White Paper

The Economics of Networking

Abstract:

A third-party business consulting firm analyzed the total cost of ownership (TCO) of Cisco enterprise customer networks, and contrasted that TCO to "good enough" networks from other networking vendors. Key findings:

1. **TCO is a better metric than CapEx to assess network cost** because it considers the full impact on IT spend, including CapEx, services, labor, bandwidth, and energy.
2. **The Cisco Borderless Network Architecture can deliver up to 13% better TCO than a "good enough" network**, offering compelling value for the strategic Cisco investment.
3. **Even if architectural benefits are discounted in the analysis, Cisco is at most a 7% TCO premium** over other vendors due to IT labor savings and extended product lifecycles from Cisco solutions.
4. **The single biggest benefit of Cisco's architectural approach is labor savings.** Labor constitutes 50% of TCO and Cisco delivers 5%-10% labor savings driven by unified wired and wireless and embedded security.
5. **A quality network delivers business benefits beyond TCO,** including improved network uptime, higher user productivity, and a lower threat of security breaches.

Executive Summary

Technology is changing the face of business more quickly with each passing day. Business and technology decision makers are challenged to balance IT resources, business requirements, and user desires. IT is mandated to deliver end-user solutions that increase agility and improve employee productivity without driving up costs. But it is increasingly hard for IT to say "yes" to their users and stakeholders without sacrificing security or ease of operations.

How can IT say "yes" without diminishing security or increasing labor costs? The answer lies in a network architecture that drives efficiency through intelligence and automation. Unlike "good enough" networks, which provide only basic connectivity, a strategic next-generation network architecture delivers superior value and lower total cost of ownership. Every day, Cisco customers are using architectural investments to do just that.

CIOs, CFOs, and IT all agree on one thing: Cost matters. But purchase price is only one component of overall total cost of ownership. In June 2011, Cisco commissioned a third-party business consulting firm to analyze the true total cost of ownership of the network, comparing the quantitative costs of acquisition, support, labor, bandwidth, energy, and product longevity, as well as qualitative business benefits such as network uptime, user productivity, and security. The quantitative results alone show that a network built on Cisco's architectural approach can yield up to a 13% better TCO, building a powerful business case for why your choice of networking gear does matter.

Overview

The right network can be a powerful engine for growth and competitive differentiation, if you can manage the underlying complexity. In today's business environment, that challenge is multi-dimensional. It spans users, devices, applications, and locations far beyond the corporate walls. New applications and usage models threaten to overwhelm IT:

- Video: Video will quadruple all IP traffic by 2014[1]
- Cloud and virtualization: 70% of organizations will use enterprise cloud technology by 2012[2]
- IT support for mobile consumer devices: Over 7 billion new wireless devices will come online by 2014[3]

In the past, IP was the unifying technology that brought multiple disparate networks together. Organizations streamlined their business and IT operations by consolidating many networks onto a single IP network. The effort required changes that weren't easy, but delivered significant results and savings.

Today, the network must evolve to intelligently support a new wave of business objectives and user demands. It is hard for IT to say "yes" today without sacrificing security or ease of operations. A next-generation network architecture gives IT the flexibility to securely adapt to shifting technology trends and drive operational efficiencies, just as the original IP network did.

This paper analyzes the true total cost of ownership (TCO) of the network, contrasting Cisco to other vendors' solutions. The research is based on a thorough TCO analysis of real network designs, augmented by interviews and data from IT decision makers around the world—both Cisco and non-Cisco customers. The resulting model offers a compelling case for an architecture-led approach to network design.

The bottom line? You have a choice between a "good enough" network and a next-generation network architecture. Cisco customers realize that they are paying an initial capital expenditure premium versus some other vendors. However, in a five-year TCO analysis, customers who chose Cisco received more for their investment, moving beyond simple connectivity to superior IT efficiency and greater business agility. Moreover, when considering architectural benefits such as network-integrated security and energy management, Cisco's TCO was a massive 13% lower than its competitors.

The Cisco Borderless Network Architecture is a next-generation network architecture that paves the way for true business innovation with architectural benefits that empower IT to say "yes" to new business opportunities and the ever-changing work environment. So the question becomes, can you afford not to invest in a next-generation network?

The Economics of Networking

TCO and ROI calculations are used by many organizations to justify the cost of investment in business systems (network and otherwise). As pressure on IT has increased, so has the desire to bring down capital costs despite the fact that labor costs actually make up more than 50% of the total cost of ownership in the western world.

Cisco commissioned a third party to develop a TCO model that evaluates measurable business benefits derived from the network. This model was then applied to network designs from Cisco and from other networking vendors, using the same technical requirements. The results were categorized into four areas, which are summarized in Figure 1.

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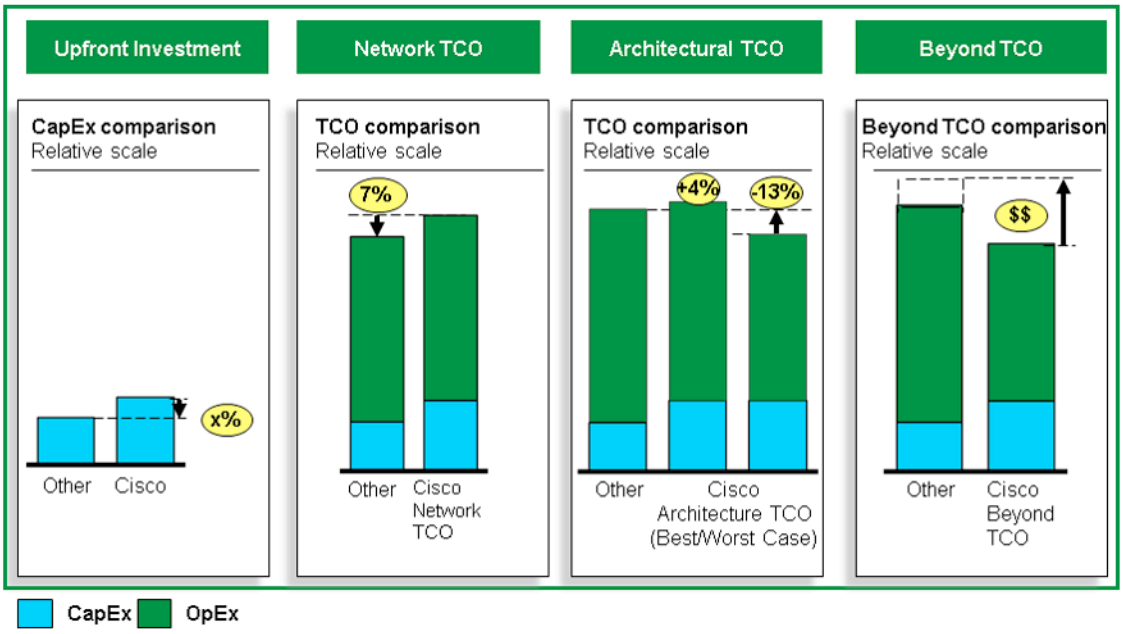
[1] Cisco Visual Networking Index
[2] State of the CIO 2011 Study by *CIO Magazine*
[3] Forrester Research reports that enterprise mobile users will make up 73 percent of the workforce by 2012.

Results illustrate that while Cisco's purchase price is greater, labor savings offset these costs. When architectural benefits are considered, Cisco TCO dramatically improves beyond point solution vendors. Non-measurable benefits such as end-user productivity, business agility, and business transformation through new processes driven by technology were not incorporated, but provide further evidence of the benefits of an architectural approach.

Figure 1. Total cost of ownership considerations



CapEx and Network TCO

Network TCO comprises the initial purchase price of a standardized, basic network design, plus the lifetime costs of labor, maintenance services, and energy costs. The baseline network TCO considered the lowest-cost solutions to meet network requirements from Cisco and other vendors. In this baseline, the research revealed that despite a Cisco price premium, the TCO difference over the lifetime of the network was at most 7%. These comparisons assume equal and undifferentiated functionality—a network that is "good enough." But Cisco networks deliver far more capability: capability that is only captured in an architectural TCO.

Architectural TCO

Architectural TCO takes into consideration the measurable advantages that a next-generation network can deliver. Analyzing customer data in the TCO model revealed that Cisco delivers up to 13% lower TCO than competing networks. TCO savings in this model included IT savings related to labor and operations, as well as non-labor savings such as reduced energy costs and longer deployment lifespans.

Some IT decision makers interviewed indicated that not all TCO savings could be credited to their organization. For example, some IT departments indicated they operated on a fixed asset depreciation schedules or product refresh cycles. Cisco TCO was 1% lower than other solutions when extended lifecycle investment protection was taken into consideration. Some customers also indicated that energy savings could not be considered because IT doesn't assume responsibility for energy costs. Energy savings from network-integrated power management provided 3% savings for endpoints, and up to 9% additional savings when building integration was included. These variations in

business practices resulted in a network architecture TCO model where Cisco TCO varied from 4% more expensive to 13% less expensive.

One key highlight of the research was investment protection. Many customers indicated that their Cisco investment was expected to last 6 to 7 years. In contrast, non-Cisco customers indicated a 4- to 5-year lifecycle for comparable competing products. A "good enough" network is often sufficient for today's needs, but does not provide the flexibility or investment protection to carry the business beyond years four or five. Roadmap inspection (studying product end of sale/end of life announcements) shows that Cisco products have significantly longer lifespans than similar competing products.

Architectural Benefits

Architectural TCO captures the business benefits a customer can realize from Cisco innovations embedded in the network infrastructure. Key highlights of the customer research included:

1. While Cisco CapEx costs are higher, overall TCO is at worst 4% to 7% higher, and when extended lifecycles and labor savings are taken into account, Cisco TCO is up to 13% lower than other vendors.
2. Cisco offers significant labor savings versus the competition—on average, customers reported 5% to 10% labor savings when compared to similar solutions, attributed to the benefits of unified wired and wireless platforms and integrated security.
3. The cost of sourcing and/or training network engineering talent on non-Cisco networks outweighs the CapEx savings of a "good enough" network.

Labor savings derived from an architectural approach offer compounded annual savings when compared to one-time CapEx savings. Examples of labor savings cited by customers include:

1. Cisco provides a single access policy and platform for managing wired, wireless, and remote users.
2. Cisco TrustSec® delivers automated, context-aware device and user policy management.
3. Cisco® CleanAir™ wireless technology decreases the labor needed for wireless interference management.
4. Integrated security reduces the number of security interfaces and network elements, and enables faster threat identification.
5. Cisco Prime™ management solutions save labor costs associated with managing network software and deploying network services.
6. Architectural reference designs can save up to 20% of the time of designing and deploying an enterprise network.
7. Cisco adaptive WAN capabilities can provide up to 10% bandwidth savings.

Many of the benefits noted are derived from innovations introduced in the Cisco Borderless Networks portfolio in 2010 and 2011. Cisco customers highlighted the increased value realized from architecture-wide network services and management platforms. These innovations streamline the mobile user experience and facilitate "bring-your-own-device" business policies, enable delivery and management of real-time multimedia traffic, and reduce IT overhead when performing user access troubleshooting and wired-wireless integration.

Professional services from Cisco and its partners help customers accelerate their ROI and manage TCO by predictably managing the health and stability of their networks, reduce costs related to outages and operations, mitigate security and business risks, and drive innovation.

The detailed benefits and differentiating factors of these architectural components can be examined in greater detail in the "When 'Good Enough' Is Not Good Enough"[4] white paper from Cisco.

Beyond TCO

In addition to offering architectural TCO benefits, a Cisco network provides many additional business benefits that help drive down TCO and increase ROI. These benefits are often measured in terms of higher business growth rates, increased customer reach, or new business processes that streamline operations and increase employee productivity.

Some examples of these benefits include:

- Improved network update (broader global support structure, network resiliency innovations)
- Higher user productivity (IT and end-user productivity)
- Lower threat of security breach (Cisco SIO and SenderBase®)
- Comprehensive professional and technical services offers that free IT resources for strategic projects, help improve network health and stability, reduce cost, and mitigate risk

More importantly, customers are realizing transformational business benefits—using the network to change and optimize the way they do business. Consider some of the following examples:

Mobile medical applications are improving the quality of patient care and reducing costly medical errors. According to a study done by Brigham Young University and Women's Hospital, 60% of doctors reported avoiding three or more medical errors per month by running mobile medical applications. Cisco delivers the wireless technology and solutions integration that powers hospitals all over the globe.

Notre Dame University was able to save approximately $1 million in travel expenses through the adoption of Cisco WebEx® technology. In addition, the solution enabled new international collaboration opportunities, increasing the frequency and value of information sharing with international studies partners.

According to Forrester Research, 80% of nurses can save 15 to 60 minutes per day by being able to reach a physician on the first attempt. Cisco makes this possible through architectural innovations that enable seamless client mobility and single number reach.

Cisco saved 40% on its data center costs by moving from a traditional blade-server approach to a Cisco UCS™ and Unified Fabric solution. Capital costs were reduced by 75%, rack space usage was reduced by 80%, and energy usage was reduced by 65%.

Enterprise Management Associates reported that EMC Corporation migrated from a legacy Sun SPARC and Solaris infrastructure to a Cisco Unified Computing System™ running Linux and Oracle Real Application Clusters (RACs). EMC reported over 20x better performance, 60% improvement in end-user response times, and as much as an 800% improvement in Oracle transaction times.

NetApp reported reducing data center cabling costs by 78% using Cisco UCS and Unified Fabric.

[4] "When 'Good Enough' Is Not Good Enough" white paper: http://www.cisco.com/en/US/solutions/collateral/ns1015/white_paper_c11_663156.pdf

Bronson Methodist Hospital in Kalamazoo, Michigan saves $330,000 annually by eliminating manual searches for wheelchairs. Using a combination of Cisco wireless technology and RFID locators, the hospital has transformed a time-consuming business process into a streamlined process that not only reduces costs, but also significantly increases customer (patient) satisfaction.

ExamWorks, a medical and legal review company, reported saving $333,000 annually by avoiding purchases of new PCs, deploying virtualized desktops on Cisco UCS servers, and further reported that the cost of supporting 1,000 virtual desktops using UCS is 67% less than conventional server architectures. Today, ExamWorks supports 1,000 users with a four-person IT department (compared to an average of 20 personnel for 1,000 users)—a 500% reduction in OpEx resulting in labor savings of $1.1 million.

Conclusion

Capital expense is only one component of the total cost of ownership of your network. While some vendors may promise you "all the functionality you need at half the price," you can't fully anticipate all the functionality you are going to need over the lifetime of your investment. Any vendor can promise the functionality for your immediate needs, but only a vendor that invests consistently in innovation can deliver the lifetime TCO and superior ROI that you demand from your network.

Those same innovations also enable superior professional and technical services offerings, which can help your IT department to streamline operations and focus on strategic business opportunities.

Cisco invests more in R&D than its top four competitors combined. This is readily apparent when you evaluate Cisco's architectural innovations and contrast them to a "good enough" network.

For Cisco customers, the benefits speak for themselves: faster business growth, faster access to new markets, greater IT efficiency, and the power to say "yes" to new business opportunities. And when a true TCO assessment is conducted, it quickly becomes apparent that "good enough" actually translates to "more expensive" over the lifetime of the solution.

To learn more about how Cisco can deliver a next-generation network with superior TCO for your organization, visit the Cisco Borderless Networks ROI Benefits Calculator at http://www.cisco.com/assets/sol/bn/flash/benefits_roi_calc/index.html, and see what benefits you could be harnessing today.

Cisco IT Lowers Its TCO

Like many large businesses, Cisco IT works to balance its investments between routine operational activities and new strategic capital expenses. Financial investment alone does not accurately reflect true IT investment costs: The operational aspects must also be considered.

Cisco IT approached Cisco Services to help reduce operational costs by identifying network operations cost savings and improvements. Cisco IT chose to deploy Cisco Remote Management Services and the Cisco Network Optimization Service. What follows are highlights from deploying these network services.

Cisco Remote Management Services simplify the adoption and ongoing management of Cisco advanced technologies. Cisco IT used Remote Management Services for many parts of its Tier 1 and Tier 2 operations, including incident response and infrastructure upgrades. For infrastructure upgrades alone, Cisco IT was able to reduce the time to deployment and save on labor costs. Prior to using Remote Management Services, Cisco IT would have had to either perform a manual upgrade or use "home-grown" scripts for mass upgrades of network devices—time-consuming and error-prone processes. Remote Management Services enabled Cisco IT to automate the entire process. In 2010 alone, Remote Management Services was instrumental in upgrading software for 4,000 devices without any human intervention, and with no incidents reported.

Before performing any major upgrades, Cisco IT conducts extensive design and compatibility testing, simulating its internal production environment. This is where the **Cisco Network Optimization Service** adds significant value. The service combines assessments, guidance, expert support, improved visibility and insight, and continual learning in a tightly integrated subscription package.

The Network Optimization Service team comprises Cisco engineers who routinely work with large enterprise customers and have a deep working knowledge of Cisco networks. Their expertise and industry know-how are particularly valuable in design validation and compatibility testing.

Technical staff member John Moe mentions a specific test case: "Without the Network Optimization Service design and testing, we would have spent 40 to 60 hours trying to find an issue, and would then have had to start the testing process all over again with another version. By proactively notifying us of potential issues, the Network Optimization Service reduces false starts, saving us time and money."

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Printed in USA C11-687149-00 09/11