Sun Ethernet Fabric Operating System

DCB Administration Guide

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Contents

Using This Documentation

The DCBX protocol is used to exchange DCB configuration parameters with LLDP neighbors. The CEE DCBX standard specifies two major feature sets: priority group, which is also known as enhanced transmission selection, and priority-flow control.

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Purpose and Scope

This document describes the SEFOS DCB implementation, which is based on the CEE standard version 1.01 DCBX base specification revision 1.0.1.

Product Notes

For late-breaking information and known issues about the following products, refer to the product notes at:

Sun Blade 6000 Ethernet Switched NEM 24p 10GbE:

http://www.oracle.com/pls/topic/lookup?ctx=SB6K-24p-10GbE

Sun Network 10GbE Switch 72p:

http://www.oracle.com/pls/topic/lookup?ctx=SN-10GbE-72p

Related Documentation

Documentation	Links
All Oracle products	http://oracle.com/documentation
Sun Blade 6000 Ethernet Switched NEM 24p 10GbE	http://www.oracle.com/pls/topic/lookup?ctx=SB6K-24p-10GbE
Sun Network 10GbE Switch 72p	http://www.oracle.com/pls/topic/lookup?ctx=SN-10GbE-72p
Sun Blade 6000 modular system	http://www.oracle.com/pls/topic/lookup?ctx=sb6000
Oracle Integrated Lights Out Manager (Oracle ILOM) 3.0	http://www.oracle.com/pls/topic/lookup?ctx=ilom30

For detailed information about the commands and options described in this document, refer to the *Sun Ethernet Fabric Operating System CLI Base Reference Manual*.

Acronyms and Abbreviations

Acronym or Abbreviation	Explanation
CEE	Converged enhanced Ethernet
CLI	Command-line interface
CNA	Converged network adapter
DCB	Data center bridging3
DCBX	DCB capability exchange protocol
ETS	Enhanced transmission selection
FC	Fibre Channel
FCoE	Fibre Channel over Ethernet
LLDP	Link Layer Discovery Protocol, IEEE 802.1AB

Acronym or Abbreviation	Explanation
OUI	Organizationally unique identifier
PFC	Priority-based flow control
PG	Priority group
PGID	Priority group to which the priority belongs
QoS	Quality of service
SEFOS	Sun Ethernet Fabric Operating System
TLV	Type length value

CLI Command Modes

The following table lists the configuration modes used in this document with their access and exit methods.

Command Mode	Access Method	Prompt	Exit Method
User EXEC	Access SEFOS from Oracle ILOM with read-only rights (privilege level 1).	SEFOS>	Use the logout or exit command to return to the Oracle ILOM prompt.
Privileged EXEC	Access SEFOS from Oracle ILOM with full administrative rights (privilege level 15).	SEFOS#	Use the logout or exit command to return to the Oracle ILOM prompt.
Global Configuration	From User EXEC mode, use the enable command.	SEFOS(config)#	Use the end command to return to Privileged EXEC mode.
Interface Configuration	From Global Configuration mode, use the interface interface-type interface-id command.	SEFOS(config-if)#	Use the exit command to return to Global Configuration mode, or use the end command to return to Privileged EXEC mode.
Router Configuration	From Global Configuration mode, use the router rip command.	SEFOS(config-router)#	Use the exit command to return to Global Configuration mode, or use the end command to return to Privileged EXEC mode.

Feedback

Provide feedback on this documentation at:

`http://www.oracle.com/goto/docfeedback`

Support and Accessibility

Description	Links
Access electronic support through My Oracle Support	`http://support.oracle.com`
	For hearing impaired:
	`http://www.oracle.com/accessibility/support.html`
Learn about Oracle's commitment to accessibility	`http://www.oracle.com/us/corporate/accessibility/index.html`

Protocol Description

These sections describe DCB, the priority group feature, the PFC feature, the application protocol feature and an example topology.

DCB Protocol

DCB is a term commonly used to describe Ethernet enhancements to improve Ethernet networking and management in data center environments. DCB is a framework that defines the enhancements that are required for switches and endpoints and includes the following features:

- PG, also knows as ETS, the priority grouping specification provides bandwidth management as well as a scheduling algorithm for various traffic classes on a converged link.
- PFC is an enhancement to the existing Ethernet pause protocol, this feature allows "no-drop" packet delivery for certain traffic classes.

This release of the SEFOS DCB feature supports DCB version 1.0.1, as specified by the DCB task group.

DCB features are discovered and exchanged using the DCBX protocol. DCBX uses LLDP to exchange parameters between two converged link peers. The parameters that are exchanged by DCB are packaged into organizationally specific TLVs and sent to the peer through LLDP messages.

The OUI used for the DCBX TLV is 0x001B21. IEEE-defined OUI and DCBX are used when the IEEE DCBX implementation is available. Because DCBX is an acknowledged protocol that uses LLDP, both transmit and receive directions from LLDP must be enabled on the interface that runs DCBX.

In addition to exchanging DCB parameters with the link partner, the local system DCBX entity works closely with the QoS module to configure the scheduling policy, manage bandwidth, and control the priority flow control in the hardware.

Priority Group Feature

PG (ETS) allocates link bandwidth based on the priority group setting on a link. Different traffic types might have different network bandwidth requirements. With a PGID group identifier, one or more priorities can be grouped together for the purpose of bandwidth allocation. The number of priority groups that can be supported cannot exceed the number of traffic classes supported.

Before you configure the PG, you must identify the priority to the priority group mapping based on the network traffic types and the bandwidth requirement for each PG. In some deployment environments, a priority group can be configured as an unrestricted group. This unrestricted group does not need its bandwidth allocation, and strict priority scheduling is applied to this group.

- PGIDs from 0 to 7 are available for bandwidth allocation.
- PGID 15 is for the unrestricted priority group.

The PG feature is an asymmetric parameter exchange feature. This means that the desired PG configuration for the peer does not have to match the local PG configuration.

PFC Feature

The PFC feature provides "no-drop" packet delivery for certain traffic classes while maintaining existing LAN behavior for other traffic classes on a converged link. Priority 3 is enabled by default for flow control. In order to efficiently utilize switch resources, the switch allows up to two priorities for Ethernet priority pause. The Ethernet per-priority pause is applied only to PFC packets.

The PFC feature is a symmetric exchange feature. This means that the desired PFC configuration for the peer must match the local PFC configuration.

Application Protocol Feature

The application protocol feature allows the DCB node to advertise the upper-layer protocols and associated priority mapping over a DCB link. Because the SEFOS switch is only a DCB-capable switch and it is not FCoE-capable, EtherType for layer 2 protocols is the only protocol supported. The protocol's main purpose is to advertise its capability to the link partner, which is a CNA port, and the host runs FCoE over this CNA link. The priority mapping for this feature is taken from what the PFC feature has configured.

Topology Setup

All the configurations explained in this guide are based on the following topology.
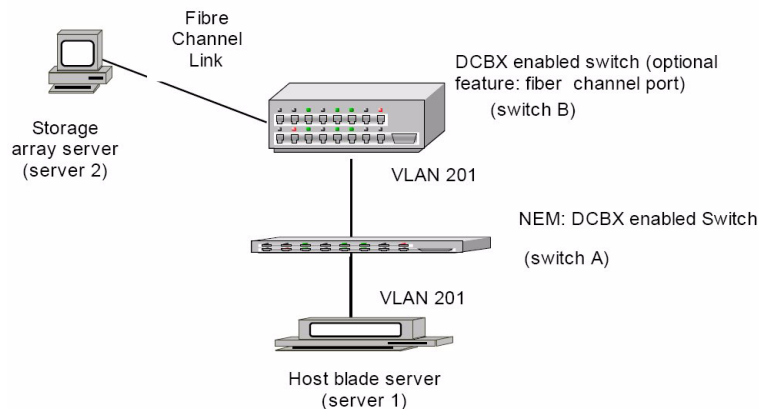
Configuring DCB

These sections provide configuration requirements and sample configurations using DCB with SEFOS switches.

Configuration Specifications

The topology that is presented in this guide is configured with the following system specifications:

Host Blade Configuration

In a configuration using DCB with SEFOS switches, the host blade (server 1) has the following specifications:

- Sun Dual 10GbE PCIe 2.0 Fabric Expansion Module connected to the switch in slot 0:
  - Linux interface: FEM port 0
  - Switch port number: 18
  - Can also be used to connect to the switch's external ports such as ports 1 or 2.

- Host blade running SUSE 11 2.6.32.12-0.7 or later.

  SEFOS DCB only supports a server with a Sun Dual 10GbE SFP+ PCIe 2.0 ExpressModule Adapter installed.

- Server option: Server running SUSE 11 2.6.32.12-0.7 with Sun Dual 10GbE SFP+ PCIe 2.0 ExpressModule Adapter installed.

Switch A

Switch A has the following specifications:

- Port 2 is connected to port 33 of a third-party DCBX-capable switch.
- Port 18 is connected to the host blade server.
- `VLAN 201` is assigned to port 2 and port 18.

Switch B

Switch B is a third-party DCB capable switch with the following specifications:

- Port 33 is connected to port 2 of switch A.
- VLAN is assigned to port 33.
- Optionally, if switch B supports a Fibre Channel port, that port can be connected to the FC port of a storage array server.

Storage Array Server

In a configuration using DCB with SEFOS switches, an optional storage array (server 2) can be configured. This additional server is only required if the host server will run FCoE. Refer to documentation provided with the storage array server for information about configuring the storage array.

Configuration Guidelines

The following configuration guidelines apply where DCB is used:

- Configure the PG based on the traffic types and bandwidth requirements.

- The PFC priority set must match the peer's configuration. VLAN priority 3 is normally used. SEFOS supports a maximum of two priorities.
- Evaluate the following default settings table to determine if the default settings are applicable.
- If SEFOS DCB is to be used as a pass-through for FCoE traffic, the port connected to the host CNA running FCoE, the port connected to a third-party FCoE switch must be configured to belong to the same VLAN as what is configured on the third-party switch.
  - You must start LLDP system control status before DCBX TLVs can be exchanged.
  - You must enable LLDP for both transmit and receive, which is the default behavior.
- To enable and configure SEFOS DCB, you must complete the following minimum tasks:
  - Enable LLDP.
  - Enable DCB globally.
  - Enable the interface DCB feature that will be involved in DCBX exchange.
  - Configure the VLAN to DCB-capable ports if needed.
- The SEFOS DCB will not accept its configurations from the peer.

Refer to the *Sun Ethernet Fabric Operating System CLI Base Reference Manual* for the complete set of commands and the various options available for configuring DCB.

Default Settings

When DCB is enabled, SEFOS configures each of the DCB features with the following default values.

Priority	Priority Group ID (PGID)	PG Bandwidth Allocation (%)	Priority Flow Control	Application Priority Mapping
0	0	50 (share with same group)	disable	disable
1	0	50 (share with same group)	disable	disable
2	0	50 (share with same group)	disable	disable
3	1	30	enable	enable

Priority	Priority Group ID (PGID)	PG Bandwidth Allocation (%)	Priority Flow Control	Application Priority Mapping
4	2	20 (share with same group)	disable	disable
5	2	20 (share with same group)	disable	disable
6	2	20 (share with same group)	disable	disable
7	15	Unrestricted (not subject to bandwidth limitation)	disable	disable

▼ Configure DCB Features

The following example shows the default configuration values for all three DCB features. Perform the following task to apply the default DCB configuration, enabling all three of the DCB features.

See "Default Settings" on page 11 for detailed information about the specifications used in the following example. See other sections in this document for additional details on each command.

1. Start DCB globally.

```
SEFOS# configure terminal
SEFOS(config)# no shutdown dcb
```

2. Enable DCB features on interface 0/2 and start the interface.

```
SEFOS(config)# interface extreme-ethernet 0/2
SEFOS(config-if)# set dcb enable
SEFOS(config-if)# set dcb priority-flow-control enable
SEFOS(config-if)# set dcb priority-flow-control vlan-priority 0 0
0 1 0 0 0 0
SEFOS(config-if)# set dcb priority-flow-control mode auto
SEFOS(config-if)# set dcb priority-group enable
SEFOS(config-if)# set dcb priority-group 0 0 0 1 2 2 2 15 bandwidth
50 30 20 0 0 0 0 0
SEFOS(config-if)# set dcb priority-group mode auto
SEFOS(config-if)# set dcb application-etype-fcoe enable
```

```
SEFOS(config-if)# lldp tlv-select dcb1tlv priority-group
priority-flow-control applicationetype-fcoe
SEFOS(config-if)# no shutdown
SEFOS(config-if)# exit
```

3. **Enable DCB features on interface** 0/18 **and start the interface.**

```
SEFOS(config)# interface extreme-ethernet 0/18
SEFOS(config-if)# set dcb enable
SEFOS(config-if)# set dcb priority-flow-control enable
SEFOS(config-if)# set dcb priority-flow-control vlan-priority 0 0
0 1 0 0 0 0
SEFOS(config-if)# set dcb priority-flow-control mode auto
SEFOS(config-if)# set dcb priority-group enable
SEFOS(config-if)# set dcb priority-group 0 0 0 1 2 2 2 15 bandwidth
50 30 20 0 0 0 0 0
SEFOS(config-if)# set dcb priority-group mode auto
SEFOS(config-if)# set dcb application-etype-fcoe enable
SEFOS(config-if)# lldp tlv-select dcb1tlv priority-group
priority-flow-control applicationetype-fcoe
SEFOS(config-if)# no shutdown
SEFOS(config-if)# end
```

4. **Assign** VLAN 201 **to ports 2 and 18 for traffic pass-through and isolation.**

```
SEFOS# configure terminal
SEFOS(config)# vlan 201
SEFOS(config-vlan)# ports add extreme-ethernet 0/2,0/18
SEFOS(config-vlan)# exit
```

5. **Start LLDP globally.**

LLDP must be started and enabled for DCBX protocol TLVs exchange.

```
SEFOS(config)# no shutdown lldp
SEFOS(config)# set lldp enable
SEFOS# end
```

Verifying DCB and LLDP Configurations

If both peers that are connected to port 2 and port 18 have been configured properly, you can use various `show` commands to verify the configurations. Use the following commands to display the configurations and verify that a DCB feature is configured correctly, and that DCBX TLVs are exchanged with a peer.

▼ Determine VLAN Assignment

● **Type the** `show vlan id` **command to determine VLAN assignment.**

In the sample configuration, port 2 and port 18 must have VLAN 201 assigned to them.

▼ Determine Whether Interfaces Are Active

● **Type.**

```
show interfaces extreme-ethernet 0/2 description
show interfaces extreme-ethernet 0/18 description
```

If interfaces are not in the up state, DCBX TLVs will not be exchanged.

▼ Determine Whether LLDP is Running and Recognizing Peers

In a correct DCB configuration, LLDP must be running and recognizing peers. If LLDP does not show the neighbors for port 2 and port 18, perform the following steps to determine whether the peers are configured correctly and both links are up.

1. Display the DCB administrative, operational, and peer configurations.

```
SEFOS# show interfaces extreme-ethernet 0/2 dcb priority-group
detail
SEFOS# show interfaces extreme-ethernet 0/2 dcb
priority-flow-control detail
SEFOS# show interfaces extreme-ethernet 0/2 dcb
application-etype-fcoe detail
SEFOS# show interfaces extreme-ethernet 0/18 dcb priority-group
detail
SEFOS# show interfaces extreme-ethernet 0/18 dcb
priority-flow-control detail
SEFOS# show interfaces extreme-ethernet 0/18 dcb
application-etype-fcoe detailshow
SEFOS# show interfaces extreme-ethernet 0/2 dcb counters
SEFOS# show interfaces extreme-ethernet 0/18 dcb counters
```

2. Display the VLAN information for the database.

```
SEFOS# show vlan 201

Vlan database
-------------
Vlan ID            : 201
Member Ports       : Ex0/2, Ex0/18
Untagged Ports     : None
Forbidden Ports    : None
Name               :
Status             : Permanent
```

In the following steps, DCB features are exchanged, and DCB is in operating mode with its peer.

3. Ensure that the interface is up on a specified port (port 0/2, in this example).

```
SEFOS# show interfaces extreme-ethernet 0/2 description

Interface    Status   Protocol
---------    ------   --------
Ex0/2        up       up
```

4. Ensure that the interface is up on a specified port (port 0/18, in this example).

```
SEFOS# show interfaces extreme-ethernet 0/18 description

Interface    Status   Protocol
---------    ------   --------
Ex0/18        up       up
```

5. Display the LLDP global configuration details.

```
SEFOS# show lldp

LLDP is enabled
Transmit Interval        : 30
Holdtime Multiplier      : 4
Reinitialization Delay   : 2
Tx Delay                 : 2
Notification Interval    : 5
Chassis Id SubType       : Mac Address
Chassis Id               : 00:14:4f:6c:5e:cf
```

6. **Display information about the neighbors learned on the interfaces.**

```
SEFOS# show lldp neighbors

Capability Codes   :
(R) Router, (B) Bridge, (T) Telephone, (C) DOCSIS Cable Device,
(W) WLAN Access Point, (P) Repeater, (S) Station, (O) Other

Chassis ID         Local Intf   Hold-time   Capability     Port Id
----------         ----------   ---------   ----------     -------
00:1b:21:4a:ab:2d   Ex0/18         120
00:1b:21:4a:ab:2d
00:0d:ec:a4:79:40   Ex0/2          120         B             Eth1/33
Total Entries Displayed : 2
```

7. **Display the local configuration, operational status, and peer configuration of the PG.**

```
SEFOS# show interfaces extreme-ethernet 0/2 dcb priority-group
detail

Port            :      Ex0/2
Show Type       :      Admin Config
Feature         :      Priority Group
Enable          :      true
Advertise       :      true
Willing         :      false
Group Bandwidth :    50%    30%    20%    0%     0%     0%
0%      0%
Priority Group ID:    0      0      0      1      2      2
2       15
Max Traffic Class:     8

Show Type        :     Oper Config
Feature          :     Priority Group
Oper Version     :     0
Max Version      :     0
Errors           :     0x0 - none
Operational Mode :     true
Syncd with Peer  :     true
Group Bandwidth  :    50%    30%    20%    0%     0%     0%
0%      0%
Priority Group ID:    0      0      0      1      2      2
2       15
Max Traffic Class:     8

Show Type        :     Peer Config
```

```
Feature            :        Priority Group
Local Interface    :        Ex0/2
Status             :        successful
Enable             :        true
Willing            :        false
Group Bandwidth  :     50%     50%     0%     0%     0%     0%
0%      0%
Priority Group ID:      0      0      0      1      0      0
0       0
Max Traffic Class:      2
-------------------------------------------------------------
Total Entries Displayed : 1
```

8. **Display the local configuration, operational status, and peer configuration of the PFC feature.**

```
SEFOS# show interfaces extreme-ethernet 0/2 dcb
priority-flow-control detail

Port               :        Ex0/2
Show Type          :        Admin Config
Feature            :        Priority Flow Control
Enable             :        true
Advertise          :        true
Willing            :        false
Priority Mask    :      0       0       0       1       0       0
0       0
Max Traffic Class:      8

Show Type          :        Oper Config
Feature            :        Priority Flow Control
Oper Version       :        0
Max Version        :        0
Errors             :        0x0 - none
Operational Mode :        true
Syncd with Peer    :        true
Priority Mask    :      0       0       0       1       0       0
0       0
Max Traffic Class:      8

Show Type          :        Peer Config
Feature            :        Priority Flow Control
Local Interface    :        Ex0/2
Status             :        successful
Enable             :        true
Willing            :        false
Priority Mask    :      0       0       0       1       0       0
0       0
```

```
Max Traffic Class:      8
-----------------------------------------------------------
Total Entries Displayed : 1
```

9. **Display the local configuration, operational status, and peer configuration of the application feature.**

```
SEFOS# show interfaces extreme-ethernet 0/2 dcb
application-etype-fcoe detail

Port            :       Ex0/2
Show Type       :       Admin Config
Feature         :       Application FCoE
Enable          :       true
Advertise       :       true
Willing         :       false
Priority Map  :       0       0       0       1       0       0       0       0

Show Type       :       Oper Config
Feature         :       Application FCoE
Oper Version    :       0
Max Version     :       0
Errors          :       0x0 - none
Operational Mode :      true
Syncd with Peer :       true
Priority Map  :       0       0       0       1       0       0       0       0

Show Type       :       Peer Config
Feature         :       Application FCoE
Local Interface :       Ex0/2
Status          :       successful
Enable          :       true
Willing         :       false
Priority Map  :       0       0       0       1       0       0       0       0
```

In addition to the commands shown in this section, you can also use the following commands to display information:

- ■ `show lldp`
- ■ `show lldp interface`
- ■ `show lldp neighbor`
- ■ `show lldp traffic`

▼ Enable DCB

After you have configured the desired DCB features, perform the following steps to start DCB in the switch. By default, DCB is disabled globally.

1. Enable DCB in the switch.

```
SEFOS# configure terminal
SEFOS(config)# no shutdown dcb
SEFOS(config)# end
```

2. View the DCB information.

```
SEFOS# show dcb global info

DCB Global Information
----------------------
System Control            : Start
```

▼ Disable DCB

By default, DCB is disabled globally.

1. Disable DCB.

```
SEFOS# configure terminal
SEFOS(config)# shutdown dcb
SEFOS(config)# end
```

2. View the DCB information.

```
SEFOS# show dcb global info

DCB Global Information
----------------------
System Control            : Shutdown
```

▼ Enable DCB for Each Interface

By default, all three features are enabled. However, to use the features, the global interface state must be turned on.

This example uses port 0/2.

1. **Enable DCB on a specific interface.**

```
SEFOS# configure terminal
SEFOS(config)# interface extreme-ethernet 0/2
SEFOS(config-if)# set dcb enable
SEFOS(config-if)# no shutdown
SEFOS(config-if)# end
```

2. **View the interface configuration.**

   These examples show the default configurations.

```
SEFOS# show interfaces extreme-ethernet 0/2 description
Interface    Status    Protocol
---------    ------    --------
Ex0/2        up        up
```

3. **Display the DCB state and feature mode on a specific interface.**

```
SEFOS# show interfaces extreme-ethernet 0/2 dcb mode

Port                 : Ex0/2
Show Type            : Admin State
DCB Capable State    : on
Priority Group       : auto
Priority Flow Control : auto
```

4. **Display the local configuration of the priority group.**

```
SEFOS# show interfaces extreme-ethernet 0/2 dcb priority-group

Port             :      Ex0/2
Show Type        :      Admin Config
Feature          :      Priority Group
Enable           :      true
Advertise        :      true
Willing          :      false
Group Bandwidth  :      50%    30%    20%    0%    0%    0%
0%      0%
Priority Group ID:      0      0      0     1     2     2
2       15
Max Traffic Class:      8
```

5. Display the local configuration of the priority flow control feature.

```
SEFOS# show interfaces extreme-ethernet 0/2 dcb
priority-flow-control
Port            :       Ex0/2
Show Type       :       Admin Config
Feature         :       Priority Flow Control
Enable          :       true
Advertise       :       true
Willing         :       false
Priority Mask   :       0       0       0       1       0       0
0       0
Max Traffic Class:      8
```

6. Display the local configuration of the application feature.

```
SEFOS# show interfaces extreme-ethernet 0/2 dcb
application-etype-fcoe

Port            :       Ex0/2
Show Type       :       Admin Config
Feature         :       Application FCoE
Enable          :       true
Advertise       :       true
Willing         :       false
Priority Map    :       0       0       0       1       0       0
0       0
```

▼ Disable DCB for Each Interface

This example uses port 0/2.

1. Enter Global Configuration mode.

```
SEFOS# configure terminal
SEFOS(config)# interface extreme-ethernet 0/2
```

2. Disable DCB.

```
SEFOS(config-if)# set dcb disable
```

3. Exit Global Configuration mode.

```
SEFOS(config-if)# end
```

4. **View the interface DCB state after it was disabled.**

```
SEFOS# show interfaces extreme-ethernet 0/2 dcb mode

Port                 : Ex0/2
Show Type            : Admin State
DCB Capable State    : off
Priority Group       : auto
Priority Flow Control : auto
```

▼ Enable and Disable a Specific DCB Feature

You can enable and disable a specific DCB feature after DCB has been globally enabled. For example, when exchanging a DCBX protocol with its peer, you might want to inform its peer that a DCB-specific feature has been enabled or disabled.

The following example enables the PFC feature and disables PG and the application. This example uses port 0/2.

1. **Enable DCB.**

```
SEFOS# configure terminal
SEFOS(config)# interface extreme-ethernet 0/2
SEFOS(config-if)# set dcb enable
```

2. **Enable PFC.**

```
SEFOS(config-if)# set dcb priority-flow-control enable
```

3. **Disable PG and the application.**

```
SEFOS(config-if)# set dcb priority-group disable
SEFOS(config-if)# set dcb application-etype-fcoe disable
SEFOS(config-if)# end
```

4. **View the DCB state and feature mode.**

```
SEFOS# show interfaces extreme-ethernet 0/2 dcb mode

Port                 : Ex0/2
Show Type            : Admin State
DCB Capable State    : on
Priority Group       : auto
Priority Flow Control : auto
```

5. **View the DCB PG parameters.**

```
SEFOS# show interfaces extreme-ethernet 0/2 dcb priority-group

Port             :       Ex0/2
Show Type        :       Admin Config
Feature          :       Priority Group
Enable           :       false
Advertise        :       true
Willing          :       false
Group Bandwidth  :       50%    30%    20%    0%     0%     0%
0%       0%
Priority Group ID:       0      0      0      1      2      2
2        15
Max Traffic Class:       8
```

6. **View the PFC parameters.**

```
SEFOS# show interfaces extreme-ethernet 0/2 dcb
priority-flow-control
Port             :       Ex0/2
Show Type        :       Admin Config
Feature          :       Priority Flow Control
Enable           :       true
Advertise        :       true
Willing          :       false
Priority Mask    :       0      0      0      1      0      0
0        0
Max Traffic Class:       8
```

7. **View the application parameters.**

```
SEFOS# show interfaces extreme-ethernet 0/2 dcb
application-etype-fcoe
Port             :       Ex0/2
Show Type        :       Admin Config
Feature          :       Application FCoE
Enable           :       false
Advertise        :       true
Willing          :       false
Priority Map     :       0      0      0      1      0      0
0        0
```

▼ Configure the Mode for the DCB Feature

In normal operation, the DCB feature is in automatic mode. Whenever applicable, the hardware configuration will be set after a feature is exchanged with its peer and the feature attributes are compatible with its peer. In some cases, "force mode" might be needed to set the hardware configuration, regardless of its peer configuration, without waiting for DCBX TLV to be exchanged.

1. Set the PG feature to auto mode.

```
SEFOS# configure terminal
SEFOS(config)# interface extreme-ethernet 0/2
SEFOS(config-if)# set dcb priority-group mode auto
SEFOS(config-if)# set dcb priority-flow-control mode auto
SEFOS(config-if)# end
```

2. View the DCB mode.

```
SEFOS# show interfaces extreme-ethernet 0/2 dcb mode

Port               : Ex0/2
Show Type          : Admin State
DCB Capable State  : on
Priority Group     : auto
Priority Flow Control : auto
```

3. Set the PG feature to force mode.

```
SEFOS# configure terminal
SEFOS(config)# interface extreme-ethernet 0/2
SEFOS(config-if)# set dcb priority-group mode on
SEFOS(config-if)# set dcb priority-flow-control mode on
SEFOS(config-if)# end
```

4. View the interface mode after setting it to force mode.

```
SEFOS# show interfaces extreme-ethernet 0/2 dcb mode
Port               : Ex0/2
Show Type          : Admin State
DCB Capable State  : on
Priority Group     : force
Priority Flow Control : force
```

▼ Configure DCB Attributes

You can set PG and PFC feature attributes. This example configures a total of three groups with bandwidths of 40%, 20%, and 40%.

1. Configure PG with different priority grouping and bandwidth.

```
SEFOS# configure terminal
SEFOS(config)# interface extreme-ethernet 0/2
SEFOS(config-if)# set dcb priority-group 0 0 0 1 2 2 2 2 bandwidth
40 20 40 0 0 0 0 0
SEFOS(config-if)# end
```

2. **View the configuration to verify that the PG feature is enabled and advertised.**

   If the feature is not enabled, it will not be in operating mode.

```
SEFOS# show int ex 0/2 dcb priority-group detail

Port              :       Ex0/2
Show Type         :       Admin Config
Feature           :       Priority Group
Enable            :       true
Advertise         :       true
Willing           :       false
Group Bandwidth   :       40%     20%     40%     0%      0%      0%
0%      0%
Priority Group ID:        0       0       0       1       2       2
2       2
Max Traffic Class:        8

Show Type         :       Oper Config
Feature           :       Priority Group
Oper Version      :       0
Max Version       :       0
Errors            :       0x0 - none
Operational Mode :        true
Syncd with Peer   :       true
Group Bandwidth   :       40%     20%     40%     0%      0%      0%
0%      0%
Priority Group ID:        0       0       0       1       2       2
2       2
Max Traffic Class:        8

Show Type         :       Peer Config
Feature           :       Priority Group
Local Interface   :       Ex0/2
Status            :       successful
Enable            :       true
Willing           :       false
Group Bandwidth   :       50%     50%     0%      0%      0%      0%
0%      0%
Priority Group ID:        0       0       0       1       0       0
0       0
Max Traffic Class:        2


------------------------------------------------------------
Total Entries Displayed : 1
```

   This configuration has the following values:

- Group 0 - priority members (0, 1, 2), bandwidth 40% (share bandwidth among priority 0, 1, 2)
- Group 1 - priority member (3), bandwidth 20% (priority 3)
- Group 2 - priority members (4, 5, 6), bandwidth 40% (share bandwidth among priority 4, 5, 6)
- Group 3 to 7 - priority members (none)

The output shows the group bandwidth of each group. For groups that have no priorities assigned to them, the bandwidth shows 0%, as follows:

Group 0	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7
40%	20%	40%	0%	0%	0%	0%	0%

The output also shows the priority group ID assigned to a priority (ID shown from 0 - 2 in this example).

3. **Set the PFC priority with the following commands when the PFC priority set does not match what the peer has configured, then set the priority to match the peer's priority set.**

```
SEFOS# configure terminal
SEFOS(config)# interface extreme-ethernet 0/2
SEFOS(config-if)# set dcb priority-flow-control vlan-priority 0 0
0 1 1 0 0 0
SEFOS(config-if)# end
SEFOS# show interfaces extreme-ethernet 0/2 dcb
priority-flow-control detail

Port             :      Ex0/2
Show Type        :      Admin Config
Feature          :      Priority Flow Control
Enable           :      true
Advertise        :      true
Willing          :      false
Priority Mask    :      0      0      0      1      1      0
0        0
Max Traffic Class:      8

Show Type        :      Oper Config
Feature          :      Priority Flow Control
Oper Version     :      0
Max Version      :      0
Errors           :      0x2 - config mismatch with peer
Operational Mode :      false
Syncd with Peer  :      true
Priority Mask    :      0      0      0      1      1      0
0        0
Max Traffic Class:      8
```

```
Show Type          :        Peer Config
Feature            :        Priority Flow Control
Local Interface    :        Ex0/2
Status             :        successful
Enable             :        true
Willing            :        false
Priority Mask      :     0       0       0       1       0       0
0       0
Max Traffic Class:        8
-----------------------------------------------------------
Total Entries Displayed : 1
```

4. Set the PFC priority the same as the PFC priority of the peer.

```
SEFOS# configure terminal
SEFOS(config)# interface extreme-ethernet 0/2
SEFOS(config-if)# set dcb priority-flow-control vlan-priority 0 0
0 1 0 0 0 0
SEFOS(config-if)# end
SEFOS# show interfaces extreme-ethernet 0/2 dcb
priority-flow-control detail

Port               :        Ex0/2
Show Type          :        Admin Config
Feature            :        Priority Flow Control
Enable             :        true
Advertise          :        true
Willing            :        false
Priority Mask      :     0       0       0       1       0       0
0       0
Max Traffic Class:        8

Show Type          :        Oper Config
Feature            :        Priority Flow Control
Oper Version       :        0
Max Version        :        0
Errors             :        0x0 - none
Operational Mode   :        true
Syncd with Peer    :        true
Priority Mask      :     0       0       0       1       0       0
0       0
Max Traffic Class:        8

Show Type          :        Peer Config
Feature            :        Priority Flow Control
Local Interface    :        Ex0/2
Status             :        successful
```

```
Enable          :       true
Willing         :       false
Priority Mask   :    0       0       0       1       0       0
0       0
Max Traffic Class:      8
--------------------------------------------------------------
Total Entries Displayed : 1
```

▼ Configure LLDP DCBX TLVs

You can enable or disable the transmission of DCBX TLV types on a port. This
example uses port 0/2.

1. Enable DCBX TLVs for PG, PFC, and the application.

```
SEFOS# configure terminal
SEFOS(config)# interface extreme-ethernet 0/2
SEFOS(config-if)# lldp tlv-select dcb1tlv priority-group
priority-flow-control application-etype-fcoe
SEFOS(config)# end
```

2. View the TLV settings.

```
SEFOS# show interfaces extreme-ethernet 0/2 dcb priority-group

Port            :       Ex0/2
Show Type       :       Admin Config
Feature         :       Priority Group
Enable          :       true
Advertise       :       true
Willing         :       false
Group Bandwidth :    40%     20%     40%     0%      0%      0%
0%      0%
Priority Group ID:    0       0       0       1       2       2
2       2
Max Traffic Class:      8
```

3. View the PFC settings.

```
SEFOS# show interfaces extreme-ethernet 0/2 dcb
priority-flow-control

Port            :       Ex0/2
Show Type       :       Admin Config
Feature         :       Priority Flow Control
```

```
Enable          :        true
Advertise       :        true
Willing         :        false
Priority Mask   :    0       0       0       1       0       0
0       0
Max Traffic Class:       8
```

4. **View the application settings.**

```
SEFOS# show interfaces extreme-ethernet 0/2 dcb
application-etype-fcoe

Port            :        Ex0/2
Show Type       :        Admin Config
Feature         :        Application FcoE
Enable          :        false
Advertise       :        true
Willing         :        false
Priority Map    :    0       0       0       1       0       0
0       0
```

5. **Disable DCBX TLVs for PG, PFC, and the application.**

```
SEFOS# configure terminal
SEFOS(config-if)# no lldp tlv-select dcb1tlv priority-group
priority-flow-control application-etype-fcoe
SEFOS(config-if)# end
```

6. **View the TLV settings after disabling them for the PG.**

```
SEFOS# show interfaces extreme-ethernet 0/2 dcb priority-group

Port              :        Ex0/2
Show Type         :        Admin Config
Feature           :        Priority Group
Enable            :        true
Advertise         :        false
Willing           :        false
Group Bandwidth   :    40%     20%     40%     0%      0%      0%
0%      0%
Priority Group ID:     0       0       0       1       2       2
2       2
Max Traffic Class:        8
```

7. **View the TLV settings after disabling them for the PFC.**

```
SEFOS# show interfaces extreme-ethernet 0/2 dcb
priority-flow-control

Port                :       Ex0/2
Show Type           :       Admin Config
Feature             :       Priority Flow Control
Enable              :       true
Advertise           :       false
Willing             :       false
Priority Mask   :     0      0      0      1      0      0
0       0
Max Traffic Class:      8
```

8. **View the TLV settings after disabling them for the PFC.**

```
SEFOS# show interfaces extreme-ethernet 0/2 dcb
application-etype-fcoe

Port                :       Ex0/2
Show Type           :       Admin Config
Feature             :       Application FCoE
Enable              :       false
Advertise           :       false
Willing             :       false
Priority Map    :     0      0      0      1      0      0
0       0
```

▼ Display DCBX Feature Statistics and Control Information

● **Type.**

```
SEFOS# show interfaces extreme-ethernet 0/2 dcb counters

Port                   :    Ex0/2
Show Type              :    Control and Feature Stats
Control Info Stats     :
  SeqNo                :    9
  AckNo                :    4
  Frames Out           :    27
  Frames In            :    19
```

```
Priority Group      :
  Frames Out        : 27
  Frames In         : 19

Priority Flow Control:
  Frames Out        : 27
  Frames In         : 19

Application Proto   :
  Frames Out        : 27
  Frames In         : 19
```

▼ Display Output of Unstarted DCBX Protocol Exchange

In the following output, all controls and features are zeroes, which indicates that the DCBX protocol exchange has not yet been started.

● **Type.**

```
SEFOS# show interfaces extreme-ethernet 0/2 dcb counters

Port                : Ex0/2
Show Type           : Control and Feature Stats
Control Info Stats  :
  SeqNo             : 0
  AckNo             : 0
  Frames Out        : 0
  Frames In         : 0
Priority Group      :
  Frames Out        : 0
  Frames In         : 0
Priority Flow Control:
  Frames Out        : 0
  Frames In         : 0

Application Proto   :
  Frames Out        : 0
  Frames In         : 0
```

▼ Display Output of DCBX TLV Exchange

● **Type.**

```
SEFOS# show interfaces extreme-ethernet 0/2 dcb counters

Port                  :  Ex0/2
Show Type             :  Control and Feature Stats
Control Info Stats    :
  SeqNo               :  1
  AckNo               :  2
  Frames Out          :  3
  Frames In           :  2

Priority Group        :
  Frames Out          :  3
  Frames In           :  2

Priority Flow Control:
  Frames Out          :  3
  Frames In           :  2

Application Proto     :
  Frames Out          :  3
  Frames In           :  2
```

▼ Display Output of No TLV Exchange

In the following output, the switch has sent out packets, but has not received packets
from the peer.

● **Type.**

```
SEFOS# show interfaces extreme-ethernet 0/19 dcb counters

Port                  :  Ex0/19
Show Type             :  Control and Feature Stats

Control Info Stats    :
  SeqNo               :  1
  AckNo               :  0
  Frames Out          :  1
  Frames In           :  0
Priority Group        :
  Frames Out          :  0
```

```
    Frames In            :  0

Priority Flow Control:
  Frames Out           :  0
  Frames In            :  0

Application Proto    :
  Frames Out           :  0
  Frames In            :  0
```

▼ Clear Feature Statistics

- **Type.**

```
SEFOS# clear interfaces extreme-ethernet 0/2 dcb counters
SEFOS# show interfaces extreme-ethernet 0/2 dcb counters

Port                 :  Ex0/2
Show Type            :  Control and Feature Stats
Control Info Stats   :
  SeqNo                :  1
  AckNo                :  2
  Frames Out           :  0
  Frames In            :  0

Priority Group       :
  Frames Out           :  0
  Frames In            :  0

Priority Flow Control:
  Frames Out           :  0
  Frames In            :  0

Application Proto    :
  Frames Out           :  0
  Frames In            :  0
```

▼ Display Output Showing a Down Link

- **Type.**

```
SEFOS# show interfaces extreme-ethernet 0/3 dcb counters

Port                 :  Ex0/3
```

```
Show Type            :  Control and Feature Stats
Status               :  Link Down

SEFOS# show interfaces extreme-ethernet 0/3 description

Interface    Status   Protocol
---------    ------   --------
Ex0/3        down     down
```