**Step 1: Install Required Packages**

1. **Update your system and install necessary packages:**

bash

Copy code

sudo yum update -y

sudo yum install freeradius freeradius-mysql mariadb-server mariadb -y

1. **Start and enable MariaDB:**

bash

Copy code

sudo systemctl start mariadb

sudo systemctl enable mariadb

**Step 2: Configure MariaDB (MySQL)**

1. **Secure MariaDB installation:**

bash

Copy code

sudo mysql\_secure\_installation

Follow the prompts to set the root password and remove anonymous users, disable remote root login, and remove the test database.

1. **Log in to MariaDB:**

bash

Copy code

mysql -u root -p

1. **Create the RADIUS database and user:**

sql

Copy code

CREATE DATABASE radius;

GRANT ALL PRIVILEGES ON radius.\* TO 'radius'@'localhost' IDENTIFIED BY 'yourpassword';

FLUSH PRIVILEGES;

EXIT;

1. **Populate the RADIUS database:**

bash

Copy code

sudo mysql -u root -p radius < /etc/raddb/mods-config/sql/main/mysql/schema.sql

**Step 3: Configure FreeRADIUS**

1. **Edit the radiusd.conf to use SQL:**

bash

Copy code

sudo nano /etc/raddb/radiusd.conf

Uncomment the following line:

plaintext

Copy code

$INCLUDE sql.conf

1. **Edit sql.conf to use MySQL:**

bash

Copy code

sudo nano /etc/raddb/mods-available/sql

Update the database connection details:

plaintext

Copy code

sql {

driver = "rlm\_sql\_mysql"

dialect = "mysql"

server = "localhost"

port = 3306

login = "radius"

password = "yourpassword"

radius\_db = "radius"

...

}

Save and link the configuration:

bash

Copy code

sudo ln -s /etc/raddb/mods-available/sql /etc/raddb/mods-enabled/sql

1. **Edit default and inner-tunnel to include SQL:**

bash

Copy code

sudo nano /etc/raddb/sites-available/default

sudo nano /etc/raddb/sites-available/inner-tunnel

In both files, within the authorize section, add:

plaintext

Copy code

sql

Within the accounting section, add:

plaintext

Copy code

sql

Within the session section, add:

plaintext

Copy code

sql

Within the post-auth section, add:

plaintext

Copy code

sql

1. **Configure the clients.conf file:**

bash

Copy code

sudo nano /etc/raddb/clients.conf

Add the Ubiquiti AP:

plaintext

Copy code

client ubiquiti {

ipaddr = <AP-IP-ADDRESS>

secret = <SHARED-SECRET>

}

**Step 4: Populate the RADIUS Database**

1. **Add users to the RADIUS database:**

sql

Copy code

mysql -u root -p radius

1. **Insert user information (e.g., student's index number and password):**

sql

Copy code

INSERT INTO radcheck (username, attribute, op, value) VALUES ('index123', 'Cleartext-Password', ':=', 'password123');

**Step 5: Set Up Ubiquiti AP**

1. **Log into the Ubiquiti Controller:**
   * Access the Ubiquiti Network Management Controller via a web browser.
2. **Go to the Wireless Networks Configuration:**
   * Navigate to Settings > Wireless Networks.
3. **Create or Edit a Wireless Network:**
   * Click Create New Wireless Network or edit an existing one.
4. **Enable WPA-Enterprise:**
   * Set Security to WPA-Enterprise.
5. **Enter RADIUS Server Details:**
   * **RADIUS Profile**: Click Create New RADIUS Profile.
   * **Name**: Enter a name for the RADIUS profile.
   * **Authentication Servers**:
     + **Server**: Enter the IP address of your FreeRADIUS server.
     + **Secret**: Enter the shared secret configured in clients.conf.
   * **Accounting Servers** (if required, otherwise leave it blank).
6. **Save and Apply Changes.**

**Step 6: Start and Enable FreeRADIUS**

1. **Start and enable FreeRADIUS:**

bash

Copy code

sudo systemctl start radiusd

sudo systemctl enable radiusd

**Step 7: Test the Configuration**

1. **Connect to the WiFi Network:**
   * Use a device to connect to the WiFi network configured with WPA-Enterprise.
2. **Authenticate Using the RADIUS Credentials:**
   * Enter the username (index number) and password configured in the RADIUS database.
3. **Verify Connectivity:**
   * Ensure that the device gets connected to the WiFi network and can access the internet or internal network resources.

**Troubleshooting**

* **Check FreeRADIUS Logs**: If there are issues, check the FreeRADIUS logs for errors.

bash

Copy code

sudo tail -f /var/log/radius/radius.log

* **Verify Network Configuration**: Ensure the FreeRADIUS server and Ubiquiti AP are on the same network or properly routed.

By following these steps, you should be able to set up a WiFi authentication system using FreeRADIUS with a MySQL backend and link it to a Ubiquiti Access Point to allow students to log in using their index numbers and registered passwords.