DOCSIS Downstream Controllers

The table lists the features, the Cisco cBR version in which it was introduced, and also gives a short description of the feature.

Table 1: Feature History

Feature Name	Release Information	Feature Description
DOCSIS Downstream Controllers	Cisco IOS XE Bengaluru 17.6.1a	This release supports 32 DOCSIS controllers and 32 video controllers on the CBR-CCAP-LC-G2-R line card.

Cisco cBR-8 routers support DOCSIS with 32 DOCSIS controllers and 32 video controllers on the CBR-CCAP-LC-G2-R line card. The CBR-CCAP-LC-40G-R line card supports 32 downstream controllers. The 32 video SGs (downstream-video) are supported in addition to the existing 32 SGs (downstream-cable).

Downstream-cable supports both DOCSIS and video channels. If you want to increase the number of DOCSIS channels, move the video channels from downstream-cable to downstream-video so that you can avail all 32 downstream-cable controllers for DOCSIS.

Configure the DOCSIS channel in the legacy downstream-cable and the video channel in the new downstream-video.

You can choose downstream-video controllers option in the following two ways:

- The Service Distribution Group (SDG) configuration under cable video contains the option
- The Core configuration in the cable RPD configuration

  The controller profile with the new video option helps to bind to the downstream-video controllers.

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Configure Video Controllers

For Remote PHY line cards, SDG specifies the line card, bay, and downstream cable-controller where the video is destined. Use RPD `downstream-cable slot/bay/controller` command instead of `rf-port`

`integrated-cable slot/bay/port` command. You can specify only one downstream cable controller for an SDG. Hence, cBR-8 routers do not support.

So there are two types of controllers in RPHY:

downstream-cable: `rpd downstream-cable slot/bay/controller`

downstream-video: `rpd downstream-video slot/bay/controller`

Cisco RPD 1x2 can join up to 30 multicast streams simultaneously for video. The Cisco HA Shelf can join up to 30 multicast streams simultaneously for each RPD for video.

Configure Video Controller-Profile

Use the following sample command to configure the video controller profile.

Use different profile IDs for the cable downstream controller-profile video and cable downstream controller-profile.

```
Router(config)#cable downstream controller-profile 10 ?
  I-CMTS  Configure I-CMTS controller profile
  RPHY    Configure RPHY controller profile (default)
  Video   Configure Video controller profile
  copy    Copy configuration from exist controller profile
  <cr>    <cr>

Router(config)#cable downstream controller-profile 10 video
Router(config-controller-profile)#
```

Note Add the keyword `video` to the controller profile. Otherwise, you cannot associate the profile to the downstream-video controller.

Configure RF Channel Type

You can configure only the video RF channels under the video controller-profile.

Use the following command to configure RF channel type:

```
Router(config-controller-profile)#rf 0 7
Router(config-prof-rf-chan)#type ?
  video  VIDEO (Asynchronous Mode)
```

Bind Video Controller to RPD DS Port

Use the following command to bind the video controller to an RPD DS port:

```
Router(config-rpd-core)#rpd-ds 0 downstream-video 1/0/?
  <0-31>  Controller port number
```

Verify Video Controller-Profile

Use the following command to verify the video controller-profile:

```
Router#show cable downstream controller-profile configured
Configured downstream controller-profiles:
I-CMTS
0   1

RPHY
99  101 134 195 197 199 200 221 223 225
227 249

VIDEO
2   10
```

Verify a Single Video Controller-Profile

Use the following command to verify a specific video controller-profile:

```
Router#show cable downstream controller-profile 2
Downstream controller-profile 2, type Video
Description:
Video controller-profile is being used by controller Downstream-Video:
  1/0/0, 1/0/3,
  Admin:  UP
  MaxOfdmSpectrum: 0
  MaxCarrier: 158
  Mode: normal
  Free freq block list has 2 blocks:
    45000000  - 264999999
    271000000 - 1217999999
  DS Splitting: No
  OFDM frequency exclusion bands: None
Configured RF Channels:
Chan Admin Frequency  Type        Annex Mod  srate Qam-profile  dcid  output
 0    UP   268000000  VIDEO-ASYNC  B    64    5057  0           -     NORMAL
```

Verify Video Controller-Profile Association

Use the following command to verify the video controller-profile association:

```
Router#show cable downstream controller-profile association
I-CMTS
Controller Integrated-Cable   Downstream controller-profile id
None

RPHY
Controller Downstream-Cable   Downstream controller-profile id
9/0/11                        223

Video
Controller Downstream-Video   Downstream controller-profile id
1/0/0                         2
1/0/3                         2
```

Debug Video Controller-Profile

Use the following sample command to debug the video controller-profile.

```
Router#debug cable controller-profile ?
  ds     Enable DS controller profile debug
  us     Enable US controller profile debug
  video  Enable Video controller profile debug

Router#debug cable controller-profile video
Video Controller Profile debugging is on
```

Show Details of All Video Controller Configurations

```
Router#show cable video downstream-video all

QAM           Port       TSID  ONID  Output  Physical     Admin      Operational
Virtual-Carrier-Group            Service-Distribution-Group       Logical-Edge-Device
         Encryption Total
Controller    Type                   Port    QAM ID       State      State        Name
                         Name                             Name
 Capable    Sessions
-------------------------------------------------------------------------------------------------
9/0/3:4       RPHY       -     -     0       160          ON         UP           -
                         -                                -
 clear      0
9/0/3:5       RPHY       -     -     0       161          ON         UP           -
                         -                                -
 clear      0
9/0/3:6       RPHY       -     -     0       162          ON         UP           -
                         -                                -
 clear      0
9/0/3:7       RPHY       -     -     0       163          ON         UP           -
                         -                                -
 clear      0
9/0/3:8       RPHY       -     -     0       164          ON         UP           -
                         -                                -
 clear      0
 --More--

Router#show cable video downstream-video 9/0/3 rf-channel 20

Downstream-Cable: 9/0/35
RF Channel: 20
TSID: 20
ONID: 0
Physical QAM ID: 176
Admin State: ON
Operational State: UP
Virtual Carrier Group Name: vcg_R
Virtual Carrier Group ID: 8
Service Distribution Group Name: sdg-R
Service Distribution Group ID: 9
Logical Edge Device Name: led-R
Logical Edge Device ID: 2
Total Bandwidth: 38810700 bps
Available Bandwidth: 38810700 bps
Oversubscribed Bandwidth: 0 bps
Total Sessions: 1

show cable video session logical-edge-device id 2 downstream-video 9/0/3 summary
CHN3-RACK3-RPHY#$l-edge-device id 2 downstream-video 9/0/3 summary
Video Session Summary For Chassis:

Active    : 0               Init      : 0                Idle       : 0
Off       : 1               Blocked   : 0                PSI-Ready  : 0
UDP       : 1               ASM       : 0                SSM        : 0
Remap     : 1               Data      : 0                Passthru   : 0
Remux     : 0               Pending   : 0                Encrypted  : 0
Low Latency: 0

Total Sessions       : 1
Total Input Bitrate  : 0 BPS
Total Output Bitrate : 0 BPS

Router#$show cable video session logical-edge-device id 2 downstream-video 9/0/3
Total Sessions = 1
```

```
Session    Output Frequency  Streaming   Sess Session Source                 UDP   Input
  Output  Input      Output  Input    Output   Encrypt        Encrypt        Low PMV
Session
Id         Port   Hz         Type        Type Ucast Dest IP/Mcast IP (S,G)    Port  Program
 Program State      State   Bitrate  Bitrate  Type           Status         Lat NUM   Name
-----------------------------------------------------------------------------------------------
2097152    20     221000000  Remap       UDP  171.113.2.21                    49520 -
  1       OFF        ON      0        0        CLEAR          -              N   -
test_video.9.0.2.20.49520
```

```
show cable video session logical-edge-device id 2 downstream-video 9/0/3 debug
Router#$ion logical-edge-device id 2 downstream-video 9/0/3 debug
Total Sessions = 1

Session    Output Output
|<------------------Input------------------>|<------------------Output------------------>|
Id         Port   Prog    Sync-Loss CC-Err    PCR-Jump  UnderFlow OverFlow  Block     Dropped
   Overrun   Error     Block     Overdue   Inv-Rate  UnderFlow OverFlow  Dropped
-----------------------------------------------------------------------------------------------
2097152    20     1       0         0         0         0         0         0         0
      0         0         0         0         0         0         0         0
```

Examples of Video Configuration

This section provides examples of the configuration.

```
Router(config)#cable downstream controller-profile 99 ?
  I-CMTS  Configure I-CMTS controller profile
  RPHY    Configure RPHY controller profile (default)
  Video   Configure Video controller profile
  copy    Copy configuration from exist controller profile
  <cr>    <cr>

Router(config)#cable downstream controller-profile 99 video
Router(config-controller-profile)#
```

Video Service Group Configuration

Manually, create video service groups (VSG) in the Cisco cBR-8 router, before you configure video service for each RPD. Provide a logical name for the VSG.

```
cable virtual-service-group 18584 downstream-cable 1/0/8 profile 101
cable virtual-service-group 18585 downstream-cable 1/0/9 profile 101
cable virtual-service-group 18586 downstream-cable 1/0/10 profile 101
cable virtual-service-group 18587 downstream-cable 1/0/11 profile 101
cable virtual-service-group 18588 downstream-cable 1/0/24 profile 101
cable virtual-service-group 18589 downstream-cable 1/0/25 profile 101
cable virtual-service-group 18590 downstream-cable 1/0/26 profile 101
```

Video Profile

```
cable downstream controller-profile 99 Video
 description Test_Downstream_Video_Controller
 max-carrier 158
 rf-chan 4 35
  type VIDEO SYNC
  qam-profile 1
  frequency 125000000
  rf-output NORMAL
```

SDG Configuration

```
cable video
service-distribution-group sdg-video id 9
    rpd downstream-video 9/0/3
```

RPD Configuration

```
cable rpd LC9_RPD0_RACK5_6x12_SHF2
 description RPD0_RACK5_6x12_SHF2
 identifier f86b.d9ff.fafc
 core-interface Te9/1/0
  principal
  rpd-ds 0 downstream-cable 9/0/4 profile 10
  rpd-ds 0 downstream-video 9/0/3 profile 99
  rpd-us 0 upstream-cable 9/0/1 profile 1
 core-interface Te9/1/2
  rpd-ds 0 downstream-cable 9/0/13 profile 32
 r-dti 1
 rpd-event profile 0
 rpd-55d1-us-event profile
```