



Cumulus RMP

Using Linux to Manage the Entire Rack

The Problem

In today's data center, out-of-band management is an often-overlooked component of deployments. This occurs as a result of lower perceived value, as the management network does not carry production traffic. The platforms are less accessible, as many network operating systems are closed to innovation, even more so as you enter the feature-limited environments that often underpin out-of-band networks. Together these combine to produce an overly simple network which allows little value to be derived, despite it being fundamental to the operation of many networks. How else do you access your systems when faced with a production network incident?

Until recently, closed network platforms have been the norm across the whole rack. Cumulus Networks has changed this with Cumulus Linux, the operating system for open networking, providing end users with broad access to what is occurring in the network. Cumulus Linux is a true Linux distribution, which enables broad innovations in the networking space just as Linux does in the server space. With the introduction of Cumulus RMP (Rack Management Platform), we have extended this into out-of-band rack management.

Cumulus RMP

Cumulus RMP extends the innovative, native Linux approach of Cumulus Linux into the out-of-band management network. By bringing the power of Linux into the switching platforms leveraged for out-of-band access to your racks, you can leverage the same deployment models that you rely on for your data plane switches or your servers. Being an open Linux platform, additional data can be derived from the network which previously was locked away or absent. Now the entire rack can be managed with the same Linux tools, and unlock the innovation that the open Linux operating system provide across servers, top-of-rack and out-of-band switches.

Cumulus RMP is based on the mature Cumulus Linux operating system, allowing you to reach the full potential of the specialized out-of-band switches sold by hardware providers.

A New Era of Out of Band Management

Being based on Cumulus Linux, Cumulus RMP enables:

- **Open Development:** Built on Linux, Cumulus RMP allows you to develop procedures, scripts and apps that solve business problems for your network along with reusing existing ones that you already have without having to learn a proprietary language, API or method.
- **Ready to Go:** Out of the box, the system is ready to be leveraged as an out-of-band switch, with a single VLAN by default, incorporating all data plane ports and a DHCP client on the VLAN for it to obtain its own IP address and an integrated license to enable forwarding.



- **Consistent Interface:** Built on native Linux, Cumulus RMP allows end-users to deploy and configure their out-of-band platforms just as they do for their data plane platforms and their servers.
- **Accessible Data:** Cumulus RMP gives you access to local network data (including MAC addresses, routes, ARP entries, LLDP, and others) using standard open tools found in all Linux systems. This enables you to use off the shelf tools for processing this information, along with developing any additional tools that meet your business needs, and then reuse them across your network and your servers.
- **Integrated Tools:** As a true Linux distribution, Cumulus RMP has pre-installed the most common network tools in the network operating system, enabling you to manage and support your connected servers without the need of an additional platform.
- **Automation Ease:** Being Linux, your choice for an automation tool to configure and maintain the platform is wide and open: using Ansible, Puppet, Chef, Salt and others, in the same way that you are already managing your Linux servers.

Rich Tools

As a Linux platform, Cumulus RMP gives you an open system in the top of your rack with built-in tools to accelerate your operational load. With these pre-installed applications you can directly manage and support the systems in the rack without relying on the rest of the network. This way, when you are building a new environment, or have limited network access, you have rich management and access to the connected systems. You are better able to operate and manage your environment without being reliant upon other components of the infrastructure, allowing you to more rapidly resolve issues. Further, you can now distribute the services load much closer to the end-system, giving you a higher overall availability by reducing the reliance upon large, centralized infrastructure and the associated impact when issues arise with them.

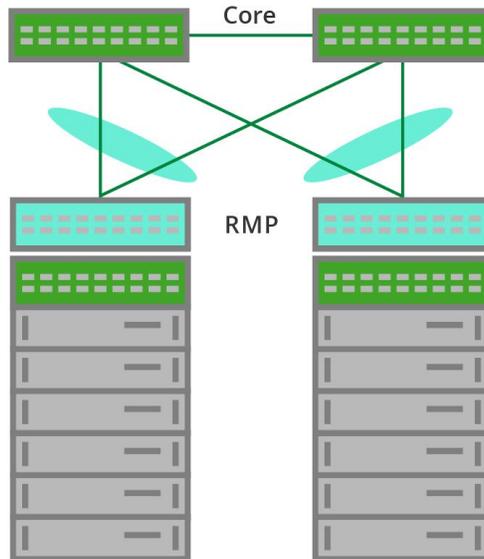
- **DHCP:** With ISC-DHCP and DNSmasq pre-installed, you can offer local DHCP configuration for connected hosts, where previously you often needed connectivity to a remote server on other platforms.
- **IPMItool & vncproxy:** Management tools for accessing the local servers are now built-in, enabling you to provision, configure and access the local servers independent of the rest of the out-of-band network. Thus, when you are building out a new facility, the tools are already available.
- **TFTP & NTP server:** By having these servers pre-installed and ready for your use, you can further lessen the reliance on remote systems to bootstrap and provide basic services to your connected hosts. Now your servers can locally boot regardless of the wider network connectivity.

Deployment Scenarios

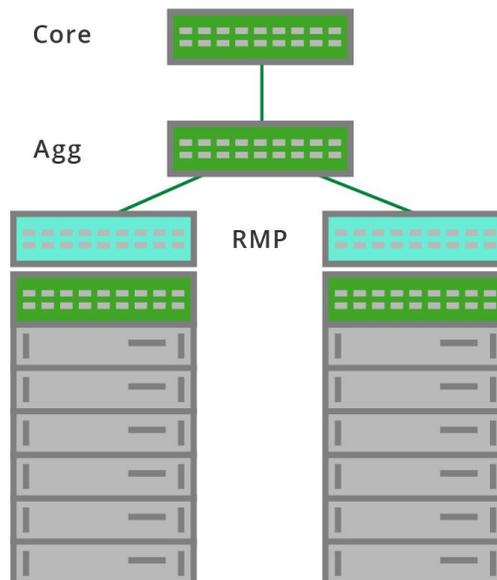
One deployment scenario is for networks that have a fully redundant out-of-band network. In this scenario, a Cumulus RMP switch is deployed in every rack, which is connected to the IPMI or management port of each server and network device in the rack. The Cumulus RMP switch is then connected upstream to two “core” devices via an LACP bond. The core devices can then act as another layer 2 tier or as the layer 2 to layer 3 transition, collecting the connections from multiple racks, which can be a platform running Cumulus Linux, as is depicted below. This approach offers you very high availability to each rack and provides the underpinning for



mission critical solutions where out-of-band management is a primary consideration in managing your systems independent of the production traffic.



For environments that do not require a highly available out-of-band network, reduced redundancy can provide a more economical solution to bringing up and managing your servers and network gear. In this scenario, a Cumulus RMP switch is deployed in every rack, which is connected to the IPMI or management port of each server and network device in the rack. The Cumulus RMP switch is then connected to an upstream layer 2 aggregation switch based on scale, which can be a Cumulus Linux switch as depicted below, or could go directly to your core layer 3 device.





Conclusion

Cumulus RMP gives you the openness of Linux in your out-of-band network, enabling you to have an open solution with integrated tools and rich data access to accelerate the operations of your network. No longer are you left with closed platforms and the inherent risk of remote tools for a critical underpinning of your network-based solution. Instead, you manage the whole rack the same way, with Linux.



Cumulus® RMP™ Rack Management Platform

About Cumulus Networks

Cumulus Networks demystifies the complexity of networking and enables better, faster, easier networks to support your business. Our network operating system, Cumulus® Linux®, allows you to build and operate your network with the mindset of web-scale pioneers like Google and Amazon, radically reducing the costs and complexities of modern data center networks. More than 400 organizations, including some of the largest-scale data center operations in the world, run Cumulus Linux. Cumulus Networks has received venture funding from Andreessen Horowitz, Battery Ventures, Sequoia Capital, Peter Wagner and four of the original VMware founders. For more information visit cumulusnetworks.com or follow [@cumulusnetworks](https://twitter.com/cumulusnetworks).

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