Configuring MAB-based Dynamic VLAN via FreeRADIUS for RKS-G4000 Series Switches

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1 Purpose and Scope

This guide explains how to configure dynamic VLAN assignment based on MAC Authentican Bypass (MAB) via FreeRADIUS on an RKS-G4000 Series switch.

Note All user input in this guide is for reference only. For security reasons, replace this input with stronger values when applying the instructions in this guide in a production environment.

2 Test Bench Environment

The following environment was used to validate the configuration.

Component	Version/Details
Ubuntu Server	Ubuntu 24.04.4 LTS; Linux kernel 6.8.0-124-generic
RKS Device	RKS-G4028-4GT-HV-T; Firmware v6.0 Build 2026_0923_2052 RKS-G4028-L3-4GT-LV-T; Firmware v6.0 Build 2026_0402_0805
FreeRADIUS	v3.2.5

3 Prerequisites

Before starting, make sure that:

- The Ubuntu server can reach the RKS management network.
- The RKS switch can reach the FreeRADIUS server.
- You have `sudo` access to the Ubuntu server.

4 Preparing the Ubuntu Server

4.1 Installing FreeRADIUS

1. Install the FreeRADIUS server and utilities.

```
$ sudo apt install freeradius freeradius-utils
```

4.2 Configuring the Client Configuration

1. Navigate to the `clients.conf` file in the `/etc/freeradius/3.0` directory.

```
# nano /etc/freeradius/3.0/clients.conf
```

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2. Add the subnet and shared key information after the `IPv6` section.

```
# IPv4 Client

client MOXA-Dev {
    ipaddr = 192.168.127.0/24
    secret = "testing1234"
    nas_type = other
}
```

4.3 Configuring the Users File for MAB

1. Navigate to the `users` file in the `/etc/freeradius/3.0` directory.

```
# nano /etc/freeradius/3.0/users
```

2. Add the MAC and VLAN ID of the connected device for MAB. In this example, `cc28aa66f44a` is the MAC address of the connected device. `Tunnel-Private-Group-ID = 10` represents the VLAN ID of the connected device.

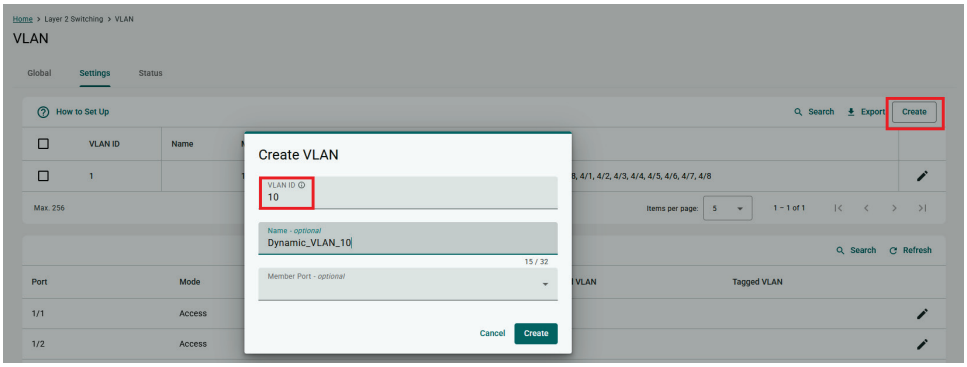
```
cc28aa66f44a Cleartext-Password := "cc28aa66f44a"
    Tunnel-Type = 13,
    Tunnel-Medium-Type = 6,
    Tunnel-Private-Group-Id = 10
```

5 Configuring the RKS-G4000

Note This scenario configures an RKS-G4028 Series switch. The following instructions and reference images apply to all RKS-G4000 Series switches.

5.1 Configuring the VLAN ID

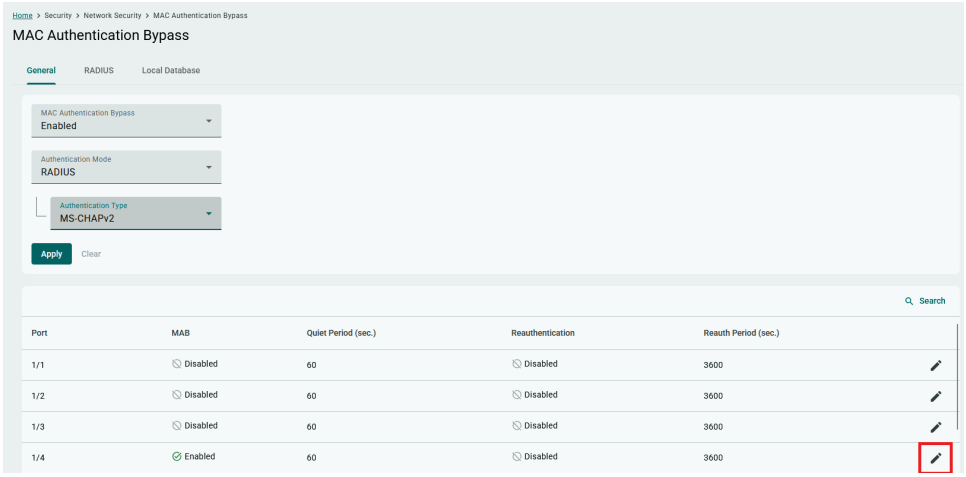
1. Navigate to **Layer 2 Switching > VLAN** and go to the **Settings** tab.
2. Click **Create** to create a new VLAN.
3. In the **Create VLAN** window, specify the VLAN ID and name. For this scenario, we are creating VLAN ID "10" to match the FreeRADIUS `users` configuration.



4. Click **Create**.

5.2 Configuring MAC Authentication Bypass

1. Navigate to **Security > Network Security > MAC Authentication Bypass** and go to the **General** tab.
2. Configure the following settings:
   a. **MAC Authentication Bypass**: Select **Enabled**.
   b. **Authentication Mode**: Select **RADIUS**.
   c. **Authentication Type**: Select **MS-CHAPv2**.
3. Click **Apply**.
4. In the port list, click the **Edit** ( ) icon of the port to enable MAB for. In this scenario, we are configuring port 1/4.

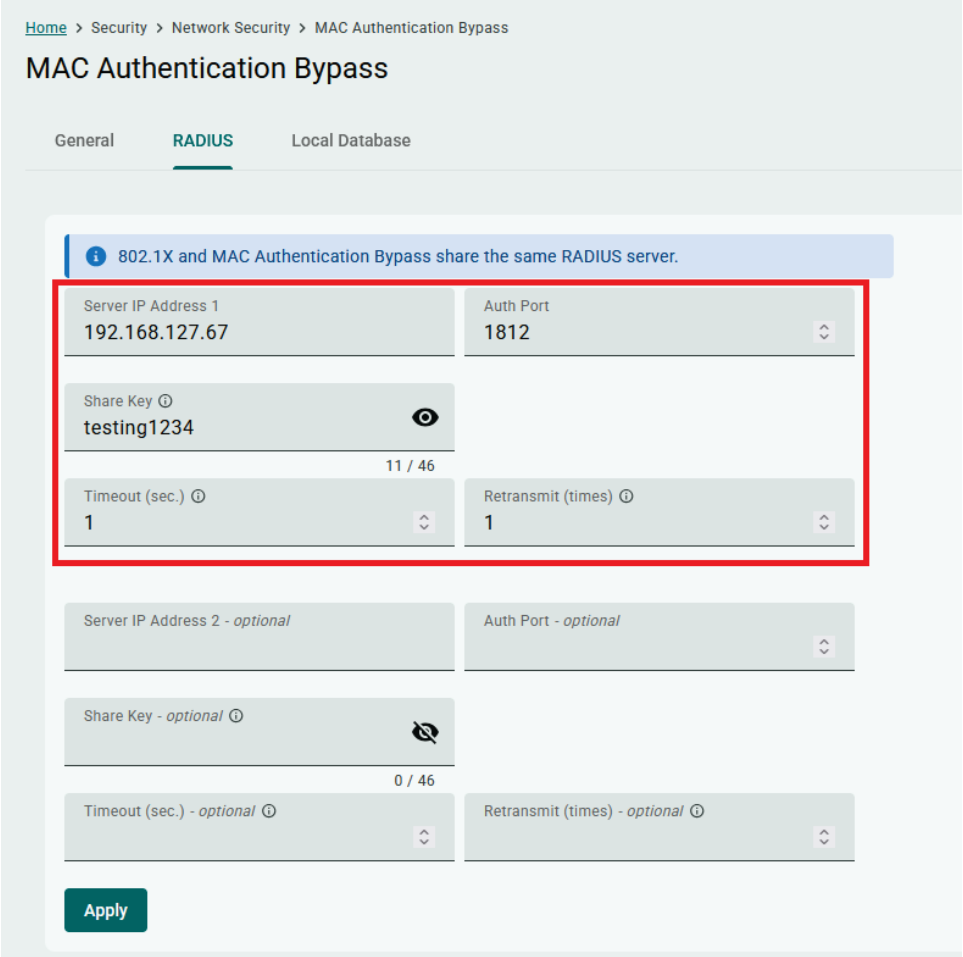


5. In the **Edit Port Settings** window, set **MAC Authentication Bypass** to **Enabled** and click **Apply**.

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5.3 Configuring the RADIUS Server

1. Navigate to **Security > Network Security > MAC Authentication Bypass** and go to the **RADIUS** tab.
2. Configure the following settings:



   a. **Server IP Address 1**: Enter the RADIUS server IP address. Since this scenario is performed in an L2 environment, the IP must be in the same subnet as specified in the FreeRADIUS `clients.conf` configuration.
   b. **Auth Port**: Specify the RADIUS server authentication port.
   c. **Share Key**: Enter the shared key. This must be the same as the shared key specified in the FreeRADIUS `clients.conf` configuration.
   d. **Timeout**: Specify how long the device will wait for a response before assuming the RADIUS server is unreachable.
   e. **Retransmit**: Specify the number of retransmissions if no response is received.
3. Click **Apply**.

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6 Validating the Configuration

6.1 Checking the FreeRADIUS Debug Log

1. Start the FreeRADIUS server in debug mode.

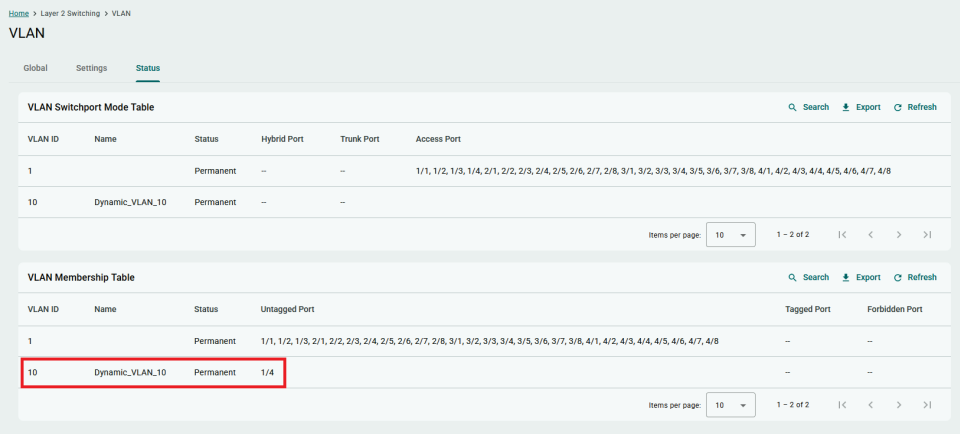
```
$ sudo freeradius -X
```

2. Connect a device to port 1/4 on the switch and confirm the authentication result in the FreeRADIUS debug log.
   Expected debug output:

```
(0) Sent Access-Accept Id 1 from 192.168.127.67:1812 to
192.168.127.253:43678 length 213
(0)   Tunnel-Type = VLAN
(0)   Tunnel-Medium-Type = IEEE-802
(0)   Tunnel-Private-Group-Id = "10"
(0)   MS-CHAP2-Success =
0x01533d4635303243364246374130393539303645363546304337444537383431414442
3535343539394133
(0)   MS-MPPE-Recv-Key = 0xf9c7ef1725b355e0d69a1ea30b92aea6
(0)   MS-MPPE-Send-Key = 0x844eab532c81ced0744e4d7c01c9dc7a
(0)   MS-MPPE-Encryption-Policy = Encryption-Allowed
(0)   MS-MPPE-Encryption-Types = RC4-40or128-bit-Allowed
(0) Finished request
```

6.2 Verifying the Assigned VLAN on the RKS Switch

1. Navigate to **Layer 2 Switching > VLAN** and go to the **Status** tab.
2. Verify that the VLAN ID assigned to the device on the connected port is correct. In our example, the device on port 1/4 is assigned VLAN ID 10.



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