



# Interfaces User Guide

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# Table of Contents

1. Introduction	3
1.1. Interface Types	3
1.2. Interface Numbering	4
1.3. Community Support for Interfaces	4
1.4. Unnumbered Interfaces	4
1.5. IP Fragmentation	5
1.5.1. Guidelines and Limitations of IP Fragmentation	5
1.6. MTU Profile	5
1.6.1. MTU Profile Limitations	6
1.7. Supported Platforms	7
2. Configuring Interfaces	8
2.1. Configuration Hierarchy	8
2.2. Configuration Syntax and Commands	8
2.2.1. MTU Profile Configuration	8
2.2.2. Physical Interface Configuration	11
2.2.3. Logical Interface Configuration	13
2.2.4. Interface Address Configuration	16
2.2.5. Global Interface Configuration	17
3. Operational Commands	19
3.1. Interface Show Commands	19
3.1.1. Interface Summary Commands	19
3.1.2. Interface Details Commands	24
3.2. MTU Profile Show Command	25
3.2.1. Interface Statistics Commands	26
3.3. Interface Clear Commands	32
3.3.1. Interface Statistics	32

# 1. Introduction

RtBrick Full Stack (RBFS) supports various types of interfaces, including physical and logical interfaces. On hardware platforms, RBFS physical interfaces represent the ports of a switch. This guide describes how to configure and verify RBFS interfaces. Features like routing protocols or access services will typically run on top of the interfaces.

## 1.1. Interface Types

### Physical Interfaces

In RBFS, physical interfaces (IFP) typically represent the physical ports of a hardware switch. For example, `ifp-0/0/1` represents switch port 1. On the physical interface level, you can configure various parameters associated with Layer 1 of the ISO/OSI reference model.

### Logical Interfaces

For each physical interface, you can create one or multiple interface units also referred to as logical interfaces (IFL) in RBFS. A logical interface is associated with the Layer 2 operation. In addition, you can configure Layer 3 parameters like IP addresses on interface units, and assign interface units to routing instances.

### Loopback Interfaces

A loopback interface is typically used to represent and identify a device itself. Loopback interfaces are preferred because they do not depend on the status of a physical port, and will always be up. Please note, although loopback interfaces are virtual interfaces, there are also represented as physical interfaces and interface units in RBFS, reflecting Layer 1 and Layer 2/3 operation.

### Host Interfaces

Linux virtual ethernet (veth) interfaces connect an LXC container with the Linux host OS. In RBFS, a veth interface to the Linux bridge `lxcbr0` is created by default. In virtual topologies, you can create additional veth interfaces and Linux bridges. RBFS host interfaces represent veth interfaces in RBFS.

For example, if the container interface `eth1` connects to the host interface `vethXYZ123`, `hostif-0/0/1` can be bound to `eth1` to represent it in RBFS. Host interfaces can be used like any other physical interface.

### Memory Interfaces

Memory interfaces (`memif`) are virtual interfaces used for creating virtual topologies. They connect multiple containers running RBFS to each other. When configuring `memif` interfaces:

- Endpoints match on the `memif` ID, i.e. the `memif` ID needs to be the same on both ends.

- memif IDs needs to be unique on the host.
- The memif interface name is locally significant only.
- One endpoint needs to be configured as master, while the other one is configured as slave.

## 1.2. Interface Numbering

RBFS interface numbers match the port numbers on the switch faceplate. An interface is named in the `ifp-<chassis-ID>/<front-panel-block-number>/<port>` format. For example, `ifp-0/0/1`.

- Chassis ID—always 0 for the currently supported platforms
- Front Panel Block—represents group of ports on faceplate
- Port—matches port number on switch faceplate

Virtual interfaces follow the same structure, for example `lo-0/0/1` or `memif-0/0/1`.

Logical interfaces are numbered: `ifl-<Node ID>/<Chip ID>/<Port ID>/<Unit ID>`, for example `ifl-0/0/1/1`.

## 1.3. Community Support for Interfaces

You can tag an interface address with a community or extended community. RBFS will create a direct route for each interface address. If a community or extended community is configured for an interface address, RBFS will add it to the direct route. Communities can be used in policies. For example, when redistributing direct routes, you can match on these communities and define desired policy rules.

## 1.4. Unnumbered Interfaces

An unnumbered interface is a point-to-point interface that is not explicitly configured with a dedicated IP address and subnet. Instead, it borrows (or links to) from a loopback interface, and uses it as the source IP address for packets originating from the interface. The IP unnumbered interface can "borrow" the IP address from another interface that is already configured on the switch, thereby conserving network and address space.

When configuring IP unnumbered on an interface:

- The IP address of the numbered interface cannot be a borrowed IP address.
- IP addresses can be borrowed from a loopback interface by logical interfaces but they cannot be borrowed vice versa.

## 1.5. IP Fragmentation

If the maximum transmission unit (MTU) of an outgoing interface is less than the original packet which needs to be routed, the packet needs to be fragmented.

RBFS supports IP fragmentation on the QMX and QAX platforms but not on the Q2C platform. However, currently there is no support for IP fragmentation in the QMX, QAX, or Q2C hardware. Due to this limitation, on the QMX and QAX platforms, the packets are sent to the CPU, and the fragmentation is handled by the CPU and therefore the rate for these packets is significantly reduced.

If the packet that needs to be fragmented and the Do-Not-Fragment (DF) bit is specified, then the device is going to send an ICMP Error code "fragmentation needed and DF set" to the source.

By default, IPv6 fragmentation is handled at source. When the transit device needs to perform fragmentation, the device sends an ICMP error code "Fragmentation needed and DF set" to the source.

### 1.5.1. Guidelines and Limitations of IP Fragmentation

The following guidelines and limitations are applicable to IP Fragmentation:

- If a packet is larger than the negotiated subscriber MTU size, it will be fragmented (on QMX and QAX platforms); whereas on Q2C such a packet will be dropped.
- The packets that are fragmented do not go over the regular QoS path in the egress pipeline.

## 1.6. MTU Profile

Maximum Transmission Unit (MTU) is the size of the packet that is allowed in the network. In the new generation silicon like Broadcom Qumran2C (Q2C), resources are conserved by creating profiles of the resources, and multiple entities like IFP, IFL and L3 interfaces utilize these profiles. In order to better manage MTU resources and platform capabilities, RBFS supports configuring MTU profiles and attaching these profiles to the attachment points.

### Attachment Points

The MTU profiles are attached to the interface entities like physical (IFP), logical (IFL) and L3 interfaces. RBFS supports the below attachment points for MTU profiles:

- Port-level
- L3 interface level (IPv4 and IPv6)
- PPPoE subscriber level (L2 IFL)

## MTU Size

A user-configured MTU size can range from 64 to 9216 in RBFS.



For MTU profiles of type "pppoe", users should provide L3 MTU size (IPv4/IPv6 headers).

## MTU Type

An MTU type specifies the attachment point of the MTU profile. The MTU types supported are as follows:

- **physical**: When checking MTU, the entire packet size is considered.
- **ipv4**: MTU check is based on IPv4 headers.
- **ipv6**: MTU check is based on IPv6 headers.
- **ip**: MTU profile of type IP.
- **pppoe**: The MTU profile is applied to the pppoe subscriber interface and the user is required to provide the L3 MTU size. Based on its best match algorithm, the Subscriber Management service associates these profiles with PPPOE subscribers.



- MTU profiles for L3 logical interfaces must be explicitly configured in Release 22.5.1, and if not configured, no default MTU size is set for IPv4 and IPv6.
- On the Q2C platform, L3 interfaces can only be configured with IPv4 MTU profile or IPv6 MTU profile, but not both. However, with type "ip" MTU profile, you can configure MTU for both IPv4 and IPv6 traffic with a common MTU size.

## MTU Action

The MTU action defines the action to be taken when the MTU check fails. Currently, RBFS supports "drop" as an action.

### 1.6.1. MTU Profile Limitations

The following limitations are applicable to MTU profile:

- There is a limit to how many MTUs can be used by each hardware.
  - On the Q2C platform, the limit is as follows:
    - Maximum number of MTU profiles: 8
    - Maximum number of L3 MTU profiles: 3 (MTU type: IP/IPv4/IPv6)
    - Maximum number of pppoe MTU profiles: 6 (including the default pppoe profile)

- Maximum number of physical MTU profiles: 7

## **1.7. Supported Platforms**

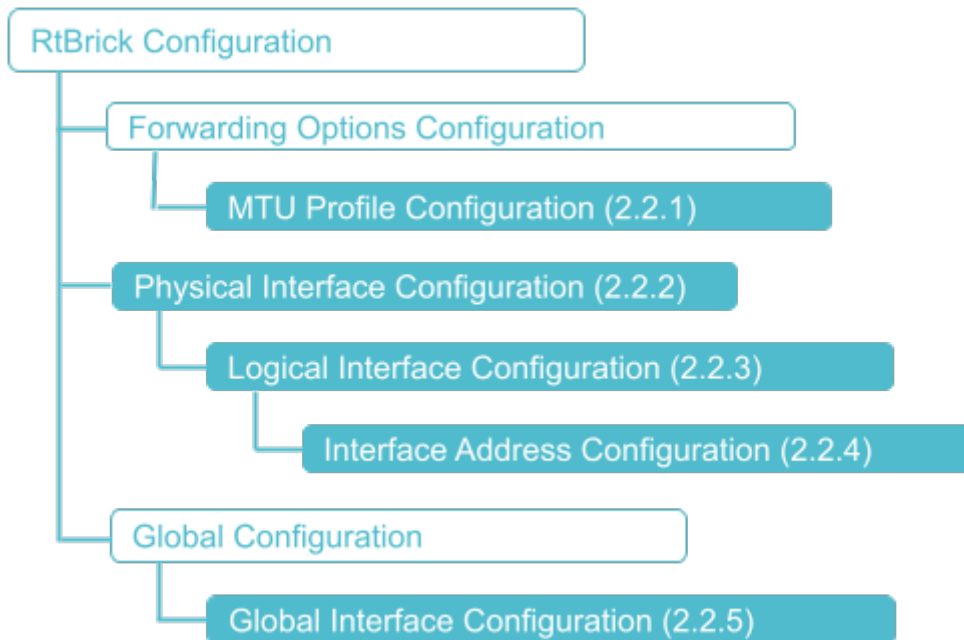
Not all features are necessarily supported on each hardware platform. Refer to the Platform Guide for the features and the sub-features that are or are not supported by each platform.



## 2. Configuring Interfaces

### 2.1. Configuration Hierarchy

The diagram illustrates the interface configuration hierarchy.



### 2.2. Configuration Syntax and Commands

The following sections describe the interface configuration syntax and commands.

#### 2.2.1. MTU Profile Configuration

This section describes how to configure MTU profiles.

Syntax:

**set forwarding-options mtu-profile** <attribute> <value>

Attribute	Description
mtu-profile <mtu-profile-name>	MTU profile name
mtu-size <mtu-size>	MTU size. Range: 64 to 9216 bytes

Attribute	Description
mtu-type <mtu-type>	Specify the MTU type: <ul style="list-style-type: none"> <li>• <b>physical</b>: Port based MTU profile</li> <li>• <b>pppoe</b>: subscriber IFL-based MTU profile for L2TP and PPPoE. This MTU profile is used by PPPoE subscribers to set the default MTU size of 1492.</li> <li>• <b>ipv4</b>: MTU profile of type IPv4. Only IPv4 traffic on the logical interface will be impacted.</li> <li>• <b>ipv6</b>: MTU profile of type IPv6. Only IPv6 traffic on the logical interface will be impacted.</li> <li>• <b>ip</b>: MTU profile of type IP. Both IPv4 and IPv6 traffic on the logical interface will be impacted.</li> </ul>
action <mtu-action>	Specify the MTU action. Currently, the only supported MTU action is "drop", which indicates that when the MTU check fails, the action "drop" is performed.

#### Example 1: Configuration of the MTU Profile for the Physical Port

```

{
  "ietf-restconf:data": {
    "rtbrick-config:forwarding-options": {
      "mtu-profile": [
        {
          "mtu-profile-name": "portMtu",
          "size": 5000,
          "type": "physical",
          "action": "drop"
        }
      ]
    }
  }
}

```

#### Example 2: MTU Profile Configuration of Type IPv4

```
{
  "ietf-restconf:data": {
    "rtbrick-config:forwarding-options": {
      "mtu-profile": [
        {
          "mtu-profile-name": "ipv4Mtu",
          "size": 1300,
          "type": "ipv4",
          "action": "drop"
        }
      ]
    }
  }
}
```

### Example 3: MTU Profile Configuration of Type IPv6

```
{
  "ietf-restconf:data": {
    "rtbrick-config:forwarding-options": {
      "mtu-profile": [
        {
          "mtu-profile-name": "ipv6Mtu",
          "size": 1400,
          "type": "ipv6",
          "action": "drop"
        }
      ]
    }
  }
}
```

### Example 4: Configuration of the MTU Profile for PPPoE

```
{
  "ietf-restconf:data": {
    "rtbrick-config:forwarding-options": {
      "mtu-profile": [
        {
          "mtu-profile-name": "pppoeMtu",
          "size": 1492,
          "type": "pppoe",
          "action": "drop"
        }
      ]
    }
  }
}
```

## 2.2.2. Physical Interface Configuration

This section describes configuration options at the physical interface (IFP) level.

Syntax:

**set interface** <interface-name> <attribute> <value>

Attribute	Description
<interface-name>	Name of the interface. Examples: ifp-0/0/1, hostif-0/0/1.
admin-status <down   up>	Administrative state of the interface.
auto-negotiation <true   false>	Enable or disable auto-negotiation.
class-of-service <profile-name>	Apply class-of-service profile name.
description	Configure physical interface description.
host-if <container-interface>	Configure a host interface. For example, if the container interface eth1 connects to the host interface vethXYZ123, use this command option to bound hostif-0/0/1 to eth1. Please note the Linux virtual ethernet (veth) interface needs to be created separately. It cannot be created via RBFS configuration.
forward-error-correction <fec-type>	Configure Forward Error Correction (FEC) on the physical interface. FEC allows you to send the required information to correct errors through the link along with the payload data. A benefit of "forward" in FEC is that errors detected at the receiver do not need to be retransmitted. Currently, the supported FEC types are: base-r, rsfec, none.
link-training <true   false>	Enable or disable link training.
master <true   false>	Memif role, master or slave, applicable only to memif interface. One end needs to be configured as master, and the other one as slave.
memif-id <id>	Configure memif ID , applicable only to memif interface. Needs to match on both ends.
mtu-profile <mtu-profile-name>	Attach MTU profile to a physical interface. This is a mandatory attribute.
mru <size>	Maximum receive unit size on the physical interface.

Attribute	Description
speed <speed>	<p>Configure speed mode for the interface. Port speed refers to the maximum amount of data transmitted. The speed value is specified in Gigabits per second (Gbps).</p> <p>Currently, RBFS supports 10G and 100G ports, and you can make the following changes:</p> <ul style="list-style-type: none"><li>• 100G port speed can be changed to 40G</li><li>• 10G port speed can be changed to 1G</li></ul>

### Example 1: Physical Interface Configuration

```
{
  "rtbrick-config:interface": [
    {
      "name": "ifp-0/0/1",
      "description": "Link to leaf1",
      "speed": "10G",
      "mtu-profile": "portMtu",
      "mru": 5000
    }
  ]
}
```

### Example 2: Memory Interface Configuration

A End:

```
{
  "rtbrick-config:interface": [
    {
      "name": "memif-0/0/1",
      "description": "Master",
      "memif-id": 11,
      "master": "true",
    }
  ]
}
```

B End:

```
{
  "rtbrick-config:interface": [
    {
      "name": "memif-0/0/1",
      "description": "Slave",
      "memif-id": 11,
      "master": "false",
    }
  ]
}
```

### Example 3: Host Interface Configuration

```
{
  "rtbrick-config:interface": [
    {
      "name": "hostif-0/0/1",
      "description": "Represents eth1 as hostif-0/0/1 in RBFS",
      "host-if": "eth1",
    }
  ]
}
```

### Example 4: MRU Configuration for Physical Interface

```
{
  "rtbrick-config:interface": [
    {
      "name": "ifp-0/0/7",
      "mru": 5000
    }
  ]
}
```

### Example 5: FEC Configuration for Physical Interface

```
{
  "rtbrick-config:interface": [
    {
      "name": "ifp-0/0/40",
      "forward-error-correction": "base-r"
    }
  ]
}
```

## 2.2.3. Logical Interface Configuration

This section describes configuration options at the logical interface (IFL) level.

Syntax:

**set interface** <interface-name> **unit** <unit-id> <attribute> <value>

Attribute	Description
unit <unit-id>	Create a logical interface (also referred to as a sub-interface) under the physical interface.
admin-status <down   up>	Administrative state of the logical interface.
class-of-service <profile-name>	Apply class-of-service profile name.
description <description>	Description of the logical interface.
inner-vlan <inner-vlan-id>	Inner VLAN ID.
instance <instance>	Assign the logical interface to an instance.
ipv4-admin-status <down   up>	Enable or disable IPv4.
ipv4-mtu-profile <ipv4-mtu-profile>	Attach IPv4 MTU profile to an L3 interface.
ipv6-admin-status <down   up>	Enable or disable IPv6.
ipv6-mtu-profile <ipv6-mtu-profile>	Attach IPv6 MTU profile to an L3 interface.
ip-mtu-profile <ip-mtu-profile>	Attach IP MTU profile to an L3 interface.
mpls-admin-status <down   up>	Enable or disable MPLS.
mpls-mtu <mpls-mtu-size>	MPLS maximum transmission unit size.
neighbor <ipv4   ipv6> <ip-address> mac <mac-address>	Configure a static IPv4 or IPv6 neighbor.
unnumbered interface <loopback-interface-name>	Configure an un-numbered interface.
vlan <outer-vlan-id>	Outer VLAN ID.

Example 1: Logical Interface Configuration with IPv4 MTU Profile

```
{
  "rtbrick-config:interface": [
    {
      "name": "ifp-0/0/1",
      "unit": [
        {
          "unit-id": 1,
          "description": "VLAN 101",
          "instance": "default",
          "ipv4-mtu-profile": "ipv4Mtu"
        }
      ]
    }
  ]
}
```

### Example 2: Logical Interface Configuration with IPv6 MTU Profile

```
{
  "rtbrick-config:interface": [
    {
      "name": "ifp-0/0/1",
      "unit": [
        {
          "unit-id": 1,
          "description": "VLAN 101",
          "instance": "default",
          "ipv6-mtu-profile": "ipv6Mtu"
        }
      ]
    }
  ]
}
```

### Example 3: Logical Interface Configuration with IP MTU Profile



```

{
  "rtbrick-config:interface": [
    {
      "name": "ifp-0/0/1",
      "unit": [
        {
          "unit-id": 1,
          "description": "VLAN 101",
          "instance": "default",
          "ip-mtu-profile": "ipMtu"
        }
      ]
    }
  ]
}

```

## 2.2.4. Interface Address Configuration

This section describes how to configure interface IP addresses.

Syntax:

**set interface** <interface-name> **unit** <unit-id> **address** <afi> <attribute> <value>

Attribute	Description
<afi>	Address family identifier (AFI). Supported values: ipv4 and ipv6
<prefix4 prefix6>	Assign IPv4 or IPv6 address to the interface unit.
community <community-value>	Configure list of communities associated with the address.
extended-community <community-value>	Configure list of extended communities associated with the address.
label <label-value>	Configure label associated with the address. Supported MPLS label values are 0 - 1048575. The reserved MPLS label range is 0 - 15. In RBFS, BGP uses the label range 20000 - 100000. It is recommended to assign label values outside of these reserved ranges to avoid conflicts.
secondary <true false>	Configure a secondary IPv4 address.

Example: Interface Address Configuration

```

{
  "rtbrick-config:interface": [
    {
      "name": "lo-0/0/1",
      "unit": [
        {
          "unit-id": 1,
          "address": {
            "ipv4": [
              {
                "prefix4": "192.1.4.3/32",
                "label": 12346
              }
            ]
          }
        }
      ]
    }
  ]
}

```

## 2.2.5. Global Interface Configuration

This section describes a configuration option applied globally to all interfaces.

Syntax:

**set global interface all** <attribute> <value>

Attribute	Description
admin-status <up down>	Configure state of the interface.



- The interface level enable/disable command has higher precedence than the global interface enable/disable command.
- You can disable all unused physical interfaces.
- Before executing the global interface disable all command ensure that all physical interfaces are in the link Up state.

Example: Enabling or Disabling all Interfaces

```
{
  "ietf-restconf:data": {
    "rtbrick-config:global": {
      "interface": {
        "all": {
          "admin-status": "down"
        }
      }
    }
  }
}
```

## 3. Operational Commands

### 3.1. Interface Show Commands

The interface show commands provide detailed information about the status and parameters of RBFS interfaces.

#### 3.1.1. Interface Summary Commands

Syntax:

**show interface** <option>

Option	Description
summary	Displays a summary of all interfaces including physical, logical, and address information.
<interface-name>	Displays a summary of an interface including physical, logical, and address information.
physical	Displays all physical interface including loopback, cpu and recycle ports.
logical	Displays all logical interfaces for all instances.
logical <instance-name>	Displays all logical interfaces for the given instance.
address	Displays all IPv4 and IPv6 addresses for all instances.
address <instance-name>	Displays all IPv4 and IPv6 addresses for the given instance.

#### Example 1: Summary Output for All Interfaces

```

supervisor@rtbrick>LEAF01: op> show interface summary
Interface                Admin    Link    Oper    IPv4 Address
IPv6 Address
ifp-0/0/1                Up       Down    Down
ifp-0/0/2                Up       Down    Down
ifp-0/0/3                Up       Down    Down
ifp-0/0/4                Up       Up      Up
ifp-0/0/5                Up       Down    Down
ifp-0/0/6                Up       Down    Down
ifp-0/0/7                Up       Down    Down
ifp-0/0/8                Up       Down    Down
ifp-0/0/9                Up       Down    Down
ifp-0/0/10               Up       Up      Up
  if1-0/0/10/100         Up       Up      Up          2.2.2.2/24
fe80::82a2:35ff:feee:a80a/128
  if1-0/0/10/200         Up       Up      Up          3.3.3.2/24
fe80::c9:80a2:35ff:feee:a80a/128
  if1-0/0/10/300         Up       Up      Up          -

```

```
fe80::12d:80a2:35ff:feee:a80a/128
ifp-0/0/11          Up      Down    Down
ifp-0/0/12          Up      Down    Down
ifp-0/0/13          Up      Down    Down
ifp-0/0/14          Up      Down    Down
ifp-0/0/15          Up      Down    Down
ifp-0/0/16          Up      Down    Down
ifp-0/0/17          Up      Down    Down
ifp-0/0/18          Up      Down    Down
ifp-0/0/19          Up      Down    Down
ifp-0/0/20          Up      Down    Down
ifp-0/0/21          Up      Down    Down
ifp-0/0/22          Up      Down    Down
ifp-0/0/23          Up      Down    Down
ifp-0/0/24          Up      Down    Down
ifp-0/0/25          Up      Down    Down
ifp-0/0/26          Up      Down    Down
ifp-0/0/27          Up      Up      Up
ifp-0/0/28          Up      Down    Down
ifp-0/0/29          Up      Down    Down
ifp-0/0/30          Up      Down    Down
ifp-0/0/31          Up      Down    Down
ifp-0/0/32          Up      Down    Down
ifp-0/0/33          Up      Down    Down
ifp-0/0/34          Up      Down    Down
ifp-0/0/35          Up      Down    Down
ifp-0/0/36          Up      Down    Down
ifp-0/0/37          Up      Down    Down
ifp-0/0/38          Up      Down    Down
ifp-0/0/39          Up      Down    Down
ifp-0/0/40          Up      Down    Down
ifp-0/0/41          Up      Down    Down
ifp-0/0/42          Up      Down    Down
ifp-0/0/43          Up      Down    Down
ifp-0/0/44          Up      Down    Down
ifp-0/0/45          Up      Down    Down
ifp-0/0/46          Up      Down    Down
ifp-0/0/47          Up      Down    Down
ifp-0/0/48          Up      Down    Down
ifp-0/0/49          Up      Down    Down
ifp-0/0/50          Up      Down    Down
ifp-0/0/51          Up      Down    Down
ifp-0/0/52          Up      Up      Up
ifp-0/0/53          Up      Up      Up
ifp-0/0/54          Up      Down    Down
cpu-0/0/200         Up      Up      Up
cpu-0/0/201         Up      Down    Down
cpu-0/0/202         Up      Down    Down
cpu-0/0/203         Up      Down    Down
recycle-0/0/75      Up      Up      Up
  recycle-0/0/75/0  Up      Up      Up
recycle-0/0/76      Up      Up      Up
  recycle-0/0/76/0  Up      Up      Up
```

Example 2: Summary Output for One Physical Interface

```

supervisor@rtbrick>LEAF01: op> show interface ifp-0/0/10
Interface                Admin    Link    Oper    IPv4 Address
IPv6 Address
ifp-0/0/10                Up      Up      Up
  ifl-0/0/10/100          Up      Up      Up      2.2.2.2/24
fe80::82a2:35ff:feee:a80a/128
  ifl-0/0/10/200          Up      Up      Up      3.3.3.2/24
fe80::c9:80a2:35ff:feee:a80a/128
  ifl-0/0/10/300          Up      Up      Up      -
fe80::12d:80a2:35ff:feee:a80a/128
  ifl-0/0/10/1000         Up      Up      Up      -
fe80::3e9:80a2:35ff:feee:a80a/128

```

### Example 3: List of All Physical Interfaces

```

supervisor@rtbrick>LEAF01: op> show interface physical
Interface                Admin    Link    Oper    MAC Address    Speed    Duplex
Uptime
lo-0/0/1                Up      Up      Up      80:a2:35:a0:00:01    -      -
Thu Nov 19 10:41:06 GMT +0000 2020
ifp-0/0/1                Up      Down    Down    80:a2:35:ee:a8:01    10G     Full
Mon Nov 16 11:24:09 GMT +0000 2020
ifp-0/0/2                Up      Down    Down    80:a2:35:ee:a8:02    10G     Full
Mon Nov 16 11:24:09 GMT +0000 2020
ifp-0/0/3                Up      Down    Down    80:a2:35:ee:a8:03    10G     Full
Mon Nov 16 11:24:09 GMT +0000 2020
ifp-0/0/4                Up      Up      Up      80:a2:35:ee:a8:04    10G     Full
Thu Nov 19 10:05:02 GMT +0000 2020
ifp-0/0/5                Up      Down    Down    80:a2:35:ee:a8:05    10G     Full
Mon Nov 16 11:24:09 GMT +0000 2020
ifp-0/0/6                Up      Down    Down    80:a2:35:ee:a8:06    10G     Full
Mon Nov 16 11:24:09 GMT +0000 2020
ifp-0/0/7                Up      Down    Down    80:a2:35:ee:a8:07    10G     Full
Mon Nov 16 11:24:09 GMT +0000 2020
ifp-0/0/8                Up      Down    Down    80:a2:35:ee:a8:08    10G     Full
Mon Nov 16 11:24:09 GMT +0000 2020
ifp-0/0/9                Up      Down    Down    80:a2:35:ee:a8:09    10G     Full
Mon Nov 16 11:24:09 GMT +0000 2020
ifp-0/0/10               Up      Up      Up      80:a2:35:ee:a8:0a    10G     Full
Fri Nov 20 00:59:12 GMT +0000 2020
ifp-0/0/11               Up      Down    Down    80:a2:35:ee:a8:0b    10G     Full
Mon Nov 16 11:24:09 GMT +0000 2020
ifp-0/0/12               Up      Down    Down    80:a2:35:ee:a8:0c    10G     Full
Mon Nov 16 11:24:09 GMT +0000 2020
ifp-0/0/13               Up      Down    Down    80:a2:35:ee:a8:0d    10G     Full
Mon Nov 16 11:24:09 GMT +0000 2020
ifp-0/0/14               Up      Down    Down    80:a2:35:ee:a8:0e    10G     Full
Mon Nov 16 11:24:09 GMT +0000 2020
ifp-0/0/15               Up      Down    Down    80:a2:35:ee:a8:0f    10G     Full
Mon Nov 16 11:24:09 GMT +0000 2020
ifp-0/0/16               Up      Down    Down    80:a2:35:ee:a8:10    10G     Full
Mon Nov 16 11:24:09 GMT +0000 2020
ifp-0/0/17               Up      Down    Down    80:a2:35:ee:a8:11    10G     Full
Mon Nov 16 11:24:09 GMT +0000 2020

```

ifp-0/0/18	Up	Down	Down	80:a2:35:ee:a8:12	10G	Full
Mon Nov 16 11:24:09 GMT +0000 2020						
ifp-0/0/19	Up	Down	Down	80:a2:35:ee:a8:13	10G	Full
Mon Nov 16 11:24:09 GMT +0000 2020						
ifp-0/0/20	Up	Down	Down	80:a2:35:ee:a8:14	10G	Full
Mon Nov 16 11:24:09 GMT +0000 2020						
ifp-0/0/21	Up	Down	Down	80:a2:35:ee:a8:15	10G	Full
Mon Nov 16 11:24:09 GMT +0000 2020						
ifp-0/0/22	Up	Down	Down	80:a2:35:ee:a8:16	10G	Full
Mon Nov 16 11:24:09 GMT +0000 2020						
ifp-0/0/23	Up	Down	Down	80:a2:35:ee:a8:17	10G	Full
Mon Nov 16 11:24:09 GMT +0000 2020						
ifp-0/0/24	Up	Down	Down	80:a2:35:ee:a8:18	10G	Full
Mon Nov 16 11:24:09 GMT +0000 2020						
ifp-0/0/25	Up	Down	Down	80:a2:35:ee:a8:19	10G	Full
Mon Nov 16 11:24:09 GMT +0000 2020						
ifp-0/0/26	Up	Down	Down	80:a2:35:ee:a8:1a	10G	Full
Mon Nov 16 11:24:09 GMT +0000 2020						
ifp-0/0/27	Up	Up	Up	80:a2:35:ee:a8:1b	10G	Full
Fri Nov 20 00:59:11 GMT +0000 2020						
ifp-0/0/28	Up	Down	Down	80:a2:35:ee:a8:1c	10G	Full
Mon Nov 16 11:24:09 GMT +0000 2020						
ifp-0/0/29	Up	Down	Down	80:a2:35:ee:a8:1d	10G	Full
Mon Nov 16 11:24:09 GMT +0000 2020						
ifp-0/0/30	Up	Down	Down	80:a2:35:ee:a8:1e	10G	Full
Mon Nov 16 11:24:09 GMT +0000 2020						
ifp-0/0/31	Up	Down	Down	80:a2:35:ee:a8:1f	10G	Full
Mon Nov 16 11:24:09 GMT +0000 2020						
ifp-0/0/32	Up	Down	Down	80:a2:35:ee:a8:20	10G	Full
Mon Nov 16 11:24:09 GMT +0000 2020						
ifp-0/0/33	Up	Down	Down	80:a2:35:ee:a8:21	10G	Full
Mon Nov 16 11:24:09 GMT +0000 2020						
ifp-0/0/34	Up	Down	Down	80:a2:35:ee:a8:22	10G	Full
Mon Nov 16 11:24:09 GMT +0000 2020						
ifp-0/0/35	Up	Down	Down	80:a2:35:ee:a8:23	10G	Full
Mon Nov 16 11:24:09 GMT +0000 2020						
ifp-0/0/36	Up	Down	Down	80:a2:35:ee:a8:24	10G	Full
Mon Nov 16 11:24:09 GMT +0000 2020						
ifp-0/0/37	Up	Down	Down	80:a2:35:ee:a8:25	10G	Full
Mon Nov 16 11:24:09 GMT +0000 2020						
ifp-0/0/38	Up	Down	Down	80:a2:35:ee:a8:26	10G	Full
Mon Nov 16 11:24:09 GMT +0000 2020						
ifp-0/0/39	Up	Down	Down	80:a2:35:ee:a8:27	10G	Full
Mon Nov 16 11:24:09 GMT +0000 2020						
ifp-0/0/40	Up	Down	Down	80:a2:35:ee:a8:28	10G	Full
Mon Nov 16 11:24:09 GMT +0000 2020						
ifp-0/0/41	Up	Down	Down	80:a2:35:ee:a8:29	10G	Full
Mon Nov 16 11:24:09 GMT +0000 2020						
ifp-0/0/42	Up	Down	Down	80:a2:35:ee:a8:2a	10G	Full
Mon Nov 16 11:24:09 GMT +0000 2020						
ifp-0/0/43	Up	Down	Down	80:a2:35:ee:a8:2b	10G	Full
Mon Nov 16 11:24:09 GMT +0000 2020						
ifp-0/0/44	Up	Down	Down	80:a2:35:ee:a8:2c	10G	Full
Mon Nov 16 11:24:09 GMT +0000 2020						
ifp-0/0/45	Up	Down	Down	80:a2:35:ee:a8:2d	10G	Full
Mon Nov 16 11:24:09 GMT +0000 2020						
ifp-0/0/46	Up	Down	Down	80:a2:35:ee:a8:2e	10G	Full
Mon Nov 16 11:24:09 GMT +0000 2020						

```

ifp-0/0/47      Up      Down   Down   80:a2:35:ee:a8:2f  10G  Full
Mon Nov 16 11:24:09 GMT +0000 2020
ifp-0/0/48      Up      Down   Down   80:a2:35:ee:a8:30  10G  Full
Mon Nov 16 11:24:09 GMT +0000 2020
ifp-0/0/49      Up      Down   Down   80:a2:35:ee:a8:31  100G Full
Mon Nov 16 11:24:09 GMT +0000 2020
ifp-0/0/50      Up      Down   Down   80:a2:35:ee:a8:35  100G Full
Mon Nov 16 11:24:09 GMT +0000 2020
ifp-0/0/51      Up      Down   Down   80:a2:35:ee:a8:39  100G Full
Mon Nov 16 11:24:09 GMT +0000 2020
ifp-0/0/52      Up      Up      Up     80:a2:35:ee:a8:3d  100G Full
Tue Nov 17 14:10:46 GMT +0000 2020
ifp-0/0/53      Up      Up      Up     80:a2:35:ee:a8:41  100G Full
Fri Nov 20 00:59:12 GMT +0000 2020
ifp-0/0/54      Up      Down   Down   80:a2:35:ee:a8:45  100G Full
Mon Nov 16 11:24:09 GMT +0000 2020
cpu-0/0/200     Up      Up      Up     80:a2:35:ee:a8:c8  100G Full
Mon Nov 16 11:24:11 GMT +0000 2020
cpu-0/0/201     Up      Down   Down   80:a2:35:ee:a8:c9  100G Full
Mon Nov 16 11:24:09 GMT +0000 2020
cpu-0/0/202     Up      Down   Down   80:a2:35:ee:a8:ca  100G Full
Mon Nov 16 11:24:09 GMT +0000 2020
cpu-0/0/203     Up      Down   Down   80:a2:35:ee:a8:cb  100G Full
Mon Nov 16 11:24:09 GMT +0000 2020
recycle-0/0/75  Up      Up      Up     80:a2:35:ee:a8:4b  100G Full
Mon Nov 16 11:24:11 GMT +0000 2020
recycle-0/0/76  Up      Up      Up     80:a2:35:ee:a8:4c  100G Full
Mon Nov 16 11:24:11 GMT +0000 2020

```

#### Example 4: List of All Logical Interfaces for All Instances

```

supervisor@rtbrick>LEAF01: op> show interface logical
Interface          Instance          Admin  Link   Oper   Outer VLAN
Inner VLAN IPv4 Status,MTU  IPv6 Status,MTU
ifl-0/0/10/100    default          Up     Up     Up     -
-                Up,1500         Up,1500
ifl-0/0/10/200    default          Up     Up     Up     200
-                Up,1500         Up,1500
ifl-0/0/10/300    default          Up     Up     Up     300
-                Up,1500         Up,1500

```

#### Example 5: List of Logical Interfaces for an Instance

```

supervisor@rtbrick: op> show interface logical instance default
Interface          Instance          Admin  Link   Oper   Outer VLAN
Inner VLAN IPv4 Status,MTU  IPv6 Status,MTU
ifl-0/0/10/100    default          Up     Up     Up     -
-                Up,1500         Up,1500
ifl-0/0/10/200    default          Up     Up     Up     200
-                Up,1500         Up,1500
ifl-0/0/10/300    default          Up     Up     Up     300
-                Up,1500         Up,1500

```



## Example 6: List of All Interface Addresses

```
supervisor@rtbrick: op> show interface address
Interface          Instance          IPv4 Address          IPv4
Primary IPv6 Address
  if1-0/0/10/100    default          2.2.2.2/24           True
fe80::82a2:35ff:feee:a80a/128
  if1-0/0/10/200    default          3.3.3.2/24           True
fe80::c9:80a2:35ff:feee:a80a/128
  if1-0/0/10/300    default          -
fe80::12d:80a2:35ff:feee:a80a/128
```

### 3.1.2. Interface Details Commands

Syntax:

**show interface** <option> **detail**

Option	Description
detail	Without any additional option, displays detailed information for all interfaces.
<interface-name> detail	Displays detailed information for an interface.

Example 7: Detailed Information for a Physical Interface and Its Logical Interfaces

```

supervisor@rtbrick: op> show interface ifp-0/0/10 detail
Interface:ifp-0/0/52
Admin/Link/Operational status: Up/Up/Up
Speed configured: 100G
Speed maximum: 100G
Duplex: Full
Autonegotiation: Disabled
Encapsulation mode: ieee
MRU: 16360
MTU Profile: portMtu
Maximum frame size: 16360
Interface type: ethernet
Interface index: 124929
MAC: 80:a2:35:ee:a8:3d
Uptime: Tue Nov 17 14:10:46 GMT +0000 2020
Description: Physical interface #52 from node 0, chip 0
Packet statistics:
Rx packets: 16034 Tx packets: 17295
Rx bytes: 1602124 Tx bytes: 1711264
Interface:ifl-0/0/52/4, Instance:default
Admin/Link/Operational status: Up/Up/Up
IPv4/IPv6/MPLS Status: Up/Up/Up
IPv4/IPv6/MPLS MTU: 1500/1500/1500
Interface type: Logical Sub interface
Interface index: 106497
MAC: 80:a2:35:ee:a8:3d

IPv4 Address IPv6 Address
4.4.4.4/24 fe80::82a2:35ff:feee:a83d/128

Packet statistics:
Ingress forwarded packets: 16000
Ingress forwarded bytes: 1598656
Ingress drop Packets: 0
Ingress drop bytes: 0
Egress forwarded packets: 0
Egress forwarded bytes: 0
Egress drop packets: 0
Egress drop bytes: 0

```

## 3.2. MTU Profile Show Command

Syntax:

**show mtu profile** <option>

Option	Description
-	Without any additional option, displays detailed information for all MTU profiles.
profile-name <mtu-profile-name>	MTU Profile Name

### Example 8: Detailed Information About the MTU Profiles

```

supervisor@rtbrick>LEAF01: op> show mtu profile
Profile Name           Type           Size   Action
__default_pppoe__    pppoe         1492   drop
l3IpMtu                ipv4          1300   drop
l3Ipv6Mtu             ipv6          1300   drop
portMtu               physical      1300   drop
portM2                physical      1400   drop
portM5                physical      1430   drop
supervisor@rtbrick>LEAF01: op>
    
```

### Example 9: Display Information About the Specified MTU Profile

```

supervisor@rtbrick>LEAF01: op> show mtu profile profile-name l3IpMtu
Profile Name           Type           Size   Action
l3IpMtu                ipv4          1300   drop
supervisor@rtbrick>LEAF01: op>
    
```

## 3.2.1. Interface Statistics Commands

Syntax:

**show interface** <option> **statistics**

Option	Description
statistics	Without any additional option, displays statistics information for all interfaces.
<interface-name> statistics	Displays statistics information for an interface.

### Example 10: Statistics Information for a Physical Interface and Its Logical Interfaces

```

supervisor@rtbrick>LEAF01: op> show interface ifp-0/0/10 statistics
Interface:  ifp-0/0/10
  Counter           Direction  Unit      Rx      Rx Diff  Rx Rate
Tx      Tx Diff  Tx Rate
  IPv4      -          -          Packets  -        -        -
-          -          -          Bytes    -        -        -
  IPv6      -          -          Packets  -        -        -
-          -          -          Bytes    -        -        -
  MPLS      -          -          Packets  -        -        -
-          -          -          Bytes    -        -        -
    
```

```

-      Punt          -          -          Packets  -          -          -
-      -            -            -            Bytes   -          -          -
-      Miss         -          RX          Packets  -          -          -
-      -            -            -            Bytes   -          -          -
-      Drops        -          -          Packets  4995      -          -
-      -            -            -            Bytes   -          -          -
-      Error        -          RX          Packets  -          -          -
-      -            -            -            Bytes   -          -          -
-      Error        -          TX          Packets  47         -          -
-      -            -            -            Bytes   -          -          -
-      No Buff      -          RX          Packets  -          -          -
-      -            -            -            Bytes   -          -          -
-      Traffic Statistics -          -          Packets  4995      -          -
68492 -            -            -            Bytes   489510    -          -
5869876 -          -          -
-      Unicast Statistics -          -          Packets  -          -          -
-      -            -            -            Bytes   -          -          -
-      Broadcast Statistics -          -          Packets  -          -          -
-      -            -            -            Bytes   -          -          -
-      Multicast Statistics -          -          Packets  -          -          -
-      -            -            -            Bytes   -          -          -
-
Bcm Statistics:
inOctets:          511632
inUcastPkts:      0
inNonUcastPkts:  5016
inErrors:         0
inUnknownProtos: 0
outOctets:        6236484
outUcastPkts:    0
outNonUcastPkts: 68492
outErrors:        0
etherStatsDropEvents: 0
etherStatsMulticastPkts: 67718
etherStatsBroadcastPkts: 5790
etherStatsUndersizePkts: 0
etherStatsFragments: 0
etherStatsOversizePkts: 0
etherStatsOctets: 6748116

```

etherStatsPkts:	73508
etherStatsCollisions:	0
etherStatsTXNoErrors:	68492
etherStatsRXNoErrors:	5016
ifInMulticastPkts:	5016
ifOutBroadcastPkts:	5790
ifOutMulticastPkts:	62702
ifOutBroadcastPkts:	5790
bcmReceivedUndersizePkts:	0
bcmTransmittedUndersizePkts:	5790
bcmQmxDot1dBasePortDelayExceededDiscards:	0
bcmQmxDot1dBasePortMtuExceededDiscards:	0
bcmQmxDot1dTpPortInFrames:	5016
bcmQmxDot1dTpPortOutFrames:	68492
bcmQmxEtherStatsPkts64Octets:	5790
bcmQmxEtherStatsPkts128to255Octets:	24
bcmQmxEtherStatsPkts256to511Octets:	0
bcmQmxEtherStatsPkts512to1023Octets:	0
bcmQmxEtherStatsPkts1024to1518Octets:	0
bcmQmxEtherRxOversizePkts:	0
bcmQmxEtherTxOversizePkts:	0
bcmQmxEtherStatsJabbers:	0
bcmQmxEtherStatsCRCAAlignErrors:	0
bcmQmxDot3StatsFCSErrors:	0
bcmQmxDot3StatsSingleCollisionFrames:	0
bcmQmxDot3StatsMultipleCollisionFrames:	0
bcmQmxDot3StatsSQETTestErrors:	0
bcmQmxDot3StatsDeferredTransmissions:	0
bcmQmxDot3StatsLateCollisions:	0
bcmQmxDot3StatsExcessiveCollisions:	0
bcmQmxDot3StatsInternalMacTransmitErrors:	0
bcmQmxDot3StatsCarrierSenseErrors:	0
bcmQmxDot3StatsFrameTooLongs:	0
bcmQmxDot3StatsInternalMacReceiveErrors:	0
bcmQmxDot3StatsSymbolErrors:	0
bcmQmxDot3ControlInUnknownOpCodes:	0
bcmQmxDot3InPauseFrames:	0
bcmQmxDot3OutPauseFrames:	0
bcmQmxIfHCInOctets:	511632
bcmQmxIfHCInUcastPkts:	0
bcmQmxIfHCInMulticastPkts:	5016
bcmQmxIfHCInBroadcastPkts:	0
bcmQmxIfHCOutOctets:	6236484
bcmQmxIfHCOutUcastPkts:	0
bcmQmxIfHCOutMulticastPkts:	62702
bcmQmxIfHCOutBroadcastPkts:	5790
bcmQmxIeee8021PfcRequests:	0
bcmQmxIeee8021PfcIndications:	0
bcmQmxBcmEtherStatsPkts1519to1522Octets:	0
bcmQmxBcmEtherStatsPkts1522to2047Octets:	0
bcmQmxBcmReceivedPkts64Octets:	0
bcmQmxBcmReceivedPkts65to127Octets:	5016
bcmQmxBcmReceivedPkts128to255Octets:	0
bcmQmxBcmReceivedPkts256to511Octets:	0
bcmQmxBcmReceivedPkts512to1023Octets:	0
bcmQmxBcmReceivedPkts1024to1518Octets:	0
bcmQmxBcmReceivedPkts1519to2047Octets:	0
bcmQmxBcmTransmittedPkts64Octets:	5790

```

bcmQmxBcmTransmittedPkts65to127Octets: 62678
bcmQmxBcmTransmittedPkts128to255Octets: 24
bcmQmxBcmTransmittedPkts256to511Octets: 0
bcmQmxBcmTransmittedPkts512to1023Octets: 0
bcmQmxBcmTransmittedPkts1024to1518Octets: 0
bcmQmxBcmTransmittedPkts1519to2047Octets: 0
bcmQmxBcmTransmittedPkts2048to4095Octets: 0
bcmQmxBcmTransmittedPkts4095to9216Octets: 0

```

Logical Interface: ifl-0/0/10/100, Physical Interface: ifp-0/0/10			Counter	Direction	Unit	Rx	Rx Diff	Rx Rate
Tx	Tx Diff	Tx Rate						
			IPv4	-	Packets	-	-	-
-	-	-			Bytes	-	-	-
			IPv6	-	Packets	-	-	-
-	-	-			Bytes	-	-	-
			MPLS	-	Packets	-	-	-
-	-	-			Bytes	-	-	-
			Punt	-	Packets	-	-	-
-	-	-			Bytes	-	-	-
			Miss	RX	Packets	-	-	-
-	-	-			Bytes	-	-	-
			Drops	-	Packets	4995	-	-
-	-	-			Bytes	-	-	-
			Error	RX	Packets	-	-	-
-	-	-			Bytes	-	-	-
			Error	TX	Packets	47	-	-
-	-	-			Bytes	-	-	-
			No Buff	RX	Packets	-	-	-
-	-	-			Bytes	-	-	-
			Traffic Statistics	-	Packets	4995	-	-
68492	-	-			Bytes	489510	-	-
5869876	-	-	Unicast Statistics	-	Packets	-	-	-
-	-	-			Bytes	-	-	-
			Broadcast Statistics	-	Packets	-	-	-
-	-	-						

-	-	-	Bytes	-	-	-
-	Multicast Statistics	-	Packets	-	-	-
-	-	-	Bytes	-	-	-
-	Packet Statistics:					
	Ingress Forwarded Packets:	1810				
	Ingress Forwarded Bytes:	184620				
	Ingress Drop Packets:	1				
	Ingress Drop Bytes:	102				
	Egress Forwarded Packets:	0				
	Egress Forwarded Bytes:	0				
	Egress Drop Packets:	0				
	Egress Drop Bytes:	0				
Logical Interface:		ifl-0/0/10/200,	Physical Interface:		ifp-0/0/10	
Counter		Direction	Unit	Rx	Rx Diff	Rx Rate
Tx	Tx Diff	Tx Rate				
-	IPv4	-	Packets	-	-	-
-	-	-	Bytes	-	-	-
-	IPv6	-	Packets	-	-	-
-	-	-	Bytes	-	-	-
-	MPLS	-	Packets	-	-	-
-	-	-	Bytes	-	-	-
-	Punt	-	Packets	-	-	-
-	-	-	Bytes	-	-	-
-	Miss	RX	Packets	-	-	-
-	-	-	Bytes	-	-	-
-	Drops	-	Packets	-	-	-
-	-	-	Bytes	-	-	-
-	Error	RX	Packets	-	-	-
-	-	-	Bytes	-	-	-
-	Error	TX	Packets	-	-	-
-	-	-	Bytes	-	-	-
-	No Buff	RX	Packets	-	-	-
-	-	-	Bytes	-	-	-
-	Traffic Statistics	-	Packets	-	-	-
6811	-	-	Bytes	-	-	-
573170	-	-				

```

Unicast Statistics - Packets - - -
- - -
- - - Bytes - - -
- - -
Broadcast Statistics - Packets - - -
- - -
- - - Bytes - - -
- - -
Multicast Statistics - Packets - - -
- - -
- - - Bytes - - -
- - -

Packet Statistics:
  Ingress Forwarded Packets: 0
  Ingress Forwarded Bytes: 0
  Ingress Drop Packets: 0
  Ingress Drop Bytes: 0
  Egress Forwarded Packets: 0
  Egress Forwarded Bytes: 0
  Egress Drop Packets: 0
  Egress Drop Bytes: 0
Logical Interface: ifl-0/0/10/300, Physical Interface: ifp-0/0/10
  Counter          Direction  Unit      Rx      Rx Diff  Rx Rate
Tx      Tx Diff    Tx Rate
  IPv4            -          Packets  -       -        -
-          -          -          Bytes  -       -        -
-          -          -          Packets -       -        -
  IPv6            -          Bytes    -       -        -
-          -          -          Packets -       -        -
-          -          -          Bytes  -       -        -
  MPLS            -          Packets  -       -        -
-          -          -          Bytes  -       -        -
-          -          -          Packets -       -        -
  Punt            -          Packets  -       -        -
-          -          -          Bytes  -       -        -
-          -          -          Packets -       -        -
  Miss            RX          Packets  -       -        -
-          -          -          Bytes  -       -        -
-          -          -          Packets -       -        -
  Drops            -          Packets  -       -        -
-          -          -          Bytes  -       -        -
-          -          -          Packets -       -        -
  Error            RX          Packets  -       -        -
-          -          -          Bytes  -       -        -
-          -          -          Packets -       -        -
  Error            TX          Packets  -       -        -
-          -          -          Bytes  -       -        -
-          -          -          Packets -       -        -
  No Buff          RX          Packets  -       -        -
-          -          -

```



```

-                                     Bytes      -      -      -
  Traffic Statistics -      Packets      -      -      -
5902 -                                     Bytes      -      -      -
531180 -                                     Packets      -      -      -
  Unicast Statistics -      Bytes      -      -      -
-                                     Packets      -      -      -
  Broadcast Statistics -      Bytes      -      -      -
-                                     Packets      -      -      -
  Multicast Statistics -      Bytes      -      -      -
-                                     Packets      -      -      -
-                                     Bytes      -      -      -
  Packet Statistics:
  Ingress Forwarded Packets: 0
  Ingress Forwarded Bytes: 0
  Ingress Drop Packets: 0
  Ingress Drop Bytes: 0
  Egress Forwarded Packets: 0
  Egress Forwarded Bytes: 0
  Egress Drop Packets: 0
  Egress Drop Bytes: 0
supervisor@rtbrick>LEAF01: op>

```

### 3.3. Interface Clear Commands

Clear commands allow to reset operational states.

#### 3.3.1. Interface Statistics

This command clears interface counters.

Syntax:

**clear interface statistics** <option>

Option	Description
-	Without any additional option, the command clears the counters for all interfaces.
<interface-name>	Clears the counters for the given interface.