

## Example: Connecting an Access Switch to a Distribution Switch

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In large local area networks (LANs), you commonly need to aggregate traffic from a number of access switches into a distribution switch.

This example describes how to connect an access switch to a distribution switch:

- Requirements on page 1
- Overview and Topology on page 1
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- Configuring the Distribution Switch on page 7
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### Requirements

This example uses the following hardware and software components:

- For the distribution switch, one EX 4200-24F switch. This model is designed to be used as a distribution switch for aggregation or collapsed core network topologies and in space-constrained data centers. It has twenty-four 1-Gigabit Ethernet fiber SFP ports and an EX-UM-2XFP uplink module with two 10-Gigabit Ethernet XFP ports.
- For the access switch, one EX 3200-24P, which has twenty-four 1-Gigabit Ethernet ports, all of which support Power over Ethernet (PoE), and an uplink module with four 1-Gigabit Ethernet ports.
- JUNOS Release 9.0 or later for EX-series switches

Before you connect an access switch to a distribution switch, be sure you have:

- Installed the two switches. See [Installing and Connecting an EX 3200 or EX 4200 Switch](#).
- Performed the initial software configuration on both switches. See [Connecting and Configuring an EX-series Switch \(J-Web Procedure\)](#).

### Overview and Topology

In a large office that is spread across several floors or buildings, or in a data center, you commonly aggregate traffic from a number of access switches into a distribution switch. This configuration example shows a simple topology to illustrate how to connect a single access switch to a distribution switch.

In the topology, the LAN is segmented into two VLANs, one for the sales department and the second for the support team. One 1-Gigabit Ethernet port on the access switch's uplink module connects to the distribution switch, to one 1-Gigabit Ethernet port on the distribution switch.

Figure 1 shows one EX 4200 switch that is connected to the three access switches.[\[Unresolved xref\]](#).

**Figure 1: Topology for Configuration**

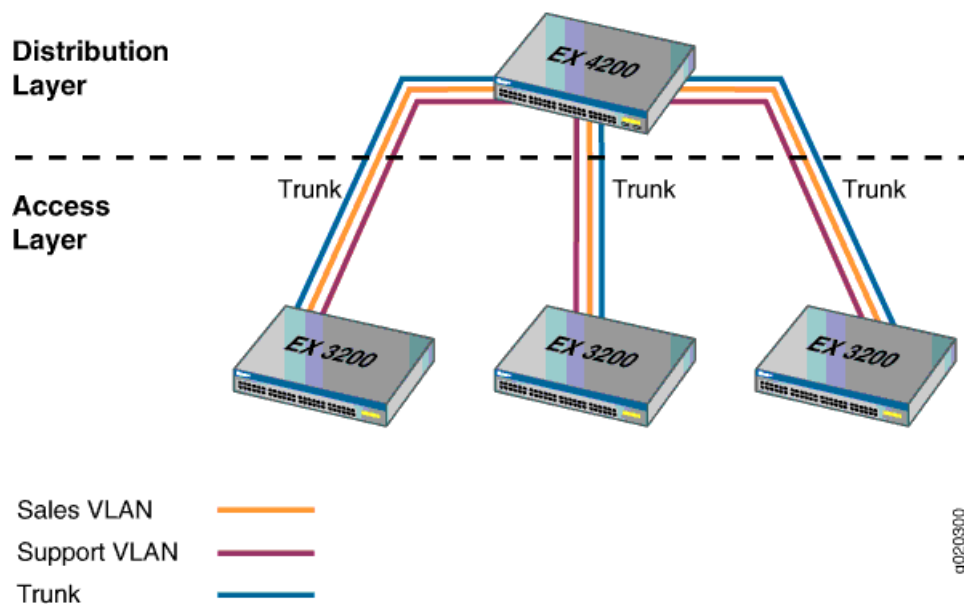


Table 1 explains the components of the example topology. The example shows how to configure one of the three access switches. The other access switches could be configured in the same manner.

**Table 1: Components of the Topology for Connecting an Access Switch to a Distribution Switch**

Property	Settings
Access switch hardware	EX 3200-24P, 24 1-Gigabit Ethernet ports, all PoE-enabled (ge-0/0/0 through ge-0/0/23); one 4-port 1-Gigabit Ethernet uplink module (EX-UM-4SFP)
Distribution switch hardware	EX 4200-24F, 24 1-Gigabit Ethernet fiber SPF ports (ge-0/0/0 through ge-0/0/23); one 2-port 10-Gigabit Ethernet XFP uplink module (EX-UM-4SFP)
VLAN names and tag IDs	sales, tag 100 support, tag 200
VLAN subnets	sales: 192.0.2.0/25 (addresses 192.0.2.1 through 192.0.2.126) support: 192.0.2.128/25 (addresses 192.0.2.129 through 192.0.2.254)
Trunk port interfaces	On the access switch: ge-0/1/0 On the distribution switch: ge-0/0/0
Access port interfaces in VLAN sales (on access switch)	Avaya IP telephones: ge-0/0/3 through ge-0/0/19 Wireless access points: ge-0/0/0 and ge-0/0/1 Printers: ge-0/0/22 and ge-0/0/23 File servers: ge-0/0/20 and ge-0/0/21
Access port interfaces in VLAN support (on access switch)	Avaya IP telephones: ge-0/0/25 through ge-0/0/43 Wireless access points: ge-0/0/24 Printers: ge-0/0/44 and ge-0/0/45 File servers: ge-0/0/46 and ge-0/0/47

**Table 1: Components of the Topology for Connecting an Access Switch to a Distribution Switch** (continued)

Unused interfaces on access switch	ge-0/0/2 and ge-0/0/25
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## Configuring the Access Switch

To configure the access switch:

**CLI Quick Configuration** To quickly configure the access switch, copy the following commands and paste them into the switch terminal window:

```
[edit]
set interfaces ge-0/0/0 unit 0 description "Sales Wireless access point port"
set interfaces ge-0/0/0 unit 0 family ethernet-switching vlan members sales
set interfaces ge-0/0/3 unit 0 description "Sales phone port"
set interfaces ge-0/0/3 unit 0 family ethernet-switching vlan members sales
set interfaces ge-0/0/22 unit 0 description "Sales printer port"
set interfaces ge-0/0/22 unit 0 family ethernet-switching vlan members sales
set interfaces ge-0/0/20 unit 0 description "Sales file server port"
set interfaces ge-0/0/20 unit 0 family ethernet-switching vlan members sales
set interfaces ge-0/0/24 unit 0 description "Support wireless access point port"
set interfaces ge-0/0/24 unit 0 family ethernet-switching vlan members support
set interfaces ge-0/0/26 unit 0 description "Support phone port"
set interfaces ge-0/0/26 unit 0 family ethernet-switching vlan members support
set interfaces ge-0/0/44 unit 0 description "Support printer port"
set interfaces ge-0/0/44 unit 0 family ethernet-switching vlan members support
set interfaces ge-0/0/46 unit 0 description "Support file server port"
set interfaces ge-0/0/46 unit 0 family ethernet-switching vlan members support
set interfaces ge-0/1/0 unit 0 description "Uplink module port connection to
distribution switch"
set interfaces ge-0/1/0 unit 0 family ethernet-switching port-mode trunk
set interfaces ge-0/1/0 unit 0 family ethernet-switching native-vlan-id 1
set interfaces ge-0/1/0 unit 0 family ethernet-switching vlan members [sales
support]
set interfaces vlan unit 0 family inet address 192.0.2.1/25
set interfaces vlan unit 1 family inet address 192.0.2.129/25
set vlans sales interface ge-0/0/0.0
set vlans sales interface ge-0/0/3.0
set vlans sales interface ge-0/0/22.0
set vlans sales interface ge-0/0/20.0
set vlans sales l3-interface vlan.0
set vlans sales vlan-id 100
set vlans sales vlan-description "Sales VLAN"
set vlans support interface ge-0/0/24.0
set vlans support interface ge-0/0/26.0
set vlans support interface ge-0/0/44.0
set vlans support interface ge-0/0/46.0
set vlans support vlan-id 200
set vlans support l3-interface vlan.1
set vlans support vlan-description "Support VLAN"
```

**Step-by-Step Procedure** To configure the access switch:

1. Configure the 1-Gigabit Ethernet interface on the uplink module to be the trunk port that connects to the distribution switch:

```
[edit interfaces ge-0/1/0 unit 0]
user@access-switch# set description "Uplink module port connection to
distribution switch"
user@access-switch# set ethernet-switching port-mode trunk
```

2. Specify the VLANs to be aggregated on the trunk port:

```
[edit interfaces ge-0/1/0 unit 0]
user@access-switch# set ethernet-switching vlan members [ sales support
]
```

3. Configure the VLAN ID to use for packets that are received with no dot1q tag (untagged packets):

```
[edit interfaces ge-0/1/0 unit 0]
user@access-switch# set ethernet-switching native-vlan-id 1
```

4. Configure the sales VLAN:

```
[edit vlans sales]
user@access-switch# set vlan-description "Sales VLAN"
user@access-switch# set vlan-id 100
user@access-switch# set l3-interface vlan.0
```

5. Configure the support VLAN:

```
[edit vlans support]
user@access-switch# set vlan-description "Support VLAN"
user@access-switch# set vlan-id 200
user@access-switch# set l3-interface vlan.1
```

6. Create the subnet for the sales broadcast domain:

```
[edit interfaces]
user@access-switch# set vlan unit 0 family inet address 192.0.2.1/25
```

7. Create the subnet for the support broadcast domain:

```
[edit interfaces]
user@access-switch# set vlan unit 1 family inet address 192.0.2.129/25
```

8. Configure the interfaces in the sales VLAN:

```
[edit interfaces]
user@access-switch# set ge-0/0/0 unit 0 description "Sales wireless access
point port"
```

```

user@access-switch# set ge-0/0/0 unit 0 family ethernet-switching vlan
members sales
user@access-switch# set ge-0/0/3 unit 0 description "Sales phone port"
user@access-switch# set ge-0/0/3 unit 0 family ethernet-switching vlan
members sales
user@access-switch# set ge-0/0/20 unit 0 description "Sales file server
port"
user@access-switch# set ge-0/0/20 unit 0 family ethernet-switching vlan
members sales
user@access-switch# set ge-0/0/22 unit 0 description "Sales printer port"
user@access-switch# set ge-0/0/22 unit 0 family ethernet-switching vlan
members sales

```

9. Configure the interfaces in the support VLAN:

```

[edit interfaces]
user@access-switch# set ge-0/0/24 unit 0 description "Support wireless
access point port"
user@access-switch# set ge-0/0/24 unit 0 family ethernet-switching vlan
members support
user@access-switch# set ge-0/0/26 unit 0 description "Support phone port"
user@access-switch# set ge-0/0/26 unit 0 family ethernet-switching vlan
members support
user@access-switch# set ge-0/0/44 unit 0 description "Support printer
port"
user@access-switch# set ge-0/0/44 unit 0 family ethernet-switching vlan
members support
user@access-switch# set ge-0/0/46 unit 0 description "Support file server
port"
user@access-switch# set ge-0/0/46 unit 0 family ethernet-switching vlan
members support

```

10. Configure descriptions and VLAN tag IDs for the sales and support VLANs:

```

[edit vlans]
user@access-switch# set sales vlan-description "Sales VLAN"
user@access-switch# set sales vlan-id 100
user@access-switch# set support vlan-description "Support VLAN"
user@access-switch# set support vlan-id 200

```

11. To route traffic between the sales and support VLANs and associate a Layer 3 interface with each VLAN:

```

[edit vlans]
user@access-switch# set sales l3-interface vlan.0
user@access-switch# set support l3-interface vlan.1

```

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

```

user@access-switch> show
interfaces {
  ge-0/0/0 {
    unit 0 {
      description "Sales wireless access point port";
      family ethernet-switching {

```

```

        vlan members sales;
    }
}
ge-0/0/3 {
    unit 0 {
        description "Sales phone port";
        family ethernet-switching {
            vlan members sales;
        }
    }
}
ge-0/0/20 {
    unit 0 {
        description "Sales file server port";
        family ethernet-switching {
            vlan members sales;
        }
    }
}
ge-0/0/22 {
    unit 0 {
        description "Sales printer port";
        family ethernet-switching {
            vlan members sales;
        }
    }
}
ge-0/0/24 {
    unit 0 {
        description "Support wireless access point port";
        family ethernet-switching {
            vlan members support;
        }
    }
}
ge-0/0/26 {
    unit 0 {
        description "Support phone port";
        family ethernet-switching {
            vlan members support;
        }
    }
}
ge-0/0/44 {
    unit 0 {
        description "Support printer port";
        family ethernet-switching {
            vlan members sales;
        }
    }
}
ge-0/0/46 {
    unit 0 {
        description "Support file server port";
        family ethernet-switching {

```

```

        vlan members support;
    }
}
ge-0/1/0 {
    unit 0 {
        description "Uplink module port connection to distribution switch";
        family ethernet-switching {
            port-mode trunk;
            vlan members [ sales support ];
            native-vlan-id 1;
        }
    }
}
vlan {
    unit 0 {
        family inet address 192.0.2.1/25;
    }
    unit 1 {
        family inet address 192.0.2.129/25;
    }
}
vpls {
    sales {
        vlan-id 100;
        vlan-description "Sales VLAN";
        l3-interface vlan.0;
    }
    support {
        vlan-id 200;
        vlan-description "Support VLAN";
        l3-interface vlan.1;
    }
}
}

```



**TIP:** To quickly configure the distribution switch, issue the `load merge terminal` command, then copy the hierarchy and paste it into the switch terminal window.

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## Configuring the Distribution Switch

To configure the distribution switch:

**CLI Quick Configuration** To quickly configure the distribution switch, copy the following commands and paste them into the switch terminal window:

```

set interfaces ge-0/0/0 description "Connection to access switch"
set interfaces ge-0/0/0 ethernet-switching port-mode trunk
set interfaces ge-0/0/0 ethernet-switching vlan members [ sales support ]
set interfaces ge-0/0/0 ethernet-switching native-vlan-id 1
set interfaces vlan unit 0 family inet address 192.0.2.2/25

```

```

set interfaces vlan unit 1 family inet address 192.0.2.130/25
set vlans sales vlan-description "Sales VLAN"
set vlans sales vlan-id 100
set vlans sales l3-interface vlan.0
set vlans support vlan-description "Support VLAN"
set vlans support vlan-id 200
set vlans support l3-interface vlan.1

```

**Step-by-Step Procedure** To configure the distribution switch:

1. Configure the interface on the switch to be the trunk port that connects to the access switch:

```

[edit interfaces ge-0/0/0 unit 0]
user@distribution-switch# set description "Connection to access switch"
user@distribution-switch# set ethernet-switching port-mode trunk

```

2. Specify the VLANs to be aggregated on the trunk port:

```

[edit interfaces ge-0/0/0 unit 0]
user@distribution-switch# set ethernet-switching vlan members [ sales
support ]

```

3. Configure the VLAN ID to use for packets that are received with no dot1q tag (untagged packets):

```

[edit interfaces]
user@distribution-switch# set ge-0/0/0 ethernet-switching native-vlan-id
1

```

4. Configure the sales VLAN:

```

[edit vlans sales]
user@distribution-switch# set vlan-description "Sales VLAN"
user@distribution-switch# set vlan-id 100
user@distribution-switch# set l3-interface vlan.0

```

5. Configure the support VLAN:

```

[edit vlans support]
user@distribution-switch# set vlan-description "Support VLAN"
user@distribution-switch# set vlan-id 200
user@distribution-switch# set l3-interface vlan.1

```

6. Create the subnet for the sales broadcast domain:

```

[edit interfaces]
user@distribution-switch# set vlan unit 0 family inet address 192.0.2.2/25

```

7. Create the subnet for the support broadcast domain:

```

[edit interfaces]

```



```
user@distribution-switch# set vlan unit 1 family inet address
192.0.2.130/25
```

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

```
user@distribution-switch> show
interfaces {
  ge-0/0/0 {
    description "Connection to access switch";
    unit 0 {
      family ethernet-switching {
        port-mode trunk;
        vlan members [ sales support ];
        native-vlan-id 1;
      }
    }
  }
}
vlan {
  unit 0 {
    family inet address 192.0.2.2/25;
  }
  unit 1 {
    family inet address 192.0.2.130/25;
  }
}
vpls {
  sales {
    vlan-id 100;
    vlan-description "Sales VLAN";
    l3-interface vlan.0;
  }
  support {
    vlan-id 200;
    vlan-description "Support VLAN";
    l3-interface vlan.1;
  }
}
```



**TIP:** To quickly configure the distribution switch, issue the **load merge terminal** command, then copy the hierarchy and paste it into the switch terminal window.

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## Verification

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

- Verifying the VLAN Members and Interfaces on the Access Switch on page 10
- Verifying the VLAN Members and Interfaces on the Distribution Switch on page 10

## Verifying the VLAN Members and Interfaces on the Access Switch

**Purpose** Verify that the sales and support have been created on the switch.

**Action** List all VLANs configured on the switch:

```
user@switch> show vlans
```

Name	Tag	Interfaces
default		ge-0/0/1.0, ge-0/0/2.0, ge-0/0/4.0, ge-0/0/5.0, ge-0/0/6.0, ge-0/0/7.0, ge-0/0/8.0*, ge-0/0/9.0,  ge-0/0/10.0, ge-0/0/11.0*, ge-0/0/12.0, ge-0/0/13.0, ge-0/0/14.0, ge-0/0/15.0, ge-0/0/16.0, ge-0/0/17.0, ge-0/0/18.0, ge-0/0/19.0*, ge-0/0/21.0, ge-0/0/23.0, ge-0/0/25.0, ge-0/0/27.0*, ge-0/0/28.0, ge-0/0/29.0, ge-0/0/30.0, ge-0/0/31.0*, ge-0/0/32.0, ge-0/0/33.0, ge-0/0/34.0, ge-0/0/35.0*, ge-0/0/36.0, ge-0/0/37.0, ge-0/0/38.0, ge-0/0/39.0*, ge-0/0/40.0, ge-0/0/41.0, ge-0/0/42.0, ge-0/0/43.0*, ge-0/0/45.0, ge-0/0/47.0, ge-0/1/1.0*, ge-0/1/2.0*, ge-0/1/3.0*
sales	100	ge-0/0/0.0*, ge-0/0/3.0, ge-0/0/20.0, ge-0/0/22.0, ge-0/1/0.0*,
support	200	ge-0/0/24.0*, ge-0/0/26.0, ge-0/0/44.0, ge-0/0/46.0,
mgmt		me0.0*

**Meaning** The output shows the sales and support VLANs and the interfaces associated with them.

## Verifying the VLAN Members and Interfaces on the Distribution Switch

**Purpose** Verify that the sales and support have been created on the switch.

**Action** List all VLANs configured on the switch:

```
user@switch> show vlans
```

Name	Tag	Interfaces
default		ge-0/0/1.0, ge-0/0/2.0, ge-0/0/3.0, ge-0/0/4.0, ge-0/0/5.0, ge-0/0/6.0, ge-0/0/7.0*, ge-0/0/8.0,  ge-0/0/9.0, ge-0/0/10.0*, ge-0/0/11.0, ge-0/0/12.0, ge-0/0/13.0, ge-0/0/14.0, ge-0/0/15.0, ge-0/0/16.0, ge-0/0/17.0, ge-0/0/18.0*, ge-0/0/19.0, ge-0/0/20.0, ge-0/0/21.0, ge-0/0/22.0*, ge-0/0/23.0, ge-0/1/1.0*, ge-0/1/2.0*, ge-0/1/3.0*
sales	100	ge-0/0/0.0*

```
support      200      ge-0/0/0.0*
mgmt                               me0.0*
```

**Meaning** The output shows the **sales** and **support** VLANs associated to interface **ge-0/0/0.0**. Interface **ge-0/0/0.0** is the trunk interface connected to the access switch.

- Related Topics**
- Example: Setting Up Basic Bridging and a VLAN for an EX-series Switch
  - Example: Setting Up Bridging with Multiple VLANs for EX-series Switches
  - Example: Configure Automatic VLAN Administration Using GVRP
  - Understanding Bridging and VLANs on EX-series Switches

