User Manual

Basic Configuration
HiProvision Add-on: Permanent Monitoring

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Contents

List of figures

List of Tables

1. INTRODUCTION

1.1 Description

This document is valid as of Dragon PTN Release 4.3DR.

The Permanent Monitoring add-on allows advanced monitoring in the Dragon PTN network over a longer period of time of specific properties. This period of time is property dependent and depends on its sampling frequency, see further. Extra alarming and trigger threshold values can be configured on these monitored properties. As a result, it is easier to detect trends in the network behaviour when monitoring/troubleshooting the network and act accordingly.

This add-on collects monitored data from the live network into HiProvision to finally export the data into CSV files for further analysis or debugging. The CSV files can be processed by third-party tools (e.g. Notepad, MS Excel, ….).

Following property category is supported for monitoring:

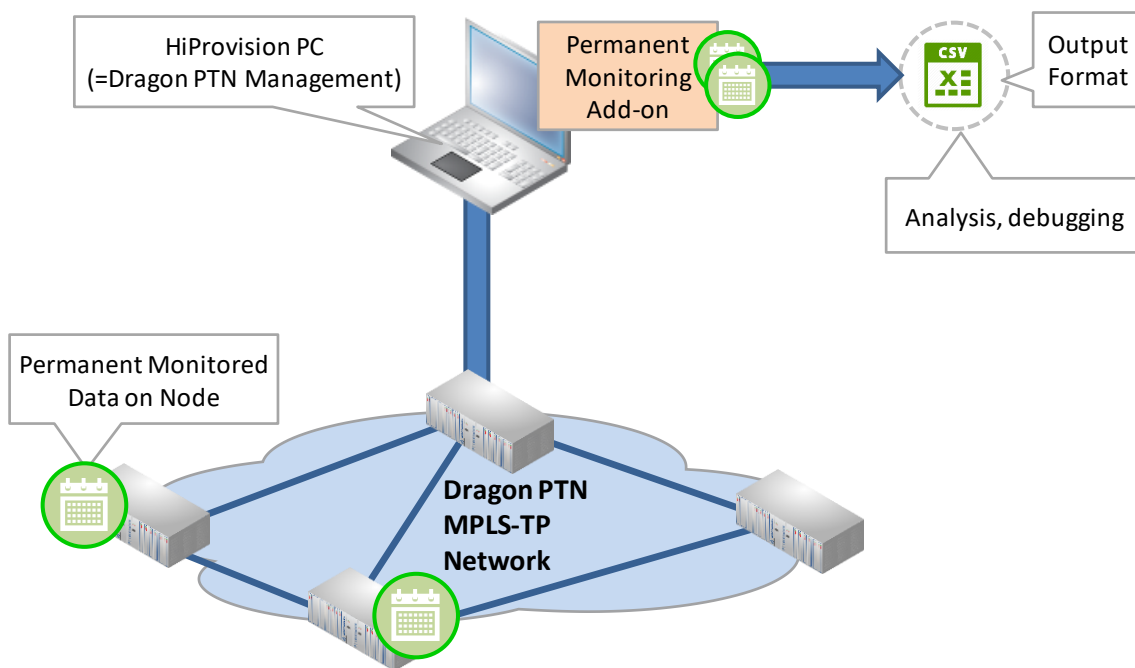▶ Optical Monitoring: Properties of transmit receive modules, e.g. SFP,….;

Figure 1 Permanent Monitoring Example

1.2 Prerequisites

Make sure that your nodes in the network are time-synchronized e.g. via an NTP = Network Timing Protocol, see Ref.[2Mgt] in Table 1.

1.3 Installation/Activation

1. This add-on is by default available in HiProvision via Dashboard → (Tools) Add-ons;
2. Click the Permanent Monitoring tab;
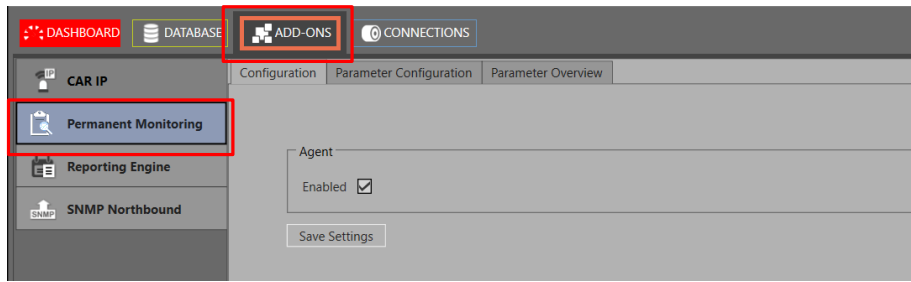
Figure 2 Permanent Monitoring: Configuration Tab

3. Check the Enabled checkbox and click the Save Settings button;
4. When the HiProvision servers were already started, a pop-up requests to restart the servers. If the servers were not started yet, just start the servers. (Re)start the HiProvision servers via Dashboard → Servers → Play button;
5. The (re)start of the servers will start up the Permanent Monitoring ('PM') process;
6. If the 'PM' process is in the Started state, this add-on is up and running.

Permanent Monitoring process (='PM') starts
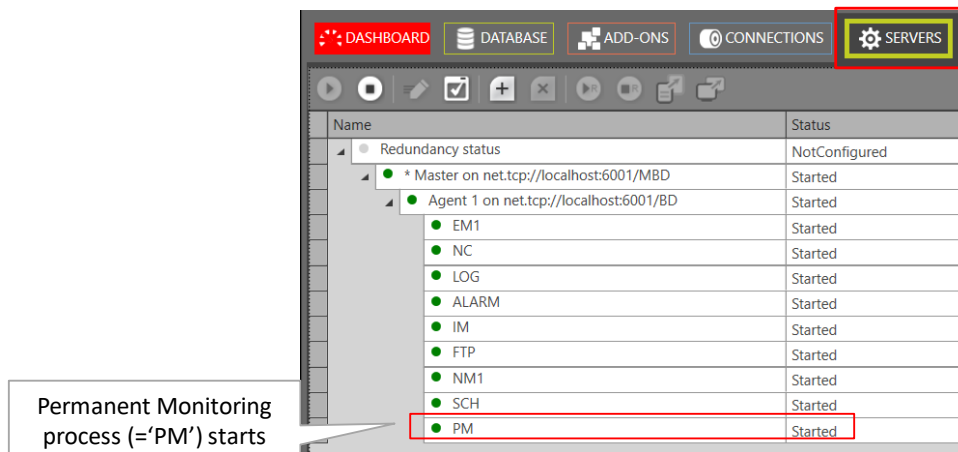
Figure 3 Permanent Monitoring (=PM) Process in Servers Tab

1.4 Supported Hardware, Firmware, Software

The supported hardware, firmware and software within this Dragon PTN release can be found on the Portal https://hiprovision.hirschmann.com via Shortcuts → Downloads.

1.5 Manual References

The table below is an overview of the manuals referred to in this manual. '&' refers to the language code, '*' refers to the manual issue. All these manuals can be found in the HiProvision Help function as well.

Table 1 Manual References

Ref.	Number	Title
[1]	DRA-DRM801-&-*	Dragon PTN Installation and Operation
[2Mgt]	DRA-DRM830-&-*	HiProvision Management Operation
[3]	DRF-DRM811-&-*	Dragon PTN TRMs (Transmit Receive Modules: SFP, XFP, QSFP+)

2. PROPERTY CONFIGURATION

2.1 General

There is one tab for property configuration (Parameter Configuration tab) and one tab that shows a summary or overview of all the configured properties (Parameter Overview tab). Configuration means configuring the monitoring of one or more properties.

▶ Parameter Configuration Tab:
  ▶ Selecting the network elements;
  ▶ Select properties that must be configured for monitoring;
  ▶ Configure the property including optional alarming;
  ▶ Start/Stop monitoring, export data, clean up data;

▶ Parameter Overview Tab:
  ▶ Only lists the configured properties (=summary) for a better overview;
  ▶ Stop monitoring, export data, clean up data;

2.2 Protocol Category: Available Properties for Monitoring

NOTE: Currently one categegory is available: Optical Monitoring.

Table 2 Protocol Category: Available Properties

Property	Description
Protocol Category: Port Performance → Optical Monitoring	
Module Temperature	Monitor the module temperature (°C) of the optical module plugged in the optical port of the selected element. A list of optical modules can be found in the Ref.[3] in Table 1.
Bias Current (n)	Monitor the Bias Current (mA) of the optical module. The Bias Current is the current needed by the optical module to transmit the optical signal and depends on the temperature. The higher the temperature, the higher the required current to transmit the same optical signal. For QSFP+ modules, (n) = [1,2,3,4], for other optical modules (n) = 1.
Tx Power (n)	Monitor the transmit power (dBm) of the optical module. For QSFP+ modules, (n) = [1,2,3,4], for other optical modules (n) = 1.
Rx Power (n)	Monitor the receive power (dBm) of the optical module. For QSFP+ modules, (n) = [1,2,3,4], for other optical modules (n) = 1.

2.3 Parameter Configuration Tab (All Element Properties)

The 'Parameter Configuration' tab shows all the network elements and all its possible properties that can be configured.

1. Click the 'Parameter Configuration' tab in the figure below;
2. CATEGORIES**:** Select the desired category:
   ▶ Optical Monitoring: lists the available properties on TRMs e.g. SFP, XFP, ….
3. ELEMENTS: All the hardware elements that have properties in the selected category will be listed;
4. ELEMENTS: Expand the list and select the elements that need permanent monitoring:
   ▶ Individual select: Just click 'selected' checkboxes of the desired items;

▶ Multiple select: first select the desired rows (via CTRL+Click or SHIFT+Click or CTRL+A (=all rows)). Then click [icon]/[icon] to check/uncheck the checkboxes of the selected rows.

5. MONITORED PROPERTIES: As a result, the element properties of the selected elements show up and are ready for monitoring configuration;
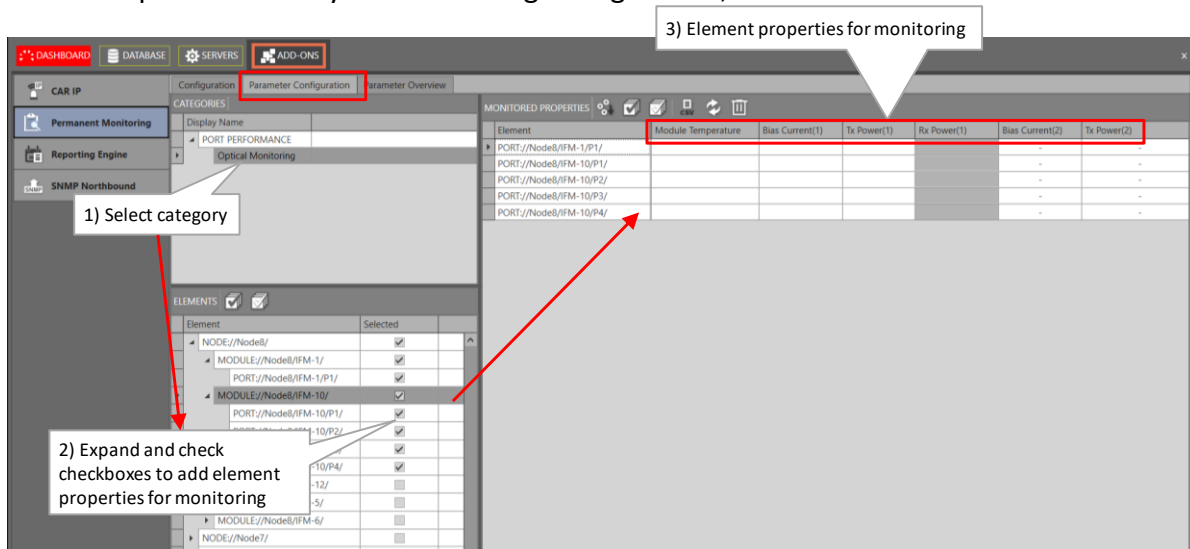

Figure 4 Element Properties for Monitoring

6. MONITORED PROPERTIES: Open the configuration settings of the desired parameter:
   ▶ Individual element: click/select one cell and click [icon];
   ▶ Multiple elements of same parameter (=column): select multiple cells (via CTRL+Click or SHIFT+Click) or click the column header and click [icon];

7. Configure the Permanent Monitoring settings:
   ▶ Sampling Interval (default = 1 hour): Indicates the time between two samples of this property. Examples:
      ▶ 1 hours → take one sample each hour;
      ▶ 2 hours → take one sample each 2 hours;
      ▶ 5 days → take one sample each 5 days;

   ▶ Sampling Capacity: indicates how many samples are stored in the node in the live network. The 50 most recent samples per property are stored. More detailed info on sampling in §3.1;

   ▶ (optional) Lower/Upper Alarm Thresholds: alarms will be generated if one or more alarm severities have been checked (Warning, Minor, Major, Critical) and the measured value of the property goes lower/higher than the configured threshold value(s) of the checked alarms. More detailed info on alarming in §4:
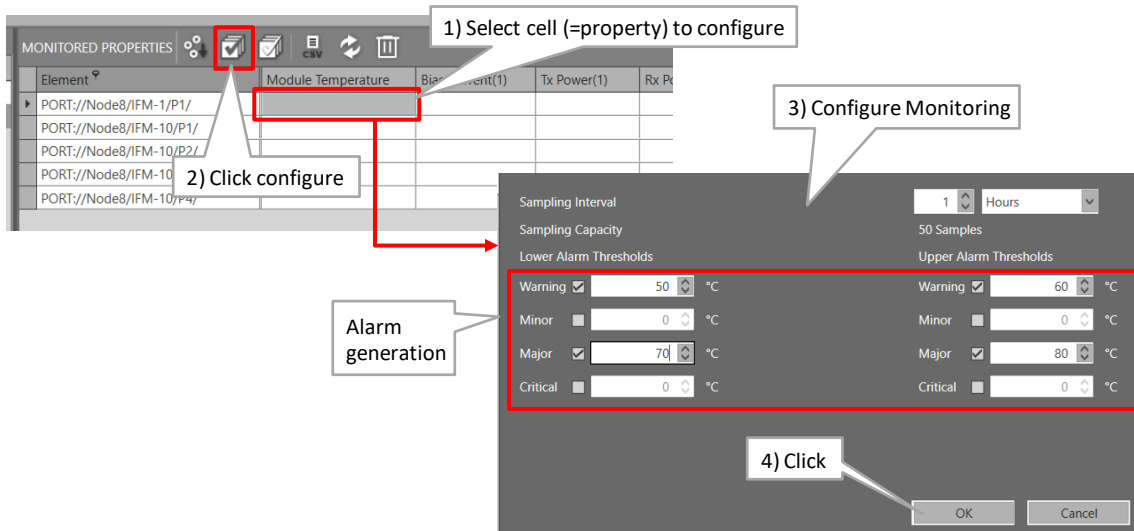
   ▶ Click OK to finish the configuration;

Figure 5 Configure Monitoring on Properties

8. After the configuration (see figures below):
   ▶ The load icon has changed into a load attention icon to indicate that the new configured properties are not loaded yet into the network;
   ▶ The configured cells will be highlighted with a green border and they also show the sampling interval and whether optional alarms are configured. Unconfigured cells or properties remain empty.
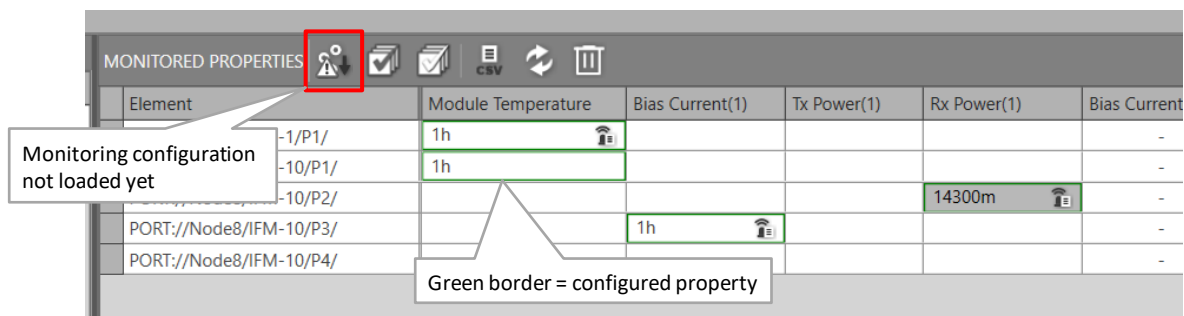

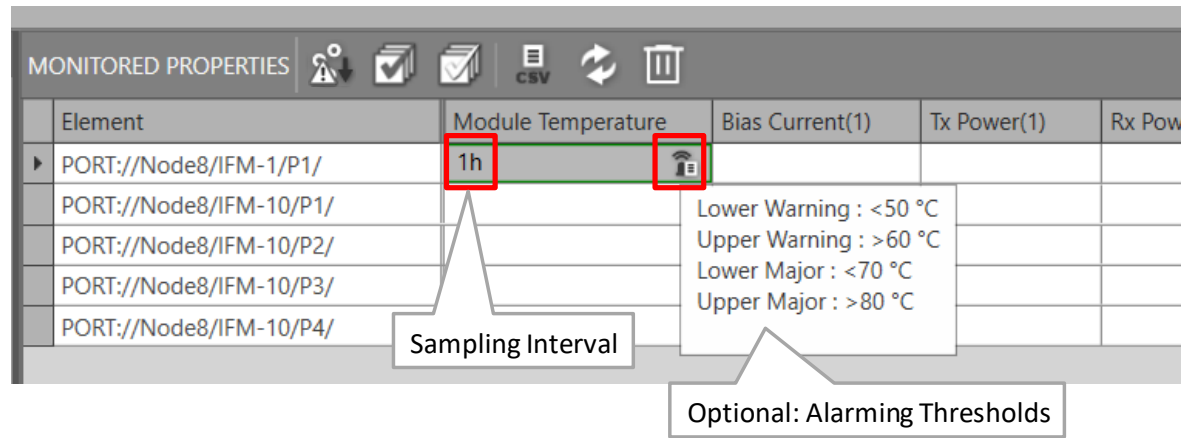**Figure 6 Load Attention Icon / Green Border**

Figure 7 Configured Monitoring on Property

9. Click the ⚠️↓ icon to load and start the permanent monitoring configuration into the network.

   NOTE: Permanent monitoring configurations can also be loaded in other places in HiProvision via the normal load button ↓.

Table 3 Menu Buttons

Button	Short Description
Elements	
☑️/☐	click ☑️/☐ to check/uncheck the checkboxes of the selected ELEMENT rows.
Monitored Properties	
↓	The 'normal load button' indicates that all permanent monitoring configurations, if any, have been loaded in the network. Otherwise, this button still allows to do other load actions (beyond Permanent Monitoring) in HiProvision.
⚠️↓	The 'attention load button' indicates that one or more permanent monitoring configurations (add a new one or removing an existing one) have not been loaded yet. Click this button to load the unloaded permanent monitoring changes, including other HiProvision configurations. Note: all changes will be loaded, not only the selected cells.
☑️	Configures the selected properties. See §2.3.
☐	Deletes the monitoring configuration of the selected properties including all its samples in the database. See §3.6.
CSV	Exports the live monitored data, retrieved via ↻, from the database into a CSV file. The default export path `<HiProvision Install Path>\HiProvision\HiProvision_V<version>\Logging\System Logging`. See §3.4.
↻	Retrieves monitored data from the live network and stores it into the database. See §3.3.
🗑	Clears/Deletes the saved monitored data in the database for the selected properties. See §3.7.

2.4 Parameter Overview Tab (Configured Element Properties)

Click the Parameter Overview tab to show an overview of only the configured elements and properties. From this tab, following actions are possible on the selected cells or properties via the menu buttons. A description of these buttons can be found in Table 3.

▶ Remove configuration;
▶ Export to CSV;
▶ Retrieve data samples from the network;
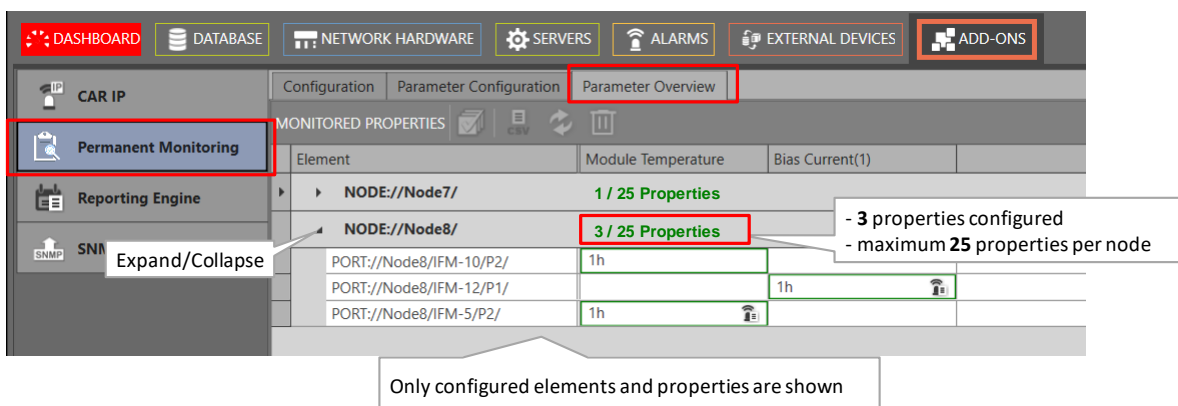▶ Clear monitored data in the database;

Figure 8 Parameter Overview Tab

3. PROPERTY MONITORING/LIVE DATA

3.1 Monitoring/Sampling On the Nodes

Permanent Monitoring means sampling the configured properties in the live network according the configured (see §2) sampling interval for each property.

▶ Maximum 25 properties per node can be monitored;
▶ Maximum 50 samples per property are stored in the node, hereafter the samples in the node are overwritten starting with the oldest samples first;
▶ Maximum 1250 samples per node;
▶ All the node samples are stored in the CSM of the node;
▶ Sampling Interval: Indicates the time or interval between two samples of this property.
  ▶ Smallest interval = 1 minute → 1 sample every minute;
  ▶ Default interval = 1 hours → 1 sample every hour;
  ▶ Largest interval = 10 days → 1 sample every 10 days;
  ▶ Minutes: range [1..14400 (=10 days)];
  ▶ Hours: range [1..240 (=10 days)];
  ▶ Days: range [1..10];

▶ Sampling Overwrite Interval: Time after which the oldest sample data in the node will be overwritten. This interval depends on the Sampling Interval and Sampling Capacity.
  ▶ Sampling Overwrite Interval = Sampling Interval * Sampling Capacity;
  ▶ Example: Sample Interval 1 minute → 50 samples → 50 minutes = Sampling Overwrite Interval;

3.2 Start Monitoring

Available in:

▶ Parameter Configuration tab;

The monitoring of the configured properties will be started in the network from the moment that a the property has been configured in §2.3 and a load action has been performed via the ⚠️ button.

3.3 Collect Monitored Data from the Network

3.3.1 General

Collecting monitored sample data from the network occurs automatically but can also be done on demand. Collected sample data will be stored in the HiProvision database. The paragraphs below explain automatic and 'on demand' collection.

CAUTION: A sample can only be retrieved/collected once from the node. If you want to collect the next sample on demand, you have to wait until the next sample was created after a new sample interval. Deleted sample values cannot be retrieved again from the node. Make sure to export your sample values before deleting them.

3.3.2 Collect Automatically

In normal conditions, when everything is up and running, HiProvision will automatically retrieve the monitored data from the nodes in the network and store it in its database. Though, a distinction between normal, alarm and abnormal conditions must be made.

▶ Normal conditions → HiProvision will collect the monitored data from the nodes in an optimized way (= after 25 available samples in the network) so that no data will be lost. Example: if a property 'x' is sampled every 5 minutes:

   ▶ Sampling Interval: 5 min → 50 samples →250 minutes = Sampling Overwrite Interval;

   ▶ HiProvision will fetch the data of 'x' after 25 samples, which is halfway the Sampling Overwrite Interval, in this example after 25*5 = 125 minutes to make sure no data is lost.

▶ Alarm conditions → If a configured alarm threshold is hit for a property, HiProvision will immediately collect all the available sampled data (and not wait the default 25 samples) to create the necessary alarms. More info in§4.

▶ Abnormal conditions → Sample data can get lost, see §3.3.4.

NOTE: To export the monitored data, see §3.4;

3.3.3 Collect On Demand

Available in:

▶ Parameter Configuration tab;
▶ Parameter Overview tab;

1. Select the desired properties of which the monitored data must be retrieved;
   ▶ Single configured property: click a single configured cell;
   ▶ Multiple configured properties: select multiple configured cells via CTRL+Click or SHIFT+Click or click the column header of the property;
   ▶ All configured properties: select all cells via CTRL+A;

2. Click the ⟳ button to collect the data. The data will be stored in the HiProvision database;

NOTE: In abnormal conditions, sample data can get lost, see §3.3.4.

NOTE: To export the monitored data, see §3.4;

3.3.4 Lost Data Samples

Data samples in the node can get lost because of abnormal conditions, which are listed below. When the abnormal condition is finally solved and the sample data has been really lost for a property, an appropriate Data Gap alarm will be raised in HiProvision to announce this data loss.

▶ HiProvision down, HiProvision network connection lost:

   ▶ Data samples overwritten: E.g. … If HiProvision was not able to collect the monitored data or samples from the network in time, the samples will be overwritten in the

node by new samples. Monitored data of a property will be lost in the node if the outage takes longer than the Sampling Overwrite Interval for that property;

▶ CSM outage (e.g. CSM reboot/switchover/unplugged/power cycle…):

    ▶ No data samples taken: Sampling is not possible because of a temporary CSM outage. If the CSM is out at the sample moment, the data sample will lost;

CAUTION: If you plan a CSM switchover/upgrade/reboot, make sure to collect (on demand) the data samples first before executing this CSM action. This CSM action will drop the monitored data samples in the CSM. These samples cannot be collected anymore later on.
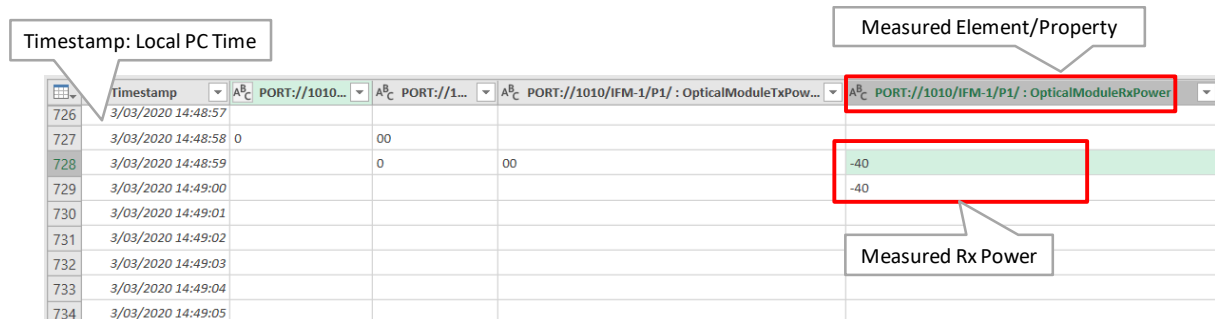

3.4 Export Monitored Data

Available in:

▶ Parameter Configuration tab;
▶ Parameter Overview tab;

Viewing the data must be done by a third-party tool (e.g. Notepad, MS Excel, …) after exporting it first as described below.

1. Select the desired properties of which the monitored data must be exported;
    ▶ Single configured property: click a single configured cell;
    ▶ Multiple configured properties: select multiple configured cells via CTRL+Click or SHIFT+Click or click the column header of the property;
    ▶ All configured properties: select all cells via CTRL+A;

2. Click the ![CSV] button to export the data. The data will be saved by default in `<HiProvision Installation Path>\HiProvision\HiProvision_V<version>\Logging\System Logging`.

3.5 View Monitored Data

Use third-party tools like e.g. Notepad, MS Excel, …. to view and analyse the monitored data in the exported CSV files. An example can be found in the figure below.

Figure 9 Example CSV in Third-Party Tool: Sampled Rx Power

CAUTION: The PC on which the CSV file is viewed must have the same regional settings (list separator, decimal symbol, …) as the HiProvision PC in order to correctly interpret the exported values in the CSV files. The regional settings on the PC can be verified and modified via Start → Control Panel → Clock/Region.

3.6 Stop Monitoring

Available in:

▶ Parameter Configuration tab;
▶ Parameter Overview tab;

Stopping the monitoring means removing the configuration in the database and loading the removed configuration into the network.

1. Select the desired properties of which the monitoring must be stopped;
    ▶ Single configured property: click a single configured cell;
    ▶ Multiple configured properties: select multiple configured cells via CTRL+Click or SHIFT+Click or click the column header of the property;
    ▶ All configured properties: select all cells via CTRL+A;

2. Click the ⬚ button to remove the configuration from the selected cells. CAUTION: Additionally all the linked sample data of the selected properties in the HiProvision database will be deleted as well.

3. (Only in Parameter Configuration tab) Click the ⚠ button to load the changes finally stop the monitoring in the live network.

NOTE: Unretrieved sample data in the nodes for the selected properties will be lost.

3.7 Clean Up Monitored Data

Available in:

▶ Parameter Configuration tab;
▶ Parameter Overview tab;

If you have stopped the monitoring of your selected properties as described in §3.6, your sample data is already cleaned up and nothing has to be done anymore. If you just want to clean up older monitored data in your database while the monitoring of your properties is still running, continue below.

NOTE: Cleaning up data samples is always in the database, nothing has to be cleaned up in the live network.

NOTE: Cleaning up monitored data does not stop the monitoring of the properties.

1. Before deleting, make sure that you have exported all the necessary samples (or create a manual backup of your database. Note: an automatic backup will not back up the sample data).

2. Select the desired properties of which the samples must be cleaned up;
    ▶ Single configured property: click a single configured cell;

- ▶ Multiple configured properties: select multiple configured cells via CTRL+Click or SHIFT+Click or click the column header of the property;
- ▶ All configured properties: select all cells via CTRL+A;

3. Click the 🗑 button open the clear samples window. Optionally, the most recent samples for the selected properties can be kept via the 'Keep data since' field.
    - ▶ Keep Data Since:
        - ▶ Nothing (=default): Nothing will be kept, all samples will be deleted;
        - ▶ 1 Day/Week/Month/Year: all the samples of the last Day/Week/Month/Year will be kept in the database, the rest will be deleted;
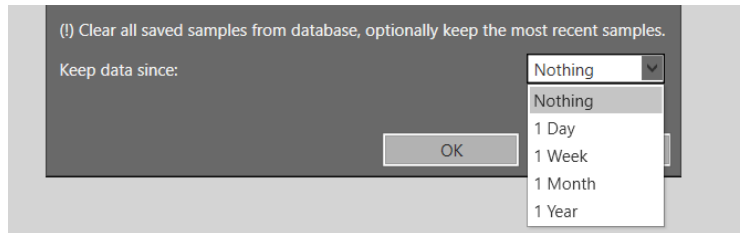

Figure 10 Clear Samples Window

4. Click the OK button to delete the samples.

CAUTION: Deleted samples are lost and cannot be exported/viewed anymore!

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4. ALARMING

Find below some extra information on alarming and alarms generated via this add-on. The generated alarms can be viewed in the Alarms tile in HiProvision. See example figure below:
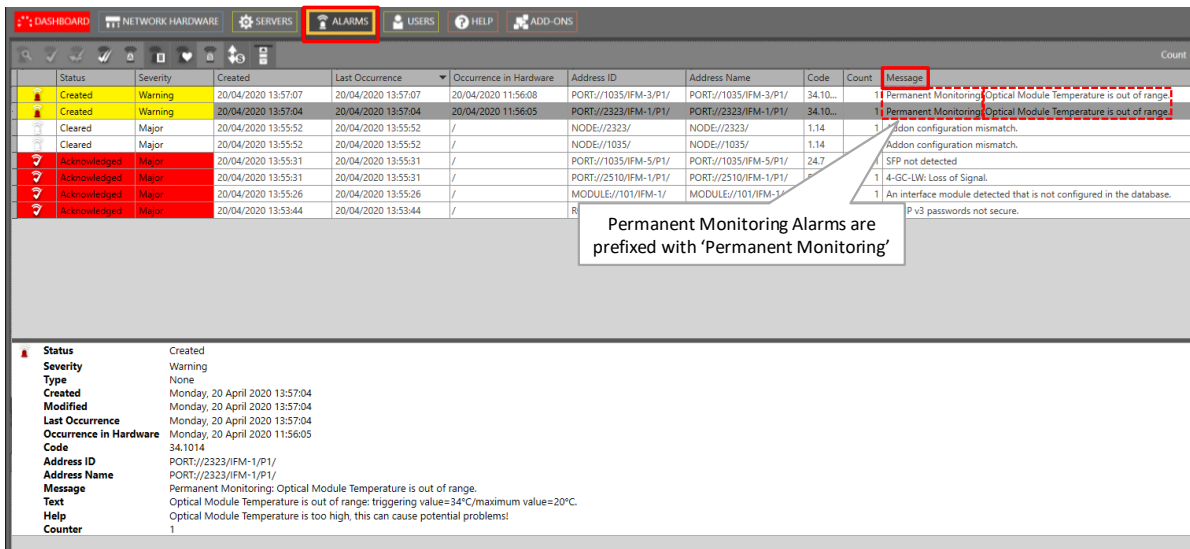

Figure 11 Permanent Monitoring Alarms: Example

- ▶ Alarms generated by this add-on are prefixed by 'Permanent Monitoring' in the alarm message in the Alarms window in HiProvision;

- Alarms can only be created or raised in HiProvision just after the sample moments. The real timestamp of the incident in the hardware (=Timestamp0, see figure below) is unknown. The incident will be detected at the next sample moment (=Timestamp1) which will be visible in the 'Occurrence in Hardware' field in the Alarms tile;

- An alarm will only be raised in HiProvision if the sample value is in the alarm zone (higher than the configured upper threshold or lower than the lower threshold);

- If the property is still in the alarm zone after an alarm was already raised in HiProvision, no new alarm will be generated at the next sample;

- If multiple severities are checked, alarms with each severity will be raised in HiProvision;

- When the measured value leaves the alarm zone and returns back in the normal zone, after an alarm was raised in HiProvision, its raised alarm will be cleared automatically;

- When a measured value goes from normal to alarm (via threshold hit) and back to normal between two sample moments, no alarm will be raised in HiProvision. The incident will not be seen by HiProvision, e.g. dip in the figure below;

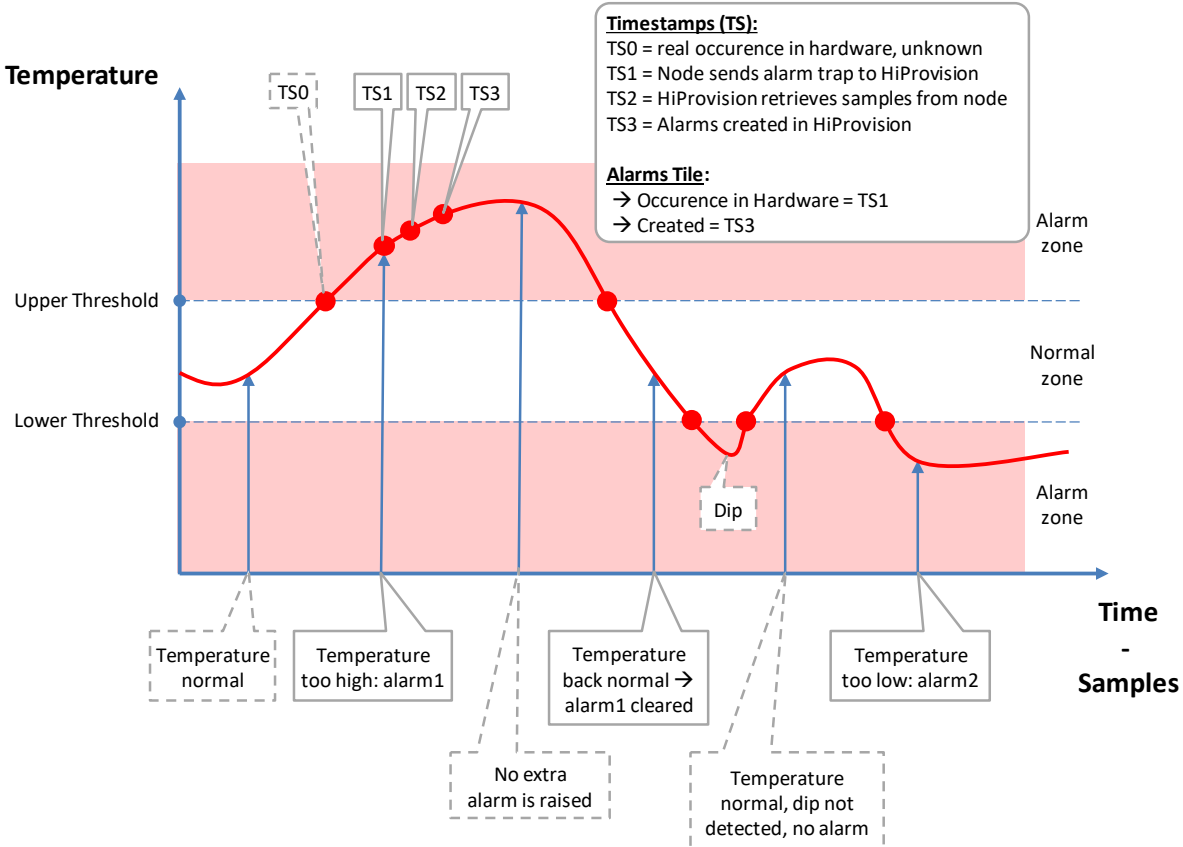- Data Gap alarms will be raised when data samples are really lost, see §3.3.4.

Figure 12 Threshold-Alarming Flow

5. ABBREVIATIONS

CSV	Comma Separated Value
MPLS-TP	Multiprotocol Label Switching – Transport Profile
NTP	Network Timing Protocol
PM	Permanent Monitoring
PTN	Packet Transport Network
Rx	Receive
SFP	Small Form Factor
TS	Timestamp
Tx	Transmit
TRM	Transmit Receive Module