



# **NVIDIA UFM Telemetry Documentation v1.24.2**

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## About This Document

NVIDIA® UFM® Telemetry platform provides network validation tools to monitor network performance and conditions, capturing and streaming rich real-time network telemetry information along with application workload usage to an on-premise or cloud-based database for further analysis.

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## Document Revision History

For the list of changes made to this document, refer to [Document Revision History](#).

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# Release Notes

These release notes pages provide information for NVIDIA UFM Telemetry such as changes and new features and bug fixes.

## Changes and New Features in This Release

### New Features in v1.24.1

- Added the ASIC identifier to the XDR secondary telemetry file (`device_num_on_tray`).
- Enhanced the XDR aggregation mechanism to support multi-plane Aport configurations.
- Introduced XDR support for Aports within SLVL xcsets.
- Updated NVL6 link speed definitions.

### Changes in v1.24.1

- Starting from version 1.24.1, installation packages are no longer available for the end-of-life operating systems **Ubuntu 18.04** and **Ubuntu 20.04**.

## System Requirements

Platform	Type and Version
OS and Kernel	<ul style="list-style-type: none"><li>• RedHat 8.X</li><li>• RedHat 9.X</li><li>• RedHat 10.X</li><li>• Ubuntu22</li><li>• Ubuntu24</li></ul>

Platform	Type and Version
CPU	x86_64
DOCA Host	DOCA 2.7.0

## Bug Fixes in This Release

Ref. #	Description
#4805011	<b>Description:</b> Resolved an issue where the <code>LinkDownCounterExtended</code> metric was intermittently oscillating on XDR fabrics.
	<b>Keywords:</b> XDR, Aggregation, Planarized
	<b>Discovered in Release:</b> v1.23.1
#4791171	<b>Description:</b> Resolved an issue where per-SLVL data was not collected during the first iteration.
	<b>Keywords:</b> SLVL
	<b>Discovered in Release:</b> v1.23.1
#4846672	<b>Description:</b> Fixed an issue with corrupted <b>"Port_Name"</b> field.
	<b>Keywords:</b> Corrupted Data, <code>Port_Name</code>
	<b>Discovered in Release:</b> v1.23.1
#4812632	<b>Description:</b> Resolved an issue where failure to collect the Port state could cause a crash.
	<b>Keywords:</b> Port state, Crash
	<b>Discovered in Release:</b> v1.23.1
#4744400	<b>Description:</b> Resolved an issue where hostname updates were not reflected in the collected data.
	<b>keywords:</b> Hostname, Restart required
	<b>Discovered in Release:</b> v1.23.1
#4791143	<b>Description:</b> Resolved an issue that caused false notifications to be generated on primary telemetry.
	<b>keywords:</b> Notification, Notify
	<b>Discovered in Release:</b> v1.23.1

# Known Issues in This Release

No known issues were found this release.

---

# Overview

NVIDIA® UFM® Telemetry platform provides network validation tools to monitor network performance and conditions, and to capture and stream rich real-time network telemetry information and application workload usage to an on-premise or cloud-based database for further analysis.

UFM Telemetry can be used to monitor the basic fabric port counters and network statistics at a relatively high rate, or a more exhaustive set of performance metrics at a lower rate (referred to as Bringup mode). It can be configured to save collected data to disk, to stream via a Fluent forward protocol, or to make the data available via an http endpoint in csv or Prometheus format.

UFM Telemetry is packaged both as a docker image and as a bare metal tarball package.

---

# Software Management

## Deploying UFM Telemetry

Deploying UFM Telemetry can be done in the following modes:

- [Bare Metal - Bringup Mode](#)
- [Docker Container Mode](#)
- [Docker Container Mode - High Availability](#)
- [Bare Metal Mode](#)
- [Bare Metal Mode - High Availability](#)

## Bare Metal - Bringup Mode

NVIDIA UFM Telemetry can be obtained as a tarball for installation on a Linux machine with all prerequisites installed.

To deploy the UFM Telemetry in Bringup mode, perform the following steps:

1. Make sure the following prerequisites are installed:
  1. Python3
  2. Python3-venv
  3. Supervisor
2. Copy the tarball package to the targeted location.
3. Extract the package.

```
tar -xf ufm_telemetry-<version>.tar.gz
```

4. Start collection.

```
./bin/run_bringup .sh
```

```
CollectX: collection_start
```

This collects port counter and cable data every minute, uses HCA mlx5\_0 and writes data to `./collection_data/clx-bringup-X` for a period of 24hrs.

```
CollectX: help collection_start
```

```
Usage:
```

defaults	Description	options	
		-----	----
		-----	----
	collection_start	time duration=n [s m h d]	24h
Session duration			
		sample_rate=n [s m h d]	60
seconds	Data sample rate		
		guids=[guid_list guid_file]	None
Target devices	guid		
		counter_set=[file.xcset]	None
Counter list to be collected			
		hca=hca_name	
mlx5_0	Device to access the fabric		
		cable cable_info=[yes no once]	yes
Collect cable info			
		nvlink_info=[yes no]	no
Collect NVLink info			
		disconnected_cable=[yes no]	no
Collect disconnected cables info			
		reset_counters=t	false
Reset counters of fabric devices			

```
compress_data=[yes|no]           yes
Compress files (if write_files=true)
mads_retries=n                    2
Set number of retries for MADs
mads_timeout=n (msec)            500
Set timeout for MADs
force_hca=t                       f
Avoid HCA state check
```

## Docker Container Mode

NVIDIA UFM Telemetry is packaged as a docker image that should be loaded and deployed on a Linux machine with docker installed. This section describes how to deploy the UFM Telemetry docker image on a Linux machine.

To deploy the UFM telemetry, perform the following steps:

1. Make sure that docker is installed on the Linux machine.

```
[root@r-ufm ~]# docker -version
```

2. Start the docker service.

```
[root@r-ufm ~]# sudo service docker start
```

3. Pull the image.

```
[root@r-ufm ~]# export image=mellanox/ufm-telemetry:<version>
[root@r-ufm ~]# sudo docker pull $image
```

4. Create the default .ini files and place them in the local directory mapped to /config in the container and initialize the container configuration.

```
root@r-ufm ~]# sudo docker run -v /opt/ufm-
telemetry/conf:/config --rm -d $image
/get_collectx_configs.sh
"sample_rate=300;hca=mlx5_0;cable_info_schedule=1/00:00,3/00:00"
```

### **(i) Note**

This collects port counter data every 5 minutes and uses HCA mlx5\_0. It also collects cable info on the 1st, 3rd, and 5th day of the week at midnight, where:

- sample\_rate: Frequency of collecting port counters
- hca: Card to use
- cable\_info\_schedule: Time of collecting cable info data (optional)

5. Create a container of UFM telemetry.

```
root@r-ufm ~]# sudo docker run --net=host --uts=host --
ipc=host \
    --ulimit stack=67108864 --ulimit memlock=-1 \
    --security-opt seccomp=unconfined --cap-
add=SYS_ADMIN \
    --device=/dev/infiniband/ -v "/opt/ufm-
telemetry/conf:/config" -v "/tmp/data:/data" -v
"/opt/ufm/files/licenses:/opt/ufm/files/licenses/" --rm --
name ufm-telemetry -d $image
```

6. Verify that UFM Telemetry is running.

1. Make sure the UFM Telemetry container is up.

```
[root@r-ufm ~]# docker ps
```

2. If the container name exists, access the shell of the container.

```
[root@r-ufm ~]# docker exec -it ufm-telemetry bash
```

3. Review your configurations under

```
/config/launch_ibdiagnet_config.ini.
```

7. View the UFM Telemetry configuration files.

```
root@ r-ufm ~]# ls -l /config/
-rw-r--r-- 1 3478 101  396 Apr 15 21:04 clx_config.ini
-rw-r--r-- 1 3478 101 2987 Apr 15 21:04 collectx.ini
-rw-r--r-- 1 3478 101 4257 Apr 15 21:04
launch_ibdiagnet_config.ini
-rw-r--r-- 1 3478 101 1912 Apr 16 12:03 supervisord.conf
```

8. To watch and review the execution of the various components, you can check the log files under `/var/log`. Each component has a dedicated log file. Running the "ls -l" command will display all files under the folder. The following output shows only the relevant log files (other files have been omitted).

```
[root@r-ufm ~]# ls -l /var/log
-rw-r--r-- 1 root root 128393 Apr  3 10:49
launch_cableinfo.log
-rw-r--r-- 1 root root    467 Apr  3 09:35
launch_compression.log
-rw-r--r-- 1 root root 194566 Apr  3 10:49
launch_ibdiagnet.log
-rw-r--r-- 1 root root    798 Apr  3 09:35
launch_retention.log
-rw-r--r-- 1 root root   1729 Apr  3 09:56 supervisord.log
```

9. To exit the UFM Telemetry docker context, run "exit" to return to the Linux machine context.
10. To access the UFM Telemetry CLI, run the following command on the Linux machine:

```
[root@r-ufm ~]# docker exec -it ufm-telemetry clxcli
```

11. For settings and configuration instructions, see [Settings and Configuration](#).

## Docker Container Mode - High Availability

### Requirements:

- An important requirement for the HA solution is to prepare a dedicated partition for DRBD to work with. Example of such a requirement: /dev/sda4.
- Install pcs and drbd-utils on both servers (using "yum" or "apt-get install", based on your OS).

## **Note**

On RH/CentOS, please run “yum install pcs drbd84-utils kmod-drbd84.

## **Procedure:**

1. Load (pull) the latest UFM Telemetry Docker image on both servers.

```
docker pull mellanox/ufm-telemetry:latest
```

2. Run the Telemetry configuration command on both servers.

```
docker run --rm -i --name=config-telemetry \  
-v /opt/ufm-telemetry/conf:/config \  
-v /etc/systemd/system:/etc/systemd/system \  
-v /var/run/docker.sock:/var/run/docker.sock \  
mellanox/ufm-telemetry:latest \  
/get_collectx_configs.sh \  
--gen_service \  
--config=ufm-telemetry
```

3. Refresh systemd on both servers:

```
systemctl daemon-reload
```

4. Create the `/opt/ufm-telemetry/licenses/` directory on the master server and copy the UFM Telemetry license file there.
5. Download UFM-HA Package on both servers from [this link](#).

6. Extract the HA package to `/tmp/`, and from there, run the installation command on both servers as follows:

**Note**

In the below commands, "disk", the partition name, is assumed as `/dev/sda4`.

```
./install -l /opt/ufm-telemetry/ -d /dev/sda4 -p telemetry
```

7. Run the UFM-HA configuration command **ONLY** on the master server, as follows:

```
configure_ha_nodes.sh \  
--cluster-password 12345678 \  
--master-ip 192.168.10.1 \  
--standby-ip 192.168.10.2 \  
--virtual-ip 192.168.10.5
```

**Note**

The `cluster-password` must be at least 8 characters long.

### **(i) Note**

Change the values of in the above command with your server' information.

8. Start UFM Telemetry HA cluster. Run:

```
ufm_ha_cluster start
```

## **Bare Metal Mode**

NVIDIA® UFM® Telemetry can be obtained as a tarball for installation on a Linux machine with all prerequisites installed.

To deploy the UFM Telemetry:

1. Ensure the following prerequisites are installed:
  1. Python3
  2. Python3-venv
  3. Supervisor
2. Copy the tarball package to the target location.
3. Extract package.

```
tar -xf ufm_telemetry-<version>.tar.gz
```

4. Initialize and configure.

```
./bin/initialize_telemetry.sh --telemetry-dir  
/tmp/ufm_telemetry --config  
"hca=mlx5_0;sample_rate=300;data_dir=/tmp/clx_data;plugin_env_
```

### **Note**

This collects port counter data every 5 minutes, and uses HCA mlx5\_0 and writes data to /tmp/clx\_data.

5. Start data collection.

```
supervisord --config /tmp/ufm_telemetry/conf/supervisord.conf
```

## Bare Metal Mode - High Availability

NVIDIA® UFM® Telemetry can be obtained as a tarball for installation on a Linux machine with all prerequisites installed.

To deploy the UFM Telemetry:

1. Ensure the following prerequisites are installed:
  1. Python3
  2. Python3-venv
  3. Supervisor
2. Copy the tarball package to the target location.
3. Extract package.

```
tar -xf ufm_telemetry -<version>.tar.gz
```

4. Initialize and configure.

```
./bin/initialize_telemetry.sh --telemetry-dir  
/tmp/ufm_telemetry --config  
"hca=mlx5_0;sample_rate=300;data_dir=/tmp/clx_data;plugin_env_  
--gen_systemd_service
```

**Note**

This collects port counter data every 5 minutes, and uses HCA mlx5\_0 and writes data to /tmp/clx\_data.

5. Download UFM-HA Package on both servers from [this link](#).

6. Extract the HA package to `/tmp/`, and from there, run the installation command on both servers as follows:

**Note**

In the below commands, "disk", the partition name, is assumed as /dev/sda4.

```
./install -l /opt/ufm-telemetry/ -d /dev/sda4 -p telemetry
```

7. Run the UFM-HA configuration command **ONLY** on the master server, as follows:

```
configure_ha_nodes.sh \  
--cluster-password 12345678 \  
--master-ip 192.168.10.1 \  
--standby-ip 192.168.10.2 \  
--virtual-ip 192.168.10.5
```

**Note**

The `cluster-password` must be at least 8 characters long.

**Note**

Change the values of in the above command with your server' information.

8. Start UFM Telemetry HA cluster. Run:

```
ufm_ha_cluster start
```

**To check the status of your UFM Telemetry HA cluster, run:**

```
ufm_ha_cluster status
```

**To perform failover, run:**

```
ufm_ha_cluster failover
```

**To perform takeover, run:**

```
ufm_ha_cluster takeover
```

## Upgrading UFM Telemetry Software

Upgrading UFM Telemetry requires removing the previous package, pulling the new version of the UFM telemetry package, configuring the telemetry, and starting it from the new installation package.

The upgrade procedure can be done in the three modes:

- [Bare Metal - Bringup Mode](#)
- [Docker Container Mode](#)
- [Bare Metal Mode](#)

### Bare Metal - Bringup Mode

1. Stop previous collection. Run:

```
./bin/run_bringup.sh  
CollectX: collection_stop
```

2. Follow instructions described in [Deploying UFM Telemetry - Bare Metal Mode](#) with the new UFM Telemetry version.
3. If needed, apply the previous configuration changes.

# Docker Container Mode

1. Stop the previous ufm-telemetry container.

```
[root@r-ufm ~]# docker stop ufm-telemetry
```

2. Pull the new UFM Telemetry image.

```
[root@r-ufm ~]# export image=mellanox/ufm-  
telemetry:rhel7.3_x86_64_ofed5.1-2.3.7_release_1.6_latest  
[root@r-ufm ~]# docker pull $image
```

3. Create a container for new UFM Telemetry.

```
[root@r-ufm ~]# docker run --net=host --uts=host --ipc=host \  
    --ulimit stack=67108864 --ulimit memlock=-1 \  
    --security-opt seccomp=unconfined --cap-  
add=SYS_ADMIN \  
    --device=/dev/infiniband/ -v "/opt/ufm-  
telemetry/conf:/config" -v "/tmp/data:/data" --rm --name ufm-  
telemetry -d $image
```

4. Configure the UFM Telemetry based on the new configurations.

```
[root@r-ufm ~]# docker run -v /opt/ufm-telemetry/conf:/config  
--rm -d $image /get_collectx_configs.sh  
sample_rate=300;hca=mlx5_0;cable_info_schedule=1/00:00,3/00:00,5/00:00
```

## Bare Metal Mode

1. Stop previous collection. Run:

```
kill $SUPERVISORD_PID # send sigterm to the supervisord proc
```

2. Follow instructions described in [Deploying UFM Telemetry - Bringup Mode](#) with the new UFM Telemetry version.
3. If needed, apply the previous configuration changes.

---

# Data Collection

NVIDIA® UFM® Telemetry uses the configuration file `launch_ibdiagnet_config.ini` to control the process of collecting the data. It collects two types of data: Cable info and port counters.

Port counters are collected periodically by setting the parameter `sample_rate` in seconds.

## Bare Metal – Bringup Mode

The Bare Metal Bringup mode is the most common output format designed for debugging a cluster. The following command shows the help menu of the generated basic report command.

### Description:

```
Dump basic results IB report for a given date or range of dates
```

### Usage:

```
generate_basic_results_csv TIME [report_type=] [out=]
[show_raw_data=]
```

TIME can be specified as:

```
    date=
    past=n[hours|days] : relative to the current time
on the server.
    from= to=
```

[out=] to specify output file

[show\_raw\_data=t|f] [boolean](#) to show raw data as is. Default: f

### Example:

```
generate_basic_results_csv past=10m out=basic_ib.csv
```

## Bare Metal Mode

By default cable info data will not be collected. To enable its collection, add the following flag:

```
plugin_env_CLX_EXPORT_API_DISABLE_CABLEINFO=0
```

When enabled, cable info data is collected, by default, on every run. It is possible to change the collection frequency to be once every `num_iterations` using the following setting:

```
plugin_env_CLX_EXPORT_API_CABLE_RUN_ONCE=1
```

To work with the collected data, you may use the Telemetry CLI, which can be accessed as follows:

```
./bin/clxcli
CollectX: set_data_root /tmp/clx_data
CollectX: set_data_template {{year}}/{{month}}
{{day}}/{{hash1023}}/{{source}}/{{tag}}{{id}}.bin
```

## Container Mode

Cable info data is collected based on a weekly schedule, set with the parameter `cable_info_schedule`. Time parameter is in the format "day/hrs:mins". For daily collection, it is "hrs:mins".

It is possible to collect the data multiple times during the week. To do that use a comma to separate the times at which collection is to take place. For example,

- `cable_info_schedule= 5/00:00` – collects cable info data on 5<sup>th</sup> day of the week at midnight
- `cable_info_schedule= 12:00` – collects cable info data midnight at 12:00 every day
- `cable_info_schedule= 5/00:00,12:00` – combines the previous two examples

To work with the collected data, you may use the Telemetry CLI, which can be accessed as follows:

```
[root@r-ufm145 ~]# docker exec -it ufm-telemetry clxcli
Read configuration from: /opt/mellanox/collectx/etc/collectx.ini
agx_data_root = /data
Loaded 2 schemas from /data/schema/schema*.json

CollectX:
```

## Cable Info Data

The main commands to query and retrieve cable info data are `collectx cable_times` and `collectx cable_info`.

- `collectx cable_times` – dump times and file names of cable info data files, and you can redirect the output to a file
- `collectx cable_info` – dump cable info for a given date or range of dates

The following presents the help menu of the `collectx cable_time` command:

```
CollectX: help cable_times
```

```
Usage:
```

```
    cable_times [TIME] [out=]
```

```
[TIME] is one the following:
```

```
    date=
```

```
    past=n[hours|days]
```

```
Description:
```

```
    Dump times and file names of cable info data files
```

```
Examples:
```

```
    cable_times
```

```
    cable_times date=jun04
```

```
    cable_times past=15d out=out.csv
```

Example for `collectx cable_time` command:

```
CollectX: cable_times
Opened 202 files in 0.05 seconds
```

```
Cable
```

```
-----
```

idx	Date Time	Filename
1	2020-07-26 04:13	/.../cables_1595725983912963.bin
3	2020-07-26 04:28	/.../cables_1595726884030804.bin

Help menu of `cable_info` command:

CollectX: help cable\_info

Usage:

```
cable_info [TIME] [out=]
```

[TIME] is one of the following:

```
last  
date=
```

past=n[hours|days]

[out=] is to specify output file (optional)

Description:

Dump cable info for a given date or range of dates.

If "last" arg is given, dumps only the last file.

If "out=" file name specified, data will be also dumped to that file.

Examples:

```
cable_info filename  
cable_info file=filename  
cable_info last  
cable_info date=jun04  
cable_info past=15d out=cable_info.csv
```

Example for `cable_info` command:

```
cable_info /.../cables_1595764809124997.bin
```

```
time, source, timestamp, port, lid, guid, port_name, vendor, oui, pn, sn, rev  
nominalbitrate, cdrenabletxrx, inputeq, outputamp, outputtemp, fw_version  
rx_power.1.mw, rx_power.1.dbm, rx_power.2.mw, rx_power.2.dbm, rx_power  
rx_power.4.dbm, tx_bias.1, tx_bias.2, tx_bias.3, tx_bias.4, tx_power.1.r  
2020-07-
```

```
26T15:00:12.742710, cable_info, 1595764812742710, 1, 117, 0x248a0703008f  
hercules-01/U1/P1, Mellanox, 0x2c9, MC2207130-002, MT1442VS07035, A3, 2  
m, Copper cable- unequalized, SDR/DDR/QDR/FDR, N/A, 1, 0, N/A  
N/A, N/A, N/A, N/A, N/A, 5 8 11  
0, OMA, 0.0, -999.999023438, 0.0, -999.999023438, 0.0, -999.999023438, 0.0  
11-27, 8224, 0, 0x0, 0x0,  
2020-07-
```

```
26T15:00:12.742710, cable_info, 1595764812742710, 1, 104, 0xe41d2d030010  
e2edmz-02/U1/P1, Mellanox, 0x2c9, MC2207130-002, MT1442VS07035, A3, 2  
m, Copper cable- unequalized, SDR/DDR/QDR/FDR, N/A, 1, 0, N/A  
N/A, N/A, N/A, N/A, N/A, 5 8 11  
0, OMA, 0.0, -999.999023438, 0.0, -999.999023438, 0.0, -999.999023438, 0.0  
11-27, 8224, 0, 0x0, 0x0,  
2020-07-
```

```
26T15:00:12.742710, cable_info, 1595764812742710, 3, 104, 0xe41d2d030010  
e2edmz-02/U1/P3, Mellanox, 0x2c9, MC2207130-002, MT1411VS08914, A3, 2  
m, Copper cable- unequalized, SDR/DDR/QDR/FDR, N/A, 1, 0, N/A  
N/A, N/A, N/A, N/A, N/A, 5 8 11  
0, OMA, 0.0, -999.999023438, 0.0, -999.999023438, 0.0, -999.999023438, 0.0  
03-25, 8224, 0, 0x0, 0x0,  
2020-07-
```

```
26T15:00:12.742710, cable_info, 1595764812742710, 1, 187, 0xe41d2d030050  
forwarder/U1/P1, Mellanox, 0x2c9, MC2207130-002, MT1411VS08914, A3, 2  
m, Copper cable- unequalized, SDR/DDR/QDR/FDR, N/A, 1, 0, N/A  
N/A, N/A, N/A, N/A, N/A, 5 8 11
```

```
0,0MA,0.0,-999.999023438,0.0,-999.999023438,0.0,-999.999023438,0.0
03-25,8224,0,0x0,0x0,
```

## Port Counters

The `port_counters` command is used to extract data in CSV format. It dumps counters matching a given text fragment or "counterset" for a date or range of dates.

Following is the help menu of `port_counters` command:

```
CollectX: help port_counters
```

Usage:

```
port_counters [TAGS] [TIME] [out=]
```

```
[TAGS] is a list of countersets/name fragments.
```

```
[TIME] can be specified as:
```

```
date=
```

```
past=n[hours|days]
```

```
from= to=
```

```
[out=] to specify output file (optional)
```

Description:

```
Dump port_counters matching a given
fragment/counterset for a
given date or range of dates.
```

Example:

```
port_counters error past=10m
```

```
port_counters error date=jul16 out=error_dump.csv
```

The following is an example of a `port_counters` command run:



```
CollectX: help switch_temperature
```

```
Usage:
```

```
switch_temperature [TIME] [out=]
```

```
[TIME] is one of the following:
```

```
last
```

```
date=
```

```
past=n[hours|days]
```

```
[out=] is to specify output file (optional)
```

```
Description:
```

```
Dump switch temperature info for a given date or  
range of dates.
```

```
If "out=" file name specified, data will be also  
dumped to that file.
```

```
Examples:
```

```
switch_temperature filename
```

```
switch_temperature file=filename
```

```
switch_temperature date=apr21
```

```
switch_temperature past=15d
```

```
out=switch_temperature.csv
```

The following is an example of a `switch_temperature` command run:

```
CollectX: switch_temperature past=10m out=switch_temperature.csv
time,source,timestamp,node_guid,sensor_index,mtmp_sensor_name,tempe
12T17:05:16.332772,0xe41d2d030003e450,1649783116332772,0xe41d2d0300
2022-04-
12T17:05:16.332772,0xe41d2d030003e450,1649783116332772,0xe41d2d0300
2022-04-
12T17:05:16.332772,0xe41d2d030003e450,1649783116332772,0xe41d2d0300
2022-04-
12T17:05:16.332772,0xec0d9a0300b41a50,1649783116332772,0xec0d9a0300
2022-04-
12T17:05:16.332772,0xec0d9a0300b41a50,1649783116332772,0xec0d9a0300
2022-04-
12T17:05:16.332772,0xec0d9a0300b41a50,1649783116332772,0xec0d9a0300
...
```

## Switch Fans

The `switch_fans` command is used to dump switch fans info for a given date or range of dates into CSV files.

The following presents the help menu of the `switch_fans` command:

```
CollectX: help switch_fans
```

```
Usage:
```

```
    switch_fans [TIME] [out=]
```

```
    [TIME] is one of the following:
```

```
        last
```

```
        date=
```

```
past=n[hours|days]
```

```
    [out=] is to specify output file (optional)
```

```
Description:
```

```
    Dump switch fans info for a given date or range of dates.
```

```
    If "out=" file name specified, data will be also dumped to that file.
```

```
Examples:
```

```
    switch_fans filename
```

```
    switch_fans file=filename
```

```
    switch_fans date=jun04
```

```
    switch_fans past=15d out=switch_fans.csv
```

The following is an example of a `switch_fans` command run:

```
CollectX: switch_fans past=10m out=switch_fans.csv
```

```
time,source,timestamp,node_guid,sensor_index,fan_speed,  
2020-10-  
04T17:36:05.287397,0xe41d2d0300169e40,1601822165287397,0xe41d2d0300  
2020-10-  
04T17:36:05.287402,0xe41d2d0300169e40,1601822165287402,0xe41d2d0300  
2020-10-  
04T17:36:05.287403,0xe41d2d0300169e40,1601822165287403,0xe41d2d0300  
2020-10-  
04T17:36:05.287404,0xe41d2d0300169e40,1601822165287404,0xe41d2d0300  
...
```

## Switch General

The `switch_general` command is used to dump general switch info for a given date or range of dates into CSV files.

The following presents the help menu of `switch_general` command:

```
CollectX: help switch_general
```

```
Usage:
```

```
switch_general [TIME] [out=]
```

```
[TIME] is one of the following:
```

```
last
```

```
date=
```

```
past=n[hours|days]
```

```
[out=] is to specify output file (optional)
```

```
Description:
```

```
Dump switch general info for a given date or range of dates.
```

```
If "out=" file name specified, data will be also dumped to that file.
```

```
Examples:
```

```
switch_general filename
```

```
switch_general file=filename
```

```
switch_general date=jun04
```

```
switch_general past=15d out=switch_general.csv
```

The following is an example of a `switch_` `general` command run:

```
CollectX: switch_general past=10m out=switch_general.csv

time,source,timestamp,node_guid,serial_number,part_number,revision
2020-10-
25T11:41:05.183039,0xe41d2d0300169e40,1603618865183039,0xe41d2d0300
EB2F,A6,Scorpion IB
EDR,0,49152,7936,16383,1,1,19,255,255,0,32,0,49183,1,1,1,1,1,
2020-10-
25T11:42:05.559284,0xe41d2d0300169e40,1603618925559284,0xe41d2d0300
EB2F,A6,Scorpion IB
EDR,0,49152,7936,16383,1,1,19,255,255,0,32,0,49183,1,1,1,1,1,
2020-10-
...
```

## Bare Metal - Bringup Mode – amBER Format

amBER is an output format designed for debugging a cluster in its bringup stage.

The following shows the help menu of the generate amBER report command:

```
CollectX: generate_amber_ib_csv past=1h out=amber_ib.csv
```

For example:

CollectX: help generate\_amber\_ib\_csv

Usage:

```
generate_amber_ib_csv TIME [report_type=] [out=]
[show_raw_data=]
```

TIME can be specified as:

date=

past=n[hours|days] :

relative to the current time on the server.

from= to=

[out=] to specify output file

[show\_raw\_data=t|f] boolean to show raw data as is.

Default: f

Description:

Dump amBER IB report for a given date or range of dates

Example:

```
generate_amber_ib_csv past=10m
```

```
generate_amber_ib_csv date=jul16 out=amber_ib.csv
```

```
TIME:
```

```
from='sep 23, 2021 16:05:00'
```

```
from='2021-09-23 16:05:00'
```

---

# Fluent Bit Export

NVIDIA® UFM® Telemetry adds the ability to stream to multiple destinations using Fluent Bit. The streaming implementation can stream to any Fluent Bit export plugin, with the "Forward" plugin being particularly useful as it allows sending data to a customer-maintained Fluent Bit or FluentD instance which the customer can then configure as based on their requirements.

## Exporting Data Using Fluent Bit Export

To export collected data from the UFM Telemetry docker image:

1. Load, configure, and run the docker image. See the details in the "[Software Management](#)" chapter.
2. Connect to "ufm-telemetry docker bash".

```
[root@r-ufm ~]# sudo docker exec -it ufm-telemetry bash
```

3. Configure/create export files `*.exp` in export directory `/config/fluent_bit_configs/` and set `enable=1` for plugins you want to run. Please see details in the "[Export Files](#)" section.
4. Enable Fluent Bit export by setting `plugin_env_FLUENT_BIT_EXPORT_ENABLE=1` in `/config/launch_ibdiagnet_config.ini`.

```
[root@r-ufm ~]# vi
/telemetry.config/launch_ibdiagnet_config.ini
...
[fluentbit_export]

plugin_env_FLUENT_BIT_EXPORT_ENABLE=1
plugin_env_FLUENT_BIT_CONFIG_DIR=/telemetry.config/fluent_bit_
plugin_env_LD_LIBRARY_PATH=/opt/mellanox/collectx/lib
...
```

Alternatively, you may do this using the configuration script `configure_ufm_telemetry_target.py` by running:

```
[root@r-ufm ~]# /config/configure_ufm_telemetry_target.py
enable-streaming
```

This changes the value of the `plugin_env_FLUENT_BIT_EXPORT_ENABLE` parameter in the `launch_ibdiagnet_config.ini` file. See section "[Controlling Fluent Bit Streaming](#)" for more details.

5. Run destination programs that will receive data. See more details in the "[Data Forwarding](#)" section.
6. See the data on the receiving side.

Ibdiagnet will collect and export data periodically as configured by `launch_ibdiagnet_config.ini` file using the `sample_rate` parameter.

## Export Files

Export destinations are set by configuring `.exp` files or creating new ones. All export files are placed in the export configuration folder `/config/fluent_bit_configs`. The easiest way to start is to use documented example `exp`-files for the following plugins:

- forward

- stdout
- stdout\_raw (this plugin is presented only in the Fluent Bit version installed in the UFM Telemetry docker image)

All plugins are disabled by default. To enable a plugin, set `enable=1`.

## Export File Configuration Details

Each export destination has the following fields:

- name – configuration name
- plugin\_name – Fluent Bit plugin name
- enable – 1 or 0 values to enable/disable this destination
- host – the host for Fluent Bit plugin
- port – port for Fluent Bit plugin
- msgpack\_data\_layout – the msgpacked data format. Default is `flb_std`. The other option is `custom`. See section "[Msgpack Data Layout](#)" for details.
- plugin\_key=val – key-value pairs of Fluent Bit plugin parameter (optional)
- counterset/fieldset – file paths (optional). See the details in section "[Cset/Fset Filtering](#)".

Use "#" to comment line.

## Msgpack Data Layout

Data layout can be configured using .exp files by setting "msgpack\_data\_layout=layout".

Two layouts are available:

1. "flb\_std" data layout is an array of 2 fields: timestamp double value and a plain dictionary (key-value pairs). The standard layout is appropriate for all Fluent Bit plugins. For example:

```
[timestamp_val, {"timestamp" -> ts_val,  
type => "counters/events", "source" => "source_val",  
"key_1" => val_1, "key_2" => val_2, ...}]
```

2. "custom" data layout is a dictionary of meta-fields and counter fields. Values are placed into a separate plain dictionary. Custom data format can be dumped with "stdout\_raw" output plugin of fluent-bit installed or can be forwarded with "forward" output plugin.

Counters example:

```
{"timestamp" => timestamp_val, "type" => "counters",  
"source" => "source_val", "values" => {"key_1" => val_1,  
"key_2" => val_2, ...}}
```

Events example:

```
{"timestamp" => timestamp_val, "type" => "events",  
"type_name" => "type_name_val", "source" => "source_val",  
"values" => {"key_1" => val_1, "key_2" => val_2, ...}}
```

## Cset/Fset Filtering

Each export file can optionally use one cset and one fset file to filter UFM Telemetry counters and events data.

- Cset file contains tokens per line to filter data with `"type"="counters"`.
- Fset contains several blocks started with the header line `[event_type_name]` and tokens under that header. Fset file is used to filter data with `"type"="events"`.

- Event type names can be prefixed to apply the same tokens to all fitting types. For example, to filter all ethtool events use `[ethtool_event_*]`.

If several tokens are needed to be matched simultaneously use "tok1+tok2+tok3".

Exclusive tokens are available too: line "tok1+tok2-tok3-tok4" will filter names that match both tok1 and tok2 and do not match tok3 or tok4.

Both events and counters can be extended with aliased fields and new constant fields.

- "meta\_field\_aliases:exact\_name=alias" will add new field/counter with name "alias\_name" and copied value from the existing field/counter "exact\_name".
- "meta\_field\_add:new\_name=constant\_value" will add new filed/counter with a name "new\_name" and value "constant\_value"

New fields should have unique names, otherwise,they will be ignored.

For more details see documentation in the files `ufm_enterprise.cset` and `ufm_enterprise.fset` under `/config/fluent_bit_configs`.

The following is the content of

`/config/fluent_bit_configs/ufm_enterprise.cset`:

```

# put tokens on separate lines

# Tokens are the actual name 'fragments' to be matched
#   port$           # match names ending with token "port"
#   ^port          # match names starting with token "port"
#   ^port$         # include name that is exact token "port"
#   port+xmit      # match names that contain both tokens "port"
and "xmit"
#   port-support   # match names that contain the token "port"
and do not match the "-" token "support"
#   -port          # exclude all names that contain the token
"port"
#
# Tip: To disable counter export put a single token line that
fits nothing

# Meta fields are user-defined additional fields of 2 types:
aliases and new constant fields.
# - Aliases:
#   add data of field "exact_name" to meta fields of record
with new "alias_name".
#   One field can have only one alias.
#   Aliases match only exact names and will appear in data
record even if field is disabled by fset.
#   Example:
#       meta_field_alias:exact_name=alias_name
# - Constants:
#   add new field "new_field_name" with constant data string
"constant_value" to the meta fields.
#   Names should be unique.
#   Example:
#       meta_field_add:new_field_name=constant_value

# List of available counters:
#

```

```
#node_guid
#port_guid
#port_num
#lid
#link_down_counter
#link_error_recovery_counter
#symbol_error_counter
#port_rcv_remote_physical_errors
#port_rcv_errors
#port_xmit_discard
#port_rcv_switch_relay_errors
#excessive_buffer_errors
...
```

The following is the content of

```
/config/fluent_bit_configs/ufm_enterprise.fset:
```

```

# Put your events here

# Usage:
#
# [type_name_1]
# tokens
# [type_name_2]
# tokens
# [type_name_3]
# tokens
# ...

# Tokens are the actual name 'fragments' to be matched
#     port$           # match names ending with token "port"
#     ^port          # match names starting with token "port"
#     ^port$         # include name that is exact token "port"
#     port+xmit      # match names that contain both tokens "port"
and "xmit"
#     port-support   # match names that contain the token "port"
and do not match the "-" token "support"
#     -port          # exclude all names that contain the token
"port"

# Meta fields are user-defined additional fields of 2 types:
aliases and new constant fields.
# - Aliases:
#     add data of field "exact_name" to meta fields of record
with new "alias_name".
#     One field can have only one alias.
#     Aliases match only exact names and will appear in data
record even if field is disabled by fset.
#     Example:
#         meta_field_alias:exact_name=alias_name
# - Constants:

```

```
#      add new field "new_field_name" with constant data sting
"constant_value"to the meta fields.
#      Names should be unique.
#      Example:
#          meta_field_add:new_field_name=constant_value

# The next example will export the whole "switch_fan" events and
events "CableInfo" filtered with token "port" :
# [switch_fan]
#
# [CableInfo]
# port

# To know which event type names are available use one of these
options:
#      1. Check export and find field
"type_name"=>"switch_temperature"
#          OR
#      2. Open log file "/tmp/ibd/ibdiagnet2_port_counters.log"
and find event types are printed to log:
#          ...
#          [info] type [CableInfo] is type of interest
#          [info] type [switch_temperature] is type of interest
#          [info] type [switch_fan] is type of interest
#          [info] type [switch_general] is type of interest
#          ...

# Corner cases:
# 1. Empty fset file will export all events.
# 2. Tokens written above/without [event_type] will be ignored.
# 3. If cannot open fset file, warning will be printed, all event
types will be exported.
```

## Quick Start Guide for FluentD

1. Connect to a remote Linux machine via SSH and ensure docker is installed and started on it.

```
[root@r-ufm ~]# sudo service docker start
```

2. Pull FluentD image:

```
[root@r-ufm ~]# sudo docker pull fluentd
```

3. Create a configuration file for fluentd container.

```
[root@r-ufm ~]# export fluentd_dir=/tmp/fluentd
[root@r-ufm ~]# mkdir -p $ fluentd_dir
[root@r-ufm ~]# vim $ fluentd_dir/config.conf #fill it with
next configuration

<source>
  @type forward
  bind 0.0.0.0
  port 24432
</source>

<match ufm_telemetry>
  @type stdout
</match>
```

4. Start fluentd collector container.

```
[root@r-ufm ~]# sudo docker run -it --rm --network host -v
$fluentd_dir:/fluentd/etc fluentd -c /fluentd/etc/config.conf
-v
```

For more details refer to "[FluentD](#)" on docker hub.

## Data Forwarding

1. Follow the instructions under "[Quick Start Guide for FluentD](#)" to prepare remote host with a running FluentD.
2. Follow the instructions under "[Exporting Data Using Fluent Bit Export](#)" to prepare UFM Telemetry with Fluent Bit export capability and ensure it matches the following configurations:
  - Fluent Bit is enabled (`plugin_env_FLUENT_BIT_EXPORT_ENABLE=1`) in the `launch_ibdiagnet_config.ini` file:

```
[root@r-ufm ~]# grep -a2 fluent
/config/launch_ibdiagnet_config.ini

[fluentbit_export]
plugin_env_FLUENT_BIT_EXPORT_ENABLE=1
plugin_env_FLUENT_BIT_CONFIG_DIR=/telemetry.config/fluent_
plugin_env_LD_LIBRARY_PATH=/opt/mellanox/collectx/lib
```

- Prepare a `forward.exp` file to send data to remote host where `fluentd` is running:

```
[root@r-ufm ~]# cat
/config/fluent_bit_configs/forward.exp

name=ufm-enterprise
enable=1
plugin_name=forward
host=10.209.36.248 # Remote host IP where fluentd is
running
port=24432

plugin_tag_match_pair=ufm_telemetry
```

3. Verify that data is streamed from the CollectX Telemetry plugin and is received on the FluentD collector.

## UFM Telemetry Configuration Script

A script to facilitate the configuration of UFM Telemetry is located under the path `/config/configure_ufm_telemetry_target.py`.

The script is used to set and show sample rate duration, enable and disable streaming capabilities, add, remove, update, enable, disable and review target destinations to receive counters and cable info data, and import filters defined in files to filter streamed data.

```
[root@r-ufm ~]# /config/configure_ufm_telemetry_target.py -h
usage: configure_ufm_telemetry_target.py <command> [<args>]
```

positional arguments:

{add-target, show-target, remove-target, enable-target, enable-streaming, disable-target, disable-streaming, modify-target, import-filter-file, disable-filter-file, set-sample-rate, show-sample-rate}

	Commands
add-target	Add a telemetry target
show-target	Show telemetry target(s)
remove-target	Remove a telemetry target
enable-target	Enable a telemetry target
enable-streaming	Enable telemetry streaming
disable-target	Disable a telemetry target
disable-streaming	Disable telemetry streaming
modify-target	Modify a telemetry target
import-filter-file	Import a telemetry target filter file
disable-filter-file	Disable telemetry target filter file
set-sample-rate	Set telemetry sample rate
show-sample-rate	Show telemetry sample rate

optional arguments:

-h, --help	show this help message and exit
-V, --version	Print version information

## Controlling Fluent Bit Streaming

Fluent Bit data streaming is disabled by default. You may enable it by using the script argument `enable-streaming` (`disable-streaming` to disable). This changes the value of the `plugin_env_FLUENT_BIT_EXPORT_ENABLE` parameter in the `launch_ibdiagnet_config.ini` file.

```
[root@r-ufm ~]# grep plugin_env_FLUENT_BIT_EXPORT_ENABLE
/config/launch_ibdiagnet_config.ini
plugin_env_FLUENT_BIT_EXPORT_ENABLE=0
[root@r-ufm ~]# /config/configure_ufm_telemetry_target.py enable-
streaming
[root@r-ufm ~]# grep plugin_env_FLUENT_BIT_EXPORT_ENABLE
/config/launch_ibdiagnet_config.ini
plugin_env_FLUENT_BIT_EXPORT_ENABLE=1
```

## Controlling Target Destinations

You can add, remove, update, enable, disable and review many target destinations to receive counters and cable info data.

### Note

Use the flag `-h` to see the details of any operation.

## Adding Destination Target

The parameter `add-target` adds and enables a destination target.

```

[root@r-ufm ~]# /config/configure_ufm_telemetry_target.py add-
target -h
usage: configure_ufm_telemetry_target.py <command> [<args>] add-
target
    [-h] -n <[A-Za-z0-9_-] Name size: 32> -H <IPv4> -p <1-
65535> -m
    {extended,standard}

optional arguments:
  -h, --help            show this help message and exit
  -n <[A-Za-z0-9_-] Name size: 32>, --target-name <[A-Za-z0-9_-]
Name size: 32>
                        Target name
  -H <IPv4>, --target-host <IPv4>
                        IPv4 address
  -p <1-65535>, --target-port <1-65535>
                        Port number
  -m {extended,standard}, --target-message-type
{extended,standard}

```

For example:

```

[root@r-ufm ~]# /config/configure_ufm_telemetry_target.py add-
target --target-name ufm-telemetry --target-host 10.212.145.6 --
target-port 24453 -m standard

```

## Displaying Destination Target Details

The parameter `show-target` displays the details of a destination target.

```

[root@r-ufm ~]#[root@r-ufm ~]#
/config/configure_ufm_telemetry_target.py add-target -h
usage: configure_ufm_telemetry_target.py <command> [<args>] add-
target
    [-h] -n <[A-Za-z0-9_-] Name size: 32> -H <IPv4> -p <1-
65535> -m
    {extended,standard}

optional arguments:
  -h, --help            show this help message and exit
  -n <[A-Za-z0-9_-] Name size: 32>, --target-name <[A-Za-z0-9_-]
Name size: 32>
                        Target name
  -H <IPv4>, --target-host <IPv4>
                        IPv4 address
  -p <1-65535>, --target-port <1-65535>
                        Port number
  -m {extended,standard}, --target-message-type
{extended,standard}

```

For example:

```

[root@r-ufm ~]# /config/configure_ufm_telemetry_target.py show-
target --target-name ufm-telemetry
Enabled:      Yes
  Name:      ufm-telemetry
  Enabled:   Yes
  Host:      10.212.145.6
  Port:      24453
  Message Type: Standard

```

## Disabling Destination Target

The parameter `disable-target` disables a destination target.

```
[root@r-ufm ~]# /config/configure_ufm_telemetry_target.py
disable-target -h
usage: configure_ufm_telemetry_target.py <command> [<args>]
disable-target
    [-h] -n TARGET_NAME

optional arguments:
  -h, --help            show this help message and exit
  -n TARGET_NAME, --target-name TARGET_NAME
```

For example:

```
[root@r-ufm ~]# /config/configure_ufm_telemetry_target.py
disable-target --target-name ufm-telemetry
[root@r-ufm ~]# /config/configure_ufm_telemetry_target.py show-
target --target-name ufm-telemetry
Enabled:      Yes
  Name:      ufm-telemetry
  Enabled:   No
  Host:      10.212.145.6
  Port:      24453
  Message Type: Standard
```

## Enabling Destination Target

The parameter `enable-target` enables a destination target.

```
[root@r-ufm ~]# /config/configure_ufm_telemetry_target.py enable-  
target -h  
usage: configure_ufm_telemetry_target.py <command> [<args>]  
enable-target  
    [-h] -n TARGET_NAME  
  
optional arguments:  
  -h, --help            show this help message and exit  
  -n TARGET_NAME, --target-name TARGET_NAME
```

For example:

```
[root@r-ufm ~]# /config/configure_ufm_telemetry_target.py enable-  
target --target-name ufm-telemetry  
[root@r-ufm ~]# /config/configure_ufm_telemetry_target.py show-  
target --target-name ufm-telemetry  
Enabled:      Yes  
  Name:      ufm-telemetry  
  Enabled:   Yes  
  Host:      10.212.145.6  
  Port:      24453  
  Message Type: Standard
```

## Modifying Destination Target

The parameter `modify-target` modifies a destination target.

```

[root@r-ufm ~]# /config/configure_ufm_telemetry_target.py modify-
target -h
usage: configure_ufm_telemetry_target.py <command> [<args>]
modify-target
    [-h] -n TARGET_NAME [-H <IPv4>] [-p <1-65535>] [-m
{extended,standard}]

optional arguments:
  -h, --help            show this help message and exit
  -n TARGET_NAME, --target-name TARGET_NAME
  -H <IPv4>, --target-host <IPv4>
                        IPv4 address
  -p <1-65535>, --target-port <1-65535>
                        Port number
  -m {extended,standard}, --target-message-type
{extended,standard}

```

For example:

```

[root@r-ufm ~]# /config/configure_ufm_telemetry_target.py modify-
target --target-name ufm-telemetry --target-host 10.212.145.7 --
target-port 24455 -m standard
[root@r-ufm ~]# /config/configure_ufm_telemetry_target.py show-
target --target-name ufm-telemetry
Enabled:      Yes
  Name:       ufm-telemetry
  Enabled:    Yes
  Host:       10.212.145.7
  Port:       24455
  Message Type: Standard

```

## Removing Destination Target

The parameter `remove-target` removes a destination target.

```
[root@r-ufm ~]# /config/configure_ufm_telemetry_target.py remove-  
target -h  
usage: configure_ufm_telemetry_target.py <command> [<args>]  
remove-target  
    [-h] -n TARGET_NAME  
  
optional arguments:  
  -h, --help            show this help message and exit  
  -n TARGET_NAME, --target-name TARGET_NAME
```

For example:

```
[root@r-ufm ~]# /config/configure_ufm_telemetry_target.py remove-  
target --target-name ufm-telemetry  
[root@r-ufm ~]# /config/configure_ufm_telemetry_target.py show-  
target --target-name ufm-telemetry  
Enabled:      Yes  
Target ufm-telemetry is missing. Please add it first.
```

## Data Filtration

The `configure_ufm_telemetry_target.py` script allows users to import filter files to enable filtering streamed data and to disable filter options.

### Enabling Data Filtration

To enable filtration of the streamed counters and cable info data, users must create a file containing the appropriate RegEx patterns (one pattern per line to extract the required

parameters data).

```
[root@r-ufm ~]# cat ~/counters_filter
lm_counter
Errors
```

Then they must import the filter file to a destination, specifying the type of data (counters or cable info) using the parameter `import-filter-file`.

```
[root@r-ufm ~]# /config/configure_ufm_telemetry_target.py import-
filter-file -h
usage: configure_ufm_telemetry_target.py <command> [<args>]
import-filter-file
    [-h] -n TARGET_NAME -t {counters,fields} -f FILE_PATH

optional arguments:
  -h, --help            show this help message and exit
  -n TARGET_NAME, --target-name TARGET_NAME
  -t {counters,fields}, --target-filter-type {counters,fields}
  -f FILE_PATH, --file-path FILE_PATH
```

For example, to enable filtering streamed data and create filters:

```
[root@r-ufm ~]# /config/configure_ufm_telemetry_target.py import-
filter-file --target-name ufm-telemetry --target-filter-type
counters --file-path ~/counters_filter
```

On the target destination side, users will receive all the counters include one of texts (lm\_counter Errors).

## Disabling Data Filtration

The parameter `disable-filter-file` disables an imported filtering file.

```
[root@r-ufm ~]# /config/configure_ufm_telemetry_target.py
disable-filter-file -h
usage: configure_ufm_telemetry_target.py <command> [<args>]
disable-filter-file
    [-h] -n TARGET_NAME -t {counters,fields}

optional arguments:
  -h, --help            show this help message and exit
  -n TARGET_NAME, --target-name TARGET_NAME
  -t {counters,fields}, --target-filter-type {counters,fields}
```

For example:

```
[root@r-ufm ~]# /config/configure_ufm_telemetry_target.py
disable-filter-file --target-name ufm-telemetry --target-filter-
type counters
```

On the target destination side, users will receive all the counters without filtering.

---

# Settings and Configuration

Inside the container, the directory `/config` contains the configuration files for the NVIDIA® UFM® Telemetry application. The file `launch_ibdiagnet_config.ini` is the main configuration file.

The basic configurations of `launch_ibdiagnet_config.ini` are listed in the following table.

Section	Key	Type	Default Value	D
ibdiagnet	ibdiagnet_enabled	bool	true	E ib
	data_dir	String	/data	D U is
	ibdiag_output_dir	String	/tmp/ibd	D ib
	sample_rate	Int	-	Fi c c
	hca	String	mlx5_2	C p s c a
	force_hca	bool	false	S
	app_name	String	/opt/collectx/bin/ibdiagnet	A fu ib if
	topology_mode	String	discover	To
	topology_discovery_factor	Int	0	E d o fr
m_key	int	-	S b c	
xdr	XDR	bool	false	N o t a ir

Section	Key	Type	Default Value	D
Retention	retention_enabled	bool	true	E re
	retention_interval	time	1d	Ir b re
	retention_age	time	100d	P c
compression	compression_enable	bool	true	E c
	compression_interval	time	6h	Ir b c
	compression_age	time	12h	P c
cable_info	cable_info_schedule	CSV	-	w T ir

## Log File Rotation

UFM telemetry log file “`ibdiagnet2_port_counters.log`” size is monitored by log rotation mechanism. This is highly relevant for cases of long execution time and/or high verbosity, where the number of logs can get excessively big.

To disable log rotation, verify that the following flag is set to 0 (default is 1):

```
plugin_env_CLX_LOG_ROTATE_ENABLED
```

To change the number of rotated files, set the following flag (default is 3):

```
plugin_env_CLX_LOG_ROTATE_NUM_FILES
```

To change the rotation's threshold, set the following flag (default is 100M), use [K|M|G] as units:

```
plugin_env_CLX_LOG_ROTATE_SIZE
```

There are three optional rotation methods, used in the following order:

1. `rotatelogs` - If this executable exists, it will be used for logs rotation, and the rotated files name will differ by index suffix.
2. `logrotate` - If this executable exists, it will be used for logs rotation, and the rotated files name will differ by timestamp suffix.
3. manual rotation - In case both executables are not available, UFM telemetry will manually rotate 2 log files. The older log file will have “.bck”

To skip options, the following flag set the executables to use (default is “rotatelogs,logrotate”):

```
plugin_env_CLX_LOG_ROTATE_APP
```

## Auto Discovery Updates

The UFM Telemetry auto discovery feature enables in-process topology updates, eliminating the need for process restarts.

This is achieved through additional in-process ad-hoc discoveries and topology updates triggered by external events.

The following parameters configure the auto discovery updates feature:

Key	Type
<code>plugin_env_CLX_EXPORT_API_ENABLE_AD_HOC_DISCOVERY</code>	bool

Key	Type
plugin_env_CLX_EXPORT_API_AD_HOC_DISCOVERY_WITH_IB_TRAP	bool
plugin_env_CLX_EXPORT_API_AD_HOC_DISCOVERY_WITH_MANAGER_IB_TRAP	bool
plugin_env_CLX_EXPORT_API_AD_HOC_DISCOVERY_MIN_INTERVAL_SECONDS	int
plugin_env_CLX_EXPORT_API_AD_HOC_DISCOVERY_WITH_CLX_RESTART	bool
plugin_env_CLX_EXPORT_API_AD_HOC_DISCOVERY_PERIODIC	bool

Key	Type
plugin_env_CLX_EXPORT_API_IB_TRAP_LID	int

## Port Counters

The table below outlines the supported configurations for enabling section collection.

To include a register for collection, certain configurations need to be added, some removed, and some may depend on other registers. Please refer to the table below for instructions:

### Note

Please note that the 'arg' key names may differ.

Register / Page name	Configurations to be Applied
SLRIP	<pre>arg_slrip=--get_phy_info --enabled_regs slrip plugin_env_CLX_EXPORT_API_SKIP_SLRIP=0</pre>
SLRP	<pre>arg_slrp=--get_phy_info --enabled_regs slrp plugin_env_CLX_EXPORT_API_SKIP_SLRP=0</pre>
SLRG	<pre>arg_slrg=--get_phy_info --enabled_regs slrg plugin_env_CLX_EXPORT_API_SKIP_SLRG=0</pre>

Register / Page name	Configurations to be Applied
PTYS	arg_ptys=--get_phy_info --enabled_regs ptys plugin_env_CLX_EXPORT_API_SKIP_PTYS=0
PPHCR	arg_pphcr=--get_phy_info --enabled_regs pphcr plugin_env_CLX_EXPORT_API_SKIP_PPHCR=0
SLSIR	arg_slsir=--get_phy_info --enabled_regs slsir plugin_env_CLX_EXPORT_API_SKIP_SLSIR=0
SLTP	arg_sltp=--get_phy_info --enabled_regs sltp plugin_env_CLX_EXPORT_API_SKIP_SLTP=0
PMDR	arg_pmdr=--get_phy_info --enabled_regs pmdr plugin_env_CLX_EXPORT_API_SKIP_PMDR=0
PPLL	arg_ppll=--get_phy_info --enabled_regs ppll plugin_env_CLX_EXPORT_API_SKIP_PPLL=0
SLLM	arg_sllm=--get_phy_info --enabled_regs sllm plugin_env_CLX_EXPORT_API_SKIP_SLLM=0
PHY BER Params	arg_phy_ber_params=--get_phy_info --enabled_regs ppbmp plugin_env_CLX_EXPORT_API_SKIP_PHY_BER_PARAMS=0
MRCS	arg_mracs=--get_phy_info --enabled_regs mracs plugin_env_CLX_EXPORT_API_SKIP_MRCS=0
ARHC	arg_arhc=--get_phy_info --enabled_regs arhc plugin_env_CLX_EXPORT_API_SKIP_ARHC=0
ARHR	arg_arhr=--get_phy_info --enabled_regs arhr plugin_env_CLX_EXPORT_API_SKIP_ARHR=0
PEMI Laser Source Advanced	arg_pemi_laser_source_advanced=--get_phy_info --enabled_regs pemi_laser_source_module_advanced_samples plugin_env_CLX_EXPORT_API_SKIP_PEMI_LASER_SOURCE_ADVANCED=0
PEMI Laser Source Essential	arg_pemi_laser_source_essential=--get_phy_info --enabled_regs pemi_laser_source_module_essential_s plugin_env_CLX_EXPORT_API_SKIP_PEMI_LASER_SOURCE_ESSENTIAL=0

Register / Page name	Configurations to be Applied
PEMI Module Samples	<pre>arg_pemi_module_samples=--get_phy_info --enabled_regs pemi_module_samples plugin_env_CLX_EXPORT_API_SKIP_PEMI_MODULE_SAMPLES=0</pre>
PEMI Module Status Properties	<pre>arg_pemi_module_status_properties=--get_phy_info --enabled_regs pemi_module_status_properties plugin_env_CLX_EXPORT_API_SKIP_PEMI_MODULE_STATUS_PROPERTIES=0</pre>
Performance Histogram Ports Control	<pre>plugin_env_CLX_EXPORT_API_SKIP_PERFORMANCE_HISTOGRAM_PORTS_CONTROL=0</pre>
Performance Histogram Ports Data	<pre>plugin_env_CLX_EXPORT_API_SKIP_PERFORMANCE_HISTOGRAM_PORTS_DATA=0</pre>
PEMI SNR Samples	<pre>arg_pemi_snr_samples=--get_phy_info --enabled_regs pemi_snr_samples plugin_env_CLX_EXPORT_API_SKIP_PEMI_SNR_SAMPLES=0</pre>
PEMI Laser Samples	<pre>arg_pemi_laser_samples=--get_phy_info --enabled_regs pemi_laser_samples plugin_env_CLX_EXPORT_API_SKIP_PEMI_LASER_SAMPLES=0</pre>
PEMI Pam4 Samples	<pre>arg_pemi_pam4_samples=--get_phy_info --enabled_regs pemi_pam4_samples plugin_env_CLX_EXPORT_API_SKIP_PEMI_PAM4_SAMPLES=0</pre>
PEMI Pre FEC BER Samples	<pre>arg_pemi_pre_fec_ber_samples=--get_phy_info --enabled_regs pemi_pre_fec_ber_samples plugin_env_CLX_EXPORT_API_SKIP_PEMI_PRE_FEC_BER_SAMPLES=0</pre>
PEMI Pre FEC BER Properties	<pre>arg_pemi_pre_fec_ber_properties=--get_phy_info --enabled_regs pemi_pre_fec_ber_properties plugin_env_CLX_EXPORT_API_SKIP_PEMI_PRE_FEC_BER_PROPERTIES=0</pre>
PEMI Ferc Samples	<pre>arg_pemi_ferc_samples=--get_phy_info --enabled_regs pemi_ferc_samples plugin_env_CLX_EXPORT_API_SKIP_PEMI_FERC_SAMPLES=0</pre>
PHY Counters	<pre>arg_phy_cntrs=--get_phy_info --enabled_regs dd_ppcnt_plc plugin_env_CLX_EXPORT_API_SKIP_PHY_CNTRS=0</pre>
PHY Statistics	<pre>arg_phy_stat=--get_phy_info --enabled_regs dd_ppcnt_plsc plugin_env_CLX_EXPORT_API_SKIP_PHY_STAT=0</pre>

Register / Page name	Configurations to be Applied
PHY InfiniBand General Counters	<pre>arg_phy_ib_general_cntrs=--get_phy_info --enabled_regs dd_ppcnt_gen_counters plugin_env_CLX_EXPORT_API_SKIP_PHY_IB_GENERAL_CNTRS=0</pre>
Histograms	<pre>arg_hist=--get_phy_info --enabled_regs dd_ppcnt_rsfc plugin_env_CLX_EXPORT_API_SKIP_HIST=0</pre>
Troubleshoot	<pre>arg_troubleshoot=--get_phy_info --enabled_regs dd_pddr_ti plugin_env_CLX_EXPORT_API_SKIP_TROUBLESHOOT=0</pre>
Operation Info	<pre>arg_operation_info=--get_phy_info --enabled_regs dd_pddr_ plugin_env_CLX_EXPORT_API_SKIP_OPERATION_INFO=0</pre>
Link Down Info	<pre>arg_link_down_info=--get_phy_info --enabled_regs dd_pddr_ plugin_env_CLX_EXPORT_API_SKIP_LINK_DOWN_INFO=0</pre>
Link Up Info	<pre>arg_link_up_info=--get_phy_info --enabled_regs dd_pddr_lu plugin_env_CLX_EXPORT_API_SKIP_LINK_UP_INFO=0</pre>
PLR	<pre>arg_plr=--get_phy_info --enabled_regs dd_ppcnt_plr plugin_env_CLX_EXPORT_API_SKIP_PLR=0</pre>
Port VL	<pre>arg_port_vl=--per_slvl_cntrs plugin_env_CLX_EXPORT_API_SKIP_PORT_VL=0</pre>
Congestion Control Port VL	<pre>arg_congestion_control=--congestion_counters plugin_env_CLX_EXPORT_API_SKIP_CC_PORT_VL=0</pre>
MLNX Counters Page0	<pre>arg_mlnx_counters_page0=--sc plugin_env_CLX_EXPORT_API_SKIP_MLNX_COUNTERS_PAGE0=0</pre>
MLNX Counters Page1	<pre>arg_mlnx_counters_page1=--sc plugin_env_CLX_EXPORT_API_SKIP_MLNX_COUNTERS_PAGE1=0</pre>
MLNX Counters Page255	<pre>arg_mlnx_counters_page255=--sc plugin_env_CLX_EXPORT_API_SKIP_MLNX_COUNTERS_PAGE255=0</pre>

Register / Page name	Configurations to be Applied
Sharp PM Counters	<pre>arg_sharp_pm_counters=--sharp --sharp_opt dsc plugin_env_CLX_EXPORT_API_SKIP_SHARP_PM_COUNTERS=0</pre>
General Info	<pre>plugin_env_CLX_EXPORT_API_SKIP_GENERAL_INFO=0</pre>
Device Temperature	<pre>plugin_env_CLX_EXPORT_API_SKIP_DEV_TEMP=0</pre>
Port Counters	<pre>plugin_env_CLX_EXPORT_API_SKIP_PORT_COUNTERS=0</pre>
Port Counters Extended	<pre>plugin_env_CLX_EXPORT_API_SKIP_PORT_COUNTERS_EXTENDED=0</pre>
Extended Speeds Counters	<pre>plugin_env_CLX_EXPORT_API_SKIP_EXTENDED_SPEEDS_COUNTERS=0</pre>
LLR Statistics	<pre>plugin_env_CLX_EXPORT_API_SKIP_LLR_STATISTICS=0</pre>
Port Rcv Error Details	<pre>plugin_env_CLX_EXPORT_API_SKIP_PORT_RCV_ERROR_DETAILS=0</pre>
Port Xmit Discard Details	<pre>plugin_env_CLX_EXPORT_API_SKIP_PORT_XMIT_DISCARD_DETAILS=</pre>
Port RN Counters	<pre>plugin_env_CLX_EXPORT_API_SKIP_RN_COUNTERS=0</pre>
Port HBF Counters	<pre>plugin_env_CLX_EXPORT_API_SKIP_HBF_COUNTERS=0</pre>
Fast Recovery Counters	<pre>plugin_env_CLX_EXPORT_API_SKIP_PORT_FAST_RECOVERY=0</pre>
Recovery Policy Type Counters	<pre>plugin_env_CLX_EXPORT_API_SKIP_PORT_RECOVERY_POLICY_COUNTERS=</pre>

Register / Page name	Configurations to be Applied
Recovery Policy Type Config	plugin_env_CLX_EXPORT_API_SKIP_PORT_RECOVERY_POLICY_CONFIG=0
PPCNT Recovery Counters	arg_ppcnt_recovery_counters=--get_phy_info --enabled_regs ppcnt_plrc plugin_env_CLX_EXPORT_API_SKIP_PPCNT_RECOVERY_COUNTERS=0
Port General Counters	plugin_env_CLX_EXPORT_API_SKIP_PORT_GENERAL_COUNTERS=0
Port Hierarchy	plugin_env_CLX_EXPORT_API_SKIP_PORT_HIERARCHY=0
Link Partner	plugin_env_CLX_EXPORT_API_SKIP_LINK_PARTNER_EXT=0
Ports	plugin_env_CLX_EXPORT_API_SKIP_PORTS=0
Calculated Info	plugin_env_CLX_EXPORT_API_SKIP_CALC_INFO=0
Mad Statistics	arg_mad_stats=--mad_stat plugin_env_CLX_EXPORT_API_SKIP_MAD_STATS=0
Performance Histogram Info	plugin_env_CLX_EXPORT_API_SKIP_PERFORMANCE_HISTOGRAM_INFO
Performance Histogram Buffer Control	plugin_env_CLX_EXPORT_API_SKIP_PERFORMANCE_HISTOGRAM_BUFF CLX_EXPORT_API_PERFORMANCE_HISTOGRAM_COLLECT_ALL=1
Performance Histogram Buffer Data	plugin_env_CLX_EXPORT_API_SKIP_PERFORMANCE_HISTOGRAM_BUFF CLX_EXPORT_API_PERFORMANCE_HISTOGRAM_COLLECT_ALL=1

## Events

The info below outlines the supported configurations for enabling section collection.

## Enable PPCC

```
plugin_env_CLX_EXPORT_API_DISABLE_PPCCINFO
```

The following events are created:

```
ppcc_algo_config, ppcc_algo_config_params, ppcc_algo_config_support,  
ppcc_algo_counters
```

## Switch Power Sensors Data

To enable Switch power sensors, ensure that the following line is added and not commented:

```
arg_x= --get_phy_info --enabled_reg mvcr # x should be replaced  
with the next available index!
```

Verify the following line does not exist / is set to 0:

```
plugin_env_CLX_EXPORT_API_DISABLE_SWITCHINFO=0
```

## Switch Power Supplies Data

To enable switch power supplies, ensure that the following line is added and not commented:

```
arg_x= --get_phy_info --enabled_reg mspms # x should be replaced  
with the next available index!
```

Verify the following line does not exist / is set to 0:

```
plugin_env_CLX_EXPORT_API_DISABLE_SWITCHINFO=0
```

## Managed Switch Data Collection

**Prerequisite:** Access to UFM that is running the sysinfo plugin. The following configs are mandatory to enable the collection.

To enable the feature, run:

```
plugin_env_CLX_EXPORT_API_DISABLE_MANAGED_SWITCHINFO=0
```

UFM endpoint:

```
plugin_env_MANAGED_SWITCH_DATA_EP=https://localhost/ufmRest/plugin/sysinfo/query
```

UFM token:

```
plugin_env_CLX_UFM_TOKEN=YWRtaW46MTIzNDU2
```

The UFM Telemetry server endpoint must be the same as the `PROMETHEUS_ENDPOINT`

```
plugin_env_CLX_EXPORT_API_MANAGED_SWITCH_CB_EP=http://localhost:1234/manag
```

The following configs are optional:

- The list of managed switches to sample, the default are all the managed switches on the fabric, defined by the sysinfo plugin:

```
plugin_env_CLX_EXPORT_API_MANAGED_SWITCH_LIST=11.222.33.44, 11.333.44
```

- `sample_rate` of `managed_switches(seconds)` should not be set faster than switch collection sample rate, default is 10 minutes.

```
plugin_env_CLX_EXPORT_API_MANAGED_SWITCH_INTERVAL=600
```

## NVLink Info

The following configuration should be applied:

\*the arg key name may differ

```
arg_nvlink_info=--nvlink  
plugin_env_CLX_EXPORT_API_SKIP_NVLINKINFO=0
```

---

# Prometheus Endpoint Support

## Prometheus Endpoint

UFM Telemetry can expose an http or https endpoint to allow simple and effective integration with monitoring systems that work in poll mode and support Prometheus, CSV, or JSON data formats. The endpoint provides only the last data sample. The user cannot obtain statistics for time points in the past.

## Supported Formats

An http endpoint provides data in Prometheus format by default. It also supports JSON and CSV formats. The user can request the desired format using a URL prefix, as shown in the table below.

Data Format	URL Prefix
Prometheus	-
JSON	/json
CSV	/csv

## Data Filtering

An http endpoint can provide all sampled data using the default `/metrics` URL. The filtering functionality described in the [Cset/Fset Filtering](#) section is also supported. To use it place `<name>.cset` or `<name>.fset` file in appropriate folders. This folder should be stated in configuration file. See section "[Configuring Data Polling Endpoint](#)" for more details.

The Extended counter set filtering, as described below, presents an alternative approach to filtering functionality by enabling counters and field selection.

A filter file name is included in the URL to request that the data be filtered through the particular `.cset` / `.fset` / `.xcset` file the user intends. For example, if there are two

filter files named `name1.cset` and `name2.cset`, then URLs `/name1` (or `/cset/name1`) and `/name2` (or `/cset/name2`) can be used to get filtered output described in these files accordingly.

The URL prefixes `/cset`, `/fset` and `/xcset` can also be used to specify which filter file is meant.

URL	File Extension	Folder Parameter in Configuration File	Note
<code>/cset</code>	<code>*.cset</code>	<code>plugin_env_PROMETHEUS_CSET_DIR</code>	If the <code>cset</code> folder is not explicitly specified in the configuration file, then the <code>cset</code> directory is set the same as the <code>fset</code> directory.
<code>/fset</code>	<code>*.fset</code>	<code>plugin_env_PROMETHEUS_FSET_DIR</code>	If the <code>fset</code> folder is not explicitly specified in the configuration file, then the <code>fset</code> directory is set the same as the <code>cset</code> directory.
<code>/xcset</code>	<code>*.xcset</code>	<code>plugin_env_PROMETHEUS_XCSET_DIR</code>	If the <code>xcset</code> folder is not explicitly specified in the configuration file, then the <code>xcset</code> directory is set the same as the <code>fset</code> directory.

### Note

If a URL prefix is not specified, then the filter file will be searched under both `cset` and `fset` folders. If they both have files with the same names, then both filters will be applied.

## Extended Counter Set Filtering

The http server provides an optional Extended counter set (`xcset`) selection mechanism in addition to the counter set (`cset`) and field set (`fset`) filtering. The Extended Counterset allows the user to generate an output record which contains data from both 'counters' and 'event' data records with the same index, which in the context of UFM Telemetry is generally the `guid/port_num`. To define an extended counter set, a file or group of files with the `.xcset` extension must be placed in its designated directory or adjacent to existing field or counter sets.

Each line of the file may contain:

- Selection of a counter with an optional alias in the format “`counter[=alias]`”
- Selection of a type's field with an optional alias in the format “`type.field[=alias]`”
- Reference to another file to be included “`file.xcset`”

Extended counter set files are searched for in the same directory as the source `xcset`.

Aliases are not mandatory, but if provided, they are used to name the selected counter or field in the output. Empty lines and comments that begin with the “#” sign are disregarded.

## Rendering Hints

Extended counter sets support rendering hints to adjust attribution and representation of the metrics values.

The hints are given as a coma-separated list of key=value pairs following the field selection line after the semicolon (`;`) character.

```
counter[=alias];key[=value][,key[=value]]*
```

For Example:

```
port_guid;label,hex,default=undefined
hw_port_state;lookup=printable_port_states
```

Supported rendering hints are the following:

		Description	
hex	n/a	Requests a numeric value to be rendered hexadecimal	port_num;hex
label	n/a	Attributes the field as Prometheus label	host_name;label
default	value	Sets a string value to be rendered in case of data for the field is missing	temperature;default=unknown
const	value	Add the marked field as constant value to the output	context;const=oberon
lookup	name	Use the named lookup table to replace the value when rendering.	hw_port_state;lookup=printable_port_states

## URL Prefixes Priority

URL prefixes can be used to manipulate data output. It is important to use the prefixes in the correct order as they have assigned priorities. The table below shows URL prefixes priority assignments with examples:

Priority	Prefix	Link Examples	Description
1	/labels	/labels/metrics, /metrics	Used to show labels from metadata files
2	/json, /csv	/json/metrics, /csv/metrics, /labels/json/metrics, /labels/csv/metrics	Used to specify output format
3	/cset, /fset, /xcset	/cset/filter1, /fset/filter2, /labels/cset/filter1, /labels/fset/filter2, /json/cset/filter1, /json/fset/filter2, /csv/cset/filter1, /csv/fset/filter2, /csv/xcset/ib, /labels/json/cset/filter1, /labels/json/fset/filter2, /labels/csv/cset/filter1, /labels/csv/fset/filter2	Used to specify which type of filter file should be applied

## Sharding Data Requests

The shard data filter is useful when metric scraping loads need to be distributed over time or across consumer space. Below are several examples of how to use sharding in queries.

1. Shard counters and events by `node_guid`, serialize to CSV:

```
curl -v http://0.0.0.0:9352/csv/metrics?
num_shards=2&shard=0&sharding_field=node_guid
```

2. Shard by `node_guid` and filter by port number:

```
curl -v http://0.0.0.0:9352/csv/metrics?
num_shards=2&shard=0&sharding_field=node_guid&port_num_eq_1
```

3. Select a specific counter set explicitly:

```
curl -v http://0.0.0.0:9352/csv/cset/minimal?
num_shards=2&shard=0&sharding_field=node_guid
```

4. Use a predefined fieldset and shard by port number (using the port field):

```
curl -v http://0.0.0.0:9352/csv/fset/low_freq?
num_shards=2&shard=0&sharding_field=port
```

## Configurable Indication of Missing Data

By default, numeric fields with no data are set to `0`. This behavior can be modified to show `'N/A'` instead.

Flag	Default Value	Effect
<code>NA_INDICATION</code>	<code>false</code>	Sets missing field values to <code>'N/A'</code> instead of <code>0</code>
<code>NA_INDICATION?</code> <code>plugin_env_CLX_CLEAN_DATA_EVERY_ITER</code>	<code>false</code>	Resets field values on each data collection iteration

## Configuring Data Polling Endpoint

To configure the Prometheus endpoint, the keys listed below need to be set in the `launch_ibdiagnet_config.ini` file.

```

plugin_env_PROMETHEUS_ENDPOINT
http://0.0.0.0:9100
plugin_env_PROMETHEUS_PROXY_ENDPOINT_PORT    9200
plugin_env_PROMETHEUS_INDEXES                port_num
plugin_env_PROMETHEUS_FSET_INDEXES           port,lid,guid,
[CableInfo]^port_guid,^Port$
plugin_env_PROMETHEUS_CSET_DIR
/config/prometheus_configs/cset
...

```

There are several options related to configuring the HTTP polling endpoint. The key `plugin_env_PROMETHEUS_ENDPOINT` is used to configure the IP interface for endpoint binding. The “0.0.0.0” part in the setting above means that any of the host’s valid IP addresses can be used. Note that the user can also specify the host’s IP address explicitly.

The `plugin_env_PROMETHEUS_ENDPOINT` key also configures the data transport. For regular HTTP, prefix to `http`. To send over a TLS connection, set the prefix to `https`, set the above mandatory parameters (keys), and select the existing security keys as follows.

A DH (key exchange protoon) file can also be specified if needed as follows:

```

plugin_env_CLX_SSL_DH_FILE=/certs/dh.pem

```

To use custom labels for Prometheus statistics, a metadata file is used. For details about labels and label file format, see sections "[Prometheus Labels](#)" and "[Prometheus Label Generation](#)".

There are several options that allow configuring metadata. The file containing the labels used in Prometheus generation is set as follows:

```

plugin_env_CLX_METADATA_FILE=/config/labels.txt

```

The user can create the metadata file upon system setup or use a script to generate it automatically via script, using the following parameter:

```
plugin_env_CLX_METADATA_COMMAND=/opt/mellanox/collectx/telem/bin/gc
--fabric compute --file /var/log/ibdiagnet2.ibnetdiscover --
output /config/labels.txt
```

In the above example, the script generates metadata from `/var/log/ibdiagnet2.ibnetdiscover`. If the user wishes to create the label file manually, the above option should be commented out to prevent periodic overwriting of the content of the metadata file.

By default, the Prometheus endpoint provides statistics with the collection timestamps. The user can decide whether counter values will be passed with or without timestamps by setting the `plugin_env_PROMETHEUS_SHOW_TIMESTAMPS` parameter to T (true) or F (false), respectively. For example, to send counter values without timestamps, set the parameter as follows:

```
plugin_env_PROMETHEUS_SHOW_TIMESTAMPS=F
```

To use data filters folders with counter set, field sets, and extended counter sets, the directories where the files are stored should be configured as follows:

```
plugin_env_PROMETHEUS_CSET_DIR=/telemetry.config/prometheus_configs
plugin_env_PROMETHEUS_FSET_DIR=/telemetry.config/prometheus_configs
plugin_env_PROMETHEUS_XCSET_DIR=/telemetry.config/prometheus_configs
```

### **Warning**

Any parameters not explicitly documented should not be changed and should be considered read-only.

## Prometheus Labels

For use cases such as UFM Enterprise or UFM Cyber AI where the network topology is known, a human-readable name can be presented based on the GUID.

```
# TYPE PortXmitDataExtended counter
# TYPE PortXmitPktsExtended counter
PortXmitDataExtended{source="0x0002c90300f172a0",
node_guid="2c90300f172a0", port_guid="2c90300f172a2",
port_num="2"} 85554128244 1628683905941
PortXmitPktsExtended{source="0x0002c90300f172a0",
node_guid="2c90300f172a0", port_guid="2c90300f172a2",
port_num="2"} 1188251785 1628683905941
```

For integration with third-party applications, labels which are more human-readable may be generated using a labels metadata file, as described below.

## Prometheus Label Generation

To generate custom labels, a file containing key-value pairs is used. When the keys are matched, the key-value pairs added to the Prometheus labels are generated.

The following is an example of the format of a labels metadata file:

```
ec0d9a0300b41a50_36|port_id|ec0d9a0300b41a50_36|device_name|Switch:
Mellanox
Technologies|device_type|switch|fabric|compute|hostname||node_desc
ec0d9a0300b41a50_37|port_id|ec0d9a0300b41a50_37|device_name|Switch:
Mellanox
Technologies|device_type|switch|fabric|compute|hostname||node_desc
ec0d9a0300b41a58_1|port_id|ec0d9a0300b41a58_1|device_name||device_
node|level||peer_level|leaf
98039b0300640b92_1|port_id|98039b0300640b92_1|device_name||device_
1|node_desc|agx-1 mlx5_0|level|server|peer_level|leaf
98039b0300640c22_1|port_id|98039b0300640c22_1|device_name||device_
2|node_desc|agx-2 mlx5_0|level|server|peer_level|leaf
0002c90300f172a0_2|port_id|0002c90300f172a0_2|device_name||device_
3|node_desc|agx-3 mlx4_0|level|server|peer_level|leaf
98039b0300640b9a_1|port_id|98039b0300640b9a_1|device_name||device_
3|node_desc|agx-3 mlx5_0|level|server|peer_level|leaf
```

The following is an example of the generated Prometheus output:

```

# TYPE infiniband_port_xmit_data_bytes counter
# TYPE infiniband_port_rcv_data_bytes counter
# TYPE infiniband_link_error_recovery_events counter
# TYPE infiniband_link_downed_events counter
# TYPE infiniband_cbw gauge
infiniband_port_xmit_data_bytes
{port_id="0002c90300f172a0_2", ADDITIONAL_LABELS} 82218360540
1628602711924
infiniband_port_rcv_data_bytes
{port_id="0002c90300f172a0_2", ADDITIONAL_LABELS} 82218429458
1628602711924
infiniband_link_error_recovery_events
{port_id="0002c90300f172a0_2", ADDITIONAL_LABELS} 0
1628602711924
infiniband_link_downed_events
{port_id="0002c90300f172a0_2", ADDITIONAL_LABELS} 0
1628602711924
infiniband_cbw
{port_id="0002c90300f172a0_2", ADDITIONAL_LABELS}} 0
1628602711924

```

where ADDITIONAL\_LABELS include:

```

hostname="agx-3"
node_desc="agx-3 mlx5_0"
device_name=""
device_type="host"
fabric="compute"
level="server"
peer_level="leaf"

```

To enable this functionality, the following additional keys need to be configured:

```
plugin_env_CLX_EXPORT_API_IBNETDISCOVER_RUN_ONCE 1    # Without
this, the gen_metadata.py script cannot generate the human
readable names, nor the level and peer_level.
plugin_env_CLX_METADATA_FILE /path/to/labels/file
plugin_env_CLX_METADATA_COMMAND "python3
/opt/mellanox/collectx/telem/bin/gen_metadata.py --fabric
compute --file /var/log/ibdiagnet2.ibnetdiscover -o
/path/to/labels/file"
```

To test, the `curl` command can be used as follows:

```
[root@jazz11 /]# curl --silent IP_ADDR_OF_HOST:9100/metrics
|egrep "xmit|rcv" | tail
port_xmit_discard{device_name="",device_type="host",fabric="compute
mlx5_2",peer_level="leaf",port_id="ec0d9a0300c04a54_1"} 0
1629194120043
port_rcv_switch_relay_errors{device_name="",device_type="host",fabr
mlx5_2",peer_level="leaf",port_id="ec0d9a0300c04a54_1"} 0
1629194120043
port_rcv_constraint_errors{device_name="",device_type="host",fabric
mlx5_2",peer_level="leaf",port_id="ec0d9a0300c04a54_1"} 0
1629194120043
port_xmit_constraint_errors{device_name="",device_type="host",fabr
mlx5_2",peer_level="leaf",port_id="ec0d9a0300c04a54_1"} 0
1629194120043
```

---

# Distributed Telemetry - Switch Telemetry Agent

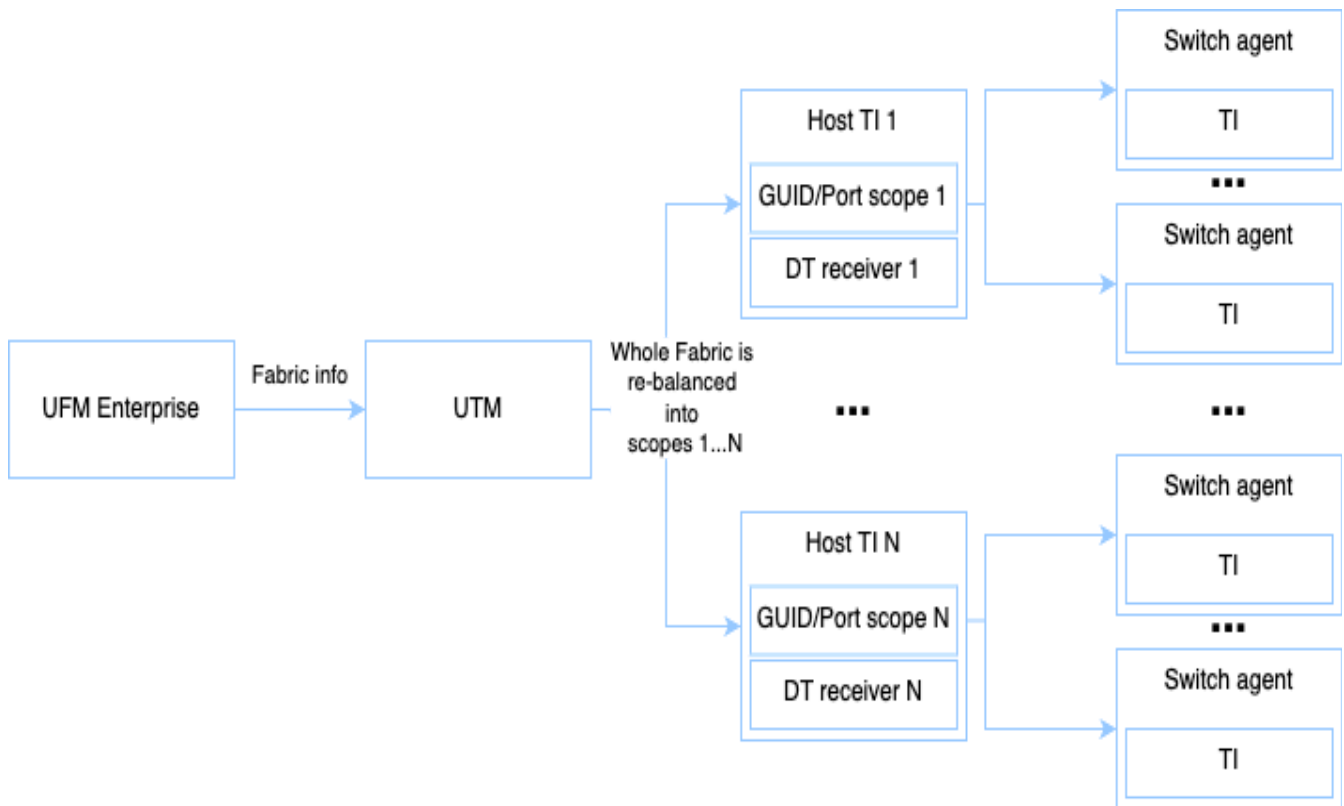
## Overview

Distributed Telemetry (DT) is UFM Telemetry mode when the whole fabric telemetry is sampled from managed switches and hosts.

- Managed switch samples itself and hosts connected directly to it
- Each managed switch TI reports to one of several host TIs via MADs
- If a fabric GUID/Port can be sampled, but not sampled by a switch, host TI will sample it.

The whole process is orchestrated by [UFM Telemetry Manager \(UTM\)](#) on the top load balancer.

Switch telemetry is organized as a docker container (Switch Agent) with a telemetry package inside.



## Distributed Telemetry components relation

## Terminology

Switch Telemetry docker image contains:

- Switch Agent is an HTTP server running inside of the container.
- Switch Telemetry Instance (Switch TI) that can be started or stopped within the container

To deploy/remove Switch Agent = to deploy/remove Switch Telemetry Container.

## Deployment

The deployment process is described in [UFM Telemetry Manager \(UTM\)](#).

### **i** Note

Switch Telemetry docker image is being docker pulled by the deployment script.

After preparing the setup enable Distributed Telemetry in `utm_config.ini`, as explained in the chapter `Configuration File`.

## Running Distributed telemetry via HTTP API

For the sake of simplicity, the commands are listed here in UTM standalone mode only.

### **i** Info

UTM HTTP API access depends on the UTM run mode. Please refer to the section `REST API` of [UFM Telemetry Manager \(UTM\)](#) for more details.

To get help for all HTTP API endpoints use `/help` endpoint:

```
curl -sk https://127.0.0.1:8888/help
```

UTM HTTP API allows users to:

- get the status of Switch Agent/Telemetry instances
- deploy/remove Switch Agent containers
- start/stop Switch Telemetry inside of deployed containers
- set switches IP list to be periodically monitored.

Recommended flow to work with Distributed Telemetry:

- Deploy:
- Check the switches status and find IP list to work with
- Set monitoring switch list and deploy Switch Agents to this list
- Start switch TIs
- Cleanup:
- Stop switch TIs
- Remove Switch Agents
- Check switches status

Detailed instructions for Switch Agent and Switch Telemetry are listed in the following subsections.

## API for Switch Agents

- Get the status of the managed switches in JSON format.

```
# all managed switches
curl -sk https://127.0.0.1:8888/managed_switches_status

# managed switches set to periodic monitoring only:
curl -sk https://127.0.0.1:8888/managed_switches_status?
monitored_only=1
```

`/status` endpoint provides JSON object per managed switch, which shows basic info about the switch, status of Switch Agent, and Switch Telemetry (If Switch Agent is installed to the switch).

- In the case of non-default switch credentials, upload them into UTM.

```
curl -s http://127.0.0.1:8888/set_switch_creds?ip={SWITCH_IP}&user={SWITCH_USER}&pass={SWITCH_PASSWORD}"
```

- Set switch IP list for periodic monitoring. Monitoring updates switch information for `/managed_switches_status` endpoint.

```
# monitor only IP1,IP2:  
curl -sk https://127.0.0.1:8888/switch_mon_list?  
ip_list=IP1,IP2  
  
# monitor all managed switches  
curl -sk https://127.0.0.1:8888/switch_mon_list?ip_list=all
```

- Deploy switch agents to a list of managed switches.

```
# deploy to all the managed switches:  
curl -sk https://127.0.0.1:8888/deploy_switch_agents?  
ip_list=all  
  
# deploy to switches with IPs IP1 and IP2:  
curl -sk https://127.0.0.1:8888/deploy_switch_agents?  
ip_list=IP1,IP2
```

- Remove switch agents from a list of managed switches

```
# deploy to all the managed switches:
curl -sk https://127.0.0.1:8888/remove_switch_agents?
ip_list=all

# deploy to switches with IPs IP1 and IP2:
curl -sk https://127.0.0.1:8888/remove_switch_agents?
ip_list=IP1,IP2
```

## API for Switch Telemetry:

- Start switch telemetry. Note at least one managed host TI should run.

```
# for all running Switch Agents
curl -sk https://127.0.0.1:8888/start_switch_telemetry

# at a specific switch IP:
curl -sk https://127.0.0.1:8888/start_switch_telemetry?ip=IP1
```

- Stop switch telemetry:

```
# for all running Switch Agents
curl -sk https://127.0.0.1:8888/stop_switch_telemetry

at a specific switch IP:
curl -sk https://127.0.0.1:8888/stop_switch_telemetry?ip=IP1
```

# Supported Telemetry Fields

## Ports Counters Info

The table below lists the names of Registers/Pages supported by telemetry, along with their respective field lists.

Register / Page Name	Field List
<b>SLRIP</b>	ffe_tap[0-8]_ib[0-3]_lane[0-3] ffe_tap_en_ib[0-3]_lane[0-3]mixer_offset[0-1]_ib[0-3]_lane[0-3]saved[0-1]
<b>SLRP</b>	crnt_bgn_offset_n[0-1]_lane[0-3] crnt_bgn_offset_p[0-1]_lane[0-3]dp_sel_lane[0-3]gctrl_bin_bgn[0-1]_n_lan
<b>SLRG</b>	Lane[0-3]Grade dn_eye_grade_lane[0-3]fom_ext_conf_cap_lane[0-3]fom_ext_conf_lane[0-
<b>PTYS</b>	data_rate_oper
<b>PPHCR</b>	active_hist_type bin_range_[0-15]_high_valbin_range_[0-15]_low_valbin_range_write_mask
<b>SLSIR</b>	ae_state_lane[0-3] cal_abort_cnt_lane[0-3]cal_done_cnt_lane[0-3]cdr_abort_cnt_lane[0-3]cdr
<b>SLTP</b>	alev_minus_bfm2_lane[0-3] alev_plus_bfm2_lane[0-3]blev_lane[0-3]lower_eye_amp_lane[0-3]main_tap
<b>PMDR</b>	clp_[1,4]x cluster_rx_lane[0-3]cluster_tx_lane[0-3]gb_dp_numgb_validgearbox_die_r
<b>PPLL</b>	ae_pll[0-3] analog_var_pll[0-3]bg_trimbg_trim_pll[0-24]bg_trim_validbg_trim_valid_pl 3]num_plls_[5,7,16]nmppll_lockdet_statepll_pwrup_pll[0-3]pll_speed_pll[0-3]
<b>SLLM</b>	ber_mon_exp_lane[0-3] ber_mon_lane[0-3]ber_mon_mantissa_lane[0-3]ctle_peq_cnt_lane[0-3]ctle
<b>PHY BER Params</b>	alarm_th_eff_ber alarm_th_raw_beralarm_th_sym_bernormal_th_eff_bernormal_th_raw_ber

Register / Page Name	Field List
<b>MRCS</b>	max_delta_freq_[0-1] max_freq_[0-1]measured_freq_[0-1]min_freq_[0-1]
<b>ARHC</b>	arhc_bin[0-1]_width arhc_bin_numarhc_bin_num_maxarhc_bin_width_modearhc_clear_on_rear
<b>ARHR</b>	arhr_bin_num arhr_histogram_bin_[0-15]
<b>PEMI Module Samples</b>	pemi_dp_st_lane[0-7] pemi_module_stpemi_rx_power_lane[0-7]pemi_tx_bias_lane[0-7]pemi_tx_
<b>PEMI SNR Samples</b>	snr_host_lane[0-7] snr_media_lane[0-7]
<b>PEMI Laser Samples</b>	laser_frequency_error_lane[0-7] els_cooled_laser_temperature_lane[0-7]els_input_power_lane[0-7]laser_ac
<b>PEMI Laser Source Advanced</b>	health_value_laser_lane[0-7] health_value_tec_lane[0-7]laser_mpd_lane[0-7]power_consumptiontec_vo
<b>PEMI Laser Source Essential</b>	bias_current_monitor_lane[0-7] icc_monitoropt_power_monitor_lane[0-7]voltage_monitor_lane[0-7]
<b>PEMI Module Status Properties</b>	max_tec_power_high_alarm max_tec_power_high_warningmax_tec_power_low_alarmmax_tec_power_l
<b>PEMI Pam4 Samples</b>	pam4_level_transition_host_lane[0-7] pam4_level_transition_media_lane[0-7]
<b>PEMI Pre FEC BER Samples</b>	pre_fec_ber_avg_host pre_fec_ber_avg_mediapre_fec_ber_max_hostpre_fec_ber_max_mediapre
<b>PEMI Pre FEC BER Properties</b>	pre_fec_ber_avg_high_host_alarm pre_fec_ber_avg_high_host_warningpre_fec_ber_avg_high_media_alarmpr
<b>PEMI Ferc Samples</b>	ferc_avg_host ferc_avg_mediaferc_max_hostferc_max_mediaferc_min_hostferc_min_me
<b>PHY Counters</b>	link_down_events

Register / Page Name	Field List
<b>PHY Statistics</b>	conf_level_raw_ber eff_ber effective_ber_coef effective_ber_magnitude phy_corrected_bits phy_
<b>PHY InfiniBand General Counters</b>	dqs2llu_xmit_wait_arb_global general_receive_discard_external_contain general_transmit_discard_exterr
<b>Histograms</b>	eeber fc_zero_hist hist[0-15]
<b>Troubleshoot</b>	group_opcode status_message status_opcode user_feedback_data user_feedback_index
<b>Operation Info</b>	cable_link_speed_cap cable_link_width_cap cable_proto_cap_ext core_to_phy_link_proto_enabled
<b>Link Down Info</b>	cons_eff_norm_ber cons_raw_norm_ber cons_symbol_norm_ber down_blamee2e_reason_opco
<b>Link Up Info</b>	fast_link_up_status lt_cnt time_logical_init_to_active time_of_module_conf_done downtime_of
<b>PLR</b>	plr_codes_loss plr_rcv_code_err plr_rcv_codes plr_rcv_uncorrectable_code plr_sync_events
<b>Port VL</b>	PortRcvDataSLExt[0-15] PortRcvDataVLExt[0-15] PortRcvPktVLExt[0-15] PortVLXmitFlowCtlUpdate
<b>Congestion Control</b>	PortVLXmitTimeCongExt[0-15]
<b>MLNX Counters Page0</b>	rq_num_dup rq_num_laerq_num_leeoerq_num_lleerq_num_lperq_num_lqpoerq_num_mc
<b>MLNX Counters Page1</b>	max_cnak_fifo_size maximum_dcrs minimum_dcrs rq_close_non_gb_gcrq_curr_gb_connectrq_
<b>MLNX Counters Page255</b>	dc_has_max_used_entries_in_line dc_hash_curr_used_lines num_cqovfnum_eqovfrq_close_gb_gcrq_cwc_gh
<b>Sharp PM Counters</b>	ack_packet_sent aeth_syndrome_ack_packet ethba_multi_packet_message_dropped_bytes shk

Register / Page Name	Field List
<b>General Info</b>	build_id device_hw_revdevice_iddevice_technologyfw_date_dmyfw_hourfw_ini_ver
<b>Device Temperature</b>	dev_temperature
<b>Port Counters</b>	excessive_buffer_errors link_down_counterlink_error_recovery_counterlocal_link_integrity_errorspc
<b>Port Counters Extended</b>	ExcessiveBufferOverrunErrorsExtended LinkDownedCounterExtendedLinkErrorRecoveryCounterExtendedLocalLinl
<b>Extended Speeds Counters</b>	ErrorDetectionCounterLane_[0-11] FECCorrectableBlockCountrLane_[0-11]FECCorrectedSymbolCounterLane.
<b>LLR Statistics</b>	MaxRetransmissionRate
<b>Port Rcv Error Details</b>	PortBufferOverrunErrors PortDLIDMappingErrorsPortLocalPhysicalErrorsPortLoopingErrorsPortMalf
<b>Port Xmit Discard Details</b>	PortInactiveDiscards PortNeighborMTUDiscardsPortSwHOQLifetimeLimitDiscardsPortSwLifetir
<b>Port RN Counters</b>	pfrn_received_error pfrn_received_packetpfrn_start_packetpfrn_xmit_packetport_ar_trialspor
<b>Port HBF Counters</b>	rx_pkt_forwarding_ar rx_pkt_forwarding_ar_sg[0-2]rx_pkt_forwarding_hbfrx_pkt_forwarding_hk
<b>Fast Recovery Counters</b>	consecutive_normal_credit_watchdog consecutive_normal_eff_berconsecutive_normal_raw_berconsecutive_nori
<b>Recovery Policy Type Counters</b>	last_result_[0-7] last_time_spent_[0-7]rp_time_since_last_recoverytotal_success_[0-7]tota
<b>Recovery Policy Type Config</b>	draining_timeout_[0-7] link_down_timeout_[0-7]recovery_type_capability_[0-7]recovery_type_en_l
<b>PPCNT Recovery Counters</b>	host_logical_recovery_count host_logical_succesful_recovery_counthost_serdes_freq_recovery_countho

Register / Page Name	Field List
<b>Port General Counters</b>	contain_n_drain_rcv_discards contain_n_drain_xmit_discardsrx_icrc_errortx_parity_error
<b>Port Hierarchy</b>	bus devicefunctionm_asicm_asic_namem_board_typem_cagem_chassis_slot_i
<b>Link Partner</b>	link_partner_description link_partner_lidlink_partner_node_guidlink_partner_port_numlink_partner
<b>Ports</b>	fec_mode_active link_speed_activelink_speed_enabledlink_speed_supportedlink_width_acti
<b>Calculated Info</b>	NormalizedXW Normalized_CBWNormalized_XmitDatainfiniband_CBW
<b>Mad Statistics</b>	recv_time_port_counters recv_time_port_counters_extendedrecv_time_port_extended_speedsrecv_
<b>Performance Histogram Info</b>	cap_cell_size cap_hist_bin_sizecap_max_port_hist_idcap_max_sample_time
<b>Performance Histogram Buffer Control</b>	phb_control_bin_size_egress[0-15] phb_control_bin_size_ingress[0-15]phb_control_hist_min_value_egress[0-
<b>Performance Histogram Buffer Data</b>	phb_data_bin[0-9]_egress[0-15] phb_data_bin[0-9]_ingress[0-15]phb_data_histogram_type_egress[0-15]p
<b>Performance Histogram Ports Control</b>	php_bin_size_id[0-1] php_hist_min_value_id[0-1]php_histogram_type_id[0-1]php_mode_id[0-1]
<b>Performance Histogram Ports Data</b>	php_data_bin[0-9]_id[0-1] php_data_histogram_type_id[0-1]php_data_max_sampled_id[0-1]php_dat

## Cable Info

Telemetry supports the following field list for cable information.

node\_guid

port\_guid

sys\_image\_guid

Port

aport

Lid

node\_type

port\_type

num\_planes

Port\_Name

Vendor

vendor\_oui

PN

SN

Rev

smf\_length

LengthCopperOrActive

Identifier

cable\_identifier

Connector

Type

ib\_compliance\_code

length

length\_by\_prtl

length\_by\_reg  
cable\_type  
SupportedSpeedDesc  
Temperature  
PowerClass  
CDREnableTxRx  
tx\_cdr\_enable  
rx\_cdr\_enable  
cable\_tx\_equalization  
cable\_rx\_amp  
OutputEmp  
cable\_rx\_emphasis  
cable\_rx\_post\_emphasis  
fw\_version  
mi\_rx\_power\_type  
HighTemperatureAlarm  
LowTemperatureAlarm  
HighTemperatureWarning  
LowTemperatureWarning  
InitializationFlagComplete  
HighSupplyVoltageAlarm  
LowSupplyVoltageAlarm  
HighSupplyVoltageWarning

LowSupplyVoltageWarning  
diag\_supply\_voltage  
transmitter\_technology  
ActiveWavelengthControl  
CooledTransmitterDevice  
ActivePinDetector  
TunableTransmitter  
ExtendedSpecificationComplianceCodes  
temperature\_high\_th  
temperature\_low\_th  
WarnTemperatureHighThresh  
WarnTemperatureLowThresh  
voltage\_high\_th  
voltage\_low\_th  
WarnVoltageHighThresh  
WarnVoltageLowThresh  
rx\_power\_high\_th  
rx\_power\_low\_th  
tx\_power\_high\_th  
tx\_power\_low\_th  
tx\_bias\_high\_th  
tx\_bias\_low\_th  
date\_code

Lot  
RXOutputDisable  
TXAdaptiveEqualizationEnable  
max\_power  
cable\_vendor  
ib\_width  
wavelength  
ethernet\_compliance\_code  
cable\_breakout  
tx\_cdr\_cap  
rx\_cdr\_cap  
memory\_map\_rev  
wavelength\_tolerance  
module\_st  
rx\_output\_valid  
rx\_input\_valid  
active\_set\_host\_compliance\_code  
active\_set\_media\_compliance\_code  
tx\_input\_freq\_sync  
error\_code  
did\_cap  
cdr\_vendor  
max\_fiber\_length

dp\_fw\_fault  
mod\_fw\_fault  
tx\_fault  
rx\_output\_valid\_change  
rx\_input\_valid\_change  
temperature\_alarm\_and\_warning  
voltage\_alarm\_and\_warning  
tx\_los  
tx\_cdr\_lol  
tx\_ad\_eq\_fault  
tx\_power\_hi\_al  
tx\_power\_lo\_al  
tx\_power\_hi\_war  
tx\_power\_lo\_war  
tx\_bias\_hi\_al  
tx\_bias\_lo\_al  
tx\_bias\_hi\_war  
tx\_bias\_lo\_war  
rx\_los  
rx\_cdr\_lol  
rx\_power\_hi\_al  
rx\_power\_lo\_al  
rx\_power\_hi\_war

cable\_temperature  
link\_partner  
HighRX[1-4]PowerAlarm  
HighRX[1-4]PowerWarning  
HighTX[1-4]BiasAlarm  
HighTX[1-4]BiasWarning  
HighTX[1-4]PowerAlarm  
HighTX[1-4]PowerWarning  
LengthOM[1-5]  
LowRX[1-4]PowerAlarm  
LowRX[1-4]PowerWarning  
LowTX[1-4]BiasAlarm  
LowTX[1-4]BiasWarning  
LowTX[1-4]PowerAlarm  
LowTX[1-4]PowerWarning  
RX[1-4]CDRLOL  
RX[1-4]LatchedLossIndicator  
TX[1-4]AdaptiveEqualizationFaultIndicator  
TX[1-4]AdaptiveEqualizationFreeze  
TX[1-4]CDRLOL  
TX[1-4]LatchedLossIndicator  
cable\_attenuation\_2\_5g  
cable\_attenuation\_[5,7,12,25]g

dp\_st\_lane[0-3]

nbr\_250

node\_guid\_plane\_[0-3]

port\_num\_plane\_[0-3]

rx\_power\_lane[0-7]

tx\_bias\_lane[0-7]

tx\_power\_lane[0-7]

## Supported Docker Statistics

- mem\_buffers – relatively temporary storage for raw disk blocks that should not become exceptionally large
- mem\_cached – memory in the pagecache (diskcache) minus SwapCache—does not include SwapCached
- mem\_free – sum of free lowmem and free highmem
- mem\_swap\_cache – memory that was once swapped out is swapped back in but is still kept in the swap file
- mem\_total – total usable RAM
- mlnx:total\_read\_time – time spent on reading all counters
- clx\_cpu\_load
- clx\_pid
- clx\_res\_mem
- clx\_shr\_mem
- clx\_virt\_mem

Type	Field
cable	timestamp node_guidport_guidLidActivePinDetectorActiveWavelengthControlCDREnableTxRx 4]PowerAlarmLowRX[1-4]PowerWarningLowSupplyVoltageAlarmLowSupplyVoltage 4]LatchedLossIndicatorTemperatureTunableTransmitterTypeVendorWarnTemperat 3]error_codeethernet_compliance_codefw_versionib_compliance_codeib_widthler 3]rx_power_lo_alrx_power_low_thsmf_lengthtemperature_alarm_and_warningtem 3]tx_power_lo_altx_power_lo_wartx_power_low_thvendor_ouivoltage_alarm_and_v

## Switch Info

The following table lists the supported register names by telemetry, along with their respective field lists.

Register Name	Field List
temp_fields	node_guid sensor_indexmtmp_sensor_nametemperaturemax_tem
power_fields	node_guid sensor_indexmvcr_sensor_namevoltagecurrentfeed_ma
total_power_managed_fields	node_guid total_power_managed
power_supplies_fields	node_guid psu_idxac_statusdc_statusalert_psupresent_psfan_ps
managed_power_supplies_fields	node_guid psu_idxpower_managed_supvoltage_managed_supcurr
fan_fields	node_guid sensor_indexfan_speedfan_speed_f[1-2]_managed
general_fields	node_guid serial_numberpart_numberrevisionproduct_namerando

## PCI Info

The following field list of PCI info is supported by telemetry.

node\_guid

pci\_node  
pcie\_index  
depth  
fw\_version  
device\_id  
device\_technology  
mvcr\_sensor\_name  
mtmp\_sensor\_name  
switch\_voltage  
switch\_current  
switch\_temperature  
switch\_serial\_number  
switch\_part\_number  
capability\_mask  
link\_speed\_enabled  
link\_width\_enabled  
link\_speed\_active  
link\_width\_active  
num\_of\_vfs  
num\_of\_pfs  
lane\_reversal  
port\_type  
pwr\_status

max\_payload\_size  
max\_read\_request\_size  
pci\_power  
link\_peer\_max\_speed  
port\_state  
device\_status  
receiver\_detect\_result  
life\_time\_counter  
life\_time\_counter\_low  
life\_time\_counter\_high  
rx\_errors  
tx\_errors  
crc\_error\_dllp  
crc\_error\_tlp  
tx\_overflow\_buffer\_pkt  
tx\_overflow\_buffer\_marked\_pkt  
outbound\_stalled\_reads  
outbound\_stalled\_writes  
outbound\_stalled\_reads\_events  
outbound\_stalled\_writes\_events  
effective\_ber\_coef  
effective\_ber\_magnitude  
effective\_ber\_pci

time\_since\_last\_clear\_high  
time\_since\_last\_clear\_low  
life\_time\_counter\_high\_lanes  
life\_time\_counter\_low\_lanes  
life\_time\_counter\_high\_timers  
life\_time\_counter\_low\_timers  
time\_to\_boot\_image\_start  
time\_to\_link\_image  
calibration\_time  
time\_to\_first\_perst  
time\_to\_detect\_state  
time\_to\_crs\_en  
time\_to\_plastic\_image\_start  
time\_to\_iron\_image\_start  
perst\_handler  
dl\_down  
correctable\_err\_msg\_sent  
non\_fatal\_err\_msg\_sent  
fatal\_err\_msg\_sent  
bdf0  
config\_cycle16to63usec  
config\_cycle2to7usec  
config\_cycle8to15usec

config\_cycle[1,64]usec  
 error\_counter\_lane[0-15]  
 IO\_to\_recovery\_eieos  
 IO\_to\_recovery\_framing  
 IO\_to\_recovery\_retrain  
 IO\_to\_recovery\_ts  
 lane0\_physical\_position  
 time\_to\_IO  
 times\_in\_I[1,23]

## NVLink Info

The table below lists the supported register names by telemetry, along with their corresponding field lists.

Register Name	Field List
nvl_class_port_info_fields	node_guid CapMskClassVersionBaseVersionRespTimeValueRedire
nvl_hbf_config_fields	node_guid port_numhash_typepacket_hash_bitmaskseedfields_e
nvl_reduction_port_info_fields	node_guid port_numport_direction_is_upexclude_include_self
nvl_reduction_config_mlid_fields	node_guid port_nummlid[0-7]
nvl_reduction_info_fields	node_guid reduction_FDB_Caphbf_group_capreduction_fdb_topn
nvl_cdrain_info_fields	node_guid port_guidport_numdi_ingress_port_statedi_egress_po
nvl_cdrain_port_state_fields	node_guid port_guidport_numdps_ingress_port_statedps_egress.

Register Name	Field List
nvl_reduction_counters_fields	node_guid port_guidport_numblocklean_pipe_selectmlidincoming
nvl_reduction_rounding_fields	node_guid native_8_bitmixed_8_bitnative_16_bitmixed_16_bitdet

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# Documentation History

- [Document Revision History](#)
- [Release Notes History](#)

## Document Revision History

Version	Date	Description
Rev 1.24.2	Feb 20, 2025	Updated <ul style="list-style-type: none"><li>• <a href="#">Changes and New Features in This Release</a></li><li>• <a href="#">System Requirements</a></li><li>• <a href="#">Bug Fixes in This Release</a></li></ul>
Rev 1.23.1	Nov 10, 2025	<a href="#">UFM Telemetry v1.23.1 Documentation History</a>
Rev 1.22.2	Sep 5, 2025	<a href="#">UFM Telemetry v1.22.2 Documentation History</a>
Rev 1.22.0	Aug 7, 2025	<a href="#">UFM Telemetry v1.22.0 Documentation History</a>
Rev 1.21.0	May 5, 2025	<a href="#">UFM Telemetry v1.21.0 Documentation History</a>
Rev 1.20.1	Feb 10, 2025	<a href="#">UFM Telemetry v1.20.1 Documentation History</a>
Rev 1.19.15	Jan 9, 2025	<a href="#">UFM Telemetry v1.19.5 Documentation History</a>
Rev 1.19.14	Dec 31, 2024	<a href="#">UFM Telemetry v1.19.4 Documentation History</a>
Rev 1.19.1	Dec 6, 2024	<a href="#">UFM Telemetry v1.19.1 Documentation History</a>
Rev 1.19.0	Nov 7, 2024	<a href="#">UFM Telemetry v1.19.0 Documentation History</a>
Rev 1.18.2	Aug 12, 2024	<a href="#">UFM Telemetry v1.18.2 Documentation History</a>
Rev 1.17.0	May 5, 2024	<a href="#">UFM Telemetry v1.17.0 Documentation History</a>
Rev 1.16.5	Feb 2024	<a href="#">UFM Telemetry v1.16.5 Documentation History</a>
Rev 1.15.6	Dec 2023	<a href="#">UFM Telemetry v1.15.6 Documentation History</a>
Rev 1.15	Nov 2023	<a href="#">UFM Telemetry v1.15.0 Documentation History</a>
Rev 1.14.5	Aug 2023	<a href="#">UFM Telemetry v1.14.5 Documentation History</a>

Version	Date	Description
Rev 1.14	Aug 2023	<a href="#">UFM Telemetry v1.14.0 Documentation History</a>

## Release Notes History

- [Bug Fixes History](#)

## Bug Fixes History

Revision	Date	Description
Rev 1.23.1	Nov 10, 2025	<a href="#">Bug Fixes History in UFM Telemetry v1.23.1</a>
Rev 1.22.0	Aug 7, 2025	<a href="#">Bug Fixes History in UFM Telemetry v1.22.0</a>
Rev 1.21.0	May 4, 2025	<a href="#">Bug Fixes History in UFM Telemetry v1.21.0</a>
Rev 1.20.1	Feb 10, 2025	<a href="#">Bug Fixes History in UFM Telemetry v1.20.1</a>
Rev 1.19.15	Jan 9, 2025	<a href="#">Bug Fixes History in UFM Telemetry v1.19.15</a>
Rev 1.19.14	Dec 31, 2024	<a href="#">Bug Fixes History in UFM Telemetry v1.19.4</a>
Rev 1.19.1	Dec 6, 2024	<a href="#">Bug Fixes History in UFM Telemetry v1.19.1</a>
Rev 1.19.0	Nov 7, 2024	<a href="#">Bug Fixes History in UFM Telemetry v1.19.0</a>
Rev 1.18.2	Aug 12, 2024	<a href="#">Bug Fixes History in UFM Telemetry v1.18.2</a>
Rev 1.17.0	May 5, 2024	<a href="#">Bug Fixes History in UFM Telemetry v1.17.0</a>
Rev 1.15.6	Dec 2023	<a href="#">Bug Fixes History in UFM Telemetry v1.15.6</a>
Rev 1.15	Nov 2023	<a href="#">Bug Fixes History in UFM Telemetry v1.15.0</a>
Rev 1.14.5	Aug 2023	<a href="#">Bug Fixes History in UFM Telemetry v1.14.5</a>

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