

## Example: Configuring VoIP on an EX Series Switch Without Including 802.1X Authentication

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You can configure voice over IP (VoIP) on an EX Series switch to support IP telephones.

To configure VoIP on an EX Series switch to support an IP phone that does not support 802.1X authentication, you must either add the MAC address of the phone to the static MAC bypass list or enable MAC RADIUS authentication on the switch.

This example describes how to configure VoIP on an EX Series switch without 802.1X authentication using static MAC bypass of authentication:

- Requirements on page 1
- Overview on page 2
- Configuration on page 2
- Verification on page 4

### Requirements

This example uses the following hardware and software components:

- JUNOS Release 9.1 or later for EX Series switches
- An IP telephone

Before you configure VoIP, be sure you have:

- Installed your EX Series switch. See [Installing and Connecting an EX3200 or EX4200 Switch](#).
- Performed the initial switch configuration. See [Connecting and Configuring an EX Series Switch \(J-Web Procedure\)](#).
- Performed basic bridging and VLAN configuration on the switch. See [Example: Setting Up Basic Bridging and a VLAN for an EX Series Switch](#).
- Configured the RADIUS server for 802.1X authentication and set up the access profile. See [Example: Connecting a RADIUS Server for 802.1X to an EX Series Switch](#).
- (Optional) Configured interface **ge-0/0/2** for Power over Ethernet (PoE). The PoE configuration is not necessary if the VoIP supplicant is using a power adapter. For information about configuring PoE, see [Configuring PoE \(CLI Procedure\)](#).



**NOTE:** If the IP address isn't configured on the Avaya IP phone, the phone exchanges LLDP-MED information to get the VLAN ID for the voice VLAN. You must configure the **voip** statement on the interface to designate the interface as a VoIP interface and allow the switch to forward the VLAN name and VLAN ID for the voice VLAN to the IP telephone. The IP telephone then uses the voice VLAN (that is, it references the voice VLAN's ID) to send a DHCP discover request and exchange information with the DHCP server (voice gateway).

## Overview

Instead of using a regular telephone, you connect an IP telephone directly to the switch. An IP phone has all the hardware and software needed to handle VoIP. You also can power an IP telephone by connecting it to one of the Power over Ethernet (PoE) interfaces on the switch.

In this example, the access interface **ge-0/0/2** on the EX4200 switch is connected to a non-802.1X IP phone.

To configure VoIP on an EX Series switch to support an IP phone that does not support 802.1X authentication, add the MAC address of the phone as a static entry in the authenticator database and set the supplicant mode to multiple.

## Configuration

To configure VoIP without 802.1X authentication:

### CLI Quick Configuration

To quickly configure VoIP, copy the following commands and paste them into the switch terminal window:

```
[edit]
set vlans data-vlan vlan-id 77
set vlans voice-vlan vlan-id 99
set vlans data-vlan interface ge-0/0/2.0
set interfaces ge-0/0/2 unit 0 family ethernet-switching vlan members data-vlan
set interfaces ge-0/0/2 unit 0 family ethernet-switching port-mode access
set ethernet-switching-options voip interface ge-0/0/2.0 vlan voice-vlan
set ethernet-switching-options voip interface ge-0/0/2.0 forwarding-class
assured-forwarding
set protocols lldp-med interface ge-0/0/2.0
set protocols dot1x authenticator authentication-profile-name auth-profile
set protocols dot1x authenticator static 00:04:f2:11:aa:a7
set protocols dot1x authenticator interface ge-0/0/2.0 supplicant multiple
```

### Step-by-Step Procedure

To configure VoIP without 802.1X:

1. Configure the VLANs for voice and data:

```
[edit vlans]
user@switch# set data-vlan vlan-id 77
user@switch# set voice-vlan vlan-id 99
```

2. Associate the VLAN **data-vlan** with the interface:

```
[edit vlans]
user@switch# set data-vlan interface ge-0/0/2.0
```

3. Configure the interface as an access interface, configure support for Ethernet switching, and add the data-vlan VLAN:

```
[edit interfaces]
user@switch# set ge-0/0/2 unit 0 family ethernet-switching vlan members
data-vlan
user@switch# set ge-0/0/2 unit 0 family ethernet-switching port-mode access
```

4. Configure VoIP on the interface and specify the assured-forwarding forwarding class to provide the most dependable class of service:

```
[edit ethernet-switching-options]
user@switch# set voip interface ge-0/0/2.0 vlan voice-vlan
user@switch# set voip interface ge-0/0/2.0 forwarding-class
assured-forwarding
```

5. Configure LLDP-MED protocol support:

```
[edit protocols]
user@switch# set lldp-med interface ge-0/0/2.0
```

6. Set the authentication profile (see Configuring 802.1X Interface Settings (CLI Procedure) and Configuring 802.1X RADIUS Accounting (CLI Procedure)):

```
[edit protocols]
set dot1x authenticator authentication-profile-name auth-profile
```

7. Add the MAC address of the phone to the static MAC bypass list:

```
[edit protocols]
set dot1x authenticator static 00:04:f2:11:aa:a7
```

8. Set the supplicant mode to multiple:

```
[edit protocols]
set dot1x authenticator interface ge-0/0/2.0 supplicant multiple
```

**Results** Display the results of the configuration:

```
[edit]
user@switch# show configuration
interfaces {
  ge-0/0/2 {
    unit 0 {
      family ethernet-switching {
        port-mode access;
        vlan {
          members data-vlan;
        }
      }
    }
  }
}
```

```

    }
  }
}
protocols {
  lldp-med {
    interface ge-0/0/2.0;
  }
  dot1x {
    authenticator {
      authentication-profile-name auth-profile;
      static {
        00:04:f2:11:aa:a7;
      }
    }
    interface {
      ge-0/0/2.0 {
        supplicant multiple;
      }
    }
  }
}
vpls {
  data-vlan {
    vlan-id 77;
    interface {
      ge-0/0/2.0;
    }
  }
  voice-vlan {
    vlan-id 99;
  }
}
ethernet-switching options {
  voip {
    interface ge-0/0/2.0 {
      vlan voice-vlan;
      forwarding-class assured-forwarding;
    }
  }
}
}

```

## Verification

To confirm that the configuration is working properly, perform these tasks:

- Verifying LLDP-MED Configuration on page 4
- Verifying Authentication for the Desktop PC on page 5
- Verifying the VLAN Association with the Interface on page 6

### Verifying LLDP-MED Configuration

**Purpose** Verify that LLDP-MED is enabled on the interface.

**Action** user@switch> **show lldp detail**

```

LLDP : Enabled
Advertisement interval : 30 Second(s)
Transmit delay : 2 Second(s)
Hold timer : 2 Second(s)
Config Trap Interval : 300 Second(s)
Connection Hold timer : 60 Second(s)

LLDP MED : Enabled
MED fast start count : 3 Packet(s)

```

Interface	LLDP	LLDP-MED	Neighbor count
all	Enabled	-	0
ge-0/0/2.0	-	Enabled	0

Interface	VLAN-id	VLAN-name
ge-0/0/0.0	0	default
ge-0/0/1.0	0	employee-vlan
ge-0/0/2.0	0	data-vlan
ge-0/0/2.0	99	voice-vlan
ge-0/0/3.0	0	employee-vlan
ge-0/0/8.0	0	employee-vlan
ge-0/0/10.0	0	default
ge-0/0/11.0	20	employee-vlan
ge-0/0/23.0	0	default

LLDP basic TLVs supported:  
Chassis identifier, Port identifier, Port description, System name, System description, System capabilities, Management address.

LLDP 802 TLVs supported:  
Power via MDI, Link aggregation, Maximum frame size, Port VLAN tag, Port VLAN name.

LLDP MED TLVs supported:  
LLDP MED capabilities, Network policy, Endpoint location, Extended power Via MDI.

**Meaning** The show lldp detail output shows that both LLDP and LLDP-MED are configured on the ge-0/0/2.0 interface. The end of the output shows the list of supported LLDP basic TLVs, 802.3 TLVs, and LLDP-MED TLVs that are supported.

### Verifying Authentication for the Desktop PC

**Purpose** Display the 802.1X configuration for the desktop PC connected to the VoIP interface through the IP phone.

**Action** user@switch> **show dot1x interface ge/0/0/2.0 detail**

```

ge-0/0/2.0
  Role: Authenticator
  Administrative state: Auto
  Supplicant mode: Multiple
  Number of retries: 3
  Quiet period: 60 seconds
  Transmit period: 30 seconds
  Reauthentication: Enabled Reauthentication interval: 3600 seconds

```

```

Supplicant timeout: 30 seconds
Supplicant timeout: 30 seconds
Server timeout: 30 seconds
Maximum EAPOL requests: 2
Number of connected supplicants: 1
  Supplicant: abc, 00:00:00:00:22:22
    Operational state: Authenticated
    Reauthentication due in 3588 seconds

```

**Meaning** The field Role shows that the ge-0/0/2.0 interface is in the authenticator state. The Supplicant field shows that the interface is configured in multiple supplicant mode, permitting multiple supplicants to be authenticated on this interface. The MAC addresses of the supplicants currently connected are displayed at the bottom of the output.

## Verifying the VLAN Association with the Interface

**Purpose** Display the interface state and VLAN membership.

**Action** user@switch> **show ethernet-switching interfaces**  
Ethernet-switching table: 0 entries, 0 learned

```

user@switch> show ethernet-switching interfaces
Interface  State  VLAN members  Blocking
ge-0/0/0.0  down  default       unblocked
ge-0/0/1.0  down  employee-vlan unblocked
ge-0/0/5.0  down  employee-vlan unblocked
ge-0/0/3.0  down  employee-vlan unblocked
ge-0/0/8.0  down  employee-vlan unblocked
ge-0/0/10.0 down  default       unblocked
ge-0/0/11.0 down  employee-vlan unblocked
ge-0/0/23.0 down  default       unblocked
ge-0/0/2.0  up    voice-vlan    unblocked
              data-vlan    unblocked

```

**Meaning** The field VLAN members shows that the ge-0/0/2.0 interface supports both the data-vlan VLAN and voice-vlan VLAN. The State field shows that the interface is up.

- Related Topics**
- Example: Setting Up VoIP with 802.1X and LLDP-MED on an EX Series Switch
  - Example: Configuring VoIP on an EX Series Switch Without Including LLDP-MED Support
  - Understanding 802.1X and VoIP on EX Series Switches
  - Understanding 802.1X and LLDP and LLDP-MED on EX Series Switches

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