Chapter 10

Ethernet Ports

This chapter describes Ethernet ports supported by Arista switches. Sections covered in this chapter include:

- Section 10.1: Ethernet Ports Introduction
- Section 10.2: Ethernet Standards
- Section 10.3: Ethernet Physical Layer
- Section 10.4: Interfaces
- Section 10.5: Ethernet Configuration Procedures
- Section 10.6: Ethernet Configuration Commands

10.1 Ethernet Ports Introduction

Arista switches support a variety of Ethernet network interfaces. This chapter describes the configuration and monitoring options available in Arista switching platforms.

10.2 Ethernet Standards

Ethernet, standardized in IEEE 802.3, is a group of technologies used for communication over local area networks. Ethernet communication divides data streams into frames containing addresses (source and destination), payload, and cyclical redundancy check (CRC) information. IEEE 802.3 also describes two types of optical fiber: single-mode fiber (SMF) and multi-mode fiber (MMF).

- SMF is more expensive, but can be used over longer distances (over 300 meters).
- MMF is less expensive, but can only be used over distances of less than 300 meters.

10.2.1 100 Gigabit Ethernet

The 100 Gigabit Ethernet (100GbE) standard defines an Ethernet implementation with a nominal data rate of 100 billion bits per second over multiple 10 gigabit lanes. 100 Gigabit Ethernet implements full duplex point to point links connected by network switches. Arista switches support 100GBASE-10SR through MXP ports.
10.2.2 40 Gigabit Ethernet

The 40 Gigabit Ethernet (40GbE) standard defines an Ethernet implementation with a nominal data rate of 40 billion bits per second over multiple 10 gigabit lanes. 40 Gigabit Ethernet implements full duplex point to point links connected by network switches. 40 gigabit Ethernet standards are named 40GBASE-xyz, as interpreted by Table 10-1.

<table>
<thead>
<tr>
<th>x</th>
<th>y</th>
<th>z</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-fiber media type, or fiber wavelength</td>
<td>PHY encoding</td>
<td>Number of WWDM wavelengths or XAUI Lanes</td>
</tr>
<tr>
<td>C = Copper</td>
<td>R = LAN PHY (64B/66B)</td>
<td>No value = 1 (serial)</td>
</tr>
<tr>
<td>F = Serial SMF</td>
<td></td>
<td>4 = 4 WWDM wavelengths or XAUI Lanes</td>
</tr>
<tr>
<td>K = Backplane</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L = Long (1310 nm)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S = Short (850 nm)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

10.2.3 10 Gigabit Ethernet

The 10 Gigabit Ethernet (10GbE) standard defines an Ethernet implementation with a nominal data rate of 10 billion bits per second. 10 Gigabit Ethernet implements full duplex point to point links connected by network switches. Half duplex operation, hubs and CSMA/CD do not exist in 10GbE. The standard encompasses several PHY standards; a networking device may support different PHY types through pluggable PHY modules. 10GbE standards are named 10GBASE-xyz, as interpreted by Table 10-2.

<table>
<thead>
<tr>
<th>x</th>
<th>y</th>
<th>z</th>
</tr>
</thead>
<tbody>
<tr>
<td>media type or wavelength, if media type is fiber</td>
<td>PHY encoding type</td>
<td>Number of WWDM wavelengths or XAUI Lanes</td>
</tr>
<tr>
<td>C = Copper (twin axial)</td>
<td>R = LAN PHY (64B/66B)</td>
<td>If omitted, value = 1 (serial)</td>
</tr>
<tr>
<td>T = Twisted Pair</td>
<td>X = LAN PHY (8B/10B)</td>
<td>4 = 4 WWDM wavelengths or XAUI Lanes</td>
</tr>
<tr>
<td>S = Short (850 nm)</td>
<td>W = WAN PHY(*) (64B/66B)</td>
<td></td>
</tr>
<tr>
<td>L = Long (1310 nm)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E = Extended (1550 nm)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Z = Ultra extended (1550 nm)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

10.2.4 Gigabit Ethernet

The Gigabit Ethernet (GbE), defined by IEEE 802.3-2008, describes an Ethernet version with a nominal data rate of one billion bits per second. GbE cables and equipment are similar to those used in previous standards. While full-duplex links in switches is the typical implementation, the specification permits half-duplex links connected through hubs.

Gigabit Ethernet physical layer standards that Arista switches support include 1000BASE-X (optical fiber), 1000BASE-T (twisted pair cable), and 1000BASE-CX (balanced copper cable).

- 1000BASE-SX is a fiber optic standard that utilizes multi-mode fiber supporting 770 to 860 nm, near infrared (NIR) light wavelength to transmit data over distances ranging from 220 to 550 meters. 1000BASE-SX is typically used for intra-building links in large office buildings, co-location facilities and carrier neutral Internet exchanges.
- 1000BASE-LX is a fiber standard that utilizes a long wavelength laser (1,270–1,355 nm), with a RMS spectral width of 4 nm to transmit data up to 5 km. 1000BASE-LX can run on all common types of multi-mode fiber with a maximum segment length of 550 m.
• 1000BASE-T is a standard for gigabit Ethernet over copper wiring. Each 1000BASE-T network segment can be a maximum length of 100 meters.

10.2.5 10/100/1000 BASE-T

Arista switches provide 10/100/1000 BASE-T Mbps Ethernet out of band management ports. Auto-negotiation is enabled on these interfaces. Speed (10/100/1000), duplex (half/full), and flow control settings are available using the appropriate `speed forced` and `flowcontrol` commands.
10.3 Ethernet Physical Layer

The Ethernet physical layer (PHY) includes hardware components connecting a switch’s MAC layer to the transceiver, cable, and ultimately a peer link partner. Data exist in digital form at the MAC layer. On the line side of the PHY, data exist as analog signals: light blips on optical fiber or voltage pulses on copper cable. Signals may be distorted while in transit and recovery may require signal processing.

Ethernet physical layer components include a PHY and a transceiver.

10.3.1 PHYs

The PHY provides translation services between the MAC layer and transceiver. It also helps to establish links between the local MAC layer and peer devices by detecting and signaling fault conditions. The PHY line-side interface receives Ethernet frames from the link partner as analog waveforms. The PHY uses signal processing to recover the encoded bits, then sends them to the MAC layer.

PHY line-side interface components and their functions include:
- Physical Medium Attachment (PMA): Framing, octet synchronization, scrambling / descrambling.
- Physical Medium Dependent (PMD): Consists of the transceiver.
- Physical Coding Sublayer (PCS): Performs auto-negotiation and coding (8B/10B or 64B/66B).

The MAC sublayer of the PHY provides a logical connection between the MAC layer and the peer device by initializing, controlling, and managing the connection with the peer.

Ethernet frames transmitted by the switch are received by the PHY system-side interface as a sequence of digital bits. The PHY encodes them into a media-specific waveform for transmission through the line-side interface and transceiver to the link peer. This encoding may include signal processing, such as signal pre-distortion and forward error correction.

PHY system-side interface components and their functions include:
- 10 Gigabit Attachment Unit Interface (XAUI): Connects an Ethernet MAC to a 10 G PHY.
- Serial Gigabit Media Independent Attachment (SGMII): Connects an Ethernet MAC to a 1G PHY.

10.3.2 Transceivers

A transceiver connects the PHY to an external cable (optical fiber or twisted-pair copper) and through a physical connector (LC jack for fiber or RJ-45 jack for copper).

- Optical transceivers convert the PHY signal into light pulses that are sent through optical fiber.
- Copper transceivers connect the PHY to twisted-pair copper cabling.

Arista Small Form-Factor Pluggable (SFP+) and Quad Small Form Factor Pluggable (QSFP+) modules and cables provide high-density, low-power Ethernet connectivity over fiber and copper media. Arista offers transceivers that span data rates, media types, and transmission distances.

Arista 10 Gigabit Ethernet SFP+ Modules:
- 10GBASE-SR (Short Reach)
  - Link length maximum 300 meters over multi-mode fiber.
  - Optical interoperability with 10GBASE-SRL.
- 10GBASE-SRL (Short Reach Lite)
  - Link length maximum 100 meters over multi-mode fiber.
  - Optical interoperability with 10GBASE-SR.
• 10GBASE-LRL (Long Reach Lite)
  • Link length maximum 1 km over single-mode fiber.
  • Optical interoperability with 10GBASE-LR (1 km maximum).
• 10GBASE-LR (Long Reach)
  • Link length maximum 10 km over single-mode fiber.
  • Optical interoperability with 10GBASE-LRL (1 km maximum).
• 10GBASE-LRM (Long Reach Multimode)
  • Link length maximum 220 meters over multi-mode fiber (50 um and 62.5 um).
• 10GBASE-ER (Extended Reach)
  • Link length maximum 40 km over single-mode fiber.
• 10GBASE-ZR (Ultra-Extended Reach)
  • Link length maximum 80 km over single-mode fiber.
• 10GBASE-DWDM (Dense Wavelength Division Multiplexing)
  • Link length maximum 80 km over single-mode fiber (40 color options).
  • Tunable SFP+ Optics Module, Full C-Band 50 GHz ITU Grid, up to 80km over duplex SMF.

Arista 10 Gigabit Ethernet CR Cable Modules:
• 10GBASE-CR SFP+ to SFP+ Cables
  • Link lengths of 0.5, 1, 1.5, 2, 2.5, 3, 5 and 7 meters over twinax copper cable
  • Includes SFP+ connectors on both ends
• 4 x 10GbE QSFP+ to 4 x SFP+ twinax copper cables
  • Link lengths of 0.5, 1, 2, 3, and 5 meters over twinax copper cable

Arista 25 Gigabit Ethernet Modules:
• 25GBASE-CR SFP28 Cable
  • Capable of 10G/25G with link length of 1 to 5 meters
• AOC-S-S-25G SFP28 to SFP28 25GbE Active Optical Cable
  • Link length of 3 to 30 meters
• SFP-25G-SR SFP28 Optics Module
  • Link length up to 70m over OM3 MMF or 100m over OM4 MMF
• SFP-25G-LR SFP28 Optics Module
  • Link length up to 10 kilometers over duplex SMF

Arista 40 Gigabit Ethernet QSFP+ Cables and Optics:
• 40GBASE-SR4 QSFP+ Transceiver
  • Link length maximum 100 meters over parallel OM3 or 150 meters over OM4 MMF
  • Optical interoperability with 40GBASE-XSR4 (100/150 meter maximum)
• 40GBASE-XSR4 QSFP+ Transceiver
  • Link length maximum 300 meters over parallel OM3 or 450 meters over OM4 MMF
  • Optical interoperability with 40GBASE-SR4 (100/150 meter maximum)
• 40GBASE-LR4 QSFP+
  • Link length maximum 10 km over duplex single-mode fiber
• 40GBASE-CR4 QSFP+ to QSFP+ twinax copper cables
  • Link lengths of 1, 2, 3, 5 and 7 meters over twinax copper cable
• 40G-SRBD Bidirectional QSFP+ Optic
  • Link length maximum up to 100 meters over parallel OM3 or 150 meters over OM4 MMF
• 40G Univ QSFP+ Optic
  • Link length maximum up to 150 meters over duplex OM3/OM4 and 500 meters over duplex SMF
• 40GBASE-LRL QSFP+ Optic
  • Link length maximum up to 1 kilometer over duplex SMF
• 40GBASE-PLRL4 QSFP+ Optic
  • Link length maximum up to 1 kilometer over parallel SMF (4x10G LR up to 1 km)
• 40GBASE-PLR4 QSFP+ Optic
  • Link length maximum up to 1 kilometer over parallel SMF (4x10G LR up to 1 km)
• 40GBASE-ER QSFP+ Optic
  • Link length maximum up to 40 kilometers duplex SMF

Arista Gigabit Ethernet SFP Options:
• 1000BASE-SX (Short Haul)
  • Multi-mode fiber
  • Link length maximum 550 meter
• 1000BASE-LX (Long Haul)
  • Single-mode fiber
  • Link length maximum 10 km (single mode)
• 1000BASE-T (RJ-45 Copper)
  • Category 5 cabling
  • Full duplex 1000Mbps connectivity

Arista 100 Gigabit Ethernet QSFP Modules:
• 100GBASE-SR4 QSFP transceiver
  • Link length up to 70 meters over parallel OM3 or 100 meters over OM4 multi-mode fiber.
• 100GBASE-SWDM4 QSFP transceiver
  • Link length up to 70 meters over OM3 or 100 meters over OM4 duplex multi-mode fiber.
• 100GBASE-SRBD BIDI QSFP transceiver
  • Link length up to 70 meters over OM3 or 100 meters over OM4 duplex multi-mode fiber.
• 100GBASE-PSM4 40G/100G dual speed QSFP Optics Module
  • Link length up to 500 meters over parallel single-mode fiber.
• 100GBASE-CWDM4 40G/100G dual speed QSFP Optics Module
  • Link length up to 2 km over duplex single-mode fiber.
• 100GBASE-LRL4 QSFP Optics Module
  • Link length up to 2 km over duplex single-mode fiber.
• 100GBASE-LR4 QSFP Optics Module
  • Link length up to 10 km over duplex single-mode fiber.
Chapter 10: Ethernet Ports

10.3.2 Ethernet Physical Layer

- 100GBASE-ERL4 QSFP Optics Module
  - Link length up to 40 km over duplex single-mode fiber.
- 100G DWDM QSFP transceiver
  - Link length up to 80 km over single-mode fiber.
- 100GBASE-CR4 QSFP to QSFP Twinax Copper Cable
  - Link length of 1 to 5 meters
- 100GBASE-CR4 QSFP to 4 x 25GbE SFP Twinax Copper Cable
  - Link length of 1 to 5 meters

**Internal ports**

Several Arista switches include internal ports that connect directly to an external cable through an RJ-45 jack. Internal ports available on Arista switches include:

- 100/1000BASE-T (7048T-A)
- 100/1000/10GBASE-T (7050-T)

**AOC cables**

- AOC-Q-Q-100G QSFP 100GbE Active Optical Cable
  - Link length of 3 to 30 meters
- AOC-Q-Q-40G QSFP+ to QSFP+ 40GbE Active Optical Cable
  - Link length of 3 to 100 meters
- AOC-S-S-25G SFP28 to SFP28 25GbE Active Optical Cable
  - Link length of 3 to 30 meters

10.3.3 MXP Ports

MXP ports provide embedded optics that operate in one of three modes: 10GbE (12 ports), 40GbE (3 ports), and 100GbE (1 port). Each mode requires a specified cable is implemented through configuration commands. MXP ports utilize multi-mode fiber to provide support over 150 meters.

- 100GbE mode requires an MTP-24 to MTP-24 cable, which uses 20 of 24 fibers to carry 100Gbe across 10 send and 10 receive channels. When connecting two 100GbE MXP ports, the TX lanes must be crossed with the RX lanes.
- 40GbE mode requires an MTP cable that provides a split into three MTP-12 ends. The cable splits the MXP port into three MTP-12 ends, each compatible with standards based 40GBASE-SR4 ports over OM3 or OM4 fiber up to 100m or 150m.
- 10GbE mode requires an MTP cable that provides a split into 12x10G with LC connectors to adapt the MXP port into 12x10GbE. The cable splits the MXP port into twelve LC ends for using SR or SRL optics over multimode OM3/OM4 cables.
10.4 Interfaces

Arista switches provide two physical interface types that receive, process, and transmit Ethernet frames: Ethernet interfaces and Management interfaces.

Each Ethernet interface is assigned a 48-bit MAC address and communicates with other interfaces by exchanging data packets. Each packet contains the MAC address of its source and destination interface. Ethernet interfaces establish link level connections by exchanging packets. Interfaces do not typically accept packets with a destination address of a different interface.

Ethernet data packets are frames. A frame begins with preamble and start fields, followed by an Ethernet header that includes source and destination MAC addresses. The middle section contains payload data, including headers for other protocols carried in the frame. The frame ends with a 32-bit cyclic redundancy check (CRC) field that interfaces use to detect data corrupted during transmission.

10.4.1 Ethernet Interfaces

Ethernet speed and duplex configuration options depend on the media type of the interface:

- 40G QSFP+: Default operation is as four 10G ports. **Speed forced** command options support configuration as a single 40G port.
- 10GBASE-T: Mode is **autonegotiate** by default, offering 10G and 1G full duplex and 100M. Default setting is 10G. Half duplex and 10M are not supported. Adjustments may be made using **speed forced** commands.
- 10GBASE (SFP+): Port operates as a single 10G port. **Speed forced** commands do not affect configuration.
- 1000BASE-T (copper): Mode is **autonegotiate** by default, offering 1G full and 100M; default setting is 1G full. Autonegotiation that offers only 100M is available through **speed auto 100full** command. Half duplex and 10M are not supported.
- 100G CFP: Default operation is 100G. It cannot be split, and its speed cannot be changed.
- 100G MXP: Default operation is as a single 100G port on the 7500 and 7280 platforms, and as three 40G ports on the 7050 platform. On the 7500 and 7280 platforms, available speed/duplex settings are a single 100G port, three 40G ports, or twelve 10G ports. On the 7050 platform, available speed/duplex settings are three 40G ports or twelve 10G ports. Adjustments are made with **speed forced** commands.
- 100G QSFP100: Available speeds are transceiver-dependent. The QSFP100 transceiver supports a single 100G port, four 25G ports, or two 50G ports; the QSFP+ transceiver supports one 40G port or four 10G ports; the CWDM transceiver supports all five configurations. Adjustments are made using **speed forced** commands. **Note:** 7500 and 7280 families do not currently support 25G or 50G speeds.

For information relating to transceivers, please see Transceivers.

10.4.2 Subinterfaces

Subinterfaces divide a single ethernet or port channel interface into multiple logical L3 interfaces based on the 802.1q tag (VLAN ID) of incoming traffic. Subinterfaces are commonly used in the L2/L3 boundary device, but they can also be used to isolate traffic with 802.1q tags between L3 peers by assigning each subinterface to a different VRF.

While subinterfaces can be configured on a port channel interface (the virtual interface associated with a port channel), the following restrictions apply:

- An L3 interface with subinterfaces configured on it should not be made a member of a port channel.
- An interface that is a member of a port channel should not have subinterfaces configured on it.
• A subinterface cannot be made a member of a port channel.

Subinterfaces on multiple ports can be assigned the same VLAN ID, but there is no bridging between subinterfaces (or between subinterfaces and SVIs), and each subinterface is considered to be in a separate bridge domain.

The following features are supported on subinterfaces:
• Unicast and multicast routing
• BGP, OSPF, ISIS, PIM
• VRF
• VRRP
• SNMP
• Subinterface counters (on some platforms)
• VXLAN (on some platforms)
• MPLS (on some platforms)
• GRE (on some platforms)
• PBR (on some platforms)
• QoS (on some platforms)
• Inheriting QoS settings (trust mode and default DSCP) from the parent interface
• Inheriting MTU setting from parent interface

The following are not supported on subinterfaces:
• BFD
• ACL
• Per-subinterface MTU setting
• Per-subinterface SFLOW settings
• Per-subinterface mirroring settings

10.4.3 Agile Ports

Agile Ports are a feature of the 7150S Series that allows the user to configure adjacent blocks of 4 x SFP+ interfaces as a single 40G link. The set of interfaces that can be combined to form a higher speed port is restricted by the hardware configuration. Only interfaces that pass through a common PHY component can be combined. One interface within a combinable set is designated as the primary port. When the primary interface is configured as a higher speed port, all configuration statements are performed on that interface. All other interfaces in the set are subsumed and not individually configurable when the primary interface is configured as the higher speed port. This feature allows the 7150S-24 to behave as a 4x40G switch (using 16 SFP+) and the remaining SFP+ provide 8 x 10G ports. On the 7150S-52 this allows up to 13x 40G (all 52 ports grouped as 40G) and on the 7150S-64 Agile Ports allows the switch to be deployed with up to 16 native 40G interfaces - 4 are QSFP+ and the remaining 12 as 4xSFP+ groups.

Section 10.5.11 describes the configuration of agile ports.

10.4.4 Management Interfaces

The management interface is a layer 3 host port that is typically connected to a PC for performing out of band switch management tasks. Each switch has one or two management interfaces. Only one port is needed to manage the switch; the second port, when available, provides redundancy.
Management interfaces are 10/100/1000 BASE-T interfaces. By default, auto-negotiation is enabled on management interfaces. All combinations of speed 10/100/1000 and full or half duplex is enforceable on these interfaces through `speed` commands.

Management ports are enabled by default. The switch cannot route packets between management ports and network (Ethernet interface) ports because they are in separate routing domains. When the PC is multiple hops from the management port, packet exchanges through layer 3 devices between the management port and PC may require the enabling of routing protocols.

The Ethernet management ports are accessed remotely over a common network or locally through a directly connected PC. An IP address and static route to the default gateway must be configured to access the switch through a remote connection.

### 10.4.5 Tunable SFP

Tuning of DWDM 10G SFP+ transceivers (10GBASE-DWDM) includes:

- Tuning transceiver wavelength/frequency by channel number
- Showing wavelengths/frequencies for specified channels supported by the transceiver
- Showing current wavelength/frequency settings of the transceiver interface

For information relating to tuning the transceiver wavelength/frequency by channel number, refer to the command `transceiver channel`. To show the current wavelength/frequency settings for specified channels, refer to the command `show interfaces transceiver channels`. To show the current wavelength/frequency settings of an interface, refer to the command `show interfaces transceiver hardware`.
10.5 Ethernet Configuration Procedures

These sections describe Ethernet and Management interface configuration procedures:

- Section 10.5.1: Physical Interface Configuration Modes
- Section 10.5.2: Assigning a MAC Address to an Interface
- Section 10.5.3: Port Groups (QSFP+ and SFP+ Interface Selection)
- Section 10.5.4: Referencing Modular Ports
- Section 10.5.5: Referencing Multi-lane Ports
- Section 10.5.6: QSFP+ Ethernet Port Configuration
- Section 10.5.7: QSFP100 Ethernet Port Configuration
- Section 10.5.8: CFP2 Ethernet Port Configuration
- Section 10.5.9: MXP Ethernet Port Configuration
- Section 10.5.10: Port Speed Capabilities
- Section 10.5.11: Agile Ports
- Section 10.5.12: Subinterface Configuration
- Section 10.5.13: Autonegotiated Settings
- Section 10.5.14: Displaying Ethernet Port Properties
- Section 10.5.15: Configuring Ingress Traffic-Class Counters

10.5.1 Physical Interface Configuration Modes

The switch provides two configuration modes for modifying Ethernet parameters:

- Interface-Ethernet mode configures parameters for specified Ethernet interfaces.
- Interface-Management mode configures parameters for specified management Ethernet interfaces.

Physical interfaces cannot be created or removed.

Multiple interfaces can be simultaneously configured. Commands are available for configuring Ethernet specific, layer 2, layer 3, and application layer parameters. Commands that modify protocol specific settings in Ethernet configuration mode are listed in the protocol chapters.

- The `interface ethernet` command places the switch in Ethernet-interface configuration mode.
- The `interface management` command places the switch in management-interface configuration mode.

Examples

- This command places the switch in Ethernet-interface mode for Ethernet interfaces 5-7 and 10.

  ```
  switch(config)#interface ethernet 5-7,10
  switch(config-if-Et5-7,10)#
  ```

- This command places the switch in management-interface mode for management interface 1.

  ```
  switch(config)#interface management 1
  switch(config-if-Ma1)#
  ```
10.5.2 Assigning a MAC Address to an Interface

Ethernet and Management interfaces are assigned a MAC address when manufactured. This address is the *burn-in address*. The `mac-address` command assigns a MAC address to the configuration mode interface in place of the burn-in address. The `no mac-address` command reverts the interface’s current MAC address to its burn-in address.

**Examples**

- This command assigns the MAC address of `001c.2804.17e1` to Ethernet interface 7.
  ```
  switch(config-if-Et7)#mac-address 001c.2804.17e1
  ```

- This command displays the MAC address of Ethernet interface 7. The active MAC address is `001c.2804.17e1`. The burn-in address is `001c.7312.02e2`.
  ```
  switch(config-if-Et7)#show interface ethernet 7
  Ethernet7 is up, line protocol is up (connected)
  Hardware is Ethernet, address is 001c.2804.17e1 (bia 001c.7312.02e2)
  Description: b.e45
  <--------OUTPUT OMITTED FROM EXAMPLE-------->
  ```

10.5.3 Port Groups (QSFP+ and SFP+ Interface Selection)

Several of Arista’s fixed switches limit the number of 10G data lanes in operation through the use of port groups. A port group is a set of interfaces that can be configured as four SFP+ interfaces or a single QSFP+ interface. When configured in SFP+ mode, the port group enables 4 standalone 10GbE interfaces using SFP+ optics. When configured in QSFP+ mode, the port group enables a single QSFP+ interface (in addition to the dedicated QSFP+ ports), which can operate as a single 40GbE port, or as four 10GbE ports with the appropriate breakout cabling.

Hardware port groups are used on the following systems:

- DCS-7050Q-16
- DCS-7050QX-32S

Use the `hardware port-group` command to select the interface mode for the specified port group.

**Important!** The `hardware port-group` command restarts the forwarding agent, which disrupts traffic on all switch ports.

**Example**

- These commands configure the DCS-7050-Q16 switch to enable four SFP+ interfaces and one extra QSFP+ interface by enabling the SFP+ interfaces in port group 1 and the QSFP+ interface in port group 2.
  ```
  switch(config)#hardware port-group 1 select Et17-20
  switch(config)#hardware port-group 2 select Et16/1-4
  ```

The `show hardware port-group` command displays the status of ports in the port groups.
Example

- This command displays the status of the flexible ports within the two port groups on a DCS-7050Q-16 switch.

  \[ \text{switch} \# \text{show hardware port-group} \]

  Portgroup: 1  Active Ports: Et17-20
  Port           State
  ------------------------------------------
  Ethernet17     Active
  Ethernet18     Active
  Ethernet19     Active
  Ethernet20     Active
  Ethernet15/1   ErrDisabled
  Ethernet15/2   ErrDisabled
  Ethernet15/3   ErrDisabled
  Ethernet15/4   ErrDisabled

  Portgroup: 2  Active Ports: Et16/1-4
  Port           State
  ------------------------------------------
  Ethernet16/1   Active
  Ethernet16/2   Active
  Ethernet16/3   Active
  Ethernet16/4   Active
  Ethernet21     ErrDisabled
  Ethernet22     ErrDisabled
  Ethernet23     ErrDisabled
  Ethernet24     ErrDisabled

10.5.3.1 DCS-7050Q-16

The DCS-7050Q-16 has 14 dedicated QSFP+ ports, plus two port groups. The port groups support either two additional QSFP+ ports or eight SFP+ ports as shown in Table 10-3.

Table 10-3 DCS-7050Q-16 Port Groups

<table>
<thead>
<tr>
<th>Port Group 1</th>
<th>Port Group 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active Interface(s)</td>
<td>Active Interface(s)</td>
</tr>
<tr>
<td>In QSFP+ Mode (Default)</td>
<td>In QSFP+ Mode (Default)</td>
</tr>
<tr>
<td>Et17-20</td>
<td>Et15/1-4</td>
</tr>
<tr>
<td>(four SFP+ ports)</td>
<td>(one QSFP+ port)</td>
</tr>
</tbody>
</table>

10.5.3.2 DCS-7050QX-32S

The DCS-7050QX-32S has 31 dedicated QSFP+ ports, plus one port group. The port group supports either one additional QSFP+ port or four SFP+ ports as shown in Table 10-4.
10.5.4 Referencing Modular Ports

Arista modular switches provide port access through installed line cards. The maximum number of line cards on a modular switch varies with the switch series and model.

Several CLI commands modify modular parameters for all ports on a specified line card or controlled by a specified chip. This manual uses these conventions to reference modular components:

- `card_x` refers to a line card.
- `module_y` refers to a QSFP+ module.
- `port_z` refers to a line card or module port.

Commands that display Ethernet port status use the following conventions:

- SFP ports: `card_x/port_z` to label the line card-port location of modular ports
- QSFP ports: `card_x/module_y/port_z` to label the line card-port location of modular ports

Section 10.5.6 describe QSFP+ module usage.

Example

- This command displays the status of interfaces 1 to 9 on line card 4:

```
switch> show interface ethernet 4/1-9 status
Port Name Status Vlan Duplex Speed Type
Et4/1 connected 1 full 10G Not Present
Et4/2 connected 1 full 10G Not Present
Et4/3 connected 1 full 10G Not Present
Et4/4 connected 1 full 10G Not Present
Et4/5 connected 1 full 10G Not Present
Et4/6 connected 1 full 10G Not Present
Et4/7 connected 1 full 10G Not Present
Et4/8 connected 1 full 10G Not Present
Et4/9 connected 1 full 10G Not Present
switch>
```

10.5.5 Referencing Multi-lane Ports

EOS supports two types of Ethernet ports:

- single-lane (also called fixed-lane)
- multi-lane (also called flexible-lane)

**Single-lane** (or “fixed-lane”) ports are always modeled as a single interface within EOS. While the speed of the interface may be configurable, the physical port can never be broken out into multiple lower-speed interfaces. Single-lane ports use the following naming scheme:

- Ethernet <port #> (for fixed switches)
- Ethernet <module #>/<port #> (for modular switches)
Multi-lane (or “flexible lane”) ports are made up of multiple parallel lanes, each served by its own laser. Multi-lane ports can be configured to combine the lanes and operate as a single native high-speed interface (a 40GbE or 100GbE interface), or to operate each lower-speed interface independently (four 10GbE or 25GbE interfaces). Multi-lane ports use the following naming scheme:

- Ethernet <port #>/<lane #> (for fixed switches)
- Ethernet <module #>/<port #>/<lane #> (for modular switches)

The operational state displayed for each lane of a multi-lane port is determined by the configuration applied to the primary lane(s), as shown in Table 10-5. When broken out into multiple lower-speed interfaces, all lanes will be active in parallel, and each will display its operational state as connected or not connected. In high-speed mode, only the primary lane(s) will be displayed as active, with the remaining lanes showing as errdisabled. The exception is the CFP2 module: when it is configured as a single 100GbE port, the primary lane is displayed as active in the CLI while the other lanes are hidden.

### Table 10-5 Lane States

<table>
<thead>
<tr>
<th>Parent Port Configured Mode</th>
<th>Primary Lane(s)</th>
<th>Secondary Lanes</th>
</tr>
</thead>
<tbody>
<tr>
<td>single high-speed interface</td>
<td>active</td>
<td>inactive</td>
</tr>
<tr>
<td>multi-interface</td>
<td>active</td>
<td>active</td>
</tr>
<tr>
<td>breakout</td>
<td>active</td>
<td>connected/not connected</td>
</tr>
</tbody>
</table>

A multi-lane port is configured as a single high-speed interface or multiple breakout interfaces by using the `speed` command on the primary lane(s) of the port. For specific configuration instructions and details regarding the primary lane(s) of a specific interface, refer to the configuration section for the appropriate interface type:

- QSFP+ Ethernet Port Configuration
- QSFP100 Ethernet Port Configuration
- CFP2 Ethernet Port Configuration
- MXP Ethernet Port Configuration

**Important!** Use of the `speed` command to configure a multi-lane port is hitless on the 7050X, 7060X, 7250X, 7260X, 7280SE, 7300X, 7320X and 7500E series platforms. On all other platforms, this command restarts the forwarding agent, which will result in traffic disruption. On 7160 series platforms, use of the `speed` command is hitless, but if the command changes the number of port lanes, packets may be dropped on unrelated ports.

### 10.5.6 QSFP+ Ethernet Port Configuration

Each QSFP+ module contains four data lanes which can be used individually or combined to form a single, higher-speed interface. This allows a QSFP+ Ethernet port to be configured as a single 40GbE interface or as four 10GbE interfaces.

When the four lanes are combined to form a 40GbE interface, display commands will show lane /1 as connected or not connected, and will show lanes /2 through /4 as errdisabled.

The following sections describe the configuration of QSFP+ ports.
10.5.6.1 Configuring a QSFP+ Module as a Single 40GbE Interface

To configure the port as a single 40GbE interface, combine the module’s four data lanes by using the `speed` command (`speed forced 40g full`) on the port’s /1 lane (the primary lane).

**Important!** Use of the `speed` command to configure a multi-lane port is hitless on the 7050X, 7060X, 7250X, 7260X, 7280SE, 7300X, 7320X and 7500E series platforms. On all other platforms, this command restarts the forwarding agent, which will result in traffic disruption. On 7160 series platforms, use of the `speed` command is hitless, but if the command changes the number of port lanes, packets may be dropped on unrelated ports.

**Step 1** Enter interface Ethernet configuration mode for lane /1 of the QSFP+ Ethernet interface.

```
switch(config)#interface ethernet 5/1/1
```

**Step 2** Enter the `speed forced 40gfull` command. Depending on the platform, this command may restart the forwarding agent, disrupting traffic on all ports for 60 seconds or more.

```
switch(config-if-Et5/1/1)#speed forced 40gfull
```

**Step 3** Use the `show interfaces status` command to confirm the change in configuration.

```
switch(config-if-Et5/1/1)#show interfaces status
```

<table>
<thead>
<tr>
<th>Port</th>
<th>Name</th>
<th>Status</th>
<th>Vlan</th>
<th>Duplex</th>
<th>Speed</th>
<th>Type</th>
<th>Flags</th>
</tr>
</thead>
<tbody>
<tr>
<td>Et1</td>
<td></td>
<td>connected</td>
<td>2</td>
<td>full</td>
<td>1G</td>
<td>10GBASE-T</td>
<td></td>
</tr>
<tr>
<td>Et5/1/1</td>
<td>connected</td>
<td>1</td>
<td>full</td>
<td>40G</td>
<td>40GBASE-SR4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Et5/1/2</td>
<td>errdisabled</td>
<td>1</td>
<td>unconf</td>
<td>unconf</td>
<td>40GBASE-SR4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Et5/1/3</td>
<td>errdisabled</td>
<td>1</td>
<td>unconf</td>
<td>unconf</td>
<td>40GBASE-SR4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Et5/1/4</td>
<td>errdisabled</td>
<td>1</td>
<td>unconf</td>
<td>unconf</td>
<td>40GBASE-SR4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

10.5.6.2 Configuring a QSFP+ Module as Four 10GbE Interfaces

To configure the port as four 10GbE interfaces, use the `speed` command (`speed forced 10000full`) on the port’s /1 lane (the primary lane).

**Important!** Use of the `speed` command to configure a multi-lane port is hitless on the 7050X, 7060X, 7250X, 7260X, 7280SE, 7300X, 7320X and 7500E series platforms. On all other platforms, this command restarts the forwarding agent, which will result in traffic disruption. On 7160 series platforms, use of the `speed` command is hitless, but if the command changes the number of port lanes, packets may be dropped on unrelated ports.

**Step 1** Enter interface Ethernet configuration mode for lane /1 of the QSFP+ Ethernet interface.

```
switch(config)#interface ethernet 5/1/1
```

**Step 2** Enter the `speed forced 10000full` command. Depending on the platform, this command may restart the forwarding agent, disrupting traffic on all ports for 60 seconds or more.

```
switch(config-if-Et5/1/1)#speed forced 10000full
```
Step 3  Use the `show interfaces status` command to confirm the change in configuration.

```
switch(config-if-Et5/1/1)# show interfaces status
Port       Name           Status       Vlan     Duplex Speed  Type         Flags
Et1                       connected    2        full   1G     10GBASE-T
Et5/1/1                   connected    1        full   10G    100GBASE-SR4
Et5/1/2                   connected    1        full   10G    100GBASE-SR4
Et5/1/3                   connected    1        full   10G    100GBASE-SR4
Et5/1/4                   connected    1        full   10G    100GBASE-SR4
```

10.5.7  QSFP100 Ethernet Port Configuration

Each QSFP100 module contains four data lanes which can be used individually or combined to form a single, higher-speed interface. This allows a QSFP100 Ethernet port to be configured as a single 100GbE interface, a single 40GbE interface, or four 10GbE interfaces. The default mode is a single 100GbE interface.

The 7060X, 7260X and 7320X platforms also allow a QSFP100 port to be configured as two 50GbE interfaces or four 25GbE interfaces.

When the lanes are combined to form a higher-speed interface, display commands will show the primary lane(s) as `connected` or `not connected`, and will show the other lanes as `errdisabled`.

The following sections describe the configuration of QSFP+ ports.

10.5.7.1  Configuring a QSFP100 Module as a Single 100GbE Interface

By default, the QSFP100 module operates as a single 100GbE interface; using the `default speed` or `no speed` command on the primary lane restores the default behavior.

To explicitly configure the port as a single 100GbE interface, combine the module’s four data lanes by using the `speed` command (`speed forced 100gfull`) on the port’s /1 lane (the primary lane).

**Important!** Use of the `speed` command to configure a multi-lane port is hitless on the 7050X, 7060X, 7250X, 7260X, 7280SE, 7300X, 7320X and 7500E series platforms. On all other platforms, this command restarts the forwarding agent, which will result in traffic disruption. On 7160 series platforms, use of the `speed` command is hitless, but if the command changes the number of port lanes, packets may be dropped on unrelated ports.

**Step 1**  Enter interface Ethernet configuration mode for lane /1 of the QSFP100 Ethernet interface.

```
switch(config)# interface ethernet 5/1/1
```

**Step 2**  Enter the `speed forced 100gfull` command. Depending on the platform, this command may restart the forwarding agent, disrupting traffic on all ports for 60 seconds or more.

```
switch(config-if-Et5/1/1)# speed forced 100gfull
```

**Step 3**  Use the `show interfaces status` command to confirm the change in configuration.

```
switch(config-if-Et5/1/1)# show interfaces status
Port       Name           Status       Vlan     Duplex Speed  Type         Flags
Et1                       connected    2        full   1G     10GBASE-T
Et5/1/1                   connected    1        full   100G  100GBASE-SR4
Et5/1/2                   errdisabled  1        unconf unconf 100GBASE-SR4
Et5/1/3                   errdisabled  1        unconf unconf 100GBASE-SR4
Et5/1/4                   errdisabled  1        unconf unconf 100GBASE-SR4
```
10.5.7.2 Configuring a QSFP100 Module as Two 50GbE Interfaces

To configure the port as a two 50GbE interfaces, configure the module’s four data lanes by using the `speed` command (`speed forced 50gfull`) on the port’s /1 and /3 lanes. This configuration is available on 7060X, 7260X and 7320X platforms.

**Important!** Use of the `speed` command to configure a multi-lane port is hitless on the 7050X, 7060X, 7250X, 7260X, 7280SE, 7300X, 7320X and 7500E series platforms. On all other platforms, this command restarts the forwarding agent, which will result in traffic disruption. On 7160 series platforms, use of the `speed` command is hitless, but if the command changes the number of port lanes, packets may be dropped on unrelated ports.

**Step 1** Enter interface Ethernet configuration mode for lane /1 of the QSFP100 Ethernet interface.

```
switch(config)#interface ethernet 5/1/1
```

**Step 2** Enter the `speed forced 50gfull` command. Depending on the platform, this command may restart the forwarding agent, disrupting traffic on all ports for 60 seconds or more.

```
switch(config-if-Et5/1/1)#speed forced 50gfull
```

**Step 3** Repeat the above steps for lane /3.

```
switch(config-if-Et5/1/1)#interface ethernet 5/1/3
switch(config-if-Et5/1/3)#speed forced 50gfull
```

**Step 4** Use the `show interfaces status` command to confirm the change in configuration.

```
switch(config-if-Et5/1/1)#show interfaces status
```

<table>
<thead>
<tr>
<th>Port</th>
<th>Name</th>
<th>Status</th>
<th>Vlan</th>
<th>Duplex</th>
<th>Speed</th>
<th>Type</th>
<th>Flags</th>
</tr>
</thead>
<tbody>
<tr>
<td>Et1</td>
<td></td>
<td>connected</td>
<td>2</td>
<td>full</td>
<td>1G</td>
<td>10GBASE-T</td>
<td></td>
</tr>
<tr>
<td>Et5/1/1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Et5/1/2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Et5/1/3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Et5/1/4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**10.5.7.3 Configuring a QSFP100 Module as a Single 40GbE Interface**

To configure the port as a single 40GbE interface, combine the module’s four data lanes by using the `speed` command (`speed forced 40gfull`) on the port’s /1 lane (the primary lane).

**Important!** Use of the `speed` command to configure a multi-lane port is hitless on the 7050X, 7060X, 7250X, 7260X, 7280SE, 7300X, 7320X and 7500E series platforms. On all other platforms, this command restarts the forwarding agent, which will result in traffic disruption. On 7160 series platforms, use of the `speed` command is hitless, but if the command changes the number of port lanes, packets may be dropped on unrelated ports.

**Step 1** Enter interface Ethernet configuration mode for lane /1 of the QSFP100 Ethernet interface.

```
switch(config)#interface ethernet 5/1/1
```

**Step 2** Enter the `speed forced 40gfull` command. Depending on the platform, this command may restart the forwarding agent, disrupting traffic on all ports for 60 seconds or more.

```
switch(config-if-Et5/1/1)#speed forced 40gfull
```
Step 3 Use the `show interfaces status` command to confirm the change in configuration.

```
switch(config-if-Et5/1/1)#show interfaces status
Port       Name           Status       Vlan     Duplex Speed  Type         Flags
Et1                       connected    2        full   1G     10GBASE-T
Et5/1/1                   connected    1        full   40G    100GBASE-SR4
Et5/1/2                   errdisabled  1        unconf unconf 100GBASE-SR4
Et5/1/3                   errdisabled  1        unconf unconf 100GBASE-SR4
Et5/1/4                   errdisabled  1        unconf unconf 100GBASE-SR4
```

10.5.7.4 Configuring a QSFP100 Module as Four 25GbE Interfaces

To configure the port as four 25GbE interfaces, use the `speed` command (`speed forced 25gfull`) on the port’s /1 lane (the primary lane). This configuration is available on 7060X, 7260X and 7320X platforms.

**Important!** Use of the `speed` command to configure a multi-lane port is hitless on the 7050X, 7060X, 7250X, 7260X, 7280SE, 7300X, 7320X and 7500E series platforms. On all other platforms, this command restarts the forwarding agent, which will result in traffic disruption. On 7160 series platforms, use of the `speed` command is hitless, but if the command changes the number of port lanes, packets may be dropped on unrelated ports.

**Step 1** Enter interface Ethernet configuration mode for lane /1 of the QSFP100 Ethernet interface.

```
switch(config)#interface ethernet 5/1/1
```

**Step 2** Enter the `speed forced 25gfull` command. Depending on the platform, this command may restart the forwarding agent, disrupting traffic on all ports for 60 seconds or more.

```
switch(config-if-Et5/1/1)#speed forced 25gfull
```

**Step 3** Use the `show interfaces status` command to confirm the change in configuration.

```
switch(config-if-Et5/1/1)#show interfaces status
Port       Name           Status       Vlan     Duplex Speed  Type         Flags
Et1                       connected    2        full   1G     10GBASE-T
Et5/1/1                   connected    1        full   25G    100GBASE-SR4
Et5/1/2                   errdisabled  1        unconf unconf 100GBASE-SR4
Et5/1/3                   errdisabled  1        unconf unconf 100GBASE-SR4
Et5/1/4                   errdisabled  1        unconf unconf 100GBASE-SR4
```

10.5.7.5 Configuring a QSFP100 Module as Four 10GbE Interfaces

To configure the port as four 10GbE interfaces, use the `speed` command (`speed forced 10000full`) on the port’s /1 lane (the primary lane).

**Important!** Use of the `speed` command to configure a multi-lane port is hitless on the 7050X, 7060X, 7250X, 7260X, 7280SE, 7300X, 7320X and 7500E series platforms. On all other platforms, this command restarts the forwarding agent, which will result in traffic disruption. On 7160 series platforms, use of the `speed` command is hitless, but if the command changes the number of port lanes, packets may be dropped on unrelated ports.

**Step 1** Enter interface Ethernet configuration mode for lane /1 of the QSFP100 Ethernet interface.

```
switch(config)#interface ethernet 5/1/1
```
Step 2 Enter the speed forced 10000full command. Depending on the platform, this command may restart the forwarding agent, disrupting traffic on all ports for 60 seconds or more.

```
switch(config-if-Et5/1/1)#speed forced 10000full
```

Step 3 Use the show interfaces status command to confirm the change in configuration.

```
switch(config-if-Et5/1/1)#show interfaces status
Port       Name           Status       Vlan     Duplex Speed  Type         Flags
Et1                       connected    2        full   1G     10GBASE-T
<--------OUTPUT OMITTED FROM EXAMPLE-------->
Et5/1/1                   connected    1        full   10G    100GBASE-SR4
Et5/1/2                   connected    1        full   10G    100GBASE-SR4
Et5/1/3                   connected    1        full   10G    100GBASE-SR4
Et5/1/4                   connected    1        full   10G    100GBASE-SR4
<--------OUTPUT OMITTED FROM EXAMPLE-------->
```

10.5.8 CFP2 Ethernet Port Configuration

Each CFP2 module contains ten data lanes. The configuration options available on the port depend on the optic inserted:

- **CFP2-100G-LR4** optics operate only in 100GbE mode.
- **CF2-100G-ER4** optics operate only 100GbE mode.
- **CFP2-100G-XSR10** optics can be configured as a single 100GbE interface or as ten 10GbE interfaces.

When the port is configured as ten 10GbE interface, each lane is active and visible in CLI display commands. When the lanes are combined to form a single 100GbE interface, display commands will show the primary lane as connected or not connected; all other lanes will be hidden.

The following sections describe the configuration of CFP2 ports.

10.5.8.1 Configuring a CFP2 Module as a Single100GbE Interface

To configure the port as a single 100GbE interface (the default configuration), combine the module’s ten data lanes by using the speed command (speed forced 100gfull) on the port’s /1 lane (the primary lane).

This configuration is available for all pluggable optics.

Important! Use of the speed command to configure a multi-lane port is hitless on the 7050X, 7060X, 7250X, 7260X, 7280SE, 7300X, 7320X and 7500E series platforms. On all other platforms, this command restarts the forwarding agent, which will result in traffic disruption. On 7160 series platforms, use of the speed command is hitless, but if the command changes the number of port lanes, packets may be dropped on unrelated ports.

```
Step 1 Enter interface Ethernet configuration mode for lane /1 of the CFP2 Ethernet interface.

```

```
switch(config)#interface ethernet 5/1/1
```

Step 2 Enter the speed forced 100gfull command. Depending on the platform, this command may restart the forwarding agent, disrupting traffic on all ports for 60 seconds or more.

```
switch(config-if-Et5/1/1)#speed forced 100gfull
```
Step 3 Use the `show interfaces status` command to confirm the change in configuration.

```
switch(config-if-Et5/1/1)#show interfaces status
```

<table>
<thead>
<tr>
<th>Port</th>
<th>Name</th>
<th>Status</th>
<th>Vlan</th>
<th>Duplex</th>
<th>Speed</th>
<th>Type</th>
<th>Flags</th>
</tr>
</thead>
<tbody>
<tr>
<td>Et1</td>
<td></td>
<td>connected</td>
<td>2</td>
<td>full</td>
<td>1G</td>
<td>10GBASE-T</td>
<td></td>
</tr>
<tr>
<td>Et5/1/1</td>
<td></td>
<td>connected</td>
<td>1</td>
<td>full</td>
<td>10G</td>
<td>100GBASE-SR1</td>
<td></td>
</tr>
<tr>
<td>Et5/2/1</td>
<td></td>
<td>connected</td>
<td>1</td>
<td>full</td>
<td>10G</td>
<td>100GBASE-SR1</td>
<td></td>
</tr>
</tbody>
</table>

10.5.8.2 Configuring a CFP2 Module as Ten 10GbE Interfaces

To configure the port as four 10GbE interfaces, use the `speed` command (`speed forced 10000full`) on the port's /1 lane (the primary lane).

This configuration is available only for CFP2-100G-XSR10 optics.

**Important!** Use of the `speed` command to configure a multi-lane port is hitless on the 7050X, 7060X, 7250X, 7260X, 7280SE, 7300X, 7320X and 7500E series platforms. On all other platforms, this command restarts the forwarding agent, which will result in traffic disruption. On 7160 series platforms, use of the `speed` command is hitless, but if the command changes the number of port lanes, packets may be dropped on unrelated ports.

Step 1 Enter interface Ethernet configuration mode for lane /1 of the CFP2 Ethernet interface.

```
switch(config)#interface ethernet 5/1/1
```

Step 2 Enter the `speed forced 10000full` command. Depending on the platform, this command may restart the forwarding agent, disrupting traffic on all ports for 60 seconds or more.

```
switch(config-if-Et5/1/1)#speed forced 10000full
```

Step 3 Use the `show interfaces status` command to confirm the change in configuration.

```
switch(config-if-Et5/1/1)#show interfaces status
```

<table>
<thead>
<tr>
<th>Port</th>
<th>Name</th>
<th>Status</th>
<th>Vlan</th>
<th>Duplex</th>
<th>Speed</th>
<th>Type</th>
<th>Flags</th>
</tr>
</thead>
<tbody>
<tr>
<td>Et5/1/1</td>
<td></td>
<td>connected</td>
<td>1</td>
<td>full</td>
<td>10G</td>
<td>100GBASE-SR1</td>
<td></td>
</tr>
<tr>
<td>Et5/1/2</td>
<td></td>
<td>connected</td>
<td>1</td>
<td>full</td>
<td>10G</td>
<td>100GBASE-SR1</td>
<td></td>
</tr>
<tr>
<td>Et5/1/3</td>
<td></td>
<td>connected</td>
<td>1</td>
<td>full</td>
<td>10G</td>
<td>100GBASE-SR1</td>
<td></td>
</tr>
<tr>
<td>Et5/1/4</td>
<td></td>
<td>connected</td>
<td>1</td>
<td>full</td>
<td>10G</td>
<td>100GBASE-SR1</td>
<td></td>
</tr>
<tr>
<td>Et5/1/5</td>
<td></td>
<td>connected</td>
<td>1</td>
<td>full</td>
<td>10G</td>
<td>100GBASE-SR1</td>
<td></td>
</tr>
<tr>
<td>Et5/1/6</td>
<td></td>
<td>connected</td>
<td>1</td>
<td>full</td>
<td>10G</td>
<td>100GBASE-SR1</td>
<td></td>
</tr>
<tr>
<td>Et5/1/7</td>
<td></td>
<td>connected</td>
<td>1</td>
<td>full</td>
<td>10G</td>
<td>100GBASE-SR1</td>
<td></td>
</tr>
<tr>
<td>Et5/1/8</td>
<td></td>
<td>connected</td>
<td>1</td>
<td>full</td>
<td>10G</td>
<td>100GBASE-SR1</td>
<td></td>
</tr>
<tr>
<td>Et5/1/9</td>
<td></td>
<td>connected</td>
<td>1</td>
<td>full</td>
<td>10G</td>
<td>100GBASE-SR1</td>
<td></td>
</tr>
<tr>
<td>Et5/1/10</td>
<td></td>
<td>connected</td>
<td>1</td>
<td>full</td>
<td>10G</td>
<td>100GBASE-SR1</td>
<td></td>
</tr>
</tbody>
</table>

10.5.9 MXP Ethernet Port Configuration

Each MXP module contains twelve data lanes which can be used individually or combined to form one or more higher-speed interfaces. This allows an MXP Ethernet port to be configured as a single 100GbE interface, up to twelve 10GbE interfaces, or a mixture of 40GbE and 10GbE ports.

MXP ports do not use pluggable optics: instead, an MTP-24 ribbon is inserted directly into the port. The remote end of the MTP 24 ribbon must then be broken out using a splitter cable or cartridge based on the operational mode and speed of the MXP port.
When four lanes of an MXP interface are combined to form a 40GbE port, CLI commands will show the primary lane of that group as **connected or not connected** and the other three lanes as **errdisabled**.

The following sections describe the configuration of MXP interfaces.

**10.5.9.1 Configuring an MXP Module as a Single 100GbE Interface**

To configure the port as a single 100GbE interface (the default configuration), enter the `speed` command (`speed forced 100gfull`) on the port’s /1 lane (the primary lane). This combines lanes 1-10 and disables lanes 11 and 12.

Under this configuration, CLI display commands will show lane /1 as **connected or not connected**, and show lanes /2-/12 as **errdisabled**.

**Important!** Use of the `speed` command to configure a multi-lane port is hitless on the 7050X, 7060X, 7250X, 7260X, 7280SE, 7300X, 7320X and 7500E series platforms. On all other platforms, this command restarts the forwarding agent, which will result in traffic disruption. On 7160 series platforms, use of the `speed` command is hitless, but if the command changes the number of port lanes, packets may be dropped on unrelated ports.

**Step 1** Enter interface Ethernet configuration mode for lane /1 of the MXP Ethernet interface.

```
switch(config)#interface ethernet 5/49/1
```

**Step 2** Enter the `speed forced 100gfull` command. Depending on the platform, this command may restart the forwarding agent, disrupting traffic on all ports for 60 seconds or more.

```
switch(config-if-Et5/49/1)#speed forced 100gfull
```

**Step 3** Use the `show interfaces status` command to confirm the change in configuration.

```
switch(config-if-Et5/49/1)#show interfaces status
```

<table>
<thead>
<tr>
<th>Port</th>
<th>Name</th>
<th>Status</th>
<th>Vlan</th>
<th>Duplex</th>
<th>Speed</th>
<th>Type</th>
<th>Flags</th>
<th>Flags</th>
</tr>
</thead>
<tbody>
<tr>
<td>Et1</td>
<td></td>
<td>connected</td>
<td>2</td>
<td>full</td>
<td>1G</td>
<td>10GBASE-T</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Et5/49/1</td>
<td></td>
<td>connected</td>
<td>1</td>
<td>full</td>
<td>100G</td>
<td>100GBASE-SR1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Et5/49/2</td>
<td></td>
<td>errdisabled</td>
<td>1</td>
<td>full</td>
<td>1G</td>
<td>100GBASE-SR1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Et5/49/3</td>
<td></td>
<td>errdisabled</td>
<td>1</td>
<td>full</td>
<td>100G</td>
<td>100GBASE-SR1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Et5/49/4</td>
<td></td>
<td>errdisabled</td>
<td>1</td>
<td>full</td>
<td>1G</td>
<td>100GBASE-SR1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Et5/49/5</td>
<td></td>
<td>errdisabled</td>
<td>1</td>
<td>full</td>
<td>100G</td>
<td>100GBASE-SR1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Et5/49/6</td>
<td></td>
<td>errdisabled</td>
<td>1</td>
<td>full</td>
<td>1G</td>
<td>100GBASE-SR1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Et5/49/7</td>
<td></td>
<td>errdisabled</td>
<td>1</td>
<td>full</td>
<td>1G</td>
<td>100GBASE-SR1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Et5/49/8</td>
<td></td>
<td>errdisabled</td>
<td>1</td>
<td>full</td>
<td>100G</td>
<td>100GBASE-SR1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Et5/49/9</td>
<td></td>
<td>errdisabled</td>
<td>1</td>
<td>full</td>
<td>1G</td>
<td>100GBASE-SR1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Et5/49/10</td>
<td></td>
<td>errdisabled</td>
<td>1</td>
<td>full</td>
<td>1G</td>
<td>100GBASE-SR1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Et5/49/11</td>
<td></td>
<td>errdisabled</td>
<td>1</td>
<td>full</td>
<td>1G</td>
<td>100GBASE-SR1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Et5/49/12</td>
<td></td>
<td>errdisabled</td>
<td>1</td>
<td>full</td>
<td>1G</td>
<td>100GBASE-SR1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**10.5.9.2 Configuring an MXP Module With 40GbE Interfaces**

Each set of four lanes on the MXP module is independently configurable as a single 40GbE interface or four 10GbE interfaces. To configure four lanes as a single 40GbE interface, enter the `speed` command (`speed forced 40gfull`) on the group’s primary lane (/1, /5, or /9). To revert a group of four lanes to functioning as four independent 10GbE interfaces, enter the `speed forced 10000full` command on the primary lane of the group.
When four lanes of an MXP interface are combined to form a 40GbE port, CLI commands will show the primary lane of that group as **connected** or **not connected** and the other three lanes as **errdisabled**. In groups of four lanes which are configured as four independent 10GbE interfaces, each lane will be displayed in the CLI as **connected** or **not connected**.

Note that a **speed forced 100gfull** command entered on the /1 lane takes precedence over **speed forced 40gfull** commands on the /5 and /9 lanes.

**Important!** Use of the **speed** command to configure a multi-lane port is hitless on the 7050X, 7060X, 7250X, 7260X, 7280SE, 7300X, 7320X and 7500E series platforms. On all other platforms, this command restarts the forwarding agent, which will result in traffic disruption. On 7160 series platforms, use of the **speed** command is hitless, but if the command changes the number of port lanes, packets may be dropped on unrelated ports.

The example below shows the steps for configuring an MXP module as three 40GbE interfaces.

**Step 1** Enter interface Ethernet configuration mode for lane /1 of the MXP Ethernet interface.

```
switch(config)#interface ethernet 5/49/1
```

**Step 2** Enter the **speed forced 40gfull** command. Depending on the platform, this command may restart the forwarding agent, disrupting traffic on all ports for 60 seconds or more.

```
switch(config-if-Et5/49/1)#speed forced 40gfull
```

**Step 3** Repeat the above steps for lanes /5 and /9.

```
switch(config-if-Et5/49/1)#interface ethernet 5/49/5
switch(config-if-Et5/49/5)#speed forced 40gfull
switch(config-if-Et5/49/5)#interface ethernet 5/49/9
switch(config-if-Et5/49/9)#speed forced 40gfull
```

**Step 4** Use the **show interfaces status** command to confirm the change in configuration.

```
switch(config-if-Et5/49/9)#show interfaces status

<table>
<thead>
<tr>
<th>Port</th>
<th>Name</th>
<th>Status</th>
<th>Vlan</th>
<th>Duplex</th>
<th>Speed</th>
<th>Type</th>
<th>Flags</th>
</tr>
</thead>
<tbody>
<tr>
<td>Et1</td>
<td></td>
<td>connected</td>
<td>2</td>
<td>full</td>
<td>1G</td>
<td>10GBASE-T</td>
<td></td>
</tr>
<tr>
<td>Et5/49/1</td>
<td></td>
<td>connected</td>
<td>1</td>
<td>full</td>
<td>40G</td>
<td>100GBASE-SR1</td>
<td></td>
</tr>
<tr>
<td>Et5/49/2</td>
<td></td>
<td>errdisabled</td>
<td>1</td>
<td>unconf</td>
<td>unconf</td>
<td>100GBASE-SR1</td>
<td></td>
</tr>
<tr>
<td>Et5/49/3</td>
<td></td>
<td>errdisabled</td>
<td>1</td>
<td>unconf</td>
<td>unconf</td>
<td>100GBASE-SR1</td>
<td></td>
</tr>
<tr>
<td>Et5/49/4</td>
<td></td>
<td>errdisabled</td>
<td>1</td>
<td>unconf</td>
<td>unconf</td>
<td>100GBASE-SR1</td>
<td></td>
</tr>
<tr>
<td>Et5/49/5</td>
<td></td>
<td>connected</td>
<td>1</td>
<td>full</td>
<td>40G</td>
<td>100GBASE-SR1</td>
<td></td>
</tr>
<tr>
<td>Et5/49/6</td>
<td></td>
<td>errdisabled</td>
<td>1</td>
<td>unconf</td>
<td>unconf</td>
<td>100GBASE-SR1</td>
<td></td>
</tr>
<tr>
<td>Et5/49/7</td>
<td></td>
<td>errdisabled</td>
<td>1</td>
<td>unconf</td>
<td>unconf</td>
<td>100GBASE-SR1</td>
<td></td>
</tr>
<tr>
<td>Et5/49/8</td>
<td></td>
<td>errdisabled</td>
<td>1</td>
<td>unconf</td>
<td>unconf</td>
<td>100GBASE-SR1</td>
<td></td>
</tr>
<tr>
<td>Et5/49/9</td>
<td></td>
<td>connected</td>
<td>1</td>
<td>full</td>
<td>40G</td>
<td>100GBASE-SR1</td>
<td></td>
</tr>
<tr>
<td>Et5/49/10</td>
<td></td>
<td>errdisabled</td>
<td>1</td>
<td>unconf</td>
<td>unconf</td>
<td>100GBASE-SR1</td>
<td></td>
</tr>
<tr>
<td>Et5/49/11</td>
<td></td>
<td>errdisabled</td>
<td>1</td>
<td>unconf</td>
<td>unconf</td>
<td>100GBASE-SR1</td>
<td></td>
</tr>
<tr>
<td>Et5/49/12</td>
<td></td>
<td>errdisabled</td>
<td>1</td>
<td>unconf</td>
<td>unconf</td>
<td>100GBASE-SR1</td>
<td></td>
</tr>
</tbody>
</table>
```

**10.5.9.3 Configuring an MXP Module as Twelve 10GbE Interfaces**

Each lane of an MXP port functions as a 10GbE interface when it is not included in a higher-speed interface configuration (either actively or as an **errdisabled** port).

To explicitly configure the port as twelve 10GbE interfaces, use the **speed** command (**speed forced 10000full**) on all twelve lanes of the port.

When each lane is configured as an independent 10GbE interface, CLI display commands show each lane as **connected** or **not connected**.
Important! Use of the `speed` command to configure a multi-lane port is hitless on the 7050X, 7060X, 7250X, 7260X, 7280SE, 7300X, 7320X and 7500E series platforms. On all other platforms, this command restarts the forwarding agent, which will result in traffic disruption. On 7160 series platforms, use of the `speed` command is hitless, but if the command changes the number of port lanes, packets may be dropped on unrelated ports.

Step 1 Enter interface Ethernet configuration mode for all twelve lanes of the MXP Ethernet interface.

```
switch(config)#interface ethernet 5/49/1-12
```

Step 2 Enter the `speed forced 10000full` command. Depending on the platform, this command may restart the forwarding agent, disrupting traffic on all ports for 60 seconds or more.

```
switch(config-if-Et5/49/1-12)#speed forced 10000full
```

Step 3 Use the `show interfaces status` command to confirm the change in configuration.

```
switch(config-if-Et5/49/1-12)#show interfaces status
```

Port Name Status Vlan Duplex Speed Type Flags
Et1 connected 2 full 1G 10GBASE-T
<br>-----OUTPUT OMITTED FROM EXAMPLE-----
Et5/1/1 connected 1 full 1G 100GBASE-SR1<br>
Et5/1/2 connected 1 full 1G 100GBASE-SR1
Et5/1/3 connected 1 full 1G 100GBASE-SR1
Et5/1/4 connected 1 full 1G 100GBASE-SR1
Et5/1/5 connected 1 full 1G 100GBASE-SR1
Et5/1/6 connected 1 full 1G 100GBASE-SR1
Et5/1/7 connected 1 full 1G 100GBASE-SR1
Et5/1/8 connected 1 full 1G 100GBASE-SR1
Et5/1/9 connected 1 full 1G 100GBASE-SR1
Et5/1/10 connected 1 full 1G 100GBASE-SR1
<br>-----OUTPUT OMITTED FROM EXAMPLE-----

10.5.10 Port Speed Capabilities

The supported speeds supported on each Arista platform per interface type are described in Table 10-6.

<table>
<thead>
<tr>
<th>Platform</th>
<th>SFP+</th>
<th>QSFP+</th>
<th>QSFP100</th>
<th>MXP</th>
<th>CFP2</th>
</tr>
</thead>
<tbody>
<tr>
<td>7050</td>
<td>1, 10</td>
<td>1, 10</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>7050X</td>
<td>1, 10</td>
<td>1, 10</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>7060X</td>
<td>1, 10</td>
<td>10, 40</td>
<td>10, 25, 40, 50, 100</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>7250X</td>
<td>N/A</td>
<td>1, 10</td>
<td>10, 25, 40, 50, 100</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>7260X</td>
<td>1, 10</td>
<td>10, 40</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>7150S</td>
<td>1, 10</td>
<td>1, 10</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>7048T</td>
<td>1, 10</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>7500</td>
<td>1, 10</td>
<td>1, 10</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>7500E</td>
<td>1, 10</td>
<td>1, 10</td>
<td>10, 40, 100</td>
<td>10, 40, 100</td>
<td>10, 100</td>
</tr>
<tr>
<td>7280SE</td>
<td>1, 10</td>
<td>1, 10</td>
<td>10, 40, 100</td>
<td>10, 40, 100</td>
<td>N/A</td>
</tr>
<tr>
<td>7210T</td>
<td>1, 10</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>
10.5.11 Agile Ports

An agile port is an interface that can function as a 10G port or can subsume a predefined set of 10G interfaces to form an interface with higher speed capabilities.

The set of interfaces that can be combined to form a higher speed port is restricted by the hardware configuration. Only interfaces that pass through a common PHY component can be combined. One interface within a combinable set is designated as the primary port.

- To view the set of available agile ports and the subsumable interfaces that comprise them, enter `show platform fm6000 agileport map`.
- To configure the primary port as a higher speed port, enter `speed forced 40gfull` or `speed auto 40gfull`.
- To revert the primary port and its subsumed ports to 10G interfaces, enter `no speed`.

Example

- These commands displays the agile port map for the switch, then configures ethernet interface 13 as a 40G port.

```
switch#show platform fm6000 agileport map

-----------------------------------------------------------------
<table>
<thead>
<tr>
<th>Agile Ports</th>
<th>Interfaces subsumed in 40G link</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethernet1</td>
<td>Ethernet3      Ethernet5      Ethernet7</td>
</tr>
<tr>
<td>Ethernet2</td>
<td>Ethernet4      Ethernet6      Ethernet8</td>
</tr>
<tr>
<td>Ethernet13</td>
<td>Ethernet15     Ethernet17     Ethernet19</td>
</tr>
<tr>
<td>Ethernet14</td>
<td>Ethernet16     Ethernet18     Ethernet20</td>
</tr>
</tbody>
</table>

switch#config
switch(config)#interface ethernet 13
switch(config-if-Et13)#speed forced 40gfull

WARNING! Executing this command will cause the forwarding agent to be restarted. All interfaces will briefly drop links and forwarding on all interfaces will momentarily stop.

Do you wish to proceed with this command? [y/N]

Ethernet17 configured for 40G.
Ethernet15, Ethernet17 and Ethernet19 are now subsumed.
switch(config-if-Et13)#

This command reverts the agile 40G port to a 10G port and frees its subsumed ports as individual 10G ports.
switch(config-if-Et13)#no speed

WARNING! Executing this command will cause the forwarding agent to be restarted. All interfaces will briefly drop links and forwarding on all interfaces will momentarily stop.

Do you wish to proceed with this command? [y/N]

Ethernet13 no longer configured for 40G.
Ethernet15, Ethernet17 and Ethernet19 are now free.
switch(config-if-Et13)#
```
10.5.12 Subinterface Configuration

For a subinterface to be operational on an Ethernet or port channel interface, the parent interface must be configured as a routed port and be administratively up, and a VLAN must be configured on the subinterface. If the parent interface goes down, all subinterfaces automatically go down as well, but will come back up with the same configuration once the parent interface is up.

Note that a port channel should not contain Ethernet interfaces with subinterfaces configured on them, and that subinterfaces cannot be members of a port channel.

Subinterfaces are named by adding a period followed by a unique subinterface number to the name of the parent interface. Note that the subinterface number has no relation to the ID of the VLAN corresponding to the subinterface.

A maximum of 750 subinterfaces can be configured on a switch, and a maximum of 250 subinterfaces can be configured under a single parent interface.

Subinterfaces are available on the following platforms:

- DCS-7050X
- DCS-7060X
- DCS-7250X
- DCS-7260X
- DCS-7280E
- DCS-7300X
- DCS-7320X
- DCS-7500E

10.5.12.1 Creating a Subinterface

To create a subinterface on an Ethernet or port channel interface:

**Step 1** Bring up the parent interface and ensure that it is configured as a routed port.

```
switch(config)#interface Ethernet1/1
switch(config-if-Et1/1)#no switchport
switch(config-if-Et1/1)#no shutdown
```

**Step 2** Configure a VLAN on the subinterface. The `encapsulation dot1q vlan` command is also used for VLAN translation, but in this context it associates a VLAN with the subinterface.

```
switch(config-if-Et1/1)#interface Ethernet1/1.1
switch(config-if-Et1/1.1)#encapsulation dot1q vlan 100
```

**Step 3** Configure an IP address on the subinterface (optional) and ensure that it is up.

```
switch(config-if-Et1/1)#ip address 10.0.0.1/24
switch(config-if-Et1/1)#no shutdown
```

10.5.12.2 Creating a Range of Subinterfaces

A range of subinterfaces can also be configured simultaneously. The following example configures subinterfaces 1 to 100 on Ethernet interface 1/1, and assigns VLANs 501 through 600 to them. Note that the range of interfaces must be the same size as the range of VLAN IDs.
Example

```
switch(config)#interface eth1/1.1-100
switch(config-if-Et1/1.1-100)#no shutdown
switch(config-if-Et1/1.1-100)#encapsulation dot1q vlan {501,600}
switch(config-if-Et1/1.1-100)#exit
switch(config)#
```

10.5.12.3 Parent Interface Configuration

For subinterfaces to function, the parent interface must be administratively up and configured as a routed port.

Some settings are inherited by subinterfaces from the parent interface. These include QoS (trust mode and default DSCP) and MTU.

Additionally, on the DCS-7050X, DCS-7250X, and DCS-7300X platforms, the parent interface may be configured with an IP address. In this case, untagged packets are treated as incoming traffic on the parent interface.

10.5.12.4 Configuring Routing Features on a Subinterface

Once a subinterface is created, the following features can be configured on it:

- Unicast and multicast routing
- BGP, OSPF, ISIS, PIM
- VRF
- VRRP
- SNMP
- Inheritance of QoS (trust mode and default DSCP) and MTU settings from the parent interface

Additionally, these features can be configured on subinterfaces on Arad (DCS-7500E and DCS-7280E) platforms:

- Subinterface counters on ingress
- VXLAN
- MPLS
- GRE
- PBR
- QoS

10.5.12.5 Displaying Subinterface Information

Subinterface information is displayed using the same show commands as for other interfaces.

Examples

This command displays summary information for all IP interfaces on the switch, including subinterfaces.

```
switch>show ip interfaces brief
Interface        IP Address     Status    Protocol    MTU
Ethernet1/1      10.1.1.1/24   up         up          1500
Ethernet1/1.1    10.0.0.1/24   up         up          1500
Ethernet1/2      unassigned    up         up          1500
```

This command displays information for subinterface Ethernet 1/1.1.

```
switch>show interface ethernet 1/1.1
Ethernet1/1.1 is down, line protocol is lowerlayerdown (notconnect)
    Hardware is Subinterface, address is 001c.735d.65dc
    Internet address is 10.0.0.1/24
    Broadcast address is 255.255.255.255
    Address determined by manual configuration
    IP MTU 1500 bytes , BW 10000000 kbit
    Down 59 seconds
```

This command displays status information for all subinterfaces configured on the switch.

```
switch>show interfaces status sub-interfaces
                    Port       Name    Status       Vlan     Duplex Speed  Type                Flags
Et1.1              connect      101      full   10G    dot1q-encapsulation
Et1.2              connect      102      full   10G    dot1q-encapsulation
Et1.3              connect      103      full   10G    dot1q-encapsulation
Et1.4              connect      103      full   10G    dot1q-encapsulation
```

### 10.5.13 Autonegotiated Settings

In autonegotiation, the transmission speed, duplex setting, and flow control parameters used for Ethernet-based communication can be automatically negotiated between connected devices to establish optimized common settings.

#### 10.5.13.1 Speed and Duplex

The `speed` command affects the transmission speed and duplex setting for the configuration mode interface. When a `speed forced` command is in effect on an interface, autonegotiation of speed and duplex settings is disabled for the interface; to enable autonegotiation, use the `speed auto` command.

The scope and effect of the `speed` command depends on the interface type; see Ethernet Interfaces and Ethernet Configuration Procedures for detailed information on the speed settings for different interfaces.

#### 10.5.13.2 Flow Control

Flow control is a data transmission option that temporarily stops a device from sending data because of a peer data overflow condition. If a device sends data faster than the receiver can accept it, the receiver's buffer can overflow. The receiving device then sends a PAUSE frame, instructing the sending device to halt transmission for a specified period.

Flow control commands configure administrative settings for flow control packets.

- The `flowcontrol receive` command configures the port's ability to receive flow control pause frames.
  - `off`: port does not process pause frames that it receives.
  - `on`: port processes pause frames that it receives.
  - `desired`: port autonegotiates; processes pause frames if peer is set to `send` or `desired`.
- The `flowcontrol send` command configures the port's ability to transmit flow control pause frames.
  - `off`: port does not send pause frames.
  - `on`: port sends pause frames.
  - `desired`: port autonegotiates; sends pause frames if peer is set to `receive` or `desired`.  

**Desired** is not an available parameter option. Ethernet data ports cannot be set to **desired**. Management ports are set to **desired** by default and with the **no flowcontrol receive** command.

The port linking process includes flow control negotiation. Ports must have compatible flow control settings to create a link. **Table 10-7** lists the compatible flow control settings.

**Table 10-7  Compatible Settings for Flow Control Negotiation**

<table>
<thead>
<tr>
<th>local port</th>
<th>peer port</th>
</tr>
</thead>
<tbody>
<tr>
<td>receive on</td>
<td>send on or send desired</td>
</tr>
<tr>
<td>receive off</td>
<td>send off or send desired</td>
</tr>
<tr>
<td>receive desired</td>
<td>send on, send off, or send desired</td>
</tr>
<tr>
<td>send on</td>
<td>receive on or receive desired</td>
</tr>
<tr>
<td>send off</td>
<td>receive off or receive desired</td>
</tr>
<tr>
<td>send desired</td>
<td>receive on, receive off, or receive desired</td>
</tr>
</tbody>
</table>

**Example**

- These commands set the flow control receive and send to **on** on Ethernet interface 5.

```
switch(config)#interface ethernet 5
switch(config-if-Et5)#flowcontrol receive on
switch(config-if-Et5)#flowcontrol send on
switch(config-if-Et5)#
```

10.5.14 Displaying Ethernet Port Properties

Show commands are available to display various Ethernet configuration and operational status on each interface. Ethernet settings that are viewable include:

- Port Type
- PHY Status
- Negotiated Settings
- Flow Control
- Capabilities

**Port Type**

The port type is viewable from the output of **show interfaces status**, **show interfaces capabilities**, and **show interfaces transceiver properties** commands.

**Example**

- This **show interfaces status** command displays the status of Ethernet interfaces 1-5.

```
switch>show interfaces status
Port    Name     Status    Vlan  Duplex  Speed Type
Et1     Et1       connected 1 full  10G 10GBASE-SRL
Et2     Et2       connected 1 full  10G 10GBASE-SRL
Et3     Et3       connected 1 full  10G 10GBASE-SRL
Et4     Et4       connected 1 full  10G 10GBASE-SRL
Et5     Et5       notconnect 1 full  10G Not Present
switch>
```
Ethernet Configuration Procedures

Chapter 10: Ethernet Ports

- This `show interfaces capabilities` command displays the speed, duplex, and flow control capabilities of Ethernet interfaces 2 and 18.

```
switch>show interfaces ethernet 2,18 capabilities
```

- This command displays the media type, speed, and duplex properties for Ethernet interfaces 1.

```
switch>show interfaces ethernet 1 transceiver properties
```

**PHY**

PHY information for each Ethernet interface is viewed by entering the `show interfaces phy` command.

**Example**

- This command summarizes PHY information for Ethernet interfaces 1-3.

```
switch>show interfaces ethernet 1-3 phy
```

**Negotiated Settings**

Speed, duplex, and flow control settings are displayed through the `show interfaces capabilities`, `show phy`, and `show interfaces status` commands.
Example

- This command displays speed/duplex and flow control settings for Ethernet interface 1.

  ```
  switch>show interfaces ethernet 1 capabilities
  Ethernet1
  Model:        DCS-7150S-64-CL
  Type:         10GBASE-SR
  Speed/Duplex: 10G/full
  Flowcontrol:  rx-(off,on),tx-(off,on)
  switch>
  ```

- This command shows the flow control settings for Ethernet interfaces 1-2.

  ```
  switch>show flowcontrol interface ethernet 1-2
  Port       Send FlowControl  Receive FlowControl  RxPause       TxPause
  admin    oper     admin    oper
  ---------  -------- -------- -------- --------    ------------- -------------
  Et1        off      off      off      off         0             0
  Et2        off      off      off      off         0             0
  switch>
  ```

- This command displays the speed type and duplex settings for management interfaces 1-2.

  ```
  switch>show interfaces management 1-2 status
  Port      Name              Status       Vlan        Duplex  Speed Type
  Ma1                         connected    routed      a-full a-100M 10/100/1000
  Ma2                         connected    routed      a-full   a-1G 10/100/1000
  switch>
  ```

10.5.15 Configuring Ingress Traffic-Class Counters

Ingress traffic class counter support is enabled in order to display per traffic-class counters on ingress interfaces, and supported on routed-ports and sub-interfaces. Both packet and octet counts are displayed.

Example

- This command enables traffic-class counter support.

  ```
  switch(config)#hardware counter feature traffic-class in
  switch(config)#
  ```

- This command enables TCAM profile ‘tc-counters’ if this profile is configured.

  ```
  switch(config)#hardware tcam profile tc-counters
  switch(config)#
  ```
10.6 Ethernet Configuration Commands

**Global Configuration Commands**
- hardware port-group
- interface ethernet
- interface ethernet create
- interface management
- transceiver qsfp default-mode
- transceiver channel

**Interface Configuration Commands – Ethernet and Management Interfaces**
- flowcontrol receive
- flowcontrol send
- link-debounce
- mac-address
- speed

**Interface Display Commands**
- show flowcontrol
- show hardware counter
- show hardware port-group
- show interfaces capabilities
- show interfaces counters
- show interfaces counters bins
- show interfaces counters errors
- show interfaces counters queue
- show interfaces counters rates
- show interfaces negotiation
- show interfaces phy
- show interfaces status
- show interfaces status errdisabled
- show interfaces transceiver
- show interfaces transceiver channels
- show interfaces transceiver hardware
- show interfaces transceiver properties
- show platform fm6000 agileport map
flowcontrol receive

The `flowcontrol receive` command configures administrative settings for inbound flow control packets. Ethernet ports use flow control to delay packet transmission when port buffers run out of space. Ports transmit a pause frame when their buffers are full, signaling their peer ports to delay sending packets for a specified period.

The `flowcontrol receive` command configures the configuration mode port's ability to receive flow control pause frames.

- **off**: port does not process pause frames that it receives.
- **on**: port processes pause frames that it receives.
- **desired**: port autonegotiates flow control; processes pause frames if the peer is set to `send desired`.

`Desired` is not an available parameter option. Ethernet data ports cannot be set to `desired`. Management ports are set to `desired` by default and with the `no flowcontrol receive` command.

The port linking process includes flow control negotiation. Ports must have compatible flow control settings to create a link. Table 10-8 lists the compatible flow control settings.

**Table 10-8 Compatible Settings for Flow Control Negotiation – Local Port Receiving**

<table>
<thead>
<tr>
<th>local port</th>
<th>peer port</th>
</tr>
</thead>
<tbody>
<tr>
<td>receive on</td>
<td>send on or send desired</td>
</tr>
<tr>
<td>receive off</td>
<td>send off or send desired</td>
</tr>
<tr>
<td>receive desired</td>
<td>send on, send off, or send desired</td>
</tr>
</tbody>
</table>

The `no flowcontrol receive` and `default flowcontrol receive` commands restore the default flow control setting for the configuration mode interface by removing the corresponding `flowcontrol receive` command from `running-config`. The default setting is `off` for Ethernet data ports and `desired` for Management ports.

**Command Mode**
- Interface-Ethernet Configuration
- Interface-Management Configuration

**Command Syntax**

```
flowcontrol receive STATE
no flowcontrol receive
default flowcontrol receive
```

**Parameters**

- **STATE** flow control pause frame processing setting. Options include:
  - **on**
  - **off**

**Examples**

- These commands set the flow control received on Ethernet interface 5.
  
  ```
  switch(config)#interface ethernet 5
  switch(config-if-Et5)#flowcontrol receive on
  ```
flowcontrol send

The `flowcontrol send` command configures administrative settings for outbound flow control packets. Ethernet ports use flow control to delay packet transmission when port buffers run out of space. Ports transmit a pause frame when their buffers are full, signaling their peer ports to delay sending packets for a specified period.

The `flowcontrol send` command configures the configuration mode port's ability to transmit flow control pause frames.

- **off**: port does not send pause frames.
- **on**: port sends pause frames.
- **desired**: port autonegotiates flow control; sends pause frames if the peer is set to receive desired.

*Desired* is not an available parameter option. Ethernet data ports cannot be set to desired. Management ports are set to desired by default and with the `no flowcontrol send` command.

The port linking process includes flow control negotiation. Ports must have compatible flow control settings to create a link. Table 10-9 lists the compatible flow control settings.

Table 10-9 Compatible Settings for Flow Control Negotiation – Local Port Transmitting

<table>
<thead>
<tr>
<th>local port</th>
<th>peer port</th>
</tr>
</thead>
<tbody>
<tr>
<td>send on</td>
<td>receive on or receive desired</td>
</tr>
<tr>
<td>send off</td>
<td>receive off or receive desired</td>
</tr>
<tr>
<td>send desired</td>
<td>receive on, receive off, or receive desired</td>
</tr>
</tbody>
</table>

The `no flowcontrol send` and `default flowcontrol send` commands restore the default flow control setting for the configuration mode interface by removing the corresponding `flowcontrol send` command from `running-config`. The default setting is off for Ethernet data ports and desired for Management ports.

**Command Mode**
- Interface-Ethernet Configuration
- Interface-Management Configuration

**Command Syntax**

- `flowcontrol send STATE`
- `no flowcontrol send`
- `default flowcontrol send`

**Parameters**

- **STATE** flow control send setting. Options include
  - **on**
  - **off**

**Examples**

- These commands set the flow control sent on Ethernet interface 5.

  ```
  switch(config)#interface ethernet 5
  switch(config-if-Et5)#flowcontrol send on
  switch(config-if-Et5)#
  ```
hardware port-group

The `hardware port-group` command configures a port group to activate a 40GBASE (QSFP+) interface or four 10GBASE (SFP+) interfaces, affecting QSFP+ and SFP+ availability.

The `no hardware port-group` and `default hardware port-group` commands restore a port group’s default setting by removing the corresponding `hardware port-group` command from `running-config`. The QSFP+ interface is active by default in each port group.

The `hardware port-group` command is available on DCS-7050Q-16 and DCS-7050QX-32S switches, and has different parameters on each platform.

**Command Mode**

Global Configuration

**Command Syntax**

```
hardware port-group group_number select PORT_LIST
no hardware port-group group_number
default hardware port-group group_number
```

**Parameters**

- `group_number` label of the port group. Valid options are 1 and 2 on the 7050Q-16; only 1 is available on the 7050QX-32S.
- `PORT_LIST` ports activated by command. Options vary by platform and depend on `group_number` value.

**DCS-7050Q-16**

- **Et15/1-4** activates QSFP+ port on port group 1. Available when `group_number` is 1.
- **Et16/1-4** activates QSFP+ port on port group 2. Available when `group_number` is 2.
- **Et17-20** activates SFP+ ports on port group 1. Available when `group_number` is 1.
- **Et21-23** activates SFP+ ports on port group 2. Available when `group_number` is 2.

**DCS-7050QX-32S**

- **Et1-4** activates SFP+ ports on port group 1. Available when `group_number` is 1.
- **Et5/1-4** activates QSFP+ port on port group 1. Available when `group_number` is 1.
**Example**

- These commands enable the QSFP+ interface in port group 1 and SFP+ interfaces in port group 2 on a DCS-7050Q-16 switch, display the port group status, and display interface status.

```bash
switch(config)#hardware port-group 1 select Et15/1-4
switch(config)#hardware port-group 2 select Et21-24
switch(config)#show hardware port-group
```

<table>
<thead>
<tr>
<th>Portgroup</th>
<th>Active Ports: Et17-20</th>
</tr>
</thead>
<tbody>
<tr>
<td>Port</td>
<td>State</td>
</tr>
<tr>
<td>------------</td>
<td>-----------------------</td>
</tr>
<tr>
<td>Ethernet17</td>
<td>ErrDisabled</td>
</tr>
<tr>
<td>Ethernet18</td>
<td>ErrDisabled</td>
</tr>
<tr>
<td>Ethernet19</td>
<td>ErrDisabled</td>
</tr>
<tr>
<td>Ethernet20</td>
<td>ErrDisabled</td>
</tr>
<tr>
<td>Ethernet15/1</td>
<td>Active</td>
</tr>
<tr>
<td>Ethernet15/2</td>
<td>Active</td>
</tr>
<tr>
<td>Ethernet15/3</td>
<td>Active</td>
</tr>
<tr>
<td>Ethernet15/4</td>
<td>Active</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Portgroup</th>
<th>Active Ports: Et16/1-4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Port</td>
<td>State</td>
</tr>
<tr>
<td>------------</td>
<td>-----------------------</td>
</tr>
<tr>
<td>Ethernet16/1</td>
<td>Active</td>
</tr>
<tr>
<td>Ethernet16/2</td>
<td>Active</td>
</tr>
<tr>
<td>Ethernet16/3</td>
<td>Active</td>
</tr>
<tr>
<td>Ethernet16/4</td>
<td>Active</td>
</tr>
<tr>
<td>Ethernet21</td>
<td>ErrDisabled</td>
</tr>
<tr>
<td>Ethernet22</td>
<td>ErrDisabled</td>
</tr>
<tr>
<td>Ethernet23</td>
<td>ErrDisabled</td>
</tr>
<tr>
<td>Ethernet24</td>
<td>ErrDisabled</td>
</tr>
</tbody>
</table>

```bash
switch(config)#show interfaces status
```

<table>
<thead>
<tr>
<th>Port</th>
<th>Name</th>
<th>Status</th>
<th>Vlan</th>
<th>Duplex</th>
<th>Speed</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Et1/1</td>
<td></td>
<td>connected</td>
<td>in Po621</td>
<td>full</td>
<td>40G</td>
<td>40GBASE-CR4</td>
</tr>
<tr>
<td>Et1/2</td>
<td></td>
<td>errdisabled</td>
<td>inactive</td>
<td>unconf</td>
<td>unconf</td>
<td>40GBASE-CR4</td>
</tr>
<tr>
<td>Et15/1</td>
<td></td>
<td>connected</td>
<td>in Po711</td>
<td>full</td>
<td>40G</td>
<td>40GBASE-CR4</td>
</tr>
<tr>
<td>Et15/2</td>
<td></td>
<td>errdisabled</td>
<td>inactive</td>
<td>unconf</td>
<td>unconf</td>
<td>Not Present</td>
</tr>
<tr>
<td>Et15/3</td>
<td></td>
<td>errdisabled</td>
<td>inactive</td>
<td>unconf</td>
<td>unconf</td>
<td>Not Present</td>
</tr>
<tr>
<td>Et15/4</td>
<td></td>
<td>errdisabled</td>
<td>inactive</td>
<td>unconf</td>
<td>unconf</td>
<td>Not Present</td>
</tr>
<tr>
<td>Et16/1</td>
<td></td>
<td>errdisabled</td>
<td>inactive</td>
<td>unconf</td>
<td>unconf</td>
<td>Not Present</td>
</tr>
<tr>
<td>Et16/2</td>
<td></td>
<td>errdisabled</td>
<td>inactive</td>
<td>unconf</td>
<td>unconf</td>
<td>Not Present</td>
</tr>
<tr>
<td>Et16/3</td>
<td></td>
<td>errdisabled</td>
<td>inactive</td>
<td>unconf</td>
<td>unconf</td>
<td>Not Present</td>
</tr>
<tr>
<td>Et16/4</td>
<td></td>
<td>errdisabled</td>
<td>inactive</td>
<td>unconf</td>
<td>unconf</td>
<td>Not Present</td>
</tr>
<tr>
<td>Et17</td>
<td></td>
<td>errdisabled</td>
<td>inactive</td>
<td>unconf</td>
<td>unconf</td>
<td>Not Present</td>
</tr>
<tr>
<td>Et18</td>
<td></td>
<td>errdisabled</td>
<td>inactive</td>
<td>unconf</td>
<td>unconf</td>
<td>Not Present</td>
</tr>
<tr>
<td>Et19</td>
<td></td>
<td>errdisabled</td>
<td>inactive</td>
<td>unconf</td>
<td>unconf</td>
<td>Not Present</td>
</tr>
<tr>
<td>Et20</td>
<td></td>
<td>errdisabled</td>
<td>inactive</td>
<td>unconf</td>
<td>unconf</td>
<td>Not Present</td>
</tr>
<tr>
<td>Et21</td>
<td></td>
<td>connected</td>
<td>425</td>
<td>full</td>
<td>10G</td>
<td>10GBASE-SRL</td>
</tr>
<tr>
<td>Et22</td>
<td></td>
<td>connected</td>
<td>611</td>
<td>full</td>
<td>10G</td>
<td>10GBASE-SRL</td>
</tr>
<tr>
<td>Et23</td>
<td></td>
<td>connected</td>
<td>in Po998</td>
<td>full</td>
<td>10G</td>
<td>10GBASE-SLR</td>
</tr>
<tr>
<td>Et24</td>
<td></td>
<td>connected</td>
<td>in Po998</td>
<td>full</td>
<td>10G</td>
<td>10GBASE-SLR</td>
</tr>
</tbody>
</table>

```bash
switch(config)#
```
interface ethernet

The **interface ethernet** command places the switch in Ethernet-interface configuration mode for the specified interfaces. The command can specify a single interface or multiple interfaces.

Ethernet interfaces are physical interfaces and are not created or removed.

Interface management commands include:
- `description`
- `exit`
- `load-interval`
- `mtu`
- `shutdown (Interfaces)`

Ethnet management commands include:
- `flowcontrol`
- `mac-address`
- `speed`

Chapters describing supported protocols and other features list additional configuration commands available from Ethernet interface configuration mode.

**Command Mode**
Global Configuration

**Command Syntax**

```
interface ethernet e_range
```

**Parameters**
- `e_range` Ethernet interfaces (number, range, or comma-delimited list of numbers and ranges).

Valid Ethernet numbers depend on the switch’s available Ethernet interfaces.

**Example**
- This command enters interface configuration mode for Ethernet interfaces 1 and 2:
  ```
  switch(config)#interface ethernet 1-2
  switch(config-if-Et1-2)#
  ```
- This command enters interface configuration mode for Ethernet interface 1:
  ```
  switch(config)#interface ethernet 1
  switch(config-if-Et1)#
  ```
**interface ethernet create**

The *interface ethernet create* command is used to configure a range of Ethernet subinterfaces. The command places the switch in Ethernet-interface configuration mode for the specified range of subinterfaces.

**Command Mode**

Global Configuration

**Command Syntax**

```
interface ethernet create sub_range
```

**Parameters**

- `sub_range` range of subinterfaces to be configured. Subinterfaces are named by adding a period followed by a unique subinterface number to the name of the parent interface. A maximum of 750 subinterfaces can be configured on a switch, and a maximum of 250 subinterfaces can be configured under a single parent interface.

**Example**

- This command enters interface configuration mode for Ethernet subinterfaces 1/1.1-100:

  ```
  switch(config)#interface ethernet create 1/1.100
  switch(config-if-Et1/1.1-100)#
  ```
interface management

The **interface management** command places the switch in management-interface configuration mode for the specified interfaces. The list can specify a single interface or multiple interfaces if the switch contains more than one management interface.

Management interfaces are physical interfaces and are not created or removed.

Interface management commands include:

- description
- exit
- load-interval
- mtu
- shutdown (Interfaces)

Ethernet management commands include:

- flowcontrol
- mac-address
- speed

Chapters describing supported protocols and other features list additional configuration commands available from management-interface configuration mode.

**Command Mode**

Global Configuration

**Command Syntax**

```
interface management m_range
```

**Parameters**

- **m_range**  Management interfaces (number, range, or comma-delimited list of numbers and ranges).

  Valid management numbers depend on the switch’s available management interfaces. A value of 0, where available, configures the virtual management interface on a dual-supervisor modular switch. Management interface 0 accesses management port 1 on the active supervisor of a dual-supervisor modular switch.

**Examples**

- This command enters interface configuration mode for management interfaces 1 and 2.
  
  ```
  switch(config)#interface management 1-2
  switch(config-if-Ma1-2)#
  ```

- This command enters interface configuration mode for management interface 1:
  
  ```
  switch(config)#interface management 1
  switch(config-if-Ma1)#
  ```
link-debounce

The `link-debounce` command configures the link debounce time for the configuration mode interface. Link debounce time is the time that advertisements for new link states are delayed after the link state is established. By default, debounce time is set to zero, disabling link debounce.

Debounce times for link-up and link-down transitions can be independently configured.

- Link-up debounce time: the delay before an interface advertises link down to link up transitions.
- Link-down debounce time: the delay before an interface advertises link up to link down transitions.

The `no link-debounce` and `default link-debounce` commands restore the default debounce setting for the configuration mode interface by removing the corresponding `link-debounce` command from `running-config`.

Command Mode

- Interface-Ethernet Configuration
- Interface-Management Configuration

Command Syntax

```
link-debounce time WAIT_TIME
no link-debounce
default link-debounce
```

Parameters

- `WAIT_TIME`  
  
  - `<0 - 30000>`  
    
    One debounce value assigned as both link up and link down.
  
  - `<0 - 30000> <0 - 30000>`  
    
    Two debounce values: link up is first, link down is second.

All debounce values range from 0 (disabled) to 30000 (30 seconds).

Examples

- These commands set the link-up and link-down debounce period to 10 seconds on Ethernet interface 5.
  ```
  switch(config)#interface ethernet 5
  switch(config-if-Et5)#link-debounce time 10000
  switch(config-if-Et5)#
  ```

- These commands set the link-up debounce to 10 seconds and the link-down debounce period to zero on Ethernet interface 5.
  ```
  switch(config)#interface ethernet 5
  switch(config-if-Et5)#link-debounce time 10000 0
  switch(config-if-Et5)#
  ```

- These commands set the link-up debounce to zero and the link-down debounce period to 12.5 seconds on Ethernet interface 5.
  ```
  switch(config)#interface ethernet 5
  switch(config-if-Et5)#link-debounce time 0 12500
  switch(config-if-Et5)#
  ```
mac-address

The **mac-address** command assigns a MAC address to the configuration mode interface. An interface’s default MAC address is its burn-in address.

The **no mac-address** and **default mac-address** commands revert the interface to its default MAC address by removing the corresponding **mac-address** command from **running-config**.

**Command Mode**
- Interface-Ethernet Configuration
- Interface-Management Configuration

**Command Syntax**
- `mac-address address`
- `no mac-address`
- `default mac-address`

**Parameters**
- **address**  MAC address assigned to the interface. Format is dotted hex notation (H.H.H). Disallowed addresses are 0.0.0 and FFFF.FFFF.FFFF.

**Example**
- This command assigns the MAC address of 001c.2804.17e1 to Ethernet interface 7, then displays interface parameters, including the assigned address.

```
switch(config)#interface ethernet 7
switch(config-if-Et7)#mac-address 001c.2804.17e1
switch(config-if-Et7)#show interface ethernet 7
Ethernet3 is up, line protocol is up (connected)
Hardware is Ethernet, address is 001c.2804.17e1 (bia 001c.7312.02e2)
Description: b.e45
MTU 9212 bytes, BW 10000000 Kbit
Full-duplex, 10Gb/s, auto negotiation: off
Last clearing of "show interface" counters never
5 seconds input rate 7.84 kbps (0.0% with framing), 10 packets/sec
5 seconds output rate 270 kbps (0.0% with framing), 24 packets/sec
1363799 packets input, 222736140 bytes
Received 0 broadcasts, 290904 multicast
0 runts, 0 giants
0 input errors, 0 CRC, 0 alignment, 0 symbol
0 PAUSE input
2264927 packets output, 2348747214 bytes
Sent 0 broadcasts, 28573 multicast
0 output errors, 0 collisions
0 late collision, 0 deferred
0 PAUSE output
switch(config-if-Et7)#
```
show flowcontrol

The `show interfaces flowcontrol` command displays administrative and operational flow control data for the specified interfaces. Administrative data is the parameter settings stored in `running-config` for the specified interface; the switch uses these settings to negotiate flow control with the peer switch. Operational data is the resolved flow control setting that controls the port’s behavior.

**Command Mode**

EXEC

**Command Syntax**

```
show flowcontrol [INTERFACE]
show [INTERFACE] flowcontrol
```

**Parameters**

- **INTERFACE** Interface type and number for which flow control data is displayed.
  - `<no parameter>` all interfaces.
  - `ethernet e_range` Ethernet interfaces in the specified range.
  - `management m_range` Management interfaces in the specified range.

Valid `e_range` and `m_range` formats include number, number range, or comma-delimited list of numbers and ranges.

**Example**

- This command shows the settings for Ethernet interfaces 1-10.

```
switch>show flowcontrol interface ethernet 1-10
Port Send FlowControl Receive FlowControl RxPause TxPause
      admin oper admin oper
--------- -------- -------- --------    ------------- -------------
Et1      off      off      off      off         0             0
Et2      off      off      off      off         0             0
Et3      off      off      off      off         0             0
Et4      off      off      off      off         0             0
Et5      off      off      off      off         0             0
Et6      off      off      off      off         0             0
Et7      off      off      off      off         0             0
Et8      off      off      off      off         0             0
Et9      off      off      off      off         0             0
Et10     off      off      off      off         0             0
switch>
```
show hardware counter

The show hardware counter command displays counter events across time intervals.

Command Mode
EXEC

Command Syntax
show hardware counter

Example
- This command displays counter events across all time intervals, which are currently more than one standard deviation apart from a given time interval.

```
switch(config-handler-eventHandler1-counters)#show hardware counter events
-----------------------------------------------------------------------------------------------
<table>
<thead>
<tr>
<th>Interval</th>
<th>Event Name</th>
<th>Chip</th>
<th>First Occurrence</th>
<th>Last Occurrence</th>
<th>Count</th>
<th>Z-Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 Min</td>
<td>MacCounters</td>
<td>All</td>
<td>2017-01-31 09:31:35</td>
<td>2017-01-31 09:44:32</td>
<td>5</td>
<td>-6.9430</td>
</tr>
<tr>
<td>10 Min</td>
<td>MacCounters</td>
<td>All</td>
<td>2017-01-31 09:39:43</td>
<td>2017-01-31 09:44:32</td>
<td>3</td>
<td>-4.8123</td>
</tr>
</tbody>
</table>
-----------------------------------------------------------------------------------------------
switch(config-handler-eventHandler1-counters)#
```
**show hardware port-group**

The **show hardware port-group** command displays the status of DCS-7050Q-16 port-groups. Port groups contain one QSFP+ interface and a set of four SFP+ interfaces. In each port group, either the QSFP+ interface or the SFP+ interface set is enabled. The port groups are configured independent of each other.

- Port group 1 contains interface 15 (QSFP+) and interfaces 17-20 (SFP+).
- Port group 2 contains interface 16 (QSFP+) and interfaces 21-24 (SFP+).

**Command Mode**

EXEC

**Command Syntax**

```
show hardware port-group
```

**Guidelines**

The **hardware port-group** command is available on DCS-7050Q-16 switches.

**Example**

- This command displays the status of ports in the two port groups on a DCS-7050Q-16 switch.

```
switch>show hardware port-group

Portgroup: 1    Active Ports: Et15/1-4
Port            State
------------------------
Ethernet17      ErrDisabled
Ethernet18      ErrDisabled
Ethernet19      ErrDisabled
Ethernet20      ErrDisabled
Ethernet15/1    Active
Ethernet15/2    Active
Ethernet15/3    Active
Ethernet15/4    Active

Portgroup: 2    Active Ports: Et16/1-4
Port            State
------------------------
Ethernet16/1    Active
Ethernet16/2    Active
Ethernet16/3    Active
Ethernet16/4    Active
Ethernet21      ErrDisabled
Ethernet22      ErrDisabled
Ethernet23      ErrDisabled
Ethernet24      ErrDisabled
switch>
```
show interfaces capabilities

The `show interfaces capabilities` command displays the model number, interface type, duplex mode, and flow control settings of the specified interfaces. The capabilities command is available on Ethernet and management interfaces.

**Command Mode**
EXEC

**Command Syntax**
```
show interfaces [INTERFACE] capabilities
```

**Parameters**
- `INTERFACE` Interface type and numbers. Options include:
  - `<no parameter>` all interfaces.
  - `ethernet e_range` Ethernet interface range specified by `e_range`.
  - `management m_range` Management interface range specified by `m_range`.

Valid `e_range` and `m_range` formats include number, number range, or comma-delimited list of numbers and ranges.

**Examples**
- This command displays the model number, interface type, duplex mode and flow control settings for Ethernet interfaces 2 and 18.

```
switch>show interfaces ethernet 2,18 capabilities
Ethernet2
  Model:        DCS-7150S-64-CL
  Type:         10GBASE-CR
  Speed/Duplex: 10G/full,40G/full,auto
  Flowcontrol:  rx-(off,on,desired),tx-(off,on,desired)
Ethernet18
  Model:        DCS-7150S-64-CL
  Type:         10GBASE-SR
  Speed/Duplex: 10G/full
  Flowcontrol:  rx-(off,on),tx-(off,on)
```

switch>
**show interfaces counters**

The `show interfaces counters` command displays packet and byte counters for the specified interfaces. Counters displayed by the command include:

- inbound bytes
- inbound unicast packets
- inbound multicast packets
- inbound broadcast packets
- outbound bytes
- outbound unicast packets
- outbound multicast packets
- outbound broadcast packets

**Command Mode**

EXEC

**Command Syntax**

```
show interfaces [INTERFACE] counters
```

**Parameters**

- `INTERFACE`  Interface type and numbers. Options include:
  - `<no parameter>`  all interfaces.
  - `ethernet e_range`  Ethernet interface range specified by `e_range`.
  - `management m_range`  Management interface range specified by `m_range`.
  - `port-channel p_range`  Port-Channel Interface range specified by `p_range`.

**Related Commands**

- `show interfaces counters bins`
- `show interfaces counters errors`
- `show interfaces counters queue`
- `show interfaces counters rates`

**Examples**

- This command displays byte and packet counters for Ethernet interfaces 1 and 2.

```
switch>show interfaces ethernet 1-2 counters
Port     InOctets  InUcastPkts  InMcastPkts  InBcastPkts
Et1     99002845169  79116358  75557   2275
Et2     81289180585  76278345  86422   11

Port     OutOctets  OutUcastPkts  OutMcastPkts  OutBcastPkts
Et1     4347928323  6085482   356173   2276
Et2     4512762190  5791718  110498   15
```

switch>
show interfaces counters bins

The `show interfaces counters bins` command displays packet counters, categorized by packet length, for the specified interfaces. Packet length counters that the command displays include:

- 64 bytes
- 65-127 bytes
- 128-255 bytes
- 256-511 bytes
- 512-1023 bytes
- 1024-1522 bytes
- larger than 1522 bytes

Command Mode

EXEC

Command Syntax

`show interfaces [INTERFACE] counters bins`

Parameters

- `INTERFACE` Interface type and numbers. Options include:
  - `<no parameter>` all interfaces.
  - `ethernet e_range` Ethernet interface range specified by `e_range`.
  - `management m_range` Management interface range specified by `m_range`.
  - `port-channel p_range` Port-Channel Interface range specified by `p_range`.

Related Commands

- `show interfaces counters`
- `show interfaces counters errors`
- `show interfaces counters queue`
- `show interfaces counters rates`

Examples

- This command displays packet counter results for Ethernet interfaces 1 and 2.

```
switch>show interfaces ethernet 1-2 counters bins
Input
Port                64 Byte      65-127 Byte     128-255 Byte     256-511 Byte
------------------------------------------------------------------------------
Et1                    2503         56681135          1045154          1029152
Et2                        8         50216275          1518179          1086297
Port          512-1023 Byte   1024-1522 Byte    1523-MAX Byte
-------------------------------------------------------------
Et1                  625825         17157823          8246822
Et2                  631173         27059077          5755101
switch>
```
**show interfaces counters errors**

The `show interfaces counters errors` command displays the error counters for the specified interfaces.

**Command Mode**

EXEC

**Command Syntax**

```
show interfaces [INTERFACE] counters errors
```

**Parameters**

- **INTERFACE** Interface type and numbers. Options include:
  - `<no parameter>` all interfaces.
  - ethernet `e_range` Ethernet interface range specified by `e_range`.
  - management `m_range` Management interface range specified by `m_range`.
  - port-channel `p_range` Port-Channel Interface range specified by `p_range`.

**Display Values**

The table displays the following counters for each listed interface:

- FCS: Inbound packets with CRC error and proper size.
- Align: Inbound packets with improper size (undersized or oversized).
- Symbol: Inbound packets with symbol error and proper size.
- Rx: Total inbound error packets.
- Runts: Outbound packets that terminated early or dropped because of underflow.
- Giants: Outbound packets that overflowed the receiver and were dropped.
- Tx: Total outbound error packets.

**Related Commands**

- `show interfaces counters`
- `show interfaces counters bins`
- `show interfaces counters queue`
- `show interfaces counters rates`

**Examples**

- This command displays the error packet counters on Ethernet interfaces 1-2.

```
switch>show interfaces ethernet 1-2 counters errors

<table>
<thead>
<tr>
<th>Port</th>
<th>FCS</th>
<th>Align</th>
<th>Symbol</th>
<th>Rx</th>
<th>Runts</th>
<th>Giants</th>
<th>Tx</th>
</tr>
</thead>
<tbody>
<tr>
<td>Et1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Et2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

switch>
```
show interfaces counters queue

The show interfaces counters queue command displays the queue drop counters for the specified interfaces.

**Command Mode**

EXEC

**Command Syntax**

```
show interfaces [INTERFACE] counters queue
```

**Parameters**

- **INTERFACE** Interface type and numbers. Options include:
  - `<no parameter>` all interfaces.
  - `ethernet e_range` Ethernet interface range specified by `e_range`.
  - `management m_range` Management interface range specified by `m_range`.
  - `port-channel p_range` Port-Channel Interface range specified by `p_range`.

**Related Commands**

- `show interfaces counters`
- `show interfaces counters bins`
- `show interfaces counters errors`
- `show interfaces counters rates`

**Example**

- This command displays the queue drop counters for Ethernet interfaces 1 and 2.

```text
switch>show interfaces ethernet 1-2 counters queue
Port     InDrops
Et1       180
Et2       169
switch>
```
show interfaces counters rates

The `show interfaces counters rates` command displays the received and transmitted packet rate counters for the specified interfaces. Counter rates provided include megabits per second (Mbps), kilopackets per second (Kpps) and utilization percentage.

All port rates are calculated approximations. Note that, when displaying rate information for a port channel, the rate value for the port channel will likely differ from the sum of the rates for the member ports. The discrepancy is likely to be larger for port channels with fewer ports, and will be most obvious in single-port port channels. The rate values for individual member ports are less inaccurate than the rate values for the port channel as a whole.

Command Mode

EXEC

Command Syntax

```
show interfaces [INTERFACE] counters rates
```

Parameters

- `INTERFACE` Interface type and numbers. Options include:
  - `<no parameter>` all interfaces.
  - `ethernet e_range` Ethernet interface range specified by `e_range`.
  - `management m_range` Management interface range specified by `m_range`.
  - `port-channel p_range` Port-Channel Interface range specified by `p_range`.

Related Commands

- `show interfaces counters`
- `show interfaces counters bins`
- `show interfaces counters errors`
- `show interfaces counters queue`

Example

```
This command displays rate counters for Ethernet interfaces 1 and 2.

switch> show interfaces ethernet 1-2 counters rates
Port    Intvl   In Mbps     % In Kpps  Out Mbps     % Out Kpps
Et1     0:05    53.3       0.5%       5         31.2   0.3%       2
Et2     0:05    43.3       0.4%       4         0.1    0.0%       0
```

show interfaces negotiation

The show interfaces negotiation command displays the speed, duplex, and flow control auto-negotiation status for the specified interfaces.

Command Mode
EXEC

Command Syntax
show interfaces [INTERFACE] negotiation [INFO_LEVEL]

Parameters
- **INTERFACE** Interface type and numbers. Options include:
  - <no parameter> Display information for all interfaces.
  - ethernet e_range Ethernet interface range specified by e_range.
  - management m_range Management interface range specified by m_range.
  Valid e_range and m_range formats include number, number range, or comma-delimited list of numbers and ranges.
- **INFO_LEVEL** amount of information that is displayed. Options include:
  - <no parameter> displays status and negotiated setting of local ports.
  - detail displays status and negotiated settings of local ports and their peers.

Examples
- This command displays the negotiated status of management 1 and 2 interfaces.

  switch>show interface management 1-2 negotiation
  Port       Autoneg            Negotiated Settings
  Status   Speed     Duplex    Rx Pause  Tx Pause
  ---------  -------  --------  --------  --------  --------
  Ma1        success  100M      full      off       off
  Ma2        success  auto      auto      off       off

- This command displays the negotiated status of management 1 interface and its peer interface.

  switch>show interface management 1 negotiation detail
  Management1 :
  Auto-Negotiation Mode     10/100/1000 BASE-T (IEEE Clause 28)
  Auto-Negotiation Status   Success
  Advertisements            Speed          Duplex          Pause
  ------------------------  ----------  --------------------
  Local                     10M/100M/1G    half/full      Disabled
  Link Partner              None            None            None
  Resolution                100Mb/s        full            Rx=off,Tx=off

  switch>
show interfaces phy

The show interfaces phy command displays physical layer characteristics for the specified interfaces.

Command Mode
EXEC

Command Syntax
show interfaces [INTERFACE] phy [INFO_LEVEL]

Parameters
- INTERFACE Interface type and numbers. Options include:
  - <no parameter> All interfaces.
  - ethernet e_range Ethernet interfaces in specified range.
    Valid e_range formats include number, number range, or comma-delimited list of numbers and ranges.
- INFO_LEVEL amount of information that is displayed. Options include:
  - <no parameter> command displays table that summarizes PHY data.
  - detail command displays data block for each specified interface.

Examples
- This command summarizes PHY information for Ethernet interfaces 1-5.

```
switch>show interfaces ethernet 1-5 phy
Key:
U = Link up
D = Link down
R = RX Fault
T = TX Fault
B = High BER
L = No Block Lock
A = No XAUI Lane Alignment
0123 = No XAUI lane sync in lane N

<table>
<thead>
<tr>
<th>Port</th>
<th>PHY state</th>
<th>State Changes</th>
<th>Reset Count</th>
<th>PMA/PMD</th>
<th>PCS</th>
<th>XAUI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethernet1</td>
<td>linkUp</td>
<td>14518</td>
<td>1750</td>
<td>U...</td>
<td>U.... U.......</td>
<td></td>
</tr>
<tr>
<td>Ethernet2</td>
<td>linkUp</td>
<td>13944</td>
<td>1704</td>
<td>U...</td>
<td>U.... U.......</td>
<td></td>
</tr>
<tr>
<td>Ethernet3</td>
<td>linkUp</td>
<td>13994</td>
<td>1694</td>
<td>U...</td>
<td>U.... U.......</td>
<td></td>
</tr>
<tr>
<td>Ethernet4</td>
<td>linkUp</td>
<td>13721</td>
<td>1604</td>
<td>U...</td>
<td>U.... U.......</td>
<td></td>
</tr>
<tr>
<td>Ethernet5</td>
<td>detectingXcvr</td>
<td>3</td>
<td>1</td>
<td></td>
<td></td>
<td>D..A0123</td>
</tr>
</tbody>
</table>
```
switch>


This command displays detailed PHY information for Ethernet interface 1.

```
switch>show interfaces ethernet 1 phy detail
Current System Time: Mon Dec 5 11:32:57 2011
Ethernet1

<table>
<thead>
<tr>
<th>Current State</th>
<th>Changes</th>
<th>Last Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHY state</td>
<td>linkUp</td>
<td>14523</td>
</tr>
<tr>
<td>HW resets</td>
<td></td>
<td>1751</td>
</tr>
<tr>
<td>Transceiver</td>
<td>10GBASE-SRL</td>
<td>1704</td>
</tr>
<tr>
<td>Transceiver SN</td>
<td>C743UC2UD</td>
<td></td>
</tr>
<tr>
<td>Oper speed</td>
<td>10Gbps</td>
<td></td>
</tr>
<tr>
<td>Interrupt Count</td>
<td></td>
<td>71142</td>
</tr>
<tr>
<td>Diags mode</td>
<td>normalOperation</td>
<td></td>
</tr>
<tr>
<td>Model</td>
<td>ae12005c</td>
<td></td>
</tr>
<tr>
<td>Active uC image</td>
<td>microInit_mdio_SR_AEL2005C_28</td>
<td></td>
</tr>
<tr>
<td>Loopback</td>
<td>none</td>
<td></td>
</tr>
<tr>
<td>PMA/PMD RX signal detect</td>
<td>ok</td>
<td>11497</td>
</tr>
<tr>
<td>PMA/PMD RX link status</td>
<td>up</td>
<td>11756</td>
</tr>
<tr>
<td>PMA/PMD RX fault</td>
<td>ok</td>
<td>11756</td>
</tr>
<tr>
<td>PMA/PMD TX fault</td>
<td>ok</td>
<td>0</td>
</tr>
<tr>
<td>PCS RX link status</td>
<td>up</td>
<td>9859</td>
</tr>
<tr>
<td>PCS RX fault</td>
<td>ok</td>
<td>9832</td>
</tr>
<tr>
<td>PCS TX fault</td>
<td>ok</td>
<td>330</td>
</tr>
<tr>
<td>PCS block lock</td>
<td>ok</td>
<td>9827</td>
</tr>
<tr>
<td>PCS high BER</td>
<td>ok</td>
<td>8455</td>
</tr>
<tr>
<td>PCS err blocks</td>
<td>255</td>
<td></td>
</tr>
<tr>
<td>PCS BER</td>
<td>16</td>
<td>50092</td>
</tr>
<tr>
<td>XFI/XAUI TX link status</td>
<td>up</td>
<td>1282</td>
</tr>
<tr>
<td>XFI/XAUI RX fault</td>
<td>ok</td>
<td>585</td>
</tr>
<tr>
<td>XFI/XAUI TX fault</td>
<td>ok</td>
<td>2142</td>
</tr>
<tr>
<td>XFI/XAUI alignment status</td>
<td>ok</td>
<td>2929</td>
</tr>
<tr>
<td>XAUI lane 0-3 sync</td>
<td>(0123) = 1111</td>
<td>2932</td>
</tr>
<tr>
<td>XAUI sync w/o align HWM</td>
<td>0</td>
<td>never</td>
</tr>
<tr>
<td>XAUI sync w/o align max OK</td>
<td>5</td>
<td>never</td>
</tr>
<tr>
<td>XAUI excess sync w/o align</td>
<td>0</td>
<td>never</td>
</tr>
<tr>
<td>Xcwr EEPROM read timeout</td>
<td>46</td>
<td>4 days, 6:33:45 ago</td>
</tr>
<tr>
<td>Spurious xcvr detection</td>
<td>0</td>
<td>never</td>
</tr>
<tr>
<td>DOM control/status fail</td>
<td>0</td>
<td>never</td>
</tr>
<tr>
<td>I2C snoop reset</td>
<td>0</td>
<td>never</td>
</tr>
<tr>
<td>I2C snoop reset (xcvr)</td>
<td>0</td>
<td>never</td>
</tr>
<tr>
<td>Margin count</td>
<td>5</td>
<td>last &gt; 0</td>
</tr>
<tr>
<td>EDC resets</td>
<td>1</td>
<td>0:02:03 ago</td>
</tr>
<tr>
<td>EDC FFE0 - FFE11</td>
<td>-4 -5 57 -6 -6 -2 1 0 -2 -1 1 -1</td>
<td></td>
</tr>
<tr>
<td>EDC FBE1 - FBE4</td>
<td>6 -1 5 -1</td>
<td></td>
</tr>
<tr>
<td>EDC TFBE1 - TFBE4</td>
<td>1 2 1 2</td>
<td></td>
</tr>
<tr>
<td>EDC VGA1, VGA3</td>
<td>12 115</td>
<td></td>
</tr>
<tr>
<td>TX path attenuation</td>
<td>3.0 dB</td>
<td></td>
</tr>
<tr>
<td>TX preemphasis</td>
<td>(0,62,4) (pre,main,post)</td>
<td></td>
</tr>
</tbody>
</table>
```
show interfaces status

The `show interfaces status` command displays the interface name, link status, vlan, duplex, speed, and type of the specified interfaces. When the command includes a link status, the results are filtered to display only interfaces whose link status match the specified type.

**Command Mode**

EXEC

**Command Syntax**

```
show interfaces [INTERFACE] status [STATUS_TYPE]
```

**Parameters**

- **INTERFACE** Interface type and numbers. Options include:
  - <no parameter> All existing interfaces.
  - `ethernet e_range` Ethernet interfaces in the specified range.
  - `management m_range` Management interfaces in the specified range.
  - `port-channel p_range` All existing port-channel interfaces in the specified range.

  Valid `e_range`, `m_range`, and `p_range` formats include number, number range, or comma-delimited list of numbers and ranges.

- **STATUS_TYPE** Interface status upon which the command filters output. Options include:
  - <no parameter> command does not filter on interface status.
  - `connected` interfaces connected to another port.
  - `notconnect` unconnected interfaces that are capable of connecting to another port.
  - `disabled` interfaces that have been powered down or disabled.
  - `sub-interfaces` L3 subinterfaces configured on the switch.

  Command may include multiple status types (`connected notconnect disabled`), which can be placed in any order.

**Example**

- This command displays the status of Ethernet interfaces 1-5.

  ```
  switch>show interfaces ethernet 1-5 status
  Port     Name      Status  Vlan  Duplex  Speed  Type
  Et1       --        connected 1  full    10G  10GBASE-SRL
  Et2       --        connected 1  full    10G  10GBASE-SRL
  Et3       --        connected 1  full    10G  10GBASE-SRL
  Et4       --        connected 1  full    10G  10GBASE-SRL
  Et5       --        notconnect 1  full    10G Not Present
  switch>
  ```

- This command displays status information for all subinterfaces configured on the switch.

  ```
  switch>show interfaces status sub-interfaces
  Port     Name      Status  Vlan  Duplex  Speed  Type                        Flags
  Et1.1     --        connect 101  full    10G  dot1q-encapsulation
  Et1.2     --        connect 102  full    10G  dot1q-encapsulation
  Et1.3     --        connect 103  full    10G  dot1q-encapsulation
  Et1.4     --        connect 103  full    10G  dot1q-encapsulation
  switch>
  ```
**show interfaces status errdisabled**

The *show interfaces status errdisabled* command displays interfaces that are in errdisabled state, including their link status and errdisable cause.

**Command Mode**

EXEC

**Command Syntax**

```bash
show interfaces [INTERFACE] status errdisabled
```

**Parameters**

- **INTERFACE** Interface type and numbers. Options include:
  - `<no parameter>` Display information for all interfaces.
  - `ethernet e_range` Ethernet interface range specified by `e_range`.
  - `management m_range` Management interface range specified by `m_range`.
  - `port-channel p_range` Port-Channel Interface range specified by `p_range`.

  Valid `e_range` and `m_range` formats include number, number range, or comma-delimited list of numbers and ranges.

**Examples**

- This command displays the error-disabled ports.

```bash
switch>show interfaces status errdisabled
+----------------+-----------------+-------------------+
<table>
<thead>
<tr>
<th>Port</th>
<th>Name</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Et49/2</td>
<td></td>
<td>errdisabled</td>
</tr>
<tr>
<td>Et49/3</td>
<td></td>
<td>errdisabled</td>
</tr>
<tr>
<td>Et49/4</td>
<td></td>
<td>errdisabled</td>
</tr>
</tbody>
</table>

switch>
```
show interfaces transceiver

The `show interfaces transceiver` command displays operational transceiver data for the specified interfaces.

**Command Mode**
EXEC

**Command Syntax**
```
show interfaces [INTERFACE] transceiver [DATA_FORMAT]
```

**Parameters**
- `INTERFACE` Interface type and numbers. Options include:
  - `<no parameter>` all interfaces.
  - `ethernet e_range` Ethernet interface range specified by `e_range`.
  - `management m_range` Management interface range specified by `m_range`.
    Valid `e_range`, and `m_range` formats include number, number range, or comma-delimited list of numbers and ranges.
- `DATA_FORMAT` format used to display the data. Options include:
  - `<no parameter>` table entries separated by tabs.
  - `csv` table entries separated by commas.

**Related Commands**
- `show interfaces transceiver properties`

**Examples**
- This command displays transceiver data on Ethernet interfaces 1 through 4.
  
```
switch>show interfaces ethernet 1-4 transceiver
If device is externally calibrated, only calibrated values are printed.
N/A: not applicable, Tx: transmit, Rx: receive.
mA: milliamperes, dBm: decibels (milliwatts).

<table>
<thead>
<tr>
<th>Port</th>
<th>Temp (Celsius)</th>
<th>Voltage (Volts)</th>
<th>Bias Current (mA)</th>
<th>Optical Tx Power (dBm)</th>
<th>Optical Rx Power (dBm)</th>
<th>Last Update</th>
</tr>
</thead>
<tbody>
<tr>
<td>Et1</td>
<td>34.17</td>
<td>3.30</td>
<td>6.75</td>
<td>-2.41</td>
<td>-2.83</td>
<td>2011-12-02 16:18:48</td>
</tr>
<tr>
<td>Et2</td>
<td>35.08</td>
<td>3.30</td>
<td>6.75</td>
<td>-2.23</td>
<td>-2.06</td>
<td>2011-12-02 16:18:42</td>
</tr>
<tr>
<td>Et3</td>
<td>36.72</td>
<td>3.30</td>
<td>7.20</td>
<td>-2.02</td>
<td>-2.14</td>
<td>2011-12-02 16:18:49</td>
</tr>
<tr>
<td>Et4</td>
<td>35.91</td>
<td>3.30</td>
<td>6.92</td>
<td>-2.20</td>
<td>-2.23</td>
<td>2011-12-02 16:18:45</td>
</tr>
</tbody>
</table>
```

switch>
show interfaces transceiver channels

The `show interfaces transceiver channels` command displays current wavelength/frequency settings for the specified channels.

**Command Mode**

EXEC

**Command Syntax**

```
show interfaces [INTERFACE e_range] transceiver channels
```

**Parameters**

- `INTERFACE` Interface type and port numbers.
  - `ethernet e_range` Ethernet interface range specified by `e_range`.

**Related Commands**

- `transceiver channel`
- `show interfaces transceiver hardware`

**Examples**

- This command displays the supported wavelengths/frequencies and their corresponding channel numbers on Ethernet interface 4 to slot 3 through 4.

  switch(config-as-if-Et4/1/3)#show interfaces ethernet 4 / 3 / 4 transceiver channels
  
<table>
<thead>
<tr>
<th>Name: Et4/3/4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>Wavelength</td>
</tr>
<tr>
<td>(nm)</td>
</tr>
<tr>
<td>-------------</td>
</tr>
<tr>
<td>1567.95</td>
</tr>
<tr>
<td>1567.54</td>
</tr>
<tr>
<td>1567.13</td>
</tr>
<tr>
<td>1566.72</td>
</tr>
<tr>
<td>...</td>
</tr>
<tr>
<td>1529.16</td>
</tr>
<tr>
<td>1528.77</td>
</tr>
<tr>
<td>1528.38</td>
</tr>
</tbody>
</table>

  switch(config-as-if-Et4/1/3)#
**show interfaces transceiver hardware**

The *show interfaces transceiver hardware* command displays current wavelength/frequency settings for the specified transceiver interfaces.

**Command Mode**

EXEC

**Command Syntax**

```
show interfaces [INTERFACE e_range] transceiver hardware
```

**Parameters**

- **INTERFACE** Interface type and port numbers.
- **ethernet e_range** Ethernet interface range specified by *e_range*.

**Related Commands**

- *transceiver channel*
- *show interfaces transceiver channels*

**Examples**

- This command displays the current wavelength/frequency settings on Ethernet interface 4 to slot 3 through 4.

  ```
  switch(config-as-if-Et4/1/3)#show interfaces ethernet 4 / 3 / 4 transceiver hardware
  Name: Et4/3/4
  Media Type: 10GBASE-DWDM
  Configured Channel : 39
  Configured Grid (GHz) : 50
  Computed Frequency (GHz) : 193,100
  Computed Wavelength (nm) : 1552.52
  Operational Channel : 39 (Default)
  Operational Grid (GHz) : 50 (Default)
  Operational Frequency (GHz): 193,100
  Operational Wavelength (nm): 1552.52
  switch(config-as-if-Et4/1/3)#
  ```
show interfaces transceiver properties

The `show interfaces transceiver properties` command displays configuration information for the specified interfaces. Information provided by the command includes the media type, interface speed-duplex settings, speed-duplex operating state.

**Command Mode**

EXEC

**Command Syntax**

```
show interfaces [INTERFACE] transceiver properties
```

**Parameters**

- `INTERFACE` Interface type and numbers. Options include:
  - `<no parameter>` Display information for all interfaces.
  - `ethernet e_range` Ethernet interface range specified by `e_range`.
  - `management m_range` Management interface range specified by `m_range`.

Valid `e_range` and `m_range` formats include number, number range, or comma-delimited list of numbers and ranges.

**Related Commands**

- `show interfaces transceiver`

**Examples**

- This command displays the media type, speed, and duplex properties for Ethernet interfaces 1-3.

```
switch>show interfaces ethernet 1-3 transceiver properties
Name : Et1
Administrative Speed: 10G
Administrative Duplex: full
Operational Speed: 10G (forced)
Operational Duplex: full (forced)
Media Type: 10GBASE-SRL

Name : Et2
Administrative Speed: 10G
Administrative Duplex: full
Operational Speed: 10G (forced)
Operational Duplex: full (forced)
Media Type: 10GBASE-SRL

Name : Et3
Administrative Speed: 10G
Administrative Duplex: full
Operational Speed: 10G (forced)
Operational Duplex: full (forced)
Media Type: 10GBASE-SRL

switch>
```
show platform fm6000 agileport map

The `show platform fm6000 agileport map` command displays the list of Ethernet interfaces that are combinable to form a higher speed port.

**Command Mode**
Privileged EXEC

**Command Syntax**

`show platform fm6000 agileport map`

**Example**

- These commands displays the agile port map for the switch, then configures Ethernet interface 13 as a 40G port, subsuming Ethernet interfaces 15, 17 and 19.

```
switch#show platform fm6000 agileport map

<table>
<thead>
<tr>
<th>Agile Ports</th>
<th>Interfaces subsumed in 40G link</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethernet1</td>
<td>Ethernet3 Ethernet5 Ethernet7</td>
</tr>
<tr>
<td>Ethernet2</td>
<td>Ethernet4 Ethernet6 Ethernet8</td>
</tr>
<tr>
<td>Ethernet13</td>
<td>Ethernet15 Ethernet17 Ethernet19</td>
</tr>
<tr>
<td>Ethernet14</td>
<td>Ethernet16 Ethernet18 Ethernet20</td>
</tr>
</tbody>
</table>

switch#config
switch(config)#interface ethernet 13
switch(config-if-Et13)#speed forced 40gfull

WARNING! Executing this command will cause the forwarding agent to be restarted. All interfaces will briefly drop links and forwarding on all interfaces will momentarily stop.

Do you wish to proceed with this command? [y/N]

Ethernet13 configured for 40G.
Ethernet15, Ethernet17 and Ethernet19 are now subsumed.
```

switch(config-if-Et13)#```
speed

The `speed` command configures the transmission speed and duplex setting for the configuration mode interface. The scope and effect of this command depends on the interface type. Interface types include:

- **40GBASE (QSFP+):** Default is 4x10G-full. `Speed forced 40gfull` and `Speed auto 40gfull` configure interface as a 40G port.
- **10GBASE-T:** Default is 10G-full. `Speed` command affects interface.
- **10GBASE (SFP+):** Default is 10G-full. `Speed` command does not affect interface.
- **1000BASE (copper):** Default is 1G-full. `speed auto 100full` affects interface.
- **1000BASE (fiber):** Default is 1G-full. `Speed` command does not affect interface.
- **10/100/1000:** Default is `auto-negotiation`. `Speed` command (10/100/1000 options) affects interface.

The `speed forced 40gfull` and `auto 40gfull` commands configure a QSFP+ Ethernet interface as a 40G port. The `no speed` and `no auto 40gfull` commands configure a QSFP+ Ethernet interface as four 10G ports. These commands must be applied to the /1 port. These commands are hitless on the 7050X, 7060X, 7250X, 7260X, 7280SE, 7300X, 7320X and 7500E series platforms. On all other platforms, these commands restart the forwarding agent, which will result in traffic disruption.

The `no speed` and `default speed` commands restore the default setting for the configuration mode interface by removing the corresponding `speed` command from `running-config`.

**Command Mode**

- Interface-Ethernet Configuration
- Interface-Management Configuration

**Command Syntax**

- `speed MODE`
- `no speed`
- `default speed`

**Parameters**

- **MODE** transmission speed and duplex setting. Options include:
  - `auto` auto negotiation mode.
  - `auto 40gfull` auto negotiation mode with clause 73 auto negotiation.

**Important!** Interfaces using clause 73 auto negotiation must connect to a device that runs clause 73 auto negotiation.

- `sfp-1000baset auto` auto-negotiation mode (1000BASE-T interfaces only).
- `forced 10000full` 10G full duplex.
- `forced 1000full` 1G full duplex.
- `forced 1000half` 1G half duplex.
- `forced 100full` 100M full duplex.
- `forced 100gfull` 100G full duplex.
- `forced 100half` 100M half duplex.
- `forced 10full` 10M full duplex.
- `forced 10half` 10M half duplex.
- `forced 40gfull` 40G full duplex.
On 40GBASE and 100GBASE interfaces, options that change the SFP+ and MXP interfaces (the auto 40gfull, the forced 40gfull, and the no speed options) may restart the forwarding agent on some switch platforms, disrupting traffic on all ports for more than a minute.

Examples

- This command configures a 40GBASE interface as a 40G port.

```plaintext
switch(config)#interface ethernet 49/1
switch(config-if-Et49/1)#speed forced 40gfull
switch(config-if-Et49/1)#show interface ethernet 49/1 - 49/4 status
Port Name Status Vlan Duplex Speed Type
Et49/1 connected in Po999 full 40G 40GBASE-CR4
Et49/2 errdisabled inactive unconf unconf 40GBASE-CR4
Et49/3 errdisabled inactive unconf unconf 40GBASE-CR4
Et49/4 errdisabled inactive unconf unconf 40GBASE-CR4
switch(config-if-Et49/1)#
```

- This command configures a 40GBASE interface as four 10G ports (default configuration).

```plaintext
switch(config-if-Et49/1)#no speed
switch(config-if-Et49/1)#show interface ethernet 49/1 - 49/4 status
Port Name Status Vlan Duplex Speed Type
Et49/1 connected routed full 10G 40GBASE-SR4
Et49/2 connected routed full 10G 40GBASE-SR4
Et49/3 connected routed full 10G 40GBASE-SR4
Et49/4 notconnect inactive full 10G 40GBASE-SR4
switch(config-if-Et49/1)#
```
transceiver qsfp default-mode

The `transceiver qsfp default-mode` command specifies the transmission mode of all QSFP transceiver modules that are not explicitly configured.

Each QSFP+ module Ethernet interface is configurable as a single 40G port or as four 10G ports. The switch displays four ports for each interface. Each port’s status depends on the interface configuration:

- The /1 port is active (connected or not connected), regardless of the interface configuration.
- The /2, /3, and /4 ports are error-disabled when the interface is configured as a single 40G port.
- all ports are active (connected or not connected), when the interface is configured as four 10G ports.

The only available default-mode value is 4x10G; QSFP modules that are not configured through a `speed` command are operated as four 10G ports.

The `no transceiver qsfp default-mode` and `default transceiver qsfp default-mode` commands restore the default-mode transceiver setting to its default value of 4x10G.

**Command Mode**

Global Configuration

**Command Syntax**

```
transceiver qsfp default-mode 4x10G
no transceiver qsfp default-mode
default transceiver qsfp default-mode
```

**Guidelines**

The `transceiver qsfp default-mode 4x10G` statement is always in `running-config` and cannot be modified or removed in the current release.
transceiver channel

The transceiver channel command displays transceiver wavelength/frequency by channel number. The channel numbering depends on the selected grid-spacing mode. The default grid-spacing mode is 50GHz-spacing.

- If the startup configuration does not specify the channel number for the interface, the transceiver will automatically tune to the default channel (i.e. channel-39 of 50GHz-spacing grid) when it is inserted.
- If the configured wavelength/frequency is not supported by the transceiver, the transceiver will be tuned to the default channel (i.e. channel-39 of 50GHz-spacing grid).

The interface is shutdown before the channel number is configured.

Command Mode
Global Configuration

Command Syntax
transceiver channel CHANNEL_NUMBER grid-spacing <SPACING_GRID>
no transceiver channel CHANNEL_NUMBER [GRID_SPACING <SPACING_GRID>]
default transceiver channel CHANNEL_NUMBER [GRID_SPACING <SPACING_GRID>]

Parameters
- CHANNEL-NUMBER The default channel is 39 (50GHz-spacing grid) which corresponds to a frequency of 193,100 GHz and a wavelength of 1552.52 nm.
- GRID_SPACING Grid-spacing mode (optional) depends on the selected grid-spacing mode. The default grid-spacing mode is 50GHz-spacing. For example, channel 39 of 50GHz-spacing grid is equivalent to channel 20 of 100GHz-spacing grid, which corresponds to a frequency of 193,100 GHz and a wavelength of 1552.52 nm.
- <SPACING_GRID> default grid-spacing mode in GHz.

Related Commands
- show interfaces transceiver channels
- show interfaces transceiver hardware

Example
- This command tunes the transceiver on slot number 4 to slot 1 through 3 of 50GHz-spacing grid.
  switch(config-as)#interface ethernet 4 / 1 / 3
  switch(config-if-Et4/1/3)#transceiver channel 1 grid-spacing 50
  switch(config-if-Et4/1/3)#