IPDR Streaming Protocol

TheCisco cBR Series Converged Broadband Routersupports the Internet Protocol Detail Record (IPDR) streaming protocol feature that provides high volume data exported from the network equipment to mediation systems such as the Operations Support Systems (OSS) or Business Support Systems (BSS). IPDR provides information about IP-based service usage and other activities that are used by OSS and BSS. This protocol provides a mechanism to collect data from various network elements or equipment using a push model as opposed to the conventional Simple Network Management Protocol (SNMP) polling mechanism.

Based on the DOCSIS 3.0 specifications, the IPDR feature optimizes time and resource efficiency in the transfer of large amounts of performance metrics to the management systems. DOCSIS 3.0 introduces five management features or the FCAPS model. FCAPS represents Fault, Configuration, Accounting, Performance and Security.

Your software release may not support all the features that are documented in this module. For the latest feature information and caveats, see the release notes for your platform and software release. The Feature Information Table at the end of this document provides information about the documented features and lists the releases in which each feature is supported.

Contents

- Restrictions for Configuring IPDR Streaming Protocol, on page 1
- Information About IPDR Streaming Protocol, on page 2
- How to Configure IPDR Streaming Protocol, on page 3
- Configuration Examples for IPDR Streaming Protocol, on page 8
- Verifying IPDR Streaming Protocol, on page 9
- Additional References, on page 11
- Feature Information for IPDR Streaming Protocol , on page 12

Restrictions for Configuring IPDR Streaming Protocol

- An IPDR exporter can be connected to many collectors, but it will only send data to the highest priority operating collector at any given time.
- Each IPDR session can be associated to one active (zero) or more standby collector with priority.

Information About IPDR Streaming Protocol

IPDR Streaming Protocol is designed to address the need for a reliable, fast, efficient, and flexible export process of high volume data records such as billing, performance and diagnostic data.

The IPDR/SP process communicates with IPDR collectors. The IPDR streaming protocol supports multiple IPDR sessions. The architecture supports primary and secondary collectors for failover purposes. At any time, data is sent to only one collector. If the exporter to primary collector connection fails due to any reason, the data is sent to the secondary collector. Depending on the network configuration, you can have only one primary collector for each session, while for different sessions, you can have different primary collectors. For example, there may be a billing collector, a diagnostic collector, and so on.

Note IPDR exporter refers to the Cable Modem Termination System (CMTS) and the IPDR collector refers to the network equipment.

Data Collection Methodologies

IPDR is the data generated or collected for various performance related metrics such as billing information, diagnostics, network topology, signal quality monitoring, and other management data. These data are based on the FCAPS model (Fault, Configuration, Accounting, Performance and Security.)

The IPDR client application communicates with the IPDR exporter using the IPDR_GET_SESSIONS message to identify the streams provided by the exporter, and the exporter sends responses to the client using the IPDR_GET_SESSIONS_RESPONSE message. This data collection method is based on the *Operations Support System Interface Specification* (CM-SP-OSSIv3.0-I13-101008).

The IPDR_GET_SESSIONS_RESPONSE message includes the SessionBlock.reserved attribute to identify the IPDR session ID. This attribute helps the Cisco CMTS router define an IPDR session ID for each data collection mechanism supported for each IPDR service definition. This attribute was not used in Cisco IOS Releases earlier to Cisco IOS Release 12.2(33)SCE.

The IPDR feature defines methods for the collectors or network elements to collect data from the CMTS. Below is the list of collection methodologies:

Time Interval Session: In this method, the CMTS follows a schedule-based session to stream data at a periodic time interval. A time interval is the time gap between two adjacent sessions' start messages. This method is managed by the CMTS in controlling the start and stop operation of a session. The time interval session terminates after the CMTS exports the records.

Note During the course of a one-time interval when the CMTS is streaming records, if another time interval is expected, the CMTS will ignore the new time interval and continue exporting the data until the previous time interval ends.

Event-based Session: In this method, the CMTS can export records at any time, when the session is open. In other words, this method works on an open-ended session.

Ad-hoc Session: In this method, the CMTS creates a session, allows data streaming, and closes the session when the data export is complete or when a closing command is generated.

A new session is created by issuing the **ipdr session** command. After, the CMTS receives the FLOW_START message from the collector, the CMTS exporter sends a SESSION_START message to start exporting the IPDR data from the collector. After all data is transported, the exporter receives a ACK message from the collector, and then sends a SESSION_STOP message to the collector. This method is known as the Ad-hoc session.

How to Configure IPDR Streaming Protocol

This section describes the configuration tasks that are performed when using the IPDR streaming protocol feature on the Cisco CMTS platforms.

Note Use no ipdr command to remove the IPDR configuration.

Configuring the IPDR Session

To enable the CMTS application to add a session to the IPDR exporter, use the ipdr session command in global configuration mode.

Use the no form of the command to remove the IPDR session.

Note

- The session ID must be unique. The valid range is from 1 to 127 on the cBR-8. A maximum of 20 IPDR sessions are supported by the cBR-8.
- To remove an active session, you must deactivate it before removing it.

Procedure

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 3	ipdr session session_id session_name session_descr **Example:**	Enables the CMTS application to add a session to the IPDR exporter.

	Command or Action	Purpose
	`Router(config)# ipdr session 1 samis_sxn test`	

Configuring the IPDR Type

To configure the IPDR session type, use the ipdr type command in global configuration mode. The IPDR session types that can be defined using this command are event type, time-interval type, and the ad hoc type.

Use the no form of the command to reset the session type to the default "event" type.

Procedure

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 3	ipdr type session_id [ad-hoc | event | time-interval value] **Example:** `Router(config)# ipdr type 1 time-interval 15`	Enables the CMTS application to configure an IPDR session type.

What to do next

Note Once the IPDR session type is configured, only the templates supported by this IPDR type are allowed be associated with it. Also, the console provides information about those templates that are not supported by this IPDR session type when the type is changed.

Configuring the IPDR Collector

To configure the IPDR collector details, use the ipdr collector command in global configuration mode. The port number is used when an exporter creates an active connection.

Procedure

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 3	**ipdr collector** **Example:** `Router(config)# ipdr collector federal 192.168.6.5`	Enables the CMTS application to configure an IPDR collector and authenticate the IPDR protocol. **Note** Configure the NAT address in case of an IPDR collector that is operating in a NAT enabled network.

Configuring the IPDR Associate

To associate the collector with a session, use the ipdr associate command in global configuration mode.

Before you begin

- You must deactivate the session before configuring the associate.

Procedure

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 3	**ipdr associate session_id collector_name priority** **Example:**	Associates the collector with a session.

	Command or Action	Purpose
	`Router(config)# ipdr associate 1 federal 1`	

Configuring the IPDR Template

To add an IPDR template to the IPDR session, use the ipdr template command in global configuration mode. The template list can be viewed by entering a "?" at the command prompt.

Note
- You can add only the system-supported templates.

Procedure

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 3	**ipdr template session_id template_name** **Example:** `Router(config)# ipdr template 1 SAMIS`	Adds an IPDR template to the IPDR session.

Configuring the IPDR Exporter

IPDR exporter parameters such as keepalive timer count, the maximum number of unacknowledged records, and unacknowledged timeout interval value can be configured using the following commands.

- **ipdr exporter keepalive**—Sets the keepalive timer count value on the IPDR Exporter.
- **ipdr exporter max-unacked**—Sets the maximum number of unacknowledged records on the IPDR Exporter.
- **ipdr exporter ack-timeout**—Sets the time interval for acknowledged records on the IPDR Exporter.

Note The default value for DataAckTimeInterval is 60 seconds and the default value for DataAckSequenceInterval is 200 seconds.

You can set the values for the IPDR parameters to customize exporter for the collectors used in the facility. However, these commands are optional, so if not configured, the default values of the commands are used when **ipdr exporter start** command is executed.

Procedure

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 3	**ipdr exporter keepalive** *time_interval* **Example:** `Router(config)# ipdr exporter keepalive 300`	(Optional) Sets the keepalive timer count for the IPDR Exporter. The valid range is from 5 to 300 seconds. The default value is 300.
Step 4	**ipdr exporter max-unacked** *records* **Example:** `Router(config)# ipdr exporter max-unacked 200`	(Optional) Sets the number of maximum unacknowledged records on the IPDR Exporter. The valid range is from 5 to 200 records. The default value is 200.
Step 5	**ipdr exporter ack-timeout** *time_interval* **Example:** `Router(config)# ipdr exporter ack-timeout 60`	(Optional) Sets the acknowledged records timeout interval on the IPDR Exporter. The valid range is from 5 to 60 seconds. The default value is 60.
Step 6	ipdr exporter start **Example:** `Router(config)# ipdr exporter start`	Enables the CMTS application to start the IPDR exporter process to connect the exporter and the collector.

Configure IPDR in IPv6 Mode

Starting from Cisco IOS XE Gibraltar 16.12.1, IPDR collector can be configured with IPv6 address and work in IPv6 mode. It means that the cBR-8 can monitor all IPv6 incoming connections from collectors.

Follow the example below to configure IPDR in IPv6 mode.

```
configure terminal
 ipdr session 1 sess_v6 sess_v6
 ipdr type 1 ad-hoc
 ipdr collector coll_v6 2001:10:74:59:250:56FF:FEA7:5FB9 4737
 ipdr associate 1 coll_v6 1
 ipdr exporter start ipv6
 cable metering ipdr-d3 session 1 type 1 full-records
```

It does not support to change connection type when the exporter is started. Stop exporter then change to another type.

Start IPDR connection by CMTS

By default, the IPDR connections are started by collectors. Starting from Cisco IOS XE Gibraltar 16.12.1, IPDR connections can be initiated by CMTS.

Follow the example below to configure the IPDR exporter to start connection.

```
configure terminal
 ipdr exporter connection-active
```

If CMTS is configured to start IPDR connections, it also supports to configure the source-interface from which to start connection, which is optional.

Follow the example below to configure the IPDR exporter to start connection with specified interface.

```
configure terminal
 ipdr exporter connection-active source-interface TenGigabitEthernet4/1/0
```

Configuration Examples for IPDR Streaming Protocol

Example: Configuring the IPDR Session

The following example shows how to configure the IPDR session.

```
Router> enable
Router# configure terminal
Router(config)# ipdr session 1 test no_descr
```

Example: Configuring the IPDR Type

The following example shows how to configure the IPDR “time-interval” session type for a time interval of 15 minutes.

```
Router> enable
Router# configure terminal
Router(config)# ipdr type 1 time-interval 15
```

Example: Configuring the IPDR Collector

The following example shows how to configure the IPDR collector.

```
Router> enable
```

```
Router# configure terminal
Router(config)# ipdr collector federal 209.165.200.225
```

Example for Configuring the IPDR Collector with NAT Address

This example shows the **nat-address** keyword used to configure the NAT address for an IPDR collector:

```
Router(config)#ipdr collector federal 192.0.2.225 nat-address 192.0.2.51
```

Example: Configuring the IPDR Associate

The following example shows how to associate the collector with a session.

```
Router> enable
Router# configure terminal
Router(config)# ipdr associate 1 federal 1
```

Example: Configuring the IPDR Template

The following example shows how to add an IPDR template to the IPDR session.

```
Router> enable
Router# configure terminal
Router(config)# ipdr template 1 SAMIS-TYPE1
```

Example: Configuring the IPDR Exporter

The following example shows how to configure the IPDR exporter process to connect the exporter and the collector.

```
Router> enable
Router# configure terminal
Router(config)# ipdr exporter keepalive 300
Router(config)# ipdr exporter max-unacked 200
Router(config)# ipdr exporter ack_timeout 60
Router(config)# ipdr exporter start
```

Verifying IPDR Streaming Protocol

This section describes the commands used for verification of the IPDR streaming protocol feature on the Cisco CMTS platforms.

Verifying the IPDR Collector

The **show ipdr collector** command displays the collector information, message statistics, and event for all the sessions that are associated with the collector.

The following example shows the sample output for the **show ipdr collector** command.

```
Router# show ipdr collector federal
Collector Name: federal, IP: 192.0.2.0, Port: 0
```

```
2001-07-05T19:28:22 Collector in session 1 Statistics:
 Transmitted 12658 Acknowledged 12658 Enqueued 12658 Lost 0
 Last Event: Event Id 1 IPDR_EVENT_SERVER_CONNECTED - INCOMING
Router(config)#
```

Verifying IPDR exporter

The **show ipdr exporter** command displays information about the IPDR Exporter state as listed below.

- started
- not started
- not initialized

Starting from Cisco IOS XE Gibraltar 16.12.1, the output of this command is updated to include active and passive mode for IPDR exporter.

The following example shows the sample output for the **show ipdr exporter** command:

```
Router# show ipdr exporter
Load for five secs: 7%/0%; one minute: 7%; five minutes: 7%
No time source, *15:52:25.468 CST Thu May 23 2019

IPDR exporter is started in passive mode.
Current parameters:
        KeepAliveInterval   :300
        AckTimeInterval     :60
        AckSequenceInterval :200
Router#
```

Verifying IPDR session

The **show ipdr session** command displays the session details such as the session ID, description, and the session state for all sessions as well as for a specific session.

The following example shows the sample output for the **all** keyword for the **show ipdr session** command.

```
Router# show ipdr session all
Session ID: 1, Name: utilsta, Descr: test, Started: False
```

The following example shows the sample output for the **session_id** keyword for the **show ipdr session** command.

```
Router# show ipdr session 1
Session ID: 1, Name: utilsta, Descr: test, Started: False
2001-07-05T19:36:28 Statistics:
Transmitted 0 Acknowledged 0 Enqueued 0 Lost 0
queuedOutstanding 0 queuedUnacknowledged 0
1 Collectors in the session:
Name: federal, IPAddr: 192.0.2.0, Port: 0, Priority: 1
```

Verifying IPDR Session Collector

The **show ipdr session collector** command displays the details of a collector that is associated with a specific session. Because there can be multiple collectors associated to a session, this command is used to show a specific session-collector pair.

The following example shows the sample output for the **show ipdr session collector** command.

```
Router# show ipdr session 1 collector federal
Session ID: 1, Name: utilsta, Descr: test, Started: False
Collecotr Name: federal, IP: 192.0.2.0, Port: 0
2001-07-05T19:38:02 Collector in session 1 Statistics:
 Transmitted 0 Acknowledged 0 Enqueued 0 Lost 0
 Last Event: Event Id 0 WRONG_EVENT_ID
```

Verifying IPDR Session Template

The **show ipdr session template** command displays the list of all active templates supported by a specific session.

The following example shows the sample output for the **show ipdr session template** command.

```
Router# show ipdr session 1 template
Template ID: 2, Name:
http://www.cablelabs.com/namespaces/DOCSIS/3.0/xsd/ipdr/DOCSIS-CMTS-CMSERVICE-FLOW-TYPE,
Type: DOCSIS-Type, KeyNumber: 22
Session 1 has totally 1 templates.
```

Additional References

Technical Assistance

Description	Link
The Cisco Support website provides extensive online resources, including documentation and tools for troubleshooting and resolving technical issues with Cisco products and technologies. To receive security and technical information about your products, you can subscribe to various services, such as the Product Alert Tool (accessed from Field Notices), the Cisco Technical Services Newsletter, and Really Simple Syndication (RSS) Feeds. Access to most tools on the Cisco Support website requires a Cisco.com user ID and password.	http://www.cisco.com/support

Feature Information for IPDR Streaming Protocol

Note The following table lists the software release in which a given feature is introduced. Unless noted otherwise, subsequent releases of that software release train also support that feature.

Table 1: Feature Information for Downstream Interface Configuration

Feature Name	Releases	Feature Information
IPDR Streaming Protocol	Cisco IOS XE Everest 16.6.1	This feature was integrated into Cisco IOS XE Everest 16.6.1 on theCisco cBR Series Converged Broadband Router.
IPDR connection initiated by CMTS	Cisco IOS XE Gibraltar 16.12.1	This feature was supported on theCisco cBR Series Converged Broadband Router.
IPDR – IPV6 address	Cisco IOS XE Gibraltar 16.12.1	This feature was supported on theCisco cBR Series Converged Broadband Router.
IPDR support for DOCSIS 3.1	Cisco IOS XE Amsterdam 17.3.1x	This feature was supported on theCisco cBR Series Converged Broadband Router.