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Introduction

This document provides an overview of the QoS configuration for CEM traffic on MWR2941 devices

CEM provides a bridge between a time-division multiplexing (TDM) network and a packet network, such as Multiprotocol Label Switching (MPLS). The router encapsulates the TDM data in MPLS packets and sends it over a CEM pseudowire to the remote provider edge (PE) router, thus functioning as a physical communication link across the packet network.

Note: You can click [here](#) to understand more on working of the CEM.

Prerequisites

Requirements

Prior to configuring QoS , perform the following steps

1. Configure one or more CEM groups on the port. Each CEM group represents a set of time slots from the TDM circuit attached to the port. When you configure a CEM group on the port, the router creates an interface that has the same slot/subslot/port number as the port (for example, **cem 0/1/0**).
2. Configure a pseudowire for each CEM group. The router maps the data from the time slots in each group to its pseudowire and sends the data over the MPLS network to the remote PE router. Use the **xconnect** command with **encap mpls** to create a pseudowire for each CEM group.

Note : Steps for configuring CEM are included [here](#).

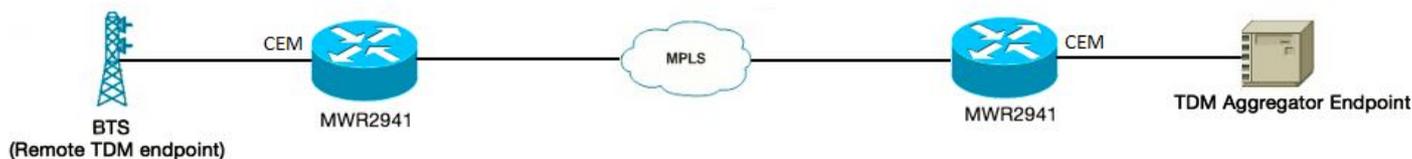
Configure

Configuring QoS for CEM traffic is different on the MWR 2941 DC router when compared to ASR901 router. MWR2941 does not support QoS on the CEM interface or CEM group whereas Ingress QOS on the CEM group is supported on ASR901 series routers.

This platform does not support policy map config under CEM interface. Also the "priority-list" under global config mode is also not supported.

So we need to set the MPLS experimental bits for CEM traffic via the pseudowire-class below. These MPLS experimental bits will map to Layer-2 VLAN COS bits, which in turn map to QoS-group. The QoS-group can then be used to classify traffic on the egress interface.

Network Diagram



Configurations

Below is the configuration :

switch I2trust ----- This needs to be enabled to perform the internal MPLS Exp bits ---- VLAN COS bits
---- QoS-group mapping

!

```
pseudowire-class CLASSABC
```

```
encapsulation mpls
```

```
mpls experimental 5
```

!

```
interface CEM0/0
```

```
no ip address
```

```
cem 0
```

```
payload-size 512
```

```
xconnect 10.1.2.253 100 pw-class CLASSABC
```

!

The policy-map can be configured as below:

```
class-map match-any cem-cos-5
```

```
match qos-group 5
```

!

```
policy-map prioritize_qos_group5
class cem-cos-5
priority percent 5
!
policy-map shape_to_20MB_with_CEM_priority
class class-default
shape average 20000000
service-policy prioritize_qos_group5
!
```

Now this policy can be applied under the interface from where the CEM traffic will exit the router. This is also the MPLS enabled interface on the router going to the ISP

```
interface GigabitEthernet0/3
service-policy output shape_to_20MB_with_CEM_priority
!
```

It is a known limitation on the MWR2941 platform that egress QoS policies on the GigabitEthernet interface do not support statistics. Since egress QoS statistics are not supported, one way to verify our configuration is to send a separate traffic stream with another COS/DSCP value beside the CEM traffic, shape the traffic and then we can observe that CEM traffic will get higher priority and get dropped later when the total traffic exceeds the shaped rate.

Note: For egress QoS, MWR2941 device does not support any output accounting/statistics. The same limitation is documented [here](#) .

Verify

```
RouterA#sh policy-map int gig 0/3
GigabitEthernet0/0
Service-policy output: shape_to_20MB_with_CEM_priority
Class-map: class-default (match-any)
    4994 packets, 2567291 bytes
    30 second offered rate 5000 bps, drop rate 0000 bps
Match: any
```

Queueing

queue limit 64 packets

(queue depth/total drops/no-buffer drops) 0/0/0

(pkts output/bytes output) 4994/2567291

shape (average) cir 20000000, bc 80000, be 80000

target shape rate 20000000

Service-policy : prioritize_qos_group5

queue stats for all priority classes:

Queueing

queue limit 64 packets

(queue depth/total drops/no-buffer drops) 0/0/0

(pkts output/bytes output) 0/0

Class-map: cem-cos-5 (match-any)

0 packets, 0 bytes ----- Due to the known limitation, there are no statistics for the CEM traffic with EXP 5

30 second offered rate 0000 bps, drop rate 0000 bps

Match: qos-group 5

Priority: 5% (1000 kbps), burst bytes 25000, b/w exceed drops: 0

Class-map: class-default (match-any)

4994 packets, 2567291 bytes

30 second offered rate 5000 bps, drop rate 0000 bps

Match: any

queue limit 64 packets

(queue depth/total drops/no-buffer drops) 0/0/0

(pkts output/bytes output) 4994/2567291