Aligning Network Management with Converging Operational Priorities

Cisco Prime Infrastructure

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Executive Summary

The age of cloud and virtualization is spawning renewed focus on networking, increasing the demands that networks be highly resilient at all times. While advanced features within network technologies clearly play a role in meeting this need, advances in network management technologies and practices are also an essential ingredient. This has driven demand for converging and integrating network management tools and functions, to pave the way for better awareness of the role that networks play in the organizations they are designed to support, and also for improving efficiency and accuracy in planning and operations. In this ENTERPRISE MANAGEMENT ASSOCIATES® (EMA™) whitepaper, the essential drivers and requirements for converging, unifying, and aligning network management are examined, and the newly updated Cisco Prime Infrastructure management solution is reviewed in this context.

Network Management in the Age of Convergence and Cloud

While it's true that most network managers are primarily concerned with the health and performance of their networks, it's also true that those networks exist to deliver applications and services, and ultimately to serve as a facilitator of business process and transactions. These facts are leading a growing number of IT organizations to re-examine the ways in which they operate and organize, newly aligning and converging around service concepts and internal cloud transformation. These changes often start with the application and data center teams, but network management tools, technologies and practices must also be addressed and adjusted sooner or later.

A parallel trend that directly affects network managers' objectives and priorities is that of unified access. In this case, unified access refers to the fact that IT end users, business customers and business partners increasingly expect consistent, ubiquitous access to IT resources, regardless of location or connection technology. While this does not affect all parts of the network infrastructure, it does represent a fundamental evolution of the way in which the access layer is managed as part of a broader, highly reliable, high-performing network "service." Integrating management of the access layer directly into core network management and monitoring, across multiple management functions, thus becomes imperative.

On a broader basis, network managers are seeking better integration of network management tools and systems. EMA research consistently reaffirms a preference for tight integration versus the historically siloed, multi-product approach to assembling management tools architectures. The driving reasons behind this include the need to improve understanding of how the network infrastructure aligns with and supports organizational/business objectives as well as the constant ongoing focus on efficiency and effectiveness in planning and operations.

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Requirements for Integrated, Aligned Network Management

While tools integration historically has meant big investments in broad, all-encompassing frameworks and suites, along with a lot of services required for deployment and upkeep, a new generation of solutions is arising that truly unifies multiple management features and functions into either a single executable product or a small number of deeply, tightly integrated products. In a growing number of cases, these newer solutions are finding success in meeting the needs of network management pros in shops both large and small.

Understanding which approaches are best positioned for success starts with examining what's really important in terms of integrated, aligned features and capabilities. Following is an assessment of essential considerations and requirements for integrating and aligning network management:

- **Multiple domains**: Integrated management starts with covering the full scope of the network, including all of the elements involved in providing connectivity between systems, users, partners and customers. Solutions must cover all of the traditional zones of the network – core, distribution and access – while also spanning both wired and wireless networking technologies. On this latter point, as the access layer turns increasingly to wireless technologies in support of simplicity and mobility, wireless access is becoming the new "normal" and must be managed using the same best practices as are applied to the wired infrastructure.
- **Multiple data source types**: Another important aspect of integrated management systems is the ability to incorporate management data that comes from many sources and in many forms. In this case, more is better, meaning that the more different types of data that can be included, the more likely a network manager will have a complete understanding of any issue or situation that arises. More specifically, network management systems that can draw both event and statistical data for availability monitoring, together with performance monitoring data through polling, NetFlow and packet inspection are far more impactful than those that focus on only a subset of types. Further, systems that embrace multiple data source types will typically take advantage of legacy instrumentation investments or unused infrastructure features that may already be in place, rather than requiring that all new instrumentation be deployed.
- **Multiple management functions**: To take full advantage of the integrated approach, a network management system should allow operators and engineers to access functionality from all basic categories – fault, configuration and performance – within the same system. A big advantage can be gained by having a single common representation of each element under management, so that tasks and operations ranging from configuration to monitoring to troubleshooting can all be undertaken using a single, common naming scheme. Even more importantly, changes made under one set of tasks are inherently recognized and reflected for the benefit of other functions and tasks, thus eliminating translation and correlation errors, and resulting confusion, from management practices.
- **Unified interface/console and facilitated workflows**: The ultimate goal of integrated management is to leverage the above-listed architectural elements to deliver a highly efficient platform from which network managers and operators can understand and assure highly available, high-performing networks. This means having systems consoles and interfaces that bring together multiple domains, multiple data sources and multiple management functions into holistic views for rapid assessment of health and status. Adding facilitated workflows for optimized and accurate task and procedure execution can further leverage such approaches.

The ultimate goal of integrated management is to deliver a highly efficient platform from which network managers and operators can understand and assure highly available, high-performing networks.

Related to the objectives of integrating or unifying network management capabilities are the equally important objectives of putting network managers and operators in position to understand how the network is playing its role in supporting the organization. These latter objectives require a few specific capabilities in order to help networking professionals align their focus to operational priorities:

- **Grouping**: While it may seem somewhat obvious to say that grouping is an important capability within any management tool, the value of proper grouping cannot be understated for business value alignment. Logical, device-oriented groups that are automatically provided by most any network management tool must be supplemented with groupings defined to reflect the organizational, geographic, and business sensitivities of the infrastructure under management. The advantage of doing this within an integrated management tool is that it need only be done once, rather than attempting to coordinate and replicate such definitions between multiple independent management systems.
- **Application and end-user awareness**: Ultimately, the role of the network is to deliver applications and services as effectively as possible so that end users, partners and customers may use them without restraint. As such, the ability to understand application performance and end-user experience in the full context of network infrastructure activity, health and changes is immensely helpful for understanding history, impact and operational detail while investigating and troubleshooting incidents and issues.

Cisco Prime Infrastructure

As a supplier of advanced networking solutions, Cisco has long provided management tools for deployment and administration of its products. Recently, the company embarked on an aggressive plan to modernize those solutions, re-designing them around an integrated, task-oriented approach that could bring together all aspects of management across the lifecycle, covering design, deployment, monitoring, troubleshooting, maintenance and asset management for all Cisco technology solutions. The result of that effort is the Cisco Prime strategy and portfolio of Carrier and IT based products.

Cisco Prime Infrastructure (PI), a member of the Cisco Prime for IT portfolio, provides visibility and control of converged network infrastructures. Delivered as a unified product architecture that is built on a single code base, Prime Infrastructure brings together a seamless user experience for planning, configuration, availability, performance monitoring and troubleshooting of wired and wireless networks end-to-end. The core objective of the solution is to drive maximum efficiency in network engineering and operations and to facilitate access to and leverage of the full extent of advanced Cisco networking features.

Cisco Prime Infrastructure (PI) provides visibility and control of converged network infrastructures.

The Cisco Prime Infrastructure 2.0 release completes the transformation of former product sets and adds new features to extend the scope of the solution. A few of the most impactful new capabilities include:

- **User 360º and Application 360º views:** Building on the existing, innovative Device 360º views for bringing together availability, performance and change visibility for each individual device, the new User 360º and Application 360º views provide powerful insights into each network-attached user and each application on the network. User 360º allows network operators to start with a user name as a focal point for troubleshooting and quickly review related response time, network access, device type, and configuration data and history related to that specific user. Application 360º views bring together details on application activity, utilization and user/device/site associations for rapidly revealing health and performance in context with rest of the shared infrastructure.

- **Extended workflows for Deploying Advanced Cisco Features:** The new PI release extends existing libraries of task-oriented, cross-functional workflows to assist with planning and deploying advanced capabilities that are specific to Cisco equipment as well as projects that are based on standards. These workflows are built directly from the vast best practices library accumulated within the Cisco engineering and support services Knowledge Base. For instance, the system now comes with workflows that assist with assessing readiness for and rolling out of features such as: Mobility Architecture, Application Visibility & Control (AVC), now available on wireless controllers, TrustSec 802.1x, Zone Firewalls, and IPv6.
- **Expanded standards-based support for monitoring:** The new version includes capabilities to monitor any and all networking and network-attached equipment through the use of standards-based SNMP interfaces. This drives more complete visibility for mixed networks and for including basic awareness of essential network-attached systems and devices.

Collectively, these new features build on the existing capabilities of Prime Infrastructure to meet the majority of requirements for integrated, aligned network management solutions outline above.

- The solution covers **multiple domains** by bringing together full lifecycle coverage across wired and wireless networks, unifying management for unified access networks.
- It takes full advantage of **multiple data source types**, bringing together traps, statistics, logs, NetFlow, and packet captures into a single unified system, allowing operators to quickly and easily traverse multiple viewpoints during planning or troubleshooting tasks.
- With features spanning planning, administration, configuration, monitoring and diagnostics, PI covers the full lifecycle of management needs, and thus clearly provides **multiple management functions** in an integrated fashion.
- One of the most innovative aspects of PI is its **task-oriented** console and user interface design. The result is a fully consistent look, feel and navigation across multiple management functions and direct interleaving within the PI console display and navigation, further augmented by task workflow procedures that can be accessed and followed directly from the PI console.

One of the most innovative aspects of PI is its **task-oriented** console and user interface design.

- The PI console has also been designed to enable easy organization of management and monitoring tasks and views in logical **groups**. This allows individual operators to shift focus as needed more efficiently, for instance by starting with business-aligned views that correlate and normalize visibility across the entire enterprise, and then diving quickly into a subset view, analyzing a potential issue one minute and then applying an enterprise-wide upgrade to a specific class of network elements the next.
- With support for the advanced Cisco monitoring features such as AVC, NBAR, and Medianet, as well as direct integration with the Cisco Network Analysis Module (NAM), PI offers deep visibility into **application and user experience** together with more traditional network management features. This brings use-based context and impact awareness to tasks and procedures spanning the entire lifecycle, from assessing the success of equipment deployment to troubleshooting degradations and outages. The results are improved awareness, accuracy and efficiency in both planning and operations.

Prime Infrastructure in Practice: A Case Study

Building an integrated, aligned network management system is certainly an important prerequisite for changing the status quo for network managers and operators, but the truest measure of practical value is the impact of deploying and using the system in a production environment. An example deployment of Cisco Prime Infrastructure has taken place within a major international air carrier. With over 30,000 employees and operations spread across the globe, this organization clearly qualifies as a large enterprise. The IT team supports over 200 specialized applications running from two data centers, underpinning both internal business processes as well as direct customer sales and support, such as ticketing, check-in and baggage management.

The carrier standardized on Cisco networking in the 1990s and has continued to rely on Cisco for its network infrastructure ever since. The network engineering and operations team currently uses Cisco Prime Infrastructure and Cisco Prime Network Analysis Modules (NAMs) deployed both as blades in Catalyst 6500 switches and as standalone appliances.

In order to meet internal expectations as well as to assure a highly available, high performing platform for customer contact and support, the IT team signed up to an internal Service Level Agreement (SLA) of 99.99% network availability. Meeting this aggressive goal meant shifting network planning and operations from reactive mode to proactive mode. The team uses Cisco Prime Infrastructure to keep a constant watch on availability and performance of all network devices, allowing them to respond quickly to incidents and also to recognize and preventatively correct growing issues before they impact operations.

The Cisco Prime solution is paying other dividends as well. By leveraging unified asset/inventory and usage/load data within Prime Infrastructure, the IT team has been able to find and redeploy underutilized equipment across the vast company. Integrated wireless LAN compliance monitoring has also greatly eased the challenge of ensuring and reporting regulatory compliance, including alerts when configurations are changed and fall out of acceptable standards.

The Cisco Prime NAM has also been a valuable element of success, providing granular visibility into precise details of application use, end-user connections, and response times for both human and machine-to-machine interactions. By deploying the NAM around its globally distributed network, the team now has the ability to follow up on issues recognized within Prime Infrastructure, to monitor and troubleshoot issues down to the lowest, most detailed packet levels with a unified view and workflow, without requiring technicians to travel to remote sites and facilities, saving significant time in incident response as well as operational cost.

Collectively, this organization has been able to save time, effort and money in many ways through the use of the Cisco Prime management solution. In the end, PI made it possible to meet and exceed their 99.99% SLA commitments.

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EMA Perspective

There has never been a question that bringing together and integrating network management systems across functions and domains has great potential value. Systems that can correlate network asset, availability, configuration, change and performance data put managers and operators in a superior position of control, able to exceed the expectations of their supported organizations via more proactive and preventative practices. The trick has been to find systems that can deliver such capabilities successfully, without requiring an army of administrators or contractors and without costing more than the managed network itself. Cisco Prime Infrastructure is an excellent example of a new breed of solutions that has been designed from the ground up to truly unify network management, eliminating the downsides of integrating best-of-breed tools and delivering on the full efficiency and effectiveness promises of integrated, aligned network management.

About Cisco

Cisco (NASDAQ: CSCO) is the worldwide leader in networking that transforms how people connect, communicate and collaborate. Information about Cisco can be found at http://www.cisco.com.

About Enterprise Management Associates, Inc.

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 its 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 or Facebook.

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