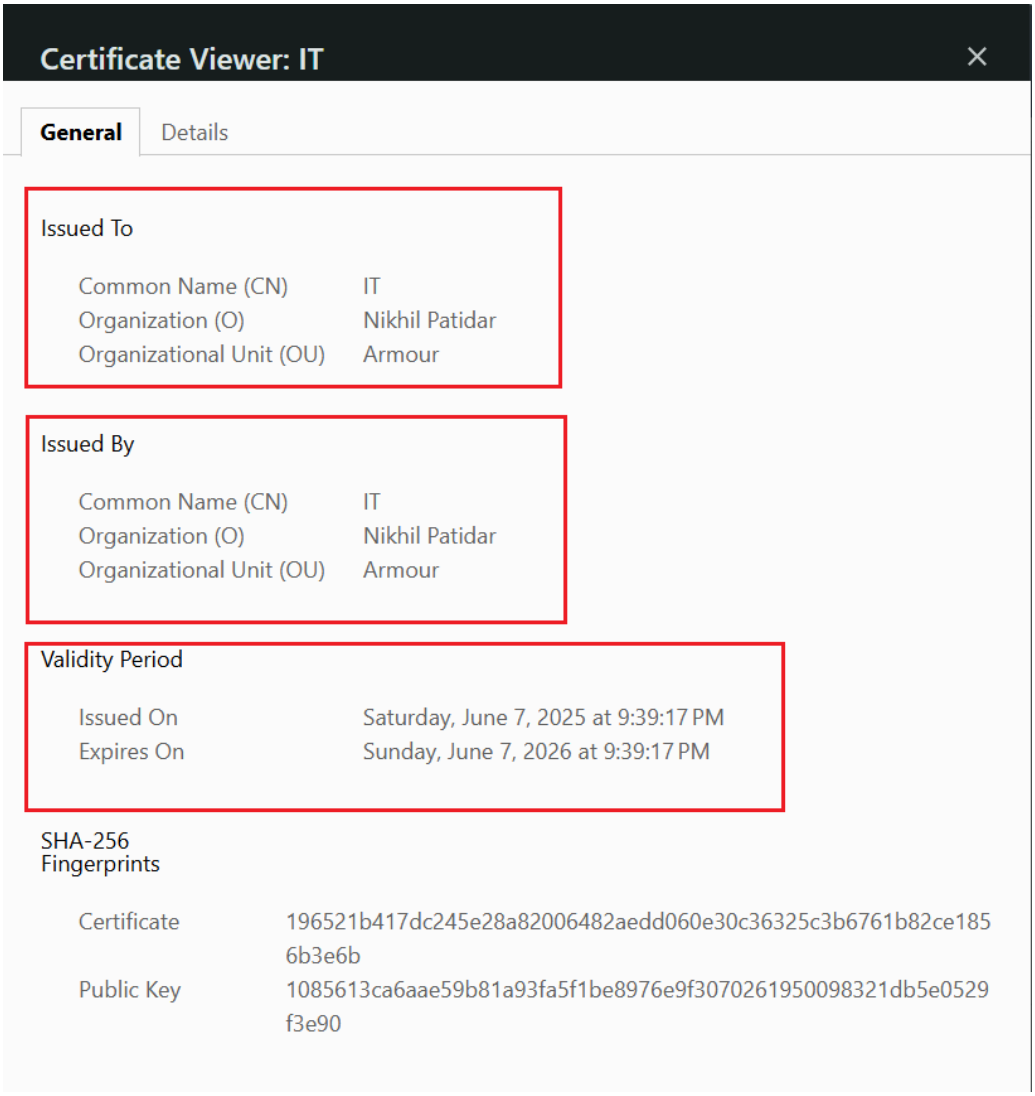
Welcome to Linux Exam
Details
Written by: Nikhil Patidar
Category: Uncategorised
Published: 07 June 2025
Hits: 2
Welcome to Linux Exam
Linux Server: The Backbone of Modern IT Infrastructure
In today's digital era, servers form the foundation of every organization's IT infrastructure. Among all server 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.