Example: Configuring Aggregated Ethernet High-Speed Uplinks with LACP Between a Virtual Chassis Access Switch and a Virtual Chassis Distribution Switch

EX Series switches allow you to combine one to eight Ethernet links into one logical interface for higher bandwidth and redundancy. The ports that are combined in this manner are referred to as a link aggregation group (LAG) or bundle. EX Series switches allow you to further enhance these links by configuring Link Aggregation Control Protocol (LACP).

This example describes how to overlay LACP on the LAG configurations that were created in Example: Configuring Aggregated Ethernet High-Speed Uplinks Between a Virtual Chassis Access Switch and a Virtual Chassis Distribution Switch:

Requirements

This example uses the following software and hardware components:

- JUNOS Release 9.0 or later for EX Series switches
- Two EX4200-48P switches
- Two EX4200-24F switches
- Four EX Series XFP uplink modules

Before you configure LACP, be sure you have:

- Set up the Virtual Chassis switches. See Example: Configuring a Virtual Chassis with a Master and Backup in a Single Wiring Closet.
- Configured the uplink ports on the switches as trunk ports. See Configuring Gigabit Ethernet Interfaces (CLI Procedure).
- Configured the LAGs. See Example: Configuring Aggregated Ethernet High-Speed Uplinks Between a Virtual Chassis Access Switch and a Virtual Chassis Distribution Switch

Overview and Topology

This example assumes that you are already familiar with the Example: Configuring Aggregated Ethernet High-Speed Uplinks between Virtual Chassis Access Switch and Virtual Chassis Distribution Switch. The topology in this example is exactly the same

as the topology in that other example. This example shows how to use LACP to enhance the LAG functionality.

LACP exchanges are made between *actors* (the transmitting link) and *partners* (the receiving link). The LACP *mode* can be either active or passive.

NOTE: If the actor and partner are both in passive mode, they do not exchange LACP packets, which results in the aggregated Ethernet links not coming up. By default, LACP is in passive mode. To initiate transmission of LACP packets and responses to LACP packets, you must enable LACP in active mode.

By default, the actor and partner send LACP packets every second. You can configure the interval at which the interfaces send LACP packets by including the periodic statement at the [edit interfaces *interface-name* aggregated-ether-options lacp] hierarchy level.

The interval can be fast (every second) or slow (every 30 seconds).

Configuring LACP for the LAGs on the Virtual Chassis Access Switch

To configure LACP for the access switch LAGs, perform these tasks:

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

```
[edit]
set interfaces ae0 aggregated-ether-options lacp active periodic fast
set interfaces ae1 aggregated-ether-options lacp active periodic fast
```

Step-by-Step Procedure To configure LACP for Host-A LAGs ae0 and ae1:

1. Specify the aggregated Ethernet options for both bundles:

```
[edit interfaces]
user@Host-A#set ae0 aggregated-ether-options lacp active periodic fast
user@Host-A#set ae1 aggregated-ether-options lacp active periodic fast
```

Results Display the results of the configuration:

```
[edit interfaces]
user@Host-A# show
ae0 {
   aggregated-ether-options {
      lacp {
         active;
         periodic fast;
      }
   }
}
ae1 {
   aggregated-ether-options {
```

```
      lacp {
        active;
        periodic fast;
      }
    }
  }
```

Configuring LACP for the LAGs on the Virtual Chassis Distribution Switch

To configure LACP for the two uplink LAGs from the Virtual Chassis access switch to the Virtual Chassis distribution switch, perform these tasks:

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

```
[edit interfaces]
set ae0 aggregated-ether-options lacp passive periodic fast
set ae1 aggregated-ether-options lacp passive periodic fast
```

Step-by-Step Procedure To configure LACP for Host D LAGs ae0 and ae1:

1. Specify the aggregated Ethernet options for both bundles:

```
[edit interfaces]
user@Host-D#set ae0 aggregated-ether-options lacp passive periodic fast
user@Host-D#set ae1 aggregated-ether-options lacp passive periodic fast
```

Results Display the results of the configuration:

```
[edit interfaces]
user@Host-D# show
ae0 {
  aggregated-ether-options {
    lacp {
      passive;
      periodic fast;
    }
  }
}
ae1 {
  aggregated-ether-options {
    lacp {
      passive
      periodic fast;
    }
  }
}
```

Verification

To verify that LACP packets are being exchanged, perform these tasks:

- Verifying the LACP Settings on page 4
- Verifying That the LACP Packets Are Being Exchanged on page 4

Verifying the LACP Settings

Purpose Verify that LACP has been set up correctly.

Action Use the show lacp interfaces *interface-name* command to check that LACP has been enabled as active on one end.

```
user@Host-A> show lacp interfaces xe-0/1/0

Aggregated interface: ae0

    LACP state:       Role   Exp   Def  Dist  Col  Syn  Aggr  Timeout  Activity

      xe-0/1/0      Actor    No   Yes    No   No   No   Yes     Fast    Active

      xe-0/1/0    Partner    No   Yes    No   No   No   Yes     Fast   Passive

    LACP protocol:   Receive State    Transmit State          Mux State

      xe-0/1/0          Defaulted     Fast periodic           Detached
```

Meaning The output indicates that LACP has been set up correctly and is active at one end.

Verifying That the LACP Packets Are Being Exchanged

Purpose Verify that LACP packets are being exchanged.

Action Use the show interfaces ae*x* statistics command to display LACP information.

```
user@Host-A> show interfaces ae0 statistics

Physical interface: ae0, Enabled, Physical link is Down
  Interface index: 153, SNMP ifIndex: 30
  Link-level type: Ethernet, MTU: 1514, Speed: Unspecified, Loopback: Disabled,
  Source filtering: Disabled, Flow control: Disabled, Minimum links needed: 1,
  Minimum bandwidth needed: 0
  Device flags   : Present Running
  Interface flags: Hardware-Down SNMP-Traps Internal: 0x0
  Current address: 02:19:e2:50:45:e0, Hardware address: 02:19:e2:50:45:e0
  Last flapped   : Never
  Statistics last cleared: Never
    Input packets : 0
    Output packets: 0
  Input errors: 0, Output errors: 0

  Logical interface ae0.0 (Index 71) (SNMP ifIndex 34)
    Flags: Hardware-Down Device-Down SNMP-Traps Encapsulation: ENET2
```

```
Statistics        Packets        pps         Bytes          bps
Bundle:
    Input :             0          0             0            0
    Output:             0          0             0            0
Protocol inet
  Flags: None
  Addresses, Flags: Dest-route-down Is-Preferred Is-Primary
    Destination: 10.10.10/24, Local: 10.10.10.1, Broadcast: 10.10.10.255
```

Meaning The output here shows that the link is down and that no PDUs are being exchanged.

Troubleshooting

These are some tips for troubleshooting:

Troubleshooting a Nonworking LACP Link

Problem The LACP link is not working.

Solution Check the following:

- Remove the LACP configuration and verify whether the static LAG is up.
- Verify that LACP is configured at both ends.
- Verify that LACP is not passive at both ends.
- Verify whether LACP protocol data units (PDUs) are being exchanged by running the monitor traffic-interface *lag-member* detail command.

Related Topics

- Example: Connecting an Access Switch to a Distribution Switch
- Virtual Chassis Cabling Configuration Examples for EX4200 Switches
- Installing an Uplink Module in an EX3200 or EX4200 Switch

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