**BMC**

**BASEBOARD MANAGEMENT CONTROLLERS**

# Introduction

The **OpenBMC** project is a [Linux Foundation](https://en.wikipedia.org/wiki/Linux_Foundation) collaborative [open-source](https://en.wikipedia.org/wiki/Open-source_model) project whose goal is to produce an open source implementation of the [Baseboard Management Controllers](https://en.wikipedia.org/wiki/Baseboard_Management_Controller) (BMC) Firmware Stack. OpenBMC is a [Linux distribution](https://en.wikipedia.org/wiki/Linux_distribution) for BMCs meant to work across heterogeneous systems that include enterprise, [high-performance computing](https://en.wikipedia.org/wiki/Supercomputer) (HPC), [telecommunications](https://en.wikipedia.org/wiki/Telecommunication), and cloud-scale [data centers](https://en.wikipedia.org/wiki/Data_center).

# Project Summary

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| Website | https://www.openbmc.org/ |
| Organization/Foundation Name | The organization behind OpenBmc is the Open Power foundation. |
| License | Apache license 2.0 |
| Open/Proprietary | BMC (Baseboard Management Controller) technology can be both open-source and proprietary. |
| Source Path(if open source) | https://github.com/openbmc/openbmc |
| Brief Description | Open BMC is an open-source software framework for managing and controlling Baseboard Management Controllers (BMCs) that are typically found on server motherboards. BMCs are responsible for monitoring system health, providing  remote access and control, and managing firmware updates. |

# Project Details

## **Key Features**

Platform independent

Remote management

Standards-based

Modularity

Scalability

Security

**Architecture**

Hardware interface: OpenBMC communicates with the underlying hardware using industry-standard interfaces such as I2C, SPI, UART, and PCIe.

BMC firmware: The BMC firmware is responsible for controlling and monitoring the system hardware. It runs on a dedicated microcontroller that is separate from the main processor.

Linux kernel: OpenBMC runs on top of a Linux kernel, which provides the core operating system functionality.

System services: OpenBMC provides a number of system services, such as power management, event logging, and sensor monitoring. These services are implemented as daemons running on top of the Linux kernel.

Hardware abstraction layer: OpenBMC includes a hardware abstraction layer (HAL) that provides a consistent interface for accessing system resources across different hardware platforms.

## **Current Usage**

Servers: OpenBMC is commonly used in server hardware from a variety of vendors, including IBM, Dell, Facebook, Google, and Microsoft.

Networking equipment: OpenBMC is used in networking equipment such as switches and routers, including products from companies such as Mellanox, Cumulus Networks, and Edgecore Networks.

Storage systems: OpenBMC is used in storage systems such as RAID controllers and storage servers.

Internet of Things (IoT) devices: OpenBMC is being explored as a potential platform for managing IoT devices, particularly those with embedded processors.

Academic research: OpenBMC is also used in academic research projects, particularly those focused on system security and reliability.

## **Technical Details**

Linux kernel: OpenBMC is built on top of the Linux kernel, which provides the core operating system functionality, including process management, memory management, and device drivers.

Hardware interface: OpenBMC communicates with the underlying hardware using industry-standard interfaces such as I2C, SPI, and PCIe. It also supports a variety of sensor types, including temperature, voltage, and fan speed sensors.

BMC firmware: The BMC firmware is responsible for controlling and monitoring the system hardware. It runs on a dedicated microcontroller that is separate from the main processor.

System services: OpenBMC provides a number of system services, such as power management, event logging, and sensor monitoring. These services are implemented as daemons running on top of the Linux kernel.

### **Project comparison**

Redfish: Redfish is an industry-standard API for managing hardware devices, including servers, storage systems, and networking equipment. While not a direct competitor to OpenBMC, Redfish does provide an alternative management interface that can be used in conjunction with OpenBMC.

OpenRack: OpenRack is an open-source hardware specification for data center racks and infrastructure. It includes a standard BMC implementation that is similar to OpenBMC.

UEFI: The Unified Extensible Firmware Interface (UEFI) is a standard firmware interface that is used in modern computers, including servers. While not a direct competitor to OpenBMC, UEFI does provide an alternative firmware interface that can be used in conjunction with OpenBMC.

**Reference / Acknowledgements**

"Home - OpenBMC". OpenBMC.

"Power of Open(Source)BMC - OpenPOWER". OpenPOWER.

"README: add Technical Steering Committee members · openbmc/docs@e28e782". GitHub.

"Docs: Add Arm representative to the list of TSC members · openbmc/docs@560b4ca".

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