A Systems Approach to Networking Improves Availability, Lowers TCO

by Zeus Kerravala | November 2009

Executive Summary

There are many approaches to designing, supporting and evolving a network. Some strategies revolve around cost, while others focus on choosing best-of-breed technologies. Such tactics, while not optimal, suffice in an era where the network is not a strategic asset. But today, the extended enterprise is driving the demand for several technology initiatives—such as unified communications, software as a service (SaaS), virtualization and enterprise mobility—that rely heavily on the network to provide maximum value (see Exhibit 1 on the next page). These technology trends raise the importance of the network to the overall business; it's no longer viewed simply as "plumbing" but more as a strategic platform that enables process change and improves productivity. To accomplish this transition, organizations need to take a systems approach to networking, in which the network is viewed as a single end-to-end system instead of just a collection of independent devices. Companies that take a systems approach to networking will realize the following benefits:

- **Lower overall TCO:** This is based on reduced operational process in the areas of provisioning, change management and incremental upgrades.
- **Increased uptime of the network:** This is due to the reduction of both planned and unplanned downtime.
- **Faster time to market of new services:** Since changes can be propagated through the network orders of magnitude faster on a system-based network than on one based on ad hoc strategies, new services come to market much more quickly.

This report examines the drivers of network change, defines a systems approach to networking and then details the strategy used by Cisco, the market leader in enterprise networking, to deliver on this vision.

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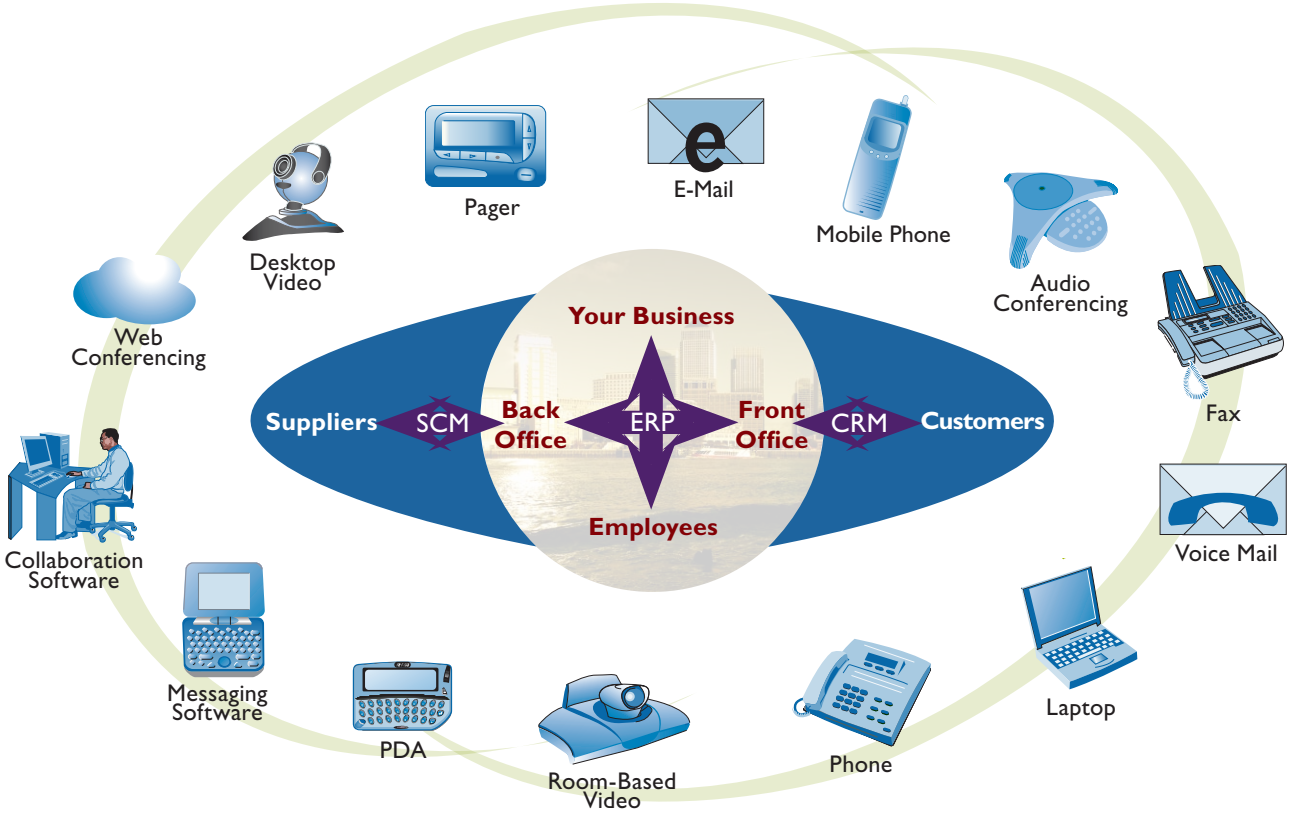
Table of Contents

Exhibit 1: The Network-Enabled Extended Enterprise

Source: Yankee Group, 2009



I. Strategic Networks Require Strategic Sourcing Strategies

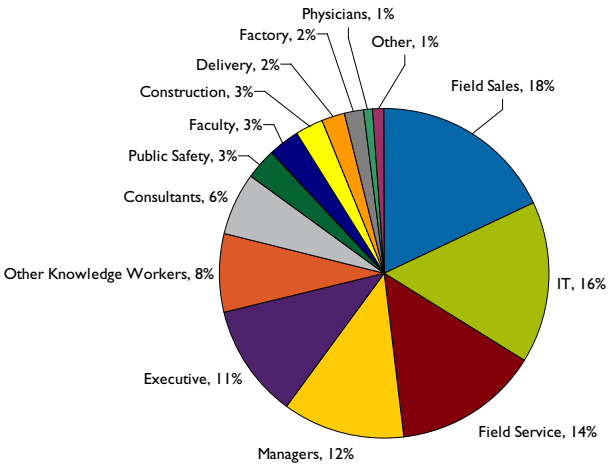
The role of IT has changed significantly over the past decade. During the late '90s and the first years of the 21st century, the technology infrastructure of organizations was viewed as highly tactical but not strategic. IT purchasing was done on an as-needed basis and little thought was given to the long-term strategic role of each solution. Technology purchasing was done by the IT department, with no input from the business units. Today, that has changed. IT has not only become strategic, but it's now the platform that allows a company to execute many of the initiatives that will enable its next wave of growth. Today's IT helps companies grow revenue, cut costs, drive up end-user productivity, improve customer satisfaction and create new business processes.

Nowhere in IT has this transition been more acute than with the network. The network touches everything and connects everyone in an extended enterprise: internal employees, customers, partners and others. Additionally, the network underpins a number of key technology trends that enable companies to maximize ROI. These trends include:

- **Unified and video-based communications:** Competitive advantage today is gained by an organization's ability to form collaborative teams and make critical decisions as fast as possible. Because of this, collaboration is a key initiative for companies today. And many collaboration tools are real-time in nature and highly dependant on the network for reach and performance.
- **Virtualization:** To date, virtualization has been used tactically to consolidate servers for greater efficiency. Plus, many organizations are also looking to use virtualization to radically simplify the data center, enabling all computing elements to become virtual components that can be delivered to any application as determined by the needs of the corporation. This puts extreme demands on the network, however, as these virtual workloads move from one end of the corporation to the other.
- **SaaS:** The cost and complexity of traditional software as well as the impending shift to cloud computing has driven many organizations to use a cloud- or SaaS-based software delivery model. Yankee Group's Anywhere Enterprise—Large: 2008 U.S. Mobility and Business Applications Survey reveals that 10 percent of software purchased today is SaaS-based, and that SaaS-based software purchases are growing 20 percent per year. Yankee Group predicts that by 2012, more software will be purchased as SaaS than as traditional software. The network plays a key role in the delivery of SaaS, especially with real-time applications and communications.
- **Enterprise mobility:** Corporate workers are more mobile now than ever before. Historically, mobile workers were either telecommuters or corporate executives, but Exhibit 2 shows the increasing diversity of mobile workers today. The vision for most organizations is to provide any information to any worker, no matter what device they have or what network they use. The network is a key component of this vision because it provides presence and location information to mobile applications.

Exhibit 2: The Network Needs to Support an Increasingly Diverse Mobile Workforce

Source: Yankee Group Anywhere Enterprise—Large: 2008 U.S. Fixed Mobile Convergence/IP Communications Survey



With all of these trends on the horizon, it's clear that organizations will need to invest in the network over the next few years. Therefore, it's critical to understand the value of a systems-based approach and key evaluation criteria when it comes to purchasing network equipment.

II. Network Purchase Evaluation Criteria

Organizations have used various strategies over the years for purchasing network infrastructure. These purchasing strategies ranged from very tactical price-based purchasing to more strategic decision-making focused on best-of-breed technologies. We profile the primary decision types below.

- **Cost-based purchasing:** Cost-based strategies that focus on purchasing the lowest priced equipment may end up providing an organization with a real cost advantage in the short term (which can be important in a down economy). But eventually, the cost model breaks down and TCO goes up. For example, low-cost infrastructure suppliers generally try to confuse initial acquisition cost with TCO. Network equipment costs make up about 20 percent of the total cost of running a network, meaning that buying on price alone has a very short TCO benefit and often carries a TCO premium. Additionally, if the purchasing is done on price alone, the product generally will meet only the minimum requirements at that moment in time, which does not leave much room for growth. This, in turn, leads to faster replacement cycles, ultimately creating more downtime than is necessary and driving up the actual TCO of running the network.
- **Best-of-breed technology:** The best-of-breed purchasing approach, in which organizations select the very best technology available for every point in the network, may result in a cutting-edge network with the latest and greatest capabilities, but this strategy normally requires a long evaluation period in which several products are put through various tests until a winner is chosen. Many of the products chosen tend to be purpose-built devices that perform certain functions (routing, switching, firewalling, etc.) and are often built from pre-standard or proprietary technology designed to gain a competitive advantage for the vendor. Within just a two- to three-year period of time, however, the organization ends up with a collection of non-interoperable network devices that support limited, specific functions. This makes manageability and support very expensive, eventually driving up TCO.
- **Systems approach:** This strategy, which evaluates the network as an end-to-end system, involves purchasing as many of the infrastructure products from a single vendor as possible. While it may result in purchasing equipment that is not quite so cutting-edge as best-of-breed, it has many advantages in the areas of training, interoperability and manageability, and it typically has a lower TCO than best-of-breed or cost-based purchasing strategies. This is because new services in an end-to-end single-vendor network are easier to provision and consistency of performance is easier to maintain.

Choosing the right purchasing strategy is critical, especially for organizations that want to take a long-term, cost-effective view of the network. A few organizations with static environments may benefit from using a low-cost vendor, but they are few and far between. In most companies, network demands are continually changing. Similarly, there are organizations that can benefit from a best-of-breed strategy, but they must be willing to continually purchase equipment from start-ups and point product vendors, requiring them to continually spend money on upgrades and interoperability testing. In general, the most effective strategy to optimize TCO is to take a systems approach.

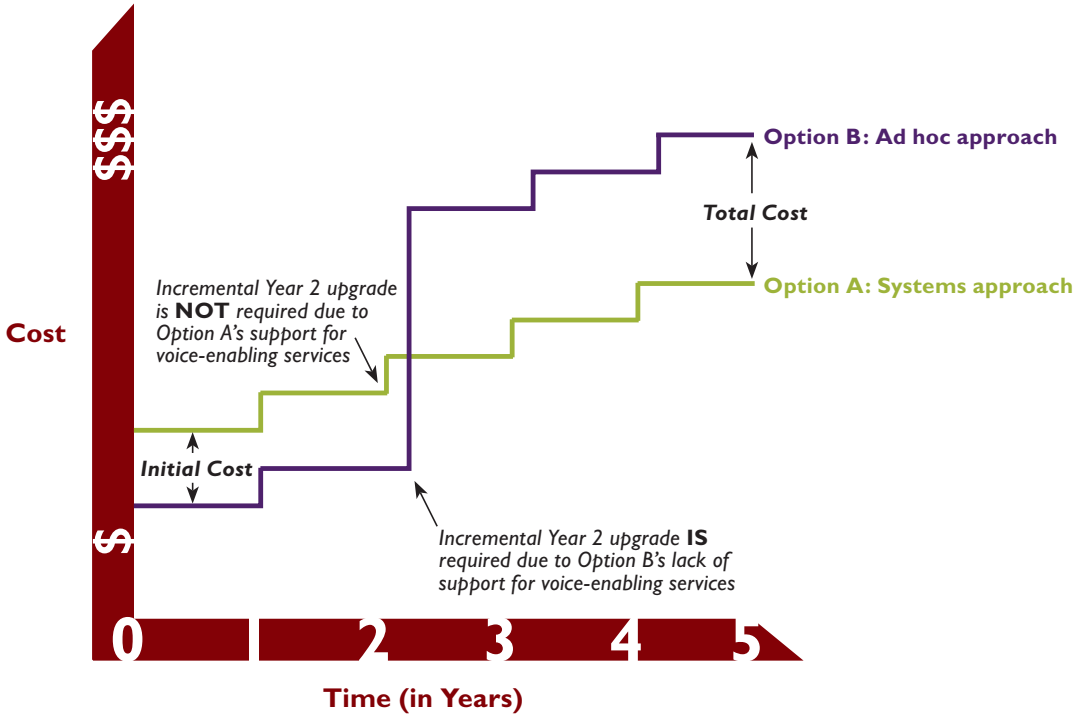
III. A Systems Approach to Networking

A systems approach to networking views the network as a single system instead of a collection of independent devices. With this type of approach, the network is a holistic, end-to-end system that is highly intelligent, secure and managed as a single entity. This means that changes to the network that support new business applications can be propagated throughout the system to ensure that the application is supported at each and every point.

Taking a systems approach to networking has both short- and long-term benefits. While choosing the lowest cost or best-of-breed vendor appears to have some benefits, it leads to networks that are built and managed on almost an ad hoc basis, creating long-term TCO that is much higher than a network built using a systems approach. For example, a product may appear to have a lower TCO early in the life cycle, but as new services are needed and incremental upgrades are performed, an incorrect choice can quickly lead to skyrocketing TCO (see Exhibit 3 on the next page).

Exhibit 3: Implications of a Non-Systems Approach

Source: Yankee Group, 2009



Additional implications of a non-systems approach to networking are:

- **Unnecessary network downtime:** When incremental upgrades are performed, they usually result in associated network downtime. Although the downtime may be planned, it still causes disruption in the work environment.
- **Lost opportunity costs:** When the network cannot adapt quickly enough to the changing business environment, losses can occur. A network needs to be able to adapt at the speed of business to become a strategic asset for the organization.
- **Device manageability:** Incremental upgrades sometimes contain different software features, and organizations often have a difficult time ensuring that features and configurations are consistent across all the network devices in the organization.

Taking a systems approach requires thinking about the network across its total life cycle. Evaluators of network equipment need to understand how their choice of vendor impacts all areas of TCO. When considering infrastructure, network managers should use the following considerations to guide them:

- **Identify total costs associated with the life cycle of the network, not just the procurement of a single device over a predefined period.** Historically, this period has been between four and five years, but in today's environment, it should be extended to a minimum of five to seven years to help maximize investments.
- **All operations tasks need to be included as part of network TCO.** This includes typical items such as maintenance costs, labor charges and consulting services, as well as the costs of training and downtime.
- **Understand the opportunity costs gained by having an agile, flexible network created via a systems approach.** When business climates change, companies can deploy network-based applications an order of magnitude faster in a network built using a systems approach. And that can make the difference between a successful corporate initiative and a failed effort.

For companies that wish to use the network as a strategic asset for competitive differentiation, a systems approach is the only viable strategy because it can create the security, scale and performance that's required while keeping overall TCO manageable.

IV. Case Study: Cisco's Systems Approach to Networking

Cisco is an example of a network infrastructure vendor that provides a systems approach to networking as part of its overall value proposition. The approach allows Cisco to continually increase its product breadth and innovate without forcing its customers to go through costly upgrades every year or two. Cisco's systems approach value proposition is made up of many factors, specifically:

- **Systems-level support and services:** Cisco helps organizations take a systems approach via a number of support services. Not only is it able to act as a single-vendor source, but it also offers pretested, validated network designs. This maximizes the accuracy of deployment, optimizes operational efficiency and delivers the solution with maximum speed. It also helps to minimize and isolate problems faster.
- **Breadth and depth of product portfolio:** No matter how complex or simple a network problem, Cisco has a set of products and matching architecture that can meet the business challenge. Other vendors may be deep in specific product lines, but no other vendor has a product line with the combined breadth and depth of Cisco's.
- **The cost of acquiring and training personnel:** Most corporate networks are supported by a combination of internal network managers and external engineers from consulting firms and value-added resellers. Because of its market leadership, Cisco has a wealth of consultants, engineers and training facilities focused solely on it and its technologies. This creates a virtually unlimited pool of resources from which organizations can draw. By contrast, niche vendors generally have a much smaller support system, meaning the cost of training and support is much higher.
- **End-to-end feature integration:** Despite Cisco's broad portfolio, the company has been very deliberate in creating a set of features that is consistent across its product lines, both wired and wireless. This allows customers to deliver any service to any point on the network securely and easily.
- **Optimized for applications:** One of the primary roles of the network is to optimize application performance. Cisco's portfolio spans Layers 2 through 7 of the OSI stack and can optimize applications at any layer.
- **Reduced cost of upgrades and maintenance:** Cisco's systems approach to networking means that upgrades and maintenance costs can be much lower. In a mixed-vendor network, making a change may require using several configuration tools, all with different syntax, which increases the risk of errors. By contrast, Cisco's consistency across hardware simplifies the requirements for building spare kits.
- **Low energy costs and green IT:** Often, there are so many features that can be delivered from a Cisco system that it obviates the need for separate appliances. For example, Cisco routers have built-in VPN capabilities, so there is no need to purchase a separate VPN appliance. This multi-feature approach ultimately reduces the number of components needed on the network, lowering overall power consumption and improving a company's green positioning. In the past, multipurpose devices were larger and consumed more power, but the current generation of hardware is designed with green in mind and overcomes this historical problem.
- **Zero-touch support:** Because a Cisco-based network supports many integrated services, such as VoIP and video capabilities, the support of these services can be fully automated. For example, a Cisco network can auto-configure and auto-boot IP phones to speed installations.
- **Prevalent security throughout the network:** As the borders of an organization continue to erode, it becomes increasingly critical for that organization to create consistent security mechanisms across the network to ensure users are protected and external threats are mitigated. Cisco's network systems strategy was designed with security integrated into it, ensuring the highest level of security delivered from the network.

- **The network as a platform:** Cisco's companywide Cisco Developer Network (CDN) initiative enables developers to create applications that utilize the network as part of its value. Programs such as Cisco's Application Extension Program (AXP), Mobility Services Engine (MSE) and WebEx Connect allow developers to build applications that integrate with the network. This truly elevates the network to an application delivery platform.
- **Cisco IOS:** Cisco's systems approach comprises a wide spectrum of hardware platforms that serve to optimize the delivery of its IOS-based software services. Here, the hardware devices (Cisco Catalyst switches, Cisco Integrated Services Routers, ASR 100 and 7200/7600, etc.) can be tailored to the unique needs of network organizations and particular segments of the network, while IOS provides for a consistent set of networking services and common management views and tools across the entire network infrastructure.

V. Conclusions and Recommendations

As the extended enterprise continues to play a bigger role in how organizations do business, the network will continue to grow in strategic value. As this evolution continues, the strategy that companies use to purchase, deploy and manage network infrastructure needs to change too. The integration of the network with business processes and applications requires that organizations treat the network as a holistic entity by taking a systems approach. The only way to ensure that the network can deliver the required level of security, application optimization and performance is to ensure it acts as a platform. This means it is crucial to choose a vendor that can deliver on the vision of a systems approach. To help network managers make the right decision, we make the following recommendations:

- **Base TCO on more than just initial cost.** It's critically important that IT decision-makers fully understand how to calculate TCO for today's network-related projects. They must consider all elements of TCO, including but not limited to initial cost, maintenance programs, labor and training.
- **Seek a vendor with a broad, deep product line that spans both wired and wireless networking.** This will enable companies to deliver a consistent set of services to any point on the network.
- **Make an apples-to-apples comparison.** A common practice of low-cost vendors is to position products as comparable to those of technology market leaders. But often, many of the lower-cost products lack the features to be long-term solutions, creating faster upgrade requirements and resulting in substantially higher long-term TCO. Enterprises should vet all solutions to ensure they contain all of the features needed to support the enterprise today and into the future.

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