

Cisco Prime Infrastructure 2.2: Enterprise-Class Network Assurance

Executive Summary

In today's world of fast-growing and fast-changing application hosting and delivery environments, networks have never been more important. Good network management tools, particularly those that help networking pros get the most out of networking equipment features and capabilities, are worth their weight in gold. And if those management tools can go further by providing the means for managing the infrastructure end to end, from users to applications, and from branch to data center, the value is even greater, opening the door to achieving business outcomes that are both directly and indirectly reliant upon the network. This paper reviews Cisco Prime Infrastructure Version 2.2 and examines how the enhancements and extensions that are part of the release bring needed capabilities for assuring high functioning, high performing networks as well as the broader data center operations function.

Issues at Hand

Enterprise network managers have a lot on their minds and a lot on their plates as they must deal with a growing number of devices to manage, steadily rising bandwidth demands, and ever-higher expectations for network reliability and performance. To help them keep pace, network management tools must rise to the challenge. One of the key network management tools and technology requirements that Enterprise Management Associates (EMA) has been steadily tracking is the consistent demand for solutions that can handle multiple management needs on a task basis, while also supporting multiple types of technologies and equipment. Such converged network management solutions help networking pros keep up with increased complexity and expectations by simplifying operations, accelerating deployments, reducing restoration times, and enhancing user experience, even when staffing levels aren't rising at the same rates.

One of the interesting challenges facing networking pros today is they must recognize and accommodate more than just the traditional physical network equipment. The introduction of network virtualization and multiple layers of virtual networking, as well as virtual endpoints being connected by those virtual network constructs, creates a new category of visibility and control challenges. More specifically, network management practices, and the tools and technologies that support them, must be ready to support a combination of physical and virtual networking elements and architectures.

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Finally, truly effective network management practices increasingly rely upon effective network management tools and technologies. To have positive impact, the tools themselves must be designed to make advanced features and critical automations both easy to access and easy to implement. This is particularly important for control and optimization solutions that are intended to improve the manageability and predictability of network and application performance. If networking management tools have not been designed properly, such advanced capabilities will be far more difficult to leverage, commonly resulting in less than full use/deployment and, ultimately, less value to the organization.

Cisco Prime Infrastructure 2.2

While Cisco Systems is well known for its networking, compute, and collaboration products, important aspects of Cisco solutions that are often overlooked and underappreciated are the company's management tools. EMA research regularly reveals Cisco's management products are among the network management tools most commonly used by enterprises today, primarily because they are used to directly configure and maintain Cisco's various infrastructure products. And yet, the Cisco management solutions suite is far more than simply an integrated set of element management tools. As an example, Cisco Prime Infrastructure has deep roots in element management but has been designed and architected to act as a fully functional operations monitoring and troubleshooting platform that spans technology domains and functional areas.

The most recent release, Cisco Prime Infrastructure 2.2 (PI2.2), delivers a number of strong steps forward in terms of platform capacity as well as functional capability for assuring the health and integrity of enterprise networks. At a high level, the release has broadened the scope of the product's management features to include data center technologies, has added a distributed architecture for managing large scale distributed infrastructures, and has continued Cisco's track record of iterative improvements to workflow and ease of use. Some of the more specific areas of improvement are as follows:

- **Intelligent WAN (IWAN) Support** – Cisco's IWAN solutions are designed to allow flexible and consistent security and application performance across multiple types of WAN connectivity. New PI2.2 features unite visibility and control for IWAN features and capabilities. PI2.2 dramatically simplifies IWAN deployments by introducing IWAN workflows and flexible templates. Once in place, direct visibility into network and application performance will enhance service assurance. In the case of Cisco, this visibility is provided via embedded Cisco equipment features, such as Application Visibility Control (AVC) and Network-Based Application Recognition (NBAR). PI2.2 features for deploying and configuring network and application control functions such as Performance Routing (PfR), Wide Area Application Services (WAAS), network Quality of Service (QoS), and Dynamic Multipoint VPN (DMVPN) are just a few clicks away. This combination of visibility and control allows network engineers and operators to take full advantage of advanced embedded Cisco networking capabilities to optimize and secure the WAN.
- **Topology Mapping** – New for this release is the ability to view Layer 2 topology maps to reveal relationships and connectivity between networking devices (see Figure 1).

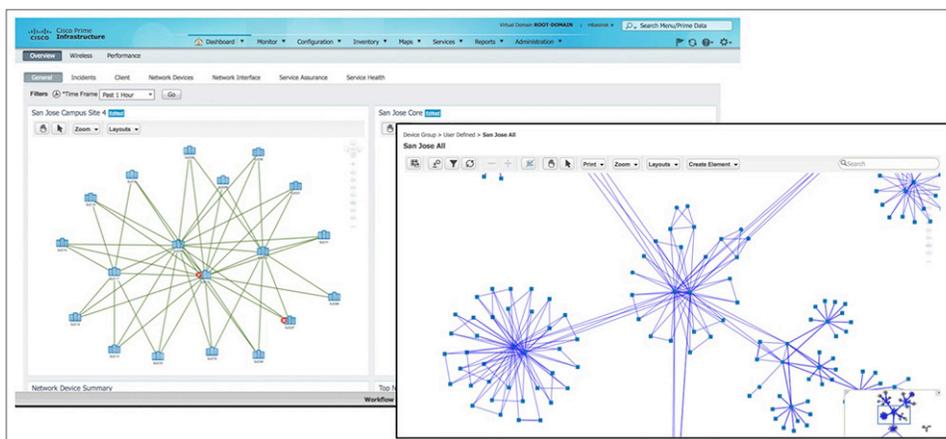


Figure 1. Device and Site Connectivity

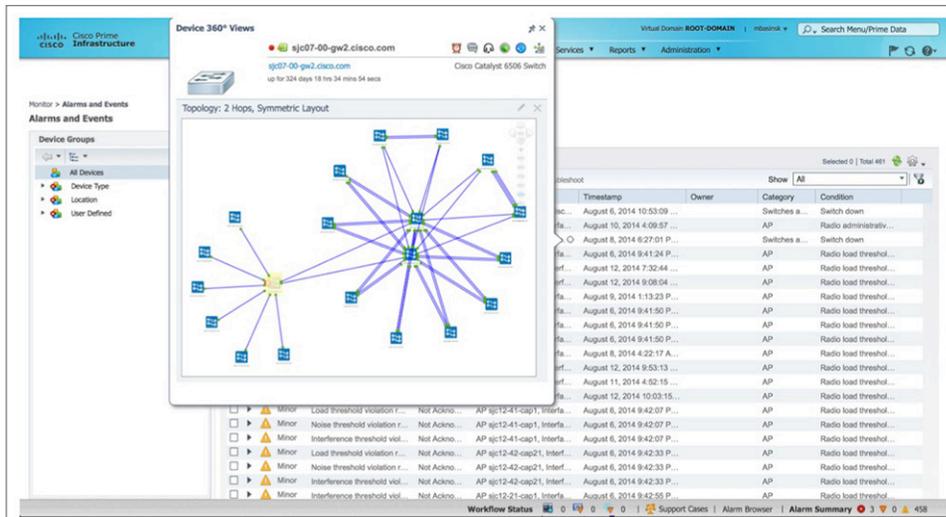


Figure 2. Topology “n-Hop” Drill Down from Device 360 View

- A related enhancement is the ability to view network connectivity up to three hops from any individual network node within the PI2.2 Device 360 View (see Figure 2). This helps network operators and engineers to quickly recognize network paths and dependencies for planning, monitoring, and troubleshooting workflows.
- **Converged Wired/Wireless Access Management** – While traditional LAN access networks are certainly still common, wireless access networks are fast becoming ubiquitous. PI2.2 includes newly integrated LAN/WLAN management capabilities, eliminating the gaps that arise by having to use disparate tools to configure and manage wired LAN vs. WLAN access infrastructure. The release includes brand new configuration templates, based on Cisco Validated Designs, that address most common converged deployment scenarios.
- **Unified Computing System (UCS) Support** – The PI2.2 release expands management scope to the full data center by adding direct monitoring of Cisco UCS, including schematic and Device 360 views into all of the elements present, from racks and blades to VMware vCenter instances, hosts, virtual machines, and physical/virtual server relationships. Also included are views for recognizing fabric interconnect and switch features, so it is possible to recognize how each server is connected to resources both within the UCS and across the broader environment. In order to support these new features, PI2.2 adds a newly defined operator role/persona for systems administrators. By adding UCS monitoring support, PI2.2 enables unified data center monitoring for better understanding and situational awareness of cross-domain dependencies and issues when planning or troubleshooting.
- **Operations Center** – Perhaps the most significant architectural enhancement is the new capability to coordinate monitoring and management tasks across multiple instances of Prime Infrastructure via the new Operations Center features. Operations Center provides centralized visibility for large managed environments via common inventory, alarms, and reporting features, as well as single sign-on and consolidated search across multiple subtended instances of PI. Fully multi-tenant by design, Operations Center uses the published REST API for communicating with PI servers. This new distributed architecture greatly enhances the scalability of the Prime Infrastructure solution, allowing organizations to support tens of thousands of managed devices in a consistent, coordinated manner.
- **Improved Manageability** – As of the PI2.2 release, a new approach is now available for keeping the PI platform current with new features and capabilities. The new Technology Packs are modular feature bundles that can be downloaded and installed as needed without requiring a full system upgrade. Cisco Prime Infrastructure will even alert the administrator directly when new Technology Packs become available.

EMA Perspective

Monitoring and documenting the evolution of network management tools over the past several years, EMA has seen increasing demand for solutions that bring together multiple management functions, such as configuration, visibility, and control. Furthermore, as operations teams begin to merge across compute, storage, and network, there is a growing need for management tools to bring together management for more than one technology “domain” so that relationships and interdependencies can be recognized and considered during planning, monitoring, and troubleshooting workflows. These types of higher level, integrated management capabilities are necessary to move from reactive, break-fix operations to a more proactive stance from which network and data center teams can help to assure high functioning, highly available, and high performing IT infrastructure that is aligned with application and business needs.

By continuously extending and advancing the management tools that network engineers and operators need to get the full value of their infrastructure investments, Cisco has demonstrated a sincere focus on going beyond delivering superior infrastructure equipment solutions. The Prime Infrastructure 2.2 release is an excellent example as it brings together visibility and control features across LAN, WAN, and data center, while also converging management of both wired and wireless access networks. In particular, the distributed architecture and Operations Center front end, the IWAN support features, and the new topology views will greatly improve the effectiveness of the solution in terms of supporting the everyday requisite tasks of the networking pro. And the additional support for UCS brings PI2.2 into the realm of integrated, cross-domain solutions. Collectively, the PI2.2 release brings integrated visibility and management of user and application performance, leveraging simplicity of design and automation to reduce operational costs. In this way, it represents a powerful step forward for existing Cisco Prime Infrastructure installations and a healthy set of valuable capabilities for those considering the solution for the first time.

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About EMA

Founded in 1996, Enterprise Management Associates (EMA) is a leading industry analyst firm that provides deep insight across the full spectrum of IT and data management technologies. EMA analysts leverage a unique combination of practical experience, insight into industry best practices, and in-depth knowledge of current and planned vendor solutions to help EMA's clients achieve their goals. Learn more about EMA research, analysis, and consulting services for enterprise line of business users, IT professionals and IT vendors at www.enterprisemanagement.com or blogs.enterprisemanagement.com. You can also follow EMA on [Twitter](#), [Facebook](#) or [LinkedIn](#).

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