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OpenBMC Updates, Platform Telemetry and Health Monitoring

OPEN SYSTEM FIRMWARE

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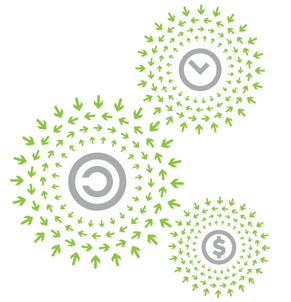


OPEN PLATINUM™

OpenBMC Updates

OPEN SYSTEM FIRMWARE

- OpenBMC overview
- Releases
- OpenBMC 2.6
- OpenBMC 2.7
- Community Forums

OpenBMC Overview

- https://www.openbmc.org
  - Define a Standard Baseboard Management Controller Firmware Stack
    - Linux distribution for devices that have BMC
    - Easy customization using: Yocto, OpenEmbedded, systemd, D-bus
  - Work across heterogeneous systems
    - Enterprise, HPC, telco, cloud-scale data centers
- https://github.com/openbmc
  - Features, Design documents
  - Recipes (meta)
  - Wiki, meeting notes
  - CI, Test automation

Releases

- Bi-annual releases to align with Yocto releases
- Stable branches starting with the 2.6 releases
- Release process and notes
  - https://github.com/openbmc/docs/blob/master/release/release-process.md
  - https://github.com/openbmc/docs/blob/master/release/release-notes.md
- OpenBMC 2.6 (Feb 2019)
- OpenBMC 2.7 (Aug 2019)

OpenBMC 2.6 (Feb 2019)

First release as Linux Foundation Project

- Yocto refresh to "Thud" version 2.6
- GUI enhancements: SNMP and Date/Time
- Serial over Lan
- IPMI 2.0 support
- Partial Redfish support
- Kernel updated to 4.19 LTS

OpenBMC 2.7 (Aug 2019)

- Yocto refresh to “Warrior” version 2.7, Linux kernel 5.x
- NVMe-MI over SMBus
- Removal of Python for footprint reduction
  - No longer required for meta-phosphor layer and its defaults
- KVM over IP
  - adds infrastructure to allow KVM sessions through the webui
- Partial PLDM/MCTP support
- Redfish support for:
  - Local user management, partial LDAP, network, event logging, DateTime, boot devices, firmware update, inventory and sensors
- OpenBMC Release Notes
  - https://github.com/openbmc/docs/tree/master/release

Community Forums

Meeting	Time	Primary Location
Weekly Community Telecon	Mon, 16:00 UTC	https://ibm.webex.com/join/bradleyb
Release Planning	Mon on odd weeks, 20:00 UTC	https://ibm.webex.com/meet/krtaylor
GUI Design workgroup	Wed on odd weeks, 12:30 UTC	https://ibm.webex.com/ibm/j.php?MTID=m49792ce33d5af28f2823638d351732f3
Infrastructure Workgroup	Wed on even weeks, 20:00 UTC	https://ibm.webex.com/meet/andrewg
Security working group	Wed on even weeks, 19:00 UTC	https://meet.google.com/fcr-ogje-etj
Test work group	Thurs on even weeks, 15:30 UTC	https://ibm.webex.com/meet/sivas.srr
Platform Telemetry and Health Monitoring	Tues on even weeks, 17:30 UTC	Microsoft Teams meeting

OpenBMC - Platform Telemetry

Cloud Telemetry Conundrums

The rise and rapid evolution of data analytics, AI and machine learning workloads have significant impact on cloud hardware design.

Commercial Cloud Infrastructure requires high availability and need state of art telemetry to build and predict failsafe models.

BMC role has evolved from legacy hardware management service to central intelligent controller serving cloud control plane operations.

Specialization with Standardization

Processors

- Processors errors and CPU Crash dump

Memory

- Memory Correctable and uncorrectable errors

IO

- PCIe Correctable and uncorrectable errors
- SMART data for disks

Add on cards and custom silicon

- Thermal data
- Vendor specific telemetry

Host Subsystem

- OS status
- Network link status

Power Supply

- Fault history
- Energy storage attributes
- Consumption history

BMC

- Firmware Stats
- Request and Response history
- BMC CPU/Memory/Flash stability

Mainboard HW

- Hot Swap Controller Faults
- Voltage Regulator Faults

Objective

- Standardize telemetry model
  - Design a configurable BMC telemetry and health monitoring framework for OpenBMC platforms (hardware, thermal, power, BMC and custom)
  - Provide a generic interface to remotely access the metric data using both a push and pull model.

Possible Solutions

Custom Daemons for every subsystem and custom IPMI/Redfish to push telemetry information

- Use native binary blobs and OEM URIs

Custom methods to specify telemetry parameters like metric definition, sensing interval, specifying triggers

Telemetry Collection Subsystem

Use “*collectd*” for collecting metrics.

“*collectd*” plugins can be written or provided by subsystem owners to collect metrics (Hardware as Service).

Integrating IPMI and Redfish subsystems with *collectd* using intermediate translation services.

Supports aggregation of metrics data, which enables space-efficient storage of data.

Redfish Telemetry Model

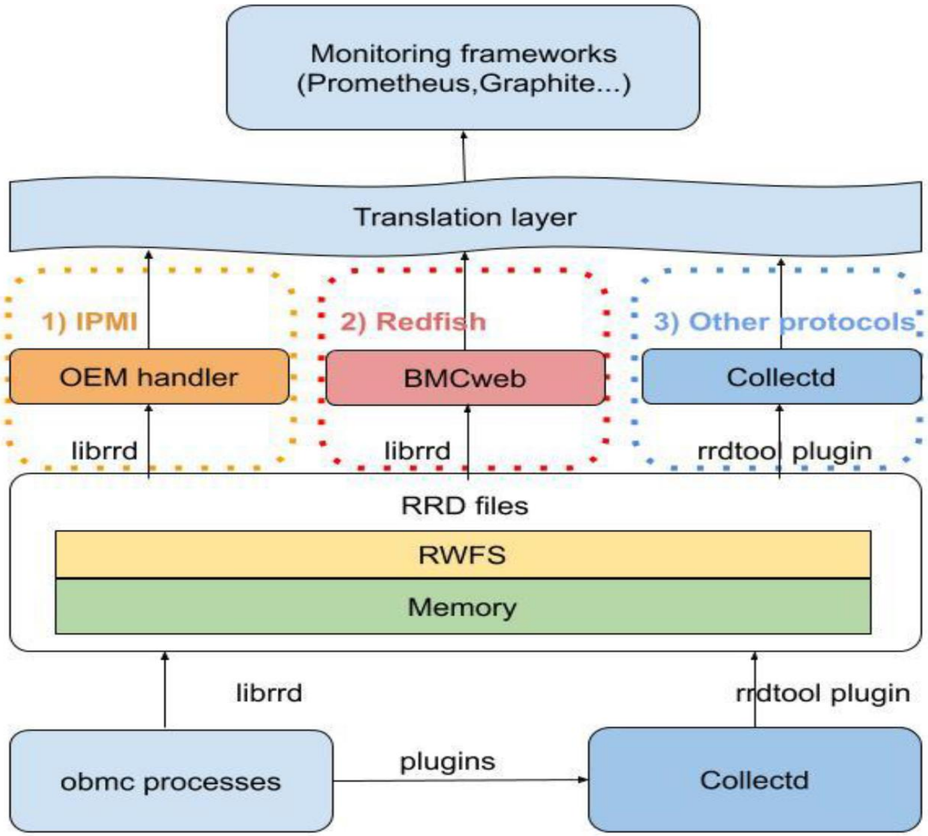
Use Standard Redfish telemetry model (Credit : Paul Vancil)

Flexible, extendible and complete for OpenBMC client interfaces

Supports push (Redfish event model) and pull model (Event logs)

Supports Triggers for specific scenarios

System Diagram



Credit: Kun Yi((https://osfc.io/uploads/talk/paper/37/Platform_telemetry_and_diagnostics.pdf)

Redfish Telemetry – Sample Metric Report


```
{
    "@odata.type": "#MetricReport.v1_2_0.MetricReport",
    "@odata.id": "/redfish/v1/TelemetryService/MetricReports/OBmcPowerMetrics",
    "Id": "OBmcPowerMetrics",
    "Name": "Metric Report: Push and Log Platform Power Metrics: Min, Max, Ave",
    "ReportSequence": "23",
    "MetricReportDefinition": {
        "@odata.id":
"/redfish/v1/TelemetryService/MetricReportDefinitions/OBmcPowerMetrics"
    },
    "MetricValues": [
        {
            "MetricId": "MinConsumedWatts",
            "MetricValue": "435",
            "Timestamp": "2018-11-07T11:25:00-01:00"
        },
        {
            "MetricId": "MaxConsumedWatts",
            "MetricValue": "515",
            "Timestamp": "2018-11-07T11:25:00-01:00"
        },
        {
            "MetricId": "AveConsumedWatts",
            "MetricValue": "221",
            "Timestamp": "2018-11-07T11:25:00-01:00"
        }
    ],
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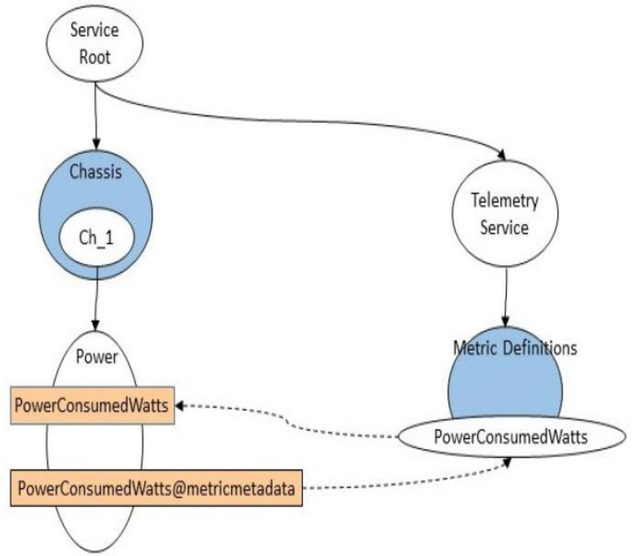

Source: https://www.dmtf.org/documents/redfish-spmf/redfish-telemetry-white-paper-010a

Get Involved

Workgroup call (Bi-weekly)

https://github.com/openbmc/openbmc/wiki/Platform-telemetry-and-health-monitoring-Work-Group

Community requirements

https://docs.google.com/spreadsheets/d/12gMMXB9r_WfWDf5wz-Z_zXsz6RNheC6p2LKp7HePAEE/edit?usp=sharing

- Design proposals

  https://gerrit.openbmc-project.xyz/c/openbmc/docs/+/22257

  https://gerrit.openbmc-project.xyz/c/openbmc/docs/+/23758

  https://gerrit.openbmc-project.xyz/c/openbmc/docs/+/24357

OCP REGIONAL SUMMIT

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OCP Regional Summit

26–27, September, 2019