

Configuring Aggregated Ethernet LACP

For aggregated Ethernet interfaces, you can configure the Link Aggregation Control Protocol (LACP). LACP is one method of bundling several physical interfaces to form one logical interface. You can configure both VLAN-tagged and untagged aggregated Ethernet with or without LACP enabled.

LACP exchanges are made between actors and partners. An actor is the local interface in an LACP exchange. A partner is the remote interface in an LACP exchange.

LACP is defined in IEEE 802.3ad, *Aggregation of Multiple Link Segments*.

LACP was designed to achieve the following:

- Automatic addition and deletion of individual links to the aggregate bundle without user intervention
- Link monitoring to check whether both ends of the bundle are connected to the correct group

The JUNOS implementation of LACP provides link monitoring but not automatic addition and deletion of links.

The LACP mode can be active or passive. 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. If either the actor or partner is active, they do exchange LACP packets. By default, LACP is in passive mode on aggregated Ethernet interfaces. To initiate transmission of LACP packets and response to LACP packets, you must enable LACP active mode.

To enable LACP active mode, include the `lACP` statement at the `[edit interfaces interface-name aggregated-ether-options]` hierarchy level, and specify the `active` option:

```
[edit interfaces interface-name aggregated-ether-options]
[Unresolved xref] {
    active;
}
```

To restore the default behavior, include the `lACP` statement at the `[edit interfaces interface-name aggregated-ether-options]` hierarchy level, and specify the `passive` option:

```
[edit interfaces interface-name aggregated-ether-options]
[Unresolved xref] {
    passive;
}
```

For more information, see the following sections:

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Configuring the LACP Interval

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:

```
[edit interfaces interface-name aggregated-ether-options lacp]
periodic interval;
```

The interval can be fast (every second) or slow (every 30 seconds). You can configure different periodic rates on active and passive interfaces. When you configure the active and passive interfaces at different rates, the transmitter honors the receiver's rate.



NOTE: Source address filtering does not work when LACP is enabled. For more information about source address filtering, see Enabling Ethernet MAC Address Filtering.

Percentage policers are not supported on aggregated Ethernet interfaces with the CCC protocol family configured. For more information about percentage policers, see the *JUNOS Policy Framework Configuration Guide*.

Generally, LACP is supported on all untagged aggregated Ethernet interfaces. For more information, see Configuring Untagged Aggregated Ethernet Interfaces.

For M-series routers with enhanced Flexible PIC Concentrators (FPCs) and T-series routing platforms, LACP over VLAN-tagged aggregated Ethernet interfaces is supported. For 8-port, 12-port, and 48-port Fast Ethernet PICs, LACP over VLAN-tagged interfaces is not supported.

Configuring LACP Link Protection



NOTE: When using LACP link protection, you can configure only two member links to an aggregated Ethernet interface: one active and one standby.

To force active and standby links within an aggregated Ethernet, you can configure LACP link protection and system priority at the aggregated Ethernet interface level using the **link-protection** and **system-priority** statements. Configuring values at this level results in only the configured interfaces using the defined configuration. LACP interface configuration also enables you to override global (chassis) LACP settings.

LACP link protection also uses port priority. You can configure port priority at the Ethernet interface `[gigether-options]` hierarchy level using the **port-priority** statement. If you choose not to configure port priority, LACP link protection uses the default value for port priority (127).



NOTE: LACP link protection supports per-unit scheduling configuration on aggregated Ethernet interfaces.

Enabling LACP Link Protection

To enable LACP link protection for an aggregated Ethernet interfaces, use the `link-protection` statement at the `[edit interfaces aeX aggregated-ether-options lacp]` hierarchy level:

```
[edit interfaces aeX aggregated-ether-options lacp]
link-protection;
  disable (Link Protection);
  revertive;
  non-revertive;
}
```

By default, LACP link protection reverts to a higher-priority (lower-numbered) link when that higher-priority link becomes operational or a link is added to the aggregator that is determined to be higher in priority. However, you can suppress link calculation by adding the **non-revertive** statement to the LACP link protection configuration. In nonrevertive mode, once a link is active and collecting and distributing packets, the subsequent addition of a higher-priority (better) link does not result in a switch and the current link remains active.

If LACP link protection is configured to be nonrevertive at the global (`[edit chassis]` hierarchy) level, you can add the **revertive** statement to the LACP link protection configuration to override the nonrevertive setting for the interface. In revertive mode, the addition of a higher-priority link to the aggregator results in LACP performing a priority recalculation and switching from the current active link to the new active link.



CAUTION: If both ends of an aggregator have LACP link protection enabled, make sure to configure both ends of the aggregator to use the same mode. Mismatching LACP link protection modes can result in lost traffic.

Configuring LACP System Priority

To configure LACP system priority for aggregated Ethernet interfaces on the interface, use the `system-priority` statement at the `[edit interfaces aeX aggregated-ether-options lacp]` hierarchy level:

```
[edit interfaces aeX aggregated-ether-options lacp]
system-priority;
```

The system priority is a 2-octet binary value that is part of the LACP system ID. The LACP system ID consists of the system priority as the two most-significant octets and the interface MAC address as the six least-significant octets. The system with the numerically lower value for system priority has the higher priority. By default, system priority is 127, with a range of 0 to 65,535.

Configuring LACP Port Priority

To configure LACP port priority for aggregated Ethernet interfaces, use the **port-priority** statement at the [edit interfaces *interface-name* **gigether-options** 802.3ad aeX lacp] or [edit interfaces *interface-name* **fastether-options** 802.3ad aeX lacp] hierarchy levels:

```
[edit interfaces interface-name gigether-options 802.3ad aeX lacp]
port-priority priority;
```

The port priority is a 2-octet field that is part of the LACP port ID. The LACP port ID consists of the port priority as the two most-significant octets and the port number as the two least-significant octets. The system with the numerically lower value for port priority has the higher priority. By default, port priority is 127, with a range of 0 to 65,535.

Port aggregation selection is made by each system based on the highest port priority and are assigned by the system with the highest priority. Ports are selected and assigned starting with the highest priority port of the highest priority system and working down in priority from there.

Tracing LACP Operations

To trace the operations of the LACP process, include the **traceoptions** statement at the [edit protocols lacp] hierarchy level:

```
[edit protocols lacp]
[Unresolved xref] {
  file <filename> <files number> <size size> <world-readable | no-world-readable>;
  flag flag;
  no-remote-trace;
}
```

You can specify the following flags in the **protocols lacp traceoptions** statement:

- **all**—All LACP tracing operations
- **configuration**—Configuration code
- **packet**—Packets sent and received
- **process**—LACP process events
- **protocol**—LACP protocol state machine
- **routing-socket**—Routing socket events
- **startup**—Process startup events

For general information about tracing, see the tracing and logging information in the *JUNOS System Basics Configuration Guide*.

Example: Configuring Aggregated Ethernet LACP

Configure aggregated Ethernet LACP over a VLAN-tagged interface:

LACP with VLAN-Tagged Aggregated Ethernet

```
[edit interfaces]
fe-5/0/1 {
  fastether-options {
    802.3ad ae0;
  }
}
ae0 {
  aggregated-ether-options {
    lacp {
      active;
    }
  }
  vlan-tagging;
  unit 0 {
    vlan-id 100;
    family inet {
      address 10.1.1.2/24 {
        vrrp-group 0 {
          virtual-address 10.1.1.4;
          priority 200;
        }
      }
    }
  }
}
```

Configure aggregated Ethernet LACP over an untagged interface:

LACP with Untagged Aggregated Ethernet

```
[edit interfaces]
fe-5/0/1 {
  fastether-options {
    802.3ad ae0;
  }
}
ae0 {
  aggregated-ether-options {
    lacp {
      active;
    }
  }
  unit 0 {
    family inet {
      address 10.1.1.2/24 {
        vrrp-group 0 {
          virtual-address 10.1.1.4;
          priority 200;
        }
      }
    }
  }
}
```

}