【BMC】Redfish Overview

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摘要 This article introduces Redfish, a RESTful management standard based on HTTPs, which is used to replace the traditional IPMI, emphasizing its advantages in device monitoring, security and ease of use. Through standardized operations and security design, Redfish is becoming a mainstream choice for server management.

The summary is generated in C Know , supported by DeepSeek-R1 full version, go to experience>

What is Redfish

Redfish is a specification maintained by the DMTF (Distributed Management Task Force).

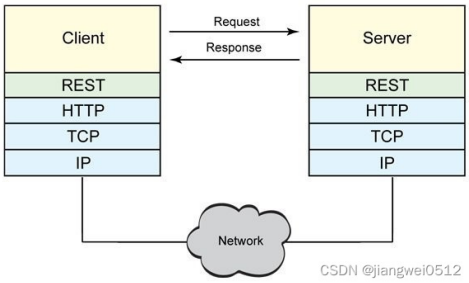
Redfish is a management standard based on HTTPs services, which uses RESTful interfaces to implement device management.

Redfish uses many Internet concepts, and the RESTful mentioned above is one of them. RESTful is an adjective that refers to a program or design that complies with the REST (Representational State Transfer) principle. RESTful programs or designs use a simple form to complete data transmission, and the specific operations are only the following:

operate	illustrate
POST（Create）	Creates a new resource or executes a method of the specified resource.
GET (Read)	Returns the requested resource description.
PATCH (Update)	Modify the current resource properties.
DELETE (Delete)	Deletes the specified resource.

The data format transmitted by each Redfish operation is also standard. There are several types, and the more commonly used one is JSON format.

Another Internet concept used by Redfish is Service-Client, as shown in the following figure:



Redfish was first used on server devices. At this time, the server (usually the BMC on the server) is the Redfish Server, and the Redfish Client can be your computer, or more precisely, the Redfish program in the computer. Through this program, you can access, modify, update, and delete resources on the server.

The Redfish specification can be downloaded from REDFISH | DMTF , and the latest version at the time of writing this article is 1.16.

What is Redfish used for?

Usually a server contains several powerful CPUs, several GPU cards, hard disks, network cards, etc. You can use this powerful server to complete various tasks, such as data calculation, animation rendering, etc. In general, the server can work normally, but there are still various abnormal situations, such as a broken fan on the server, which causes the device to overheat and produce abnormalities.

When a server is abnormal, you need to troubleshoot and solve the problem. Usually the server is placed in a separate room, so you need to go to this room to locate the problem. Due to heat dissipation issues, the room is usually either overheated or overcooled. What's more terrible is that in order to dissipate heat, the server is usually equipped with powerful fans, and the noise they generate will make you feel uncomfortable during the location process. If it's just one server, it's still bearable, but when you have a room full of servers, the situation will become more unbearable.

At this point, you may wonder if it is possible to locate the device remotely, so that you don't need to stay in a room with too much air conditioning and noise. Usually, the operating system installed on the server has remote tools (such as SSH), so remote operation is still possible. Therefore, we can add various functions to the server operating system to monitor temperature, fans, etc. However, there are still some problems: What if the problem with the server is so serious that the operating system crashes? And if the server operating system is asked to do these monitoring tasks, will a lot of computing power be wasted, especially since these tasks are really overkill for the CPU (the monitoring is all slow devices, which is a waste of efficiency for a high-speed CPU).

In order to solve this problem, one way is to introduce additional components to perform monitoring operations. After having this idea, major server manufacturers joined together and introduced the concept of platform management. It uses an additional baseboard management chip (Baseboard Manager Controller, referred to as BMC) to complete all monitoring tasks. Of course, in addition to monitoring tasks, we also hope that it can complete other basic operations, such as server power on and off, log recording, alarm after monitoring abnormalities, etc., which will be more helpful for problem discovery, location and resolution.

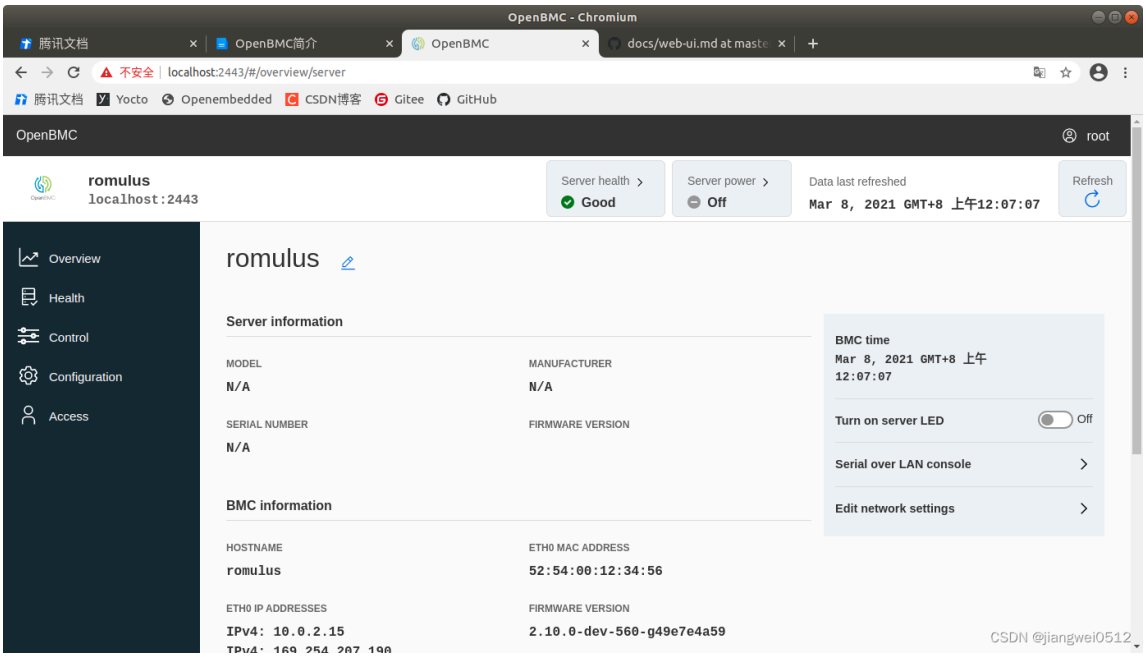
Now that the hardware is ready, we need software implementation. Here, the manufacturer has introduced a specification called IPMI (Intelligent Platform Management Interface). The IPMI specification defines the interface for external devices (mainly various components in the server) to interact with the BMC. This is understandable because if the BMC needs to monitor other devices on the server, it must have a way to communicate. The hardware interface for communication can be a common I2C, UART, PCIe, USB, network card, etc., or a specific BMC-specific hardware interface such as KCS, IPMB, etc., and the data transmitted on it must meet the format defined by the IPMI specification. The operations defined by these data formats can meet basic server operations, such as server power on and off, sensor data acquisition, log acquisition, and so on.

At this point, although there are still many functions and details that have not been mentioned, the platform management function of the server is basically complete. However, after talking about a lot, the protagonist of this article, Redfish, has not been mentioned yet. The emergence of Redfish is actually to replace IPMI. After using IPMI for a period of time (IPMI was launched in 1998 and Redfish was launched in 2014), server manufacturers found some problems. First, although the IPMI specification defines many operations, the initial version did not define enough operations, resulting in the use of many custom operations by each server during the development process. Since the IPMI operation is defined in the format of (NetFn/Cmd), for the same (NetFn/Cmd), servers provided by different manufacturers may correspond to different operations. Then, IPMI was not sufficiently considered for security at the beginning of its design, resulting in many security vulnerabilities at present, which are costly to repair. Therefore, after the withdrawal of the 2.0 version of the IPMI specification in 2013, it was no longer updated and switched to Redfish.

Redfish is based on HTTPs, so it is secure. The RESTfull interface and JSON data format used by Redfish are simple, easy to use, easy to read, and easy to expand. Therefore, it has become a substitute for IPMI. Currently, most servers have implemented the Redfish interface.

So far, Redfish has not appeared much in this article, but through the previous explanation, you should have been able to understand the role of Redfish.

If you want to talk about the actual experience, you can log in to the BMC through the browser, such as the following (the example is from the virtual OpenBMC, not the real server):



The operations performed through the browser may contain Redfish implementation behind the scenes. This is an indirect example, and you may not see Redfish yet. Another example is to use the postman tool, in which you can see the JSON data transmitted by Redfish. The following is an example: