Monitoring IPMI Management Console
with Verax NMS
Abstract
This publication provides an overview on how to monitor and manage IPMI Management Console using Verax NMS (including the free Express edition available at http://www.veraxsystems.com/en/downloads - please read terms & conditions for limitations of the Express version).

Tools used:
- **IPMI Management Console**: http://www.intel.com/design/servers/ipmi/
- **Monitoring tool**: www.veraxsystems.com/en/products/nms

Agenda:
1. Adding IPMI Management Console to the list of monitored applications within Verax NMS.
2. Configuring availability sensors and performance counters for IPMI Management Console.
3. Verax NMS IPMI Management Console features.
4. Setting up alarms and notification policies.
1. Adding IPMI Management Console to device inventory

In order to include IPMI Management Console to be monitored by Verax NMS, add an application instance to the device actually running this instance.

**Note:** Verax NMS allows for creating multiple instances for applications of the same type on a single device.

In order to add an IPMI Management Console to the device running its instance, perform the following steps:

1. Log into the Verax NMS and select *Home* from the *main menu*.
2. Select a device running the IPMI Management Console instance from the left-side *aspects* view.

![Aspect hierarchy tree](image1)

3. In *Summary tab* select *Manage applications* from the *actions* section.

![Adding a new managed application](image2)

4. A pop-up dialog is displayed.
5. Select **Add application** option from the context menu and click **Go**. A dialog window is displayed. Choose **IPMI Management Console** from **Application types**.

Verax NMS will ask to enter the following application-specific parameters:

- **Instance name** - Name of the application instance. You can enter any name describing the monitored application instance.
- **Host** - Address of the host running the application instance. In most cases, the host address is an IP address of the device the application instance is assigned to.
- **User** - Username used to connect to the server.
• **Password** - Password used to connect to the server.
• **BMC Key** – the server-specific key used only if the server is configured to use two-key authentication. Otherwise, BMC key field should be left empty.
• **Privilege level** – the level of privileges associated with the user or lower. In most cases privilege level is User.

**Note:** application-specific parameters depend on the selected application type.

6. Provide the necessary information and click **Save changes**.

7. The system will ask if you want to add a default set of sensors and counters for IPMI Management Console. Since, (in this example) sensors and performance will be added manually – click **No**.

8. The newly added IPMI Management Console is now visible in the aspect tree within the host’s node in **Managed Applications** category.

Figure 5: IPMI Management Console - properties window
2. **Adding sensors for IPMI Management Console**

Verax NMS provides IPMI Management Console application pluggable module to extend core built-in functionalities and allows monitoring servers via IPMI protocol in various aspects like:

1. Advanced views: General, Hardware info (data read from FRU – Field Replaceable Unit),
2. Analog sensors, Discrete sensors and System event log
3. IPMI sensor checking if device's chosen sensor is responding
4. IPMI counter monitoring value of device’s chosen analog sensor's reading
5. System Event Log collector, polling devices event log and raising equivalent events in NMS

**Sensors** are active monitors periodically querying the device services for which they are configured and waiting for their responses. If a query is returned with an expected response, the queried service is considered "available." If a response is not received (timed out), or if the response is not as expected, the queried service is considered "unavailable".

The system includes a number of pre-configured sensors. The following types of sensors for IPMI Management Console application type are available by default:

- **IPMI Sensor** - checks the response time of the chosen analog or discrete IPMI sensor.
- **IPMI System Log Collector** – polls the IPMI system event log checking for new events that occurred and raises equivalent events in NMS.

In order to add a sensor, perform the following steps:

1. Select device from the aspect tree in **Home view** (IPMI Management Console in this case).
2. Select **Monitors tab** and switch to sensor list by clicking **Sensor list** link in the upper-right corner of the tab field. The sensor list is displayed.
3. Select **Add** from the global action menu and click **Go**. The wizard dialog is displayed.

![Figure 6: Adding a sensor](image-url)
4. Select the sensor you want to add and click **Next**.

![Add new sensor dialog](image)

**Figure 7: Specify sensor parameters**

5. A dialog shows up with all sensor parameters to be provided. Specify the sensor parameters and click **Finish**.

6. Once the sensors have been added, they are visible on the sensor list (**Monitors tab**).
3. Adding performance counters for IPMI Management Console

Performance counters measure system activity and performance (metrics). The application retrieves their current values in predefined intervals. The aim of probing and collecting data is to analyze and convert the data into a performance graph/chart. The user can define a counter manually or load it from a template.

Performance counter templates are templates with defined probing parameters for specified devices in order to improve and speed up counter creation.

Each Verax NMS counter template is characterized by the following information:

- **Name and description** - unique identifier and optional description,
- **Device type** - type of a device,
- **Protocol type** - protocol used,
- **Probing interval** - pauses between probing.

Counter templates are needed when the counter creation method is set to "from template". Counter templates provide defined probing parameters for specified devices in order to improve and quicken counter creation.

In order to add IPMI Management Console performance counters, perform the following steps:

1. Select device from aspect tree in **Home view**.
2. Select **Monitors tab** and switch to the counter list by clicking **Counter list** link in the upper-right corner of the tab field. A counter list is displayed.
3. Select **Add** from the global action menu and click **Go**. Select the counter you want to create and click **Next**.

![Figure 8: Adding counter for IPMI Management Console](image-url)
4. Once the data has been loaded, the edit window shows up with all counter attributes to be provided.

![Figure 9: Selecting measure metrics](image)

5. Specify the rest of the counter parameters and click **Finish**.

The new counter has been created and is now visible on the counter list.
4. Creating custom event processing rules for IPMI Management Console

Events are processed by Event Processing Rules running under control of the Event Processing Engine. The Event Processing Engine within the system is able to process events fast without materializing them in database. Verax NMS comes with a set of embedded, flexibly customized processing rules such as: De-duplication, Pairwise matching, Event forwarding, Intermittent failure, Scheduled Maintenance, etc. It also provides users with the ability to implement their own processing rules using JRuby scripting language.

Verax NMS provides complex fault management, such as alarm collection, filtering, blocking, thresholds and correlation (scripted, user-defined rules defining business logic for alarm correlation, cleaning, root-cause, etc.) as well as alarm management actions, e.g. assignment, change of status, clearing, annotation and others. It also enables users to create alarms based on network data etc.

In this example we will show how to assign basic event processing rules:

- Alarm generating
- Event dropping
- Event forwarding
- Severity assigning

To assign an event processing rule, perform the following steps:

1. After selecting the desired host go to Events tab.
2. Select the event to assign processing rules to by selecting its corresponding check box in grid view (first column).
3. Select Assign processing rules from the global action menu and click Go.
4. A dialog window is displayed (see figure below).
5. Select rule category and click Add new rule. A dialog window is displayed (see figure below).

The newly created event processing rule is now visible and active (there's no need to logout).
5. **Verax NMS IPMI Management Console features**

Verax NMS IPMI Management Console supports IPMI (Intelligent Platform Management Interface) devices compliant with IPMI 2.0 over UDP.

**General view**

In the General tab, one may find the overall information about IPMI Management Console (address of the host running the application instance, privilege level, user and password, BMC Key) as well as graphs presenting Analog sensor statuses, Discrete sensor statuses and SEL entries statuses.

**Hardware information (FRU) view**

The view displays all the properties stored in the FRU (Field Replaceable Unit) inventory, such as serial numbers, part numbers, vendor information and others. The list of properties is dependent on the type of managed hardware and its configuration.
Analog sensors view

The view displays analog sensors for the device. These are device dependent and may include temperature, fan speeds, voltage, and others. The following information is displayed for each analog sensor:

- Status (OK, not OK) specifying if given analog sensor is within acceptable range or not
- Sensor name (e.g. Average Power, Planar Voltage, etc.)
- Type of sensor (e.g. fan speed, voltage, temperature, etc.), current value and units (e.g. volts, Celsius, etc.)
- Lower and upper non-critical and critical thresholds

Analog sensor statuses are visualized in red, green, and yellow for easy problem detection. Verax NMS can create its sensors, performance counters and generate alarms based on any IPMI analog sensors.

![Figure 12: Analog sensors view](image-url)
Discrete sensors view

The view displays discrete sensors for the device. IPMI analog sensors have associated value and thresholds, discrete sensors have a value only (acceptable values are defined in the IPMI standard, including information which values indicate abnormal conditions). The following information is displayed for each analog sensor:

- **Status (OK, not OK)** specifying if given sensor has a value which is considered normal or not
- **Name** (e.g. Video USB, FrontPanel, IOH Temp Status, etc.)
- **Type** (e.g. EntityPresence, Processor, CableInterconnect, etc.)
- **Current value**

Analog sensor statuses are visualized in red, green, and yellow for easy problem detection. Verax NMS can create its sensors, performance counters and generate alarms based on any IPMI discrete sensors.
System log event view

Verax NMS IPMI console allows browsing of the IPMI event log including:
- Date and time of event occurrence
- Sensor associated with the event (e.g. Power Unit)
- Assertion (e.g. error detected) and de-assertion (e.g. error has been cleared) information
- Human readable event description

The events are visualized in red, green, and yellow to distinguish between alarm, warning and informational events.

Chassis control command support

The plugin allows executing the IPMI chassis control commands directly from the NMS console. Supported commands include: Power Up, Power Down and Reset. These commands can be integrated with NMS business rules engine (e.g. reset a server when it does not respond with a ping).
Summary

If you performed all actions described in chapters 1-5 you are now able to monitor IPMI Management Console application.