White Paper

Integrating Cisco Prime Performance Manager with Cisco Active Network Abstraction for Comprehensive Service Assurance

Executive Summary

Collecting network elements' performance information is crucial to most network administrators, in order to troubleshoot and identify network problems and bottlenecks, usage trends, and plan for future capacity expansions. Operators of all types—mobile backhaul, carrier Ethernet, and others—face common challenges in service assurance.

Cisco Active Network Abstraction (ANA) equips service providers and other carrier-grade network operators with a solid, well-rounded network management solution for IP next-generation networks. However, Cisco ANA does not offer performance management capabilities. Cisco Prime Performance Manager, an extensible, highly scalable and easy-to-use tool, provides a way for IP Next-Generation Network (NGN) service providers to gain visibility into their network performance and attain actionable information for troubleshooting and capacity planning. Cisco Prime Performance Manager augments the power of Cisco ANA to create a comprehensive management tool. This paper describes Cisco Prime Performance Manager capabilities, how the solution integrates with Cisco ANA, and the business benefits for service providers delivered by that integration.

Introduction

The convergence of mobile data, video, residential, and business services is creating new opportunities for communications service providers (CSPs), but with those opportunities come a host of new challenges and an ultra-competitive marketplace in which service assurance is vital for success. Operational expenses (OpEx) perennially factor into the landscape of challenges. CSPs need to find ways to deliver high-quality services at the lowest possible price. Operators want to improve service quality at a lower price per monitored link, but network complexity and disjointed management solutions increase the cost of operations. IP Next-Generation Network (NGN) service architectures are increasingly complex to operate, and the explosive growth of IP traffic is levying greater demands on backhaul and transport networks.

To rapidly introduce new services, effectively plan for network extensions, and optimize capacity, CSPs that use Cisco ANA to help manage their IP Next-Generation Networks need a clear understanding of network performance capabilities and resource availability. They need a solution that works in parallel with Cisco ANA to satisfy both business requirements and unify the management of complex services. The ideal solution provides both visibility into network and service performance to meet service-level agreements (SLAs), as well as tools for capacity planning.

Keeping operational expenditures low is critical for service providers' ability to meet the goal of delivering high-quality services at the lowest possible price, particularly in light of changing economics for service providers. "In developed regions, revenue per gigabyte will fall from US$23.21 in 2010 to US$4.27 in 2015,"[1] says Patrick Kelly, research director at Analysis Mason. Kelly notes that the combination of high traffic growth and slow revenue

[1] Cisco Prime Performance Manager Webinar, June 28, 2011

growth puts pressure on operators' profit margins. These numbers indicate that CSPs will need to work even harder in coming years to manage their costs while intensifying their focus on what Kelly names as two specific business outcomes that service assurance solutions must offer:

- Isolate faults and identify points of congestion within their networks
- Improve customer experience

A powerful performance management application can target these outcomes. To effectively introduce new services and help ensure the quality of existing services, providers must have the ability to manage critical technologies and solutions such as Carrier Ethernet, IP/Multiprotocol Label Switching (MPLS), and mobile backhaul. Service providers need a solution that gives them actionable information for network service and element use to help them identify potential performance and reliability issues before these issues can result in service degradation. These same capabilities can also lend visibility into utilization and usage trends that can help CSPs perform capacity planning with a high level of precision.

Cisco Prime Performance Manager

Towards these objectives, one highly effective solution is Cisco® Prime Performance Manager, a system that provides actionable information for network operators and administrators. A scalable, integrated application that spans core, aggregation, and access networks, Cisco Prime Performance Manager offers CSPs a rich set of prepackaged reports, giving them a powerful application for visibility into service assurance and capacity planning for their IP Next-Generation Networks. Cisco Prime Performance Manager integrates with Cisco ANA, combining the functionality of both products for a highly effective, complementary solution set.

Cisco Prime Performance Manager automatically collects raw data from network elements, analyzes and processes the collected data, and then generates standard and custom reports. In addition to providing support for a heterogeneous, multi-vendor network environment, Cisco Prime Performance Manager also supports multiple technologies, as shown in Table 1.

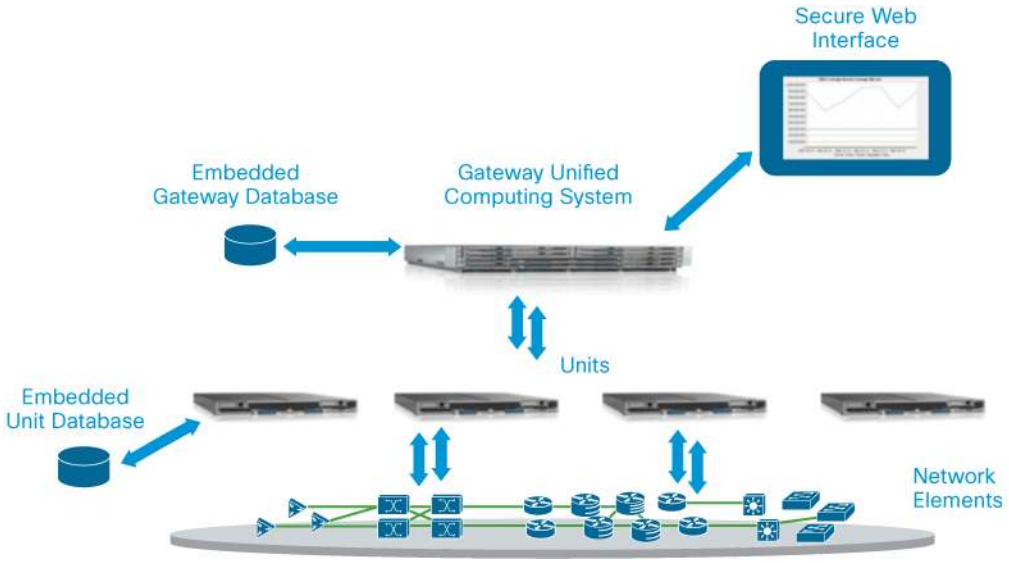
Table 1. Monitoring Support for Multiple Technologies

Network Resource Monitoring	Network Service Monitoring	Network Congestion Monitoring
Device Utilization	Pseudowire	Class-Based QoS
Interface Utilization	Ethernet OAM	Traffic Engineering (TE) Tunnels
Availability	IP SLA	Application
Environmental	MPLS Segments	Protocol
	Label Distribution Protocol (LDP)	
	Integrated Inline Video Monitoring (VidMon)	

Cisco Prime Performance Manager Physical Architecture

The Cisco Prime Performance Manager architecture comprises a gateway server that manages unit servers, which are dedicated to polling network element performance data through Simple Network Management Protocol (SNMP) management information bases (MIBs). The unit servers store the performance data in local database servers and then process it and present it to network staff through a secure web interface, or through data exports using CSV and HTML, transmitted through the server's northbound interface.

Figure 1. Cisco Prime Performance Manager: Physical Architecture



Challenges in Capacity Planning and Troubleshooting

Communications service providers of all types, as well as enterprise users operating carrier-class networks, face several universal problems with regard to service assurance. One very common problem revolves around network issues that are incurring service degradation and lower QoS for customers, but which have not so far led to an actual outage or service or fault on a device or service. In such cases, operators must be able to scrutinize the issue and respond to it accordingly, and put the appropriate remediation in place before the problem becomes an emergency. These issues typically indicate that a service provider needs to plan for additional capacity or adjust priorities set for other services—either on internal devices, or in the bandwidth that the service provider has contracted with a customer. With the proper performance management tools, service providers can gain a granular look on a per-technology basis at traffic statistics to help them maintain a positive customer experience. Additionally, such tools enable CSPs to provision the right amount of capacity—without costly over provisioning.

Cisco Active Network Abstraction

Cisco Active Network Abstraction (ANA) provides service providers and other carrier-grade network operators with a comprehensive solution for network element and service management. Capabilities include automated service activation, discovery, monitoring, event de-duplication, and root-cause analysis. Cisco ANA supports all major Cisco service provider network elements, as well as a wide variety of network technologies, including Multiprotocol Label Switching (MPLS), Carrier Ethernet, and Unified Radio Access Network (RAN) Backhaul reference architectures.

A Closer Look at Cisco ANA

At the core of Cisco ANA technology lies a unique Virtual Network Element (VNE) abstraction model that dynamically discovers and identifies device and network components, reflecting the near real-time state of these network elements. The ANA model enables an array of embedded device management and network abstraction features. Cisco ANA provides a rich set of platform and network mediation services for network and service management applications from Cisco and its partners. Scaling directly alongside the physical network, the ANA

approach allows operators to view and manage the complexities of multiple services in a multi-technology, multi-vendor network. However, Cisco ANA by itself does not provide performance management capabilities.

Figure 2. Cisco ANA Physical Architecture

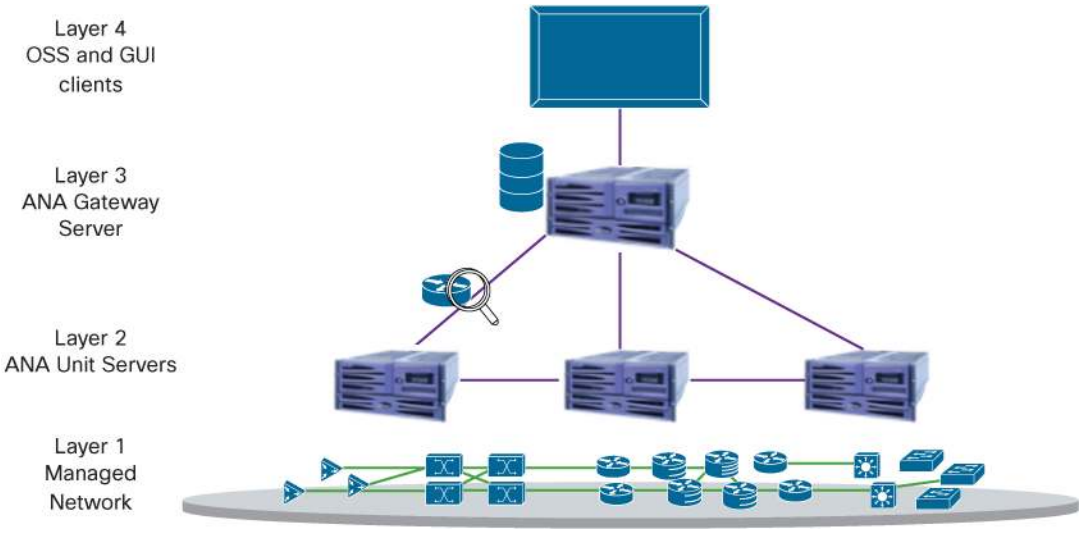


Figure 2 illustrates the main tiers of the Cisco ANA system. From the bottom layer to the top, the tiers are:

1. Managed network, comprising network elements from Cisco and other vendors.
2. ANA unit servers, which provide the runtime environment for the VNEs.
3. ANA gateway server, which manages client and northbound OSS interface requests.
4. OSS and GUI clients, which interact with the gateway.

Integrating Cisco Prime Performance Manager with Cisco ANA

Cisco Prime Performance Manager can be configured for automatic integration with Cisco ANA to import its inventory and poll the devices that ANA manages for the selected performance reports. Cisco Prime Performance can operate either in *strict* or *open* mode, as selected by the user. In strict mode, Cisco ANA polls only the inventory of devices that it manages. In open mode, Cisco ANA can discover and poll other devices.

The combined solution of Cisco Prime Performance Manager and Cisco ANA creates contextual cross-launch points at different levels within the Cisco ANA network vision GUI, at both the physical and logical level, monitoring these network elements:

- Devices
- Physical interfaces
- Logical entities
- Pseudowires
- Tunnels
- Ethernet virtual circuits (EVCs)
- BGP and OSFP
- Layer 3 VPN

Figure 3. Cisco ANA Contextual Cross-Launch to Cisco Prime Performance Manager

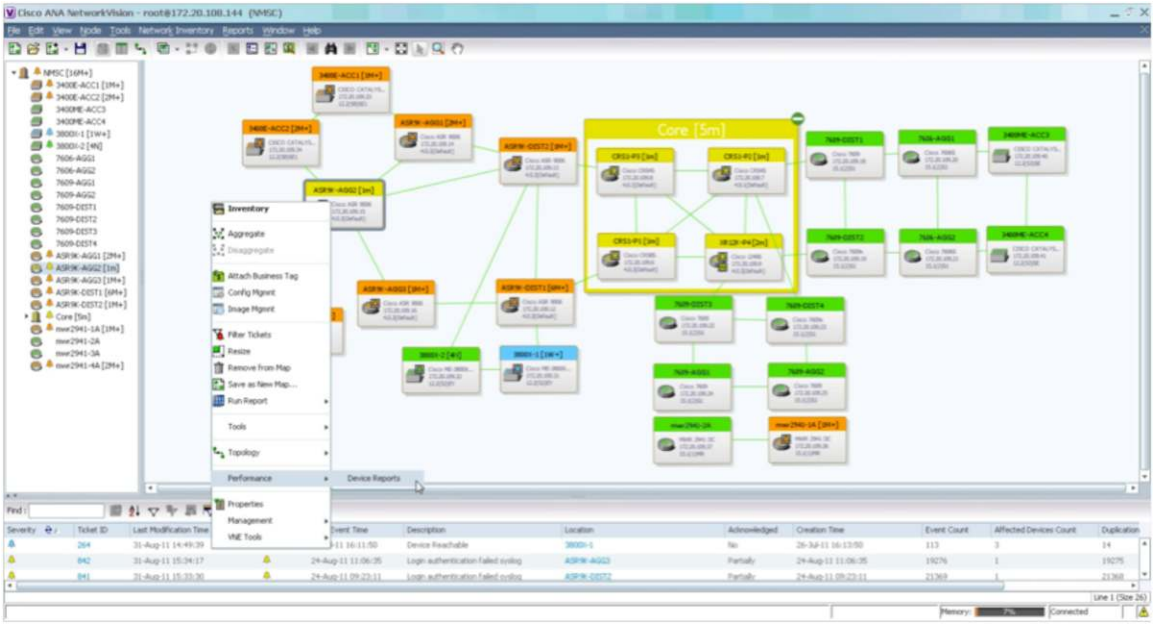
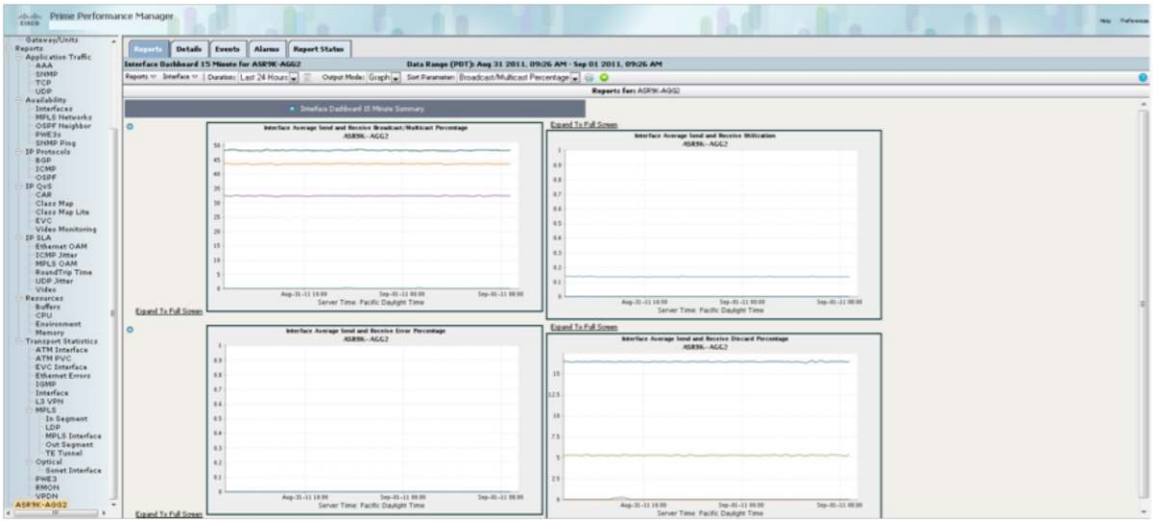


Figure 4. Cisco Prime Performance Manager Device Interface Dashboard



Together, Cisco Prime Performance Manager and Cisco ANA create a potent synergy of fault and performance information. The contextual cross-launch of reports from Cisco ANA provides a seamless experience for users viewing performance reports. Additionally, having the ability to launch performance reports from within Cisco ANA at different levels gives users powerful tools to further enhance management capabilities, providing in-depth reports on network health at each layer, as well as for the different technologies supported by Cisco ANA and Cisco Prime Performance Manager.

Features to Help Control OpEx

Controlling operational expenditures is an important weapon in CSPs' arsenal for fighting falling revenues and keeping networks profitable. Cisco Prime Performance Manager can help CSPs focus on the bottom line by helping them to proactively isolate faults and identify points of congestion within their networks, and improve the overall customer experience. Well-designed elements and features of Cisco Prime Performance Manager target these objectives while keeping their operational costs low.

Ease-of-use saves time for operations staff:

A web-based graphical user interface (GUI) for administration and report viewing minimizes complexity and the learning curve for network staff. The web-based nature of the GUI reduces the need to install Cisco Prime Performance Manager on multiple operating systems or client machines; it also provides a consistent user experience across an organization. To keep communications secure, the GUI uses Secure Sockets Layer (SSL). The interface also provides auto-discovery administration for network devices.

Easily extensible system reduces costs and complexity:

Cisco Prime Performance Manager enables the dynamic loading of new reports, extensions to existing reports, or the addition of new devices (including non-Cisco equipment) to the network through field customization. This capability minimizes the cost and complexity of customization. Customization capabilities enable network operators to create customized reports as quickly as they can provision new services, speeding time to market.

Comprehensive set of reports saves time and reduces total cost of ownership:

Network operators can select from hundreds of prepackaged reports on a wide range of network services, technologies, and devices, from core, aggregation, and access networks. The reports are automatically generated, saving time and reducing total cost of ownership (TCO). For example, customized reports can include:

- What to poll (poll definition)
- How to process data (calculations, storage)
- How to display data in GUI (graph, table, or dashboard views)
- How to export to comma-separated value (CSV) format (content, format)

Users can also compile new MIBs to add services and network elements, including non-Cisco devices. Operators can dynamically load new customizations without restarting the system, avoiding downtime.

Easy-to-integrate solution minimizes expensive operational support systems (OSS) integration costs:

Cisco Prime Performance Manger uses the standards-based CSV format. Once integrated, GUI reports can be easily cross-launched from other applications.

Carrier-class scale without the cost promotes growth and protects investments:

Designed for low startup and administrative costs, Cisco Prime Performance Manager can manage as many as 16,000 devices with up to 1.1 million interfaces and 50 GUI clients. Its distributed architecture provides reliability, deployment flexibility, and horizontal scaling to grow with the network. Cisco Prime Performance Manager runs on several platforms, including Cisco Unified Computing System (UCS), Linux with VMWare, and Solaris with Solaris VM Server.

Simplicity of installation and administration reduces deployment time:

Cisco Prime Performance Manager uses an embedded database that requires no manual administration and can be deployed on single or multiple servers. When installed, the system is driven by an easy-to-use web-based user

interface. Automation and the user-friendly interface reduce errors and minimize deployment time from weeks to hours, thus reducing the overall cost of deployment.

Conclusion

The challenging economics of service provider markets require operators of IP NGNs to seek out every competitive opportunity available to stay ahead. Service assurance tools represent one such opportunity, enabling services providers to troubleshoot their networks and gain insight for accurate capacity planning.

Using Cisco Prime Performance Manager with Cisco ANA, service providers can gain simplified monitoring for proactive service assurance, capacity planning, and network optimization for converged networks. Deployed as a standalone application or with Cisco ANA, Cisco Prime Performance Manager helps ensure high-quality service and n overall positive experience for end customers, while helping CSPs to reduce integration costs and the overall cost of network administration.

About Cisco Prime

The Cisco Prime portfolio of enterprise and service provider management offerings empowers IT organizations to more effectively manage their networks and the services they deliver. Built on a service-centered foundation, the Cisco Prime portfolio of products supports integrated lifecycle management through an intuitive workflow-oriented user experience. The portfolio of Cisco Prime solutions for service providers provides A-to-Z management for IP next-generation networks, mobility, video, and managed services.

For More Information

For more information about Cisco Prime Performance Manager, contact your local account representative or visit the Cisco Prime Performance Manager Overview at http://www.cisco.com/go/performance.

Download a no-cost, 60-day evaluation version of Cisco Prime Performance Manager from the Cisco Marketplace at http://www.cisco.com/go/nmsevals.

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Printed in USA C11-687454-00 09/11