

How Cisco IT Uses SONA Framework to Optimize Network Capabilities

SONA enables organizations to maximize the value of their network services and resources.

Cisco IT Case Study / Enterprise Network Architecture / Service Oriented Network Architecture:

Facing the same IT challenges as other global enterprises, Cisco Systems® adopted a framework-based approach to improve workplace productivity and reduce costs. This case study describes the initial work done within Cisco IT, and how Cisco is making this transition to a SONA architecture. Cisco customers can draw on Cisco IT's real-world experience in this area to help support similar enterprise needs.

BUSINESS CHALLENGES

Cisco Systems® faces many of the same challenges that confront its customers – how to efficiently and effectively deploy new technology, ensure business resilience, cope with the rising costs of data storage, and simplify the management of a global IT infrastructure. One group within the Cisco® IT organization, Cisco on Cisco, is charged with using Cisco IT's own experience with Cisco products to improve customers' experiences with Cisco solutions, as well as enhance its products and support capabilities.

In 2000, the Cisco IT group began to change how it viewed the Cisco network, moving from a perspective based on specific technologies to one based on the Cisco Service-Oriented Network Architecture (SONA) – an architectural framework that enables organizations to maximize the value of their network services and resources.

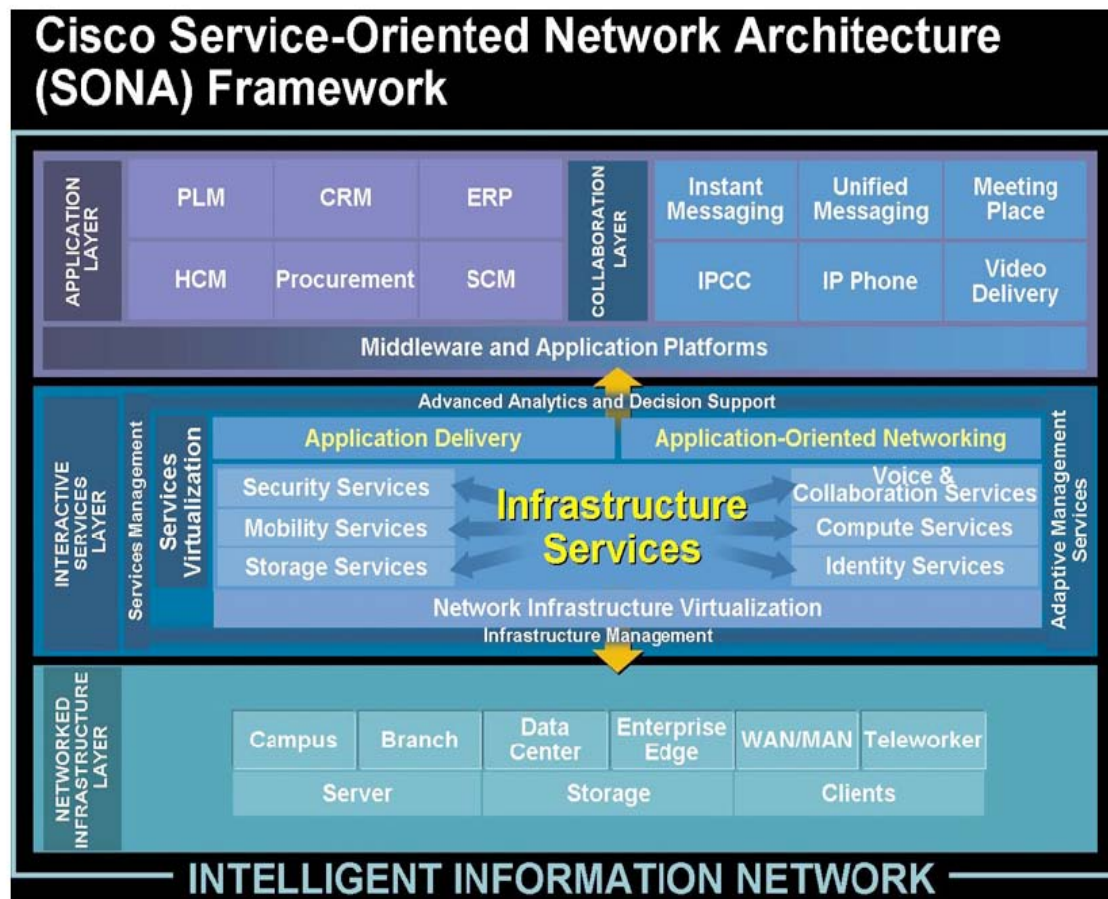
NETWORK SOLUTION

In the Cisco SONA framework, the network forms a common, single element that connects and enables all components of an IT infrastructure – including clients, servers, and storage – to accelerate applications, optimize processes, and maximize IT resources. Using the Cisco SONA framework, organizations can increase revenue and opportunity, improve business resiliency, strengthen customer relationships, and improve productivity while simultaneously reducing costs. See Figure 1.

Unlike traditional networks, elements of an infrastructure based on the Cisco SONA framework work together to connect business and collaboration applications to the network through infrastructure and application services. Ultimately, the Cisco SONA framework enables organizations to adapt its networking capabilities and deliver new technology features to users, wherever they may be, without having to replace the network infrastructure itself.

Cisco uses virtually all of its enterprise lines of products and technologies in its network, creating an intelligent, integrated infrastructure that connects and enables all components of its IT infrastructure. Today, the Cisco network securely spans its data center, main campus, branches, teleworker locations, and wide-area networks/metropolitan-area networks (WAN/MANs). Since 2000, Cisco has deployed a wide range of security, identity, voice, mobility, computing, storage, and application networking services – adapting them as needed to specific users, groups of users, or applications.

Figure 1. Cisco Service-Oriented Network Architecture(SONA) Framework



BUSINESS RESULTS

The Cisco SONA framework has not only met specific productivity needs and cost-reduction targets, it has also delivered many other positive benefits. It has changed how employees communicate and work together, how the Cisco IT group manages systems, how new systems and solutions are launched, and even how new products are developed.

The Connected Workspace – Improving Collaboration and Reducing Real-Estate Costs

With a global workforce and customer base, Cisco employees often work nontraditional hours and are highly mobile, even within a campus building. As a result, employees' cubicles were vacant 65 percent of the time. Cisco decided to reassign real-estate resources based on how they are actually used to reduce real-estate costs, raise productivity, and enhance collaboration. To create a connected workplace and reduce costs, the company used Cisco wireless, IP Communications services, videoconferencing, and WebMeeting technologies that were deployed over the Cisco network.

Cost savings were significant, reducing:

- Real-estate rent and workplace services by 37 percent
- Construction costs by 42 percent
- Furniture costs by 50 percent
- IT capital spend by 40 percent

- Cabling by 60 percent and equipment room space by 50 percent

Employees also benefited, gaining the ability to choose their work environments and technology tools to suit their individual work styles. A completely secure, wireless environment creates mobility and allows people to conduct meetings in break rooms or common areas, as well as in more traditional closed-door conference rooms. Employees use Extension Mobility, a Cisco IPC feature that enables multiple users to share a single Cisco IP phone, which he or she personalizes with phone numbers and preferences. Employees can also use Cisco IP Communicator – a software IP phone that runs on a laptop and sends voice over the wireless network – and wired headphones or wireless Bluetooth headsets to turn their laptops into high-quality IP phones.

The company can now accommodate twice as many people in the same physical space while retaining a spacious feeling. Employees can easily sit together to work on common projects, increasing productivity, information sharing, and collaboration – as well as employee satisfaction. Through the ability to provide extension mobility, a wireless office network, laptop computers, and Web-based self-service access to the corporate directory, the Cisco IT group also saved US\$70 in operating expenses each time an employee was moved from one office to another.

Adding Video Telephony from the Existing Framework

In 2005, the company piloted a project to add video telephony to its existing IP phones, enabling users to add video to their communications experiences. Cisco CallManager clusters, IP phones, routing, switching, telephony-provisioning, and Web-provisioning systems were already in place; the only additional technology required was Cisco Video Telephony Advantage (VTA) cameras and software to enable video capabilities to each user. The existing network infrastructure easily handled the new service, and within approximately 45 days after the initial launch to 750 users, the Cisco IT group was able to extend video telephony to 3000 users. Today more than 10,000 Cisco employees around the world order video telephony as a service, and to the IT team, provisioning video telephony services is almost completely transparent.

Changing IT Management – “Zero-Touch” Deployment to Remote Teleworkers

The Cisco SONA framework played an important role in enabling Cisco to connect its remote teleworkers to valuable enterprise data and services – and resulted in a new, highly successful product offering. Known as the Cisco Enterprise Class Teleworker (ECT), the solution is a secure, highly scalable tool that integrates the network infrastructure, management infrastructure, managed services, and applications across Cisco LANs, WANs, remote branches, and approximately 5000 teleworker home offices.

A primary challenge to the IT team in deploying teleworker connectivity was minimizing deployment resources, costs, and management support for such a large-scale deployment. Six existing Cisco products addressed various components of an ECT solution, but none provided the IT team with touchless installation for each teleworker premises router. In addition, none of the existing solutions enabled the team to manage the systems securely.

To address this need, the IT team worked for two years with an internal product group to produce the new ECT solution, which includes Cisco 831 and 871 routers. The team has now deployed more than 5000 Cisco 831 or 871 routers, which are preconfigured and shipped to employees for installation. Once employees connect to the Internet, the router automatically authenticates the user, establishes a secure VPN tunnel for management, receives all current Cisco security policies, and establishes complete, secure connectivity to corporate network resources.

The Cisco ECT solution has become a valuable, revenue-generating solution as well. It has been purchased by large enterprise customers for deployments ranging up to 14,000 systems – all enabling zero-touch deployment, secure provisioning, and productivity gains similar to those experienced by Cisco.

Changing IT Management – Protecting Data at the Desktop

No organization is immune to network viruses and worms, and the global cost of dealing with these threats is

estimated to reach US\$75 billion by 2007. Cisco relies on a layered security strategy, including Cisco firewall devices, Cisco Network-Based Intrusion Detection, antivirus software on desktops and e-mail gateways, and other measures. However, none of these methods alone effectively protected individuals' PCs and handheld devices, especially with new viruses continuously appearing and the difficulty of being able to use tested patches to protect these assets in time.

The Cisco IT team needed a solution that would not impede employees' use of their systems, but would protect the system from threats. By shifting from a traditional signature-based security solution to one that can detect threats based on behavior, the Cisco IT team was able to help ensure security for more than 50,000 users while centrally managing and updating the solution. Cisco Security Agent was deployed on centralized servers and made available to all employees worldwide over the Cisco Application Content and Networking System distribution network.

A serious virus outbreak in April 2004 tested the Cisco Security Agent deployment. Patches had been released by e-mail server and desktop vendors too late to prevent infection, but the CiscoSecurity Agent increased protection by 99.86 percent. Only 0.14 percent of employee systems became infected and only because of user error. The solution significantly reduced the cost of remediating infected systems and also enabled Cisco IT to discover systems that lacked antivirus software or systems in which the users had removed the software.

Improving the Launch of New Technologies

The Cisco SONA framework perspective has also changed the way Cisco IT launches new solutions, provisions new servers, and introduces new applications. Since 2000, the team has developed a comprehensive "checklist" that enables the team to accurately identify technology and solution dependencies across the enterprise infrastructure and evaluate the impact of a new service prior to implementation. The predeployment approach takes into consideration the solution architecture, provisioning requirements, reporting, and how the new service fits with current applications. Predeployment effort has increased, but the difference has been far outweighed by the benefits:

- Streamlined deployment, resulting in simplified management
- Reduced number of IT-related incidents after a service launch
- Accelerated deployment from pilot groups to large user populations
- Translation of lessons learned into new, revenue-generating consulting best practices
- Ability to prevent or mitigate deployment issues for Cisco customers, resulting in higher customer satisfaction
- Ability to bring more successful products to market

Understanding infrastructure interdependencies was critical to Cisco deployment of IP Communicator. In the past, mobile employees relied primarily on cell phones to make and receive calls, check voicemail, and dial into conference calls. However, cell phones did not permit access to productivity features available to users at Cisco headquarters and offices, such as unified messaging, 5-digit dialing, Web collaboration, and the company's online directory. In addition, cell phones were costly. The average cell-phone bill exceeded US\$100 per month, and there were more than 10,000 mobile employees.

Cisco IT chose to deploy Cisco IP Communicator, software that transforms a laptop into the equivalent of a Cisco IP phone and provides voice services and the same productivity features that nonmobile Cisco employees enjoy. The IT team had to adjust the company's Cisco CallManager systems to accommodate differences between calls originating from an IP softphone versus a regular IP phone. Security features had to be coordinated between Cisco Security Agent, firewalls, and other solutions. Once these interdependency issues were resolved, the Cisco IT team was able to quickly launch the service with high quality.

Cisco estimates that it will save US\$500,000 annually in cell phone charges, and the project has achieved US\$1.7 million in net present value. Enthusiastic acceptance by users and higher productivity are added benefits. Today

more than 25,000 employees use Cisco IP Communicator, and approximately 1000 more enroll each month.

Ensuring Business Resiliency

In addition to planning and preparing for disaster recovery, organizations need business resiliency, which enables them to adjust more easily to unplanned events and take advantage of new opportunities. Resiliency at Cisco begins with a high-availability network design and redundant architecture and employs quality-of-service mechanisms across the network to ensure that critical voice and data traffic receive bandwidth priority regardless of network status. Application resilience helps ensure that employees have continuous access to data and applications – and that these tools perform as expected. The network and corporate data centers both support this goal, using a wide range of Cisco technologies.

Workforce resilience enables employees to work easily anywhere, through appropriate tools and flexible, secure network access. Finally, collaboration resilience helps ensure the ability of employees to effectively communicate and work with others in a variety of ways, over a variety of media, in fast response to evolving situations.

By using the Cisco SONA framework, the Cisco IT team is able to deploy consistent security, availability, management, and application optimization capabilities across the infrastructure and ensure resiliency for all employees. For example, when a Cisco San Jose campus building experienced a power outage, employees were able to take their Cisco IP phone and laptops, find vacant space in other Cisco buildings, and connect immediately to the Cisco network. In the aftermath of a severe hurricane season, many employees were able to continue working from home or hotels while office buildings were closed for repairs. And in several cases, even though telephone connections were destroyed, Internet access was still available, and employees using IP Communicator could operate effectively for weeks.

The Cisco Service-Oriented Data Center

Like many large enterprise IT groups, the Cisco IT team is challenged to cope with rapid growth of storage requirements and rising costs, due to regulatory compliance, business resiliency needs, and business growth. Even though the cost of data per gigabyte is dropping, the cost of data center operations is growing at a pace of approximately 40 percent annually. In addition, this growth creates critical change management, provisioning, and operational management burdens that place onerous demands on budgets and human resources.

To effectively manage data throughout the organization, Cisco has completed the first phase of a comprehensive service-oriented data center (SODC) design, based on a Cisco SONA framework, which will enable IT to quickly provision data center services anywhere in the world. What differentiates the SODC from other architectures is that it will integrate higher-layer application services into the network, offloading them from expensive server and storage resources to improve performance and reduce costs.

Initially, Cisco connected isolated computing and storage islands with enterprisewide networks and consolidated data center resources into fewer physical locations and a single storage area network (SAN), using virtual SANs (VSANs) to ensure scalability and security. To date, Cisco has experienced maintenance savings of more than US\$4.3 million per year for three years by consolidating storage resources into a high-performance, scalable storage area network. Simultaneously, the total cost of storage ownership has dropped from US\$0.12 to US\$0.035 per MB of storage.

Cisco has almost completed phase two, resource virtualization – enabling computing, network, and storage resources to be dynamically partitioned, provisioned, and easily assigned to different applications. Resource virtualization requires an intelligent, application-aware network that can dynamically adapt to changing conditions to ensure optimized application performance. Content switching and application-oriented networking are examples of application integration. Management will take place through an Intelligent Management Fabric that will automatically provision and set storage services based on business unit requirements.

NEXT STEPS

Cisco is continuing its data center consolidation and re-engineering initiative with the goal of creating a data center that automatically allocates, at any moment, to any application, the optimal storage and processing resources from shared resource pools.

The Cisco SONA framework has had long-term implications for Cisco IT operations, with significant savings, productivity increases, and deployment improvements. Today Cisco is able to efficiently and effectively deploy new technology, support business resilience, cope with the rising costs of data storage, and simplify the management of a global IT infrastructure.

FOR MORE INFORMATION

To read the entire case study or for additional Cisco IT case studies on a variety of business solutions, visit Cisco on Cisco: Inside Cisco IT www.cisco.com/go/ciscoit

NOTE

This publication describes how Cisco has benefited from the deployment of its own products. Many factors may have contributed to the results and benefits described; Cisco does not guarantee comparable results elsewhere.

CISCO PROVIDES THIS PUBLICATION AS IS WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

Some jurisdictions do not allow disclaimer of express or implied warranties, therefore this disclaimer may not apply to you.



Americas Headquarters
Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
www.cisco.com
Tel: 408 526-4000
800 553-NETS (6387)
Fax: 408 527-0883

Asia Pacific Headquarters
Cisco Systems, Inc.
168 Robinson Road
#28-01 Capital Tower
Singapore 068912
www.cisco.com
Tel: +65 6317 7777
Fax: +65 6317 7799

Europe Headquarters
Cisco Systems International BV
Haarlerbergpark
Haarlerbergweg 13-19
1101 CH Amsterdam
The Netherlands
www-europe.cisco.com
Tel: +31 0 800 020 0791
Fax: +31 0 20 357 1100

Cisco has more than 200 offices worldwide. Addresses, phone numbers, and fax numbers are listed on the Cisco Website at www.cisco.com/go/offices.

©2007 Cisco Systems, Inc. All rights reserved. CCVP, the Cisco logo, and the Cisco Square Bridge logo are trademarks of Cisco Systems, Inc.; Changing the Way We Work, Live, Play, and Learn is a service mark of Cisco Systems, Inc.; and Access Registrar, Aironet, BPX, Catalyst, CCDA, CCDP, CCIE, CCIP, CCNA, CCNP, CCSP, Cisco, the Cisco Certified Internetwork Expert logo, Cisco IOS, Cisco Press, Cisco Systems, Cisco Systems Capital, the Cisco Systems logo, Cisco Unity, Enterprise/Solver, EtherChannel, EtherFast, EtherSwitch, Fast Step, Follow Me Browsing, FormShare, GigaDrive, HomeLink, Internet Quotient, IOS, iPhone, IP/TV, iQ Expertise, the iQ logo, iQ Net Readiness Scorecard, iQuick Study, LightStream, Linksys, MeetingPlace, MGX, Networking Academy, Network Registrar, Packet, PIX, ProConnect, ScriptShare, SMARTnet, StackWise, The Fastest Way to Increase Your Internet Quotient, and TransPath are registered trademarks of Cisco Systems, Inc. and/or its affiliates in the United States and certain other countries.

All other trademarks mentioned in this document or Website are the property of their respective owners. The use of the word partner does not imply a partnership relationship between Cisco and any other company. (0705R)