



Link Aggregation Groups (LAG) User Guide

Version 21.6.1, 25 June 2021

Registered Address	Support	Sales
26, Kingston Terrace, Princeton, New Jersey 08540, United States		
		+91 80 4850 5445
http://www.rtbrick.com	support@rtbrick.com	sales@rtbrick.com

©Copyright 2021 RtBrick, Inc. All rights reserved. The information contained herein is subject to change without notice. The trademarks, logos and service marks ("Marks") displayed in this documentation are the property of RtBrick in the United States and other countries. Use of the Marks are subject to RtBrick's Term of Use Policy, available at <https://www.rtbrick.com/privacy>. Use of marks belonging to other parties is for informational purposes only.

Table of Contents

1. Overview	3
1.1. LAG Interface Modes	3
1.2. Layer2 and Layer 3 Interfaces	3
1.3. LACP (Link Aggregation Control Protocol)	3
1.4. Guidelines and Limitations	4
2. Configuring Link Aggregation Groups (LAGs)	5
2.1. Creating LAG Interfaces	5
2.2. Configuring LAG Member Interfaces	6
3. LAG Operational Commands	7
3.1. Show Commands	7
3.1.1. Viewing LAG Running Configuration	7
3.1.2. Viewing LAG Information	7

1. Overview

A link aggregation group (LAG) combines multiple physical links into a single logical interface which is referred to as a bundle interface. These physical links are connected between two devices. The device uses LACP protocol to bundle the member links and create high speed connections. Although a bundle can be created based on static configuration, bandwidth can be increased by adding member links to the bundle. This also allows load sharing among the physical links. Thus, a group of ports combined together is called a link aggregation group, or LAG.

The LAG interface combines the bandwidth of the individual member links. The properties like speed and bandwidth of the individual member links should be the same to make it part of that LAG. The traffic which is directed towards the LAG interface is sent on the individual member links. This traffic is not pinned to a specific member link but rather determined by a specific flow. This hash could be calculated based on various fields in the packet.

1.1. LAG Interface Modes

The LAG interface could be formed statically or dynamically. LACP protocol helps to bring up the interface dynamically. The two modes of LAG interface are:

1. **Static LAG:** In this mode, the member links do not initiate or process any of the LACP packets received. The device brings up the LAG interface without LACP negotiation.
2. **Dynamic LAG:** In this mode, the member links process the LACP packets received. Under this mode, there two sub modes:
 - a. **active:** LACP packets are generated on each of the member links on the transmit side.
 - b. **passive:** LACP packets are generated on the member link in response to the LACP packet received. That means, at least one side of the LAG should be configured as **active** to bring up the LAG interface.

1.2. Layer2 and Layer 3 Interfaces

LAG interfaces can be used as layer 2 and layer 3 interfaces. A regular layer 2 or layer 3 interface can be created on top of the single LAG interface. These interfaces can be divided based on 802.1q VLAN ID's. Multiple layer 3 interfaces can be created and each of them can be associated with different instances.

1.3. LACP (Link Aggregation Control Protocol)

LACP is part of an IEEE specification (802.3ad) that allows several physical ports to be grouped to form a single logical interface. LACP allows a switch to negotiate an

LAG by sending LACP packets on its member links. It negotiates the various configuration parameters to bring up the individual member links.

1.4. Guidelines and Limitations

- You cannot configure logical interfaces on a LAG member ports.
- You cannot configure L2X on a LAG member port.

2. Configuring Link Aggregation Groups (LAGs)

2.1. Creating LAG Interfaces

Syntax:

```
set link-aggregation interface <name> <attribute> <value>
```

Attribute	Description
<name>	Specifies the name of the LAG interface. The supported LAG interface names: 'lag-1' to 'lag-99'.
<description>	Link aggregation interface description
mode <mode>	Specifies the LAG mode. The default mode is LACP. The possible modes are: <ul style="list-style-type: none"> • lacp - In this mode, the member links processes LACP packets received. When you create a LAG interface in LACP mode, the LACP PDUs are sent and received through member interfaces. • static: In this mode, the member links do not initiate or process any of the LACP packets received.
<minimum-link-count>	Minimum number of active member links required for the link aggregation interface.
<admin-status>	Administrative status of the link aggregation interface.

Example: LAG Interfaces Configuration

```

supervisor@rtbrick: cfg> show config link-aggregation
{
  "rtbrick-config:link-aggregation": {
    "interface": [
      {
        "interface-name": "lag-3",
        "mode": "lacp",
        "minimum-link-count": 2,
        "member-interface": [
          {
            "member-interface-name": "ifp-0/0/1",
            "lacp-mode": "active"
          },
          {
            "member-interface-name": "ifp-0/0/5",
            "lacp-mode": "active"
          }
        ]
      }
    ]
  }
}

```

2.2. Configuring LAG Member Interfaces

You can add member ports to the LAG interface. The command below allows you to bundle multiple physical interfaces with similar properties like speed, MTU.

Syntax:

```
set link-aggregation interface <name> member-interface <name>
<attribute> <value>
```

Attribute	Description
lacp-mode <mode>	Specifies the LACP mode. The default lacp-mode is active . active : LACP packets are generated on each of the member links on the trad, the receive side. passive : LACP packets are generated on the member link in response to the LACP packet received at one side of the LAG should be configured as active to bring the LAG interface.
lacp-timeout <timeout-value>	Specifies the timeout for the LACP session. The default long time-out value is 90 seconds; short is 3 seconds. The default lacp-timeout is short .

3. LAG Operational Commands

3.1. Show Commands

3.1.1. Viewing LAG Running Configuration

The following command displays the LAG running configuration on the system.

Syntax:

```
show config link-aggregation
```

Example: LAG Running Configuration

```
supervisor@dev1: cfg> show config link-aggregation
{
  "rtbrick-config:link-aggregation": {
    "interface": [
      {
        "interface-name": "lag-4",
        "mode": "lacp",
        "minimum-link-count": 4,
        "member-interface": [
          {
            "member-interface-name": "ifp-0/0/1",
            "lacp-mode": "active",
            "lacp-timeout": "long"
          },
          {
            "member-interface-name": "ifp-0/0/4",
            "lacp-mode": "active",
            "lacp-timeout": "long"
          }
        ]
      }
    ]
  }
}
```

3.1.2. Viewing LAG Information

The following command displays the LAG information.

Syntax:


```
show lag <options>
```

Option	Description
<interface-name>	Displays information for a specific LAG interface
detail	Displays detailed LAG information
mode <mode>	Displays information for a LAG mode: static or LACP

Example: Viewing LAG Information

```
supervisor@rtbrick: cfg> show lag detail

Lag interface name: lag-3
Status:                Up
Minimum link count: 2
Mode:                  lacp
  Member interface name: ifp-0/0/1
    Actor system id: 04:f8:f8:e9:bc:83
    Actor key: 107
    Partner system id: 04:f8:f8:e9:bf:83
    Partner key: 43
  Member interface name: ifp-0/0/5
    Actor system id: 04:f8:f8:e9:bc:83
    Actor key: 107
    Partner system id: 04:f8:f8:e9:bf:83
    Partner key: 43
```