NORTEL NETWORKS
BUSINESS WITHOUT BOUNDARIES

understanding total cost of ownership for IP telephony solutions

Position Paper

A study from an independent research and consulting group reveals that a customer deploying a Nortel Networks IP telephony solution could realize more than a 50% savings compared to a competitive offering

Executive Summary

Today, many enterprises are advised to concentrate their IT spending on optimizing operational expenses and leveraging their current asset base; while strategically building customer-focused solutions that enhance their competitive advantage. This incremental approach is designed to help reduce capital expenditures, minimize risk, and drive obtainable business objectives – such as reducing operating costs. Return on investment (ROI) looks at a capital purchase in terms of a financial transaction – "what is the return on capital?" is the metric being considered. ROI typically does not consider the cost impact to the annual operating budget, staffing levels, and other ownership issues. Once a general investment has demonstrated value, it is important to perform a comparative TCO analysis to determine which implementation option best meets the strategic needs of the organization. TCO is complementary to ROI, because a lower TCO will yield a higher ROI. A TCO assessment integrates the operational budget, providing holistic and long-term management of network spending. A TCO analysis also goes well beyond a particular proposal provided by a vendor sales representative.

The IP telephony TCO analysis presented in this paper was developed by an independent research and consulting group, using base assumptions and conducting primary research of Nortel Networks IP PBX and a competing data-centric vendor solution. Interviews were conducted with channel resellers experienced in installing, deploying and maintaining both Nortel Networks and the competing vendor's IP telephony products. The independent consulting group developed a TCO model that provides for two deployment options to analyze: (1) deploying a converged IP telephony solution in a new location, or (2) adding IP telephony to an existing location. The model generates a like-for-like comparison of a Nortel Networks IP PBX against a competing data-centric vendor solution starting from a common set of defined user inputs.

From their primary research the study revealed that an organization deploying a Nortel Networks IP PBX can receive up to a 66% TCO advantage over using an alternative approach from a competitive data-centric vendor solution. These

savings were based on a medium sized new IP telephony implementation measured over a three year deployment horizon across six key areas of lifecycle cost. In this example, the Nortel Networks IP PBX total cost of ownership savings advantage included:

- 28% on initial purchase
- 51% on installation
- 28% on maintenance
- 52% on administration

Not included in the quantitative analysis, but important to the overall deployment consideration are the qualitative elements of features and characteristics of the vendor's IP PBX product. Further details on the TCO analysis model, including the six key cost elements are presented in the body of this paper.

ROI & TCO – Which One, When?

Return On Investment (ROI) - used to justify spending money on a product or service. ROI attempts to define the "financial return a company will get for a particular investment."

Total Cost of Ownership (TCO) - used to justify investing in one vendor's solution over another. The analysis in this case assesses "the total cost of using vendor X product or vendor Y product over the ownership lifecycle."

In this study, the often hidden costs associated with an IP telephony ownership are revealed. Key findings illustrate that many of the post-installation details can become a costly burden to the annual IT budget, amounting to as much as a 66% higher price tag over the product lifecycle. For a complete assessment of the budgetary impact of an IP telephony implementation, customers are well advised to delve into the cost of ongoing support, management, and maintenance of all the servers that comprise the IP telephony implementation. When one considers OS upgrades, software patch management, and regular anti-virus update activity; it is easy to understand that the greater the number of servers and network devices in a given vendor's solution, the more the annual and replacement costs will add to the total cost of ownership. Another often overlooked TCO factor is the relative scalability of a given vendor's solution. This study reveals that the data-centric vendor's architecture compounds the solution complexity by adding additional servers and network devices, every time a customer adds users, or adds new features and services to an existing solution. This is a post-installation cost that is best scoped prior to a product purchase; because choosing a more elegant and complete solution is not a cost-effective option, after the fact. Total cost of ownership is an important benchmark that should be measured very early in the project: ideally a TCO study can be performed along with a network assessment to establish the relevant technical and business metrics upfront, before the IP telephony solution is deployed.

Introduction

The IP telephony TCO methodology and analysis presented in this document has been developed by an independent research and consulting group. It uses base assumptions and primary research gathered on Nortel Networks IP PBX and a competing data-centric vendor solution. The intents of this paper are to:

- Analyze the nature and impact of cost differences for IP telephony
- Examine and explain the value of the consulting group's TCO model
- Understand the TCO comparison key finding
- Examination of the primary research interview responses
- Propose the next steps an enterprise should take to apply the model for their own TCO analysis.

Analyzing TCO: The Nature & Impact of Cost Differences for IP Telephony

Enterprises looking to better understand their IP telephony implementation costs must go beyond a simple ROI analysis for the total costs incurred over the lifecycle of a converged voice and data network deployment. A TCO analysis is designed to help drive the bigger picture as it considers both tactical and strategic goals that include the management of the overall IT budget (annual operational and capital expenditures), risk assessment, and strategic objectives (short-term and long-term business planning). TCO should also assess the improvements to employee productivity, customer responsiveness, competitive advantages and accelerated efficiencies that impact business capital and strategic objectives. As part of a well-constructed business case, the TCO analysis will provide the financial data points and a structure that identifies business value verses expenses. Proving the business case then becomes as straight-forward as scrutinizing the base assumptions.

The TCO analysis compares various aspects of the vendor's solution including architecture, quality, reliability, scalability, and functional capabilities that all weigh heavily on the long-term economic and strategic impact. A common strategy employed by some vendors is to provide a stripped down or heavily discounted initial solution proposal with the understanding that they will "make up for it on the back end", usually through higher margin products and services. Unfortunately, many customers realize this approach only after making their purchase, and they become "locked-in" to a total cost of ownership that ends up being far more expensive over the product lifecycle. This highlights the importance of performing a thorough cost impact assessment of doing business with a particular vendor over an extended period of time. The consulting group segmented their TCO analysis into six cost elements that combine to define the lifecycle cost (or total cost) of ownership. The cumulative cost of the initial solution purchase price, the installation and deployment of the solution, additional configuration items (such as incremental routers and switches), ongoing maintenance and support, administration and operational costs, and other hidden costs (such as higher priced feature or application roll-out) that lead to incremental post-installation costs which increases a solutions' TCO.

The TCO Model for IP Telephony

A good way to understand the total cost of ownership for IP telephony—particularly from an IT management perspective—is to address the cost elements throughout the lifecycle of a deployment. This framework follows the project implementation lifecycle from acquisition to production operation and management. Consider the following summary of an objective third party research project which addresses the total costs of the Nortel Networks IP PBX versus a competing data-centric IP telephony solution offering over a three year time horizon. The scenario modeled is a branch office integration deployment for 300 IP telephony users with a basic feature set including IP telephones, voicemail, conferencing, unified messaging and web-based management. In this scenario, an independent consulting group interviewed customers of both Nortel Networks and a competing IP telephony vendor and discovered several key quantifiable cost differentiators. Those factors were incorporated into the comprehensive TCO model as illustrated in Figure 1.

Details on each of the above six TCO cost areas are presented and discussed in the following sections. The model used for this analysis is a branch integration scenario involving one primary corporate office with 150 employees, four branch offices with 25 employees each and 50 "virtual employees" who work from remote locations. Figure 2 on the next page table includes the key inputs and assumptions used in this TCO analysis.

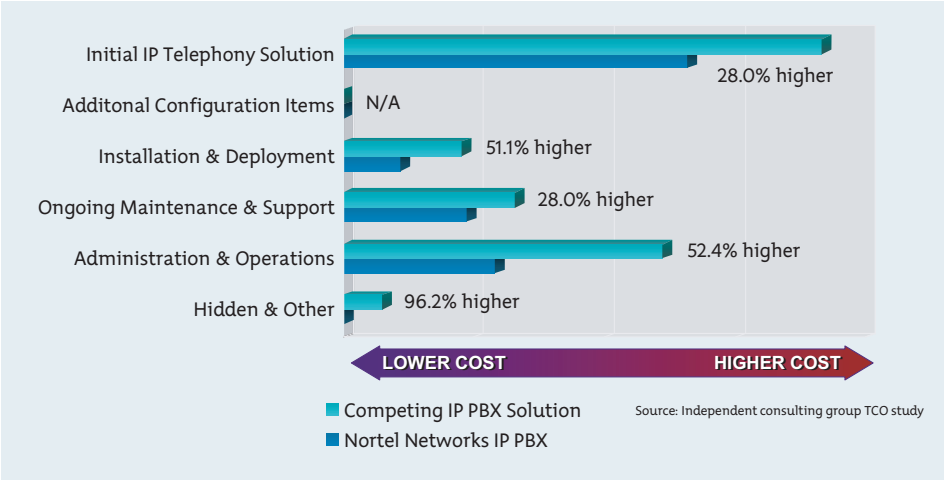

Figure 1. IP Telephony TCO Model Key Cost Areas & Solution Comparisons

Initial IP Telephony Solution

The initial cost of a solution is the upfront capital outlay, but it is only a portion of the total cost of ownership. Initial costs are important to analyze, and when comparing alternative offerings it is critical to ensure that the vendors are providing a like-for-like solution. During the analysis and research, the primary goal was to compare a real world equivalent configuration of Nortel Networks IP PBX and the competing vendor's solution. Given the nuances of pricing models and the number of potential components, this was by no means a trivial analysis. However, it is important for customers to understand the solution components required to make a fair comparison.

For this scenario, the research uncovered significant cost differences in supporting the 300 IP telephony users. In almost every IP telephony initial cost area, including the server hardware, media, line and application cards, and hard clients, the Nortel Networks offering cost averaged 28.0% less than the competing solution. To support the same 300 users, the

Figure 2. IP Telephony TCO Model Assumptions

General Details:

Analysis Horizon: 3 years
Cost of Capital (Present Value): 5%
Acquisition: Capital purchase for IP telephony equipment / licensing

Office Details:

	Number of Locations	Number of Employees
Main Offices	1	150
Branch Offices	4	100 (~25 per site)
Virtual/Mobile Workers		50
Total		**300**

Employee Details:

Knowledge Worker	60%	180
Management/Exec	30%	90
Administrative	10%	30

Features & Applications User Details:

	Knowledge Worker	Management/ Executive	Administrative
Voicemail	Yes	Yes	Yes
Conference Calling	Yes	Yes	Yes
Unified Messaging	Yes	Yes	No
Facsimile	No	No	No
Publishing	No	No	No
Web-based Mgmt	Yes	Yes	No
Personal Call Agent	No	No	No
Soft phone	No	No	No

Other Users / Additional Phones:

Call Center Agents	0
Multi-tenant	0
Meeting/Common Area	15
Modems & Facsimile	15

IP Telephony Deployment Details:

Call Server Redundancy	Yes
Percentage of Gateway Redundancy	0%
Ratio of Stations to Trunks	10.0
Employees per Conference Bridge	40
Desired number of simultaneous RAN users	25
Personalization Services Ports per Employee	250
Branch Depth of IVR	Medium Tree
Method for Offnet call termination	ITSP

Administration & Operation Details:

Admin FTEs per Server	0.15
Annual Salary for Admin FTE	$75,000
Frequency of Configuration Updates Required Per Year	4
Frequency of Virus Updates Incidents Per Year	4
IP Telephony Network Devices (routers/switches) Per 100 Users	2

competing solution often required additional hardware components, including the server hardware and IP media, line and applications card investments. From a software licensing perspective, there typically were smaller differences, mostly due to variations in the unified messaging pricing.

Additional Configuration Items

In addition to the equipment and software purchases, research identified many cases where additional investments were required in the competing IP telephony vendor environment, often after the fact and due to a realization of an unanticipated need. In addition, there are often requirements to add or upgrade networking equipment to provide the necessary network infrastructure to enable IP telephony traffic and functionality. It is highly advisable to perform a network assessment at the onset of the project. If the data network is older, this cost category can often be a very significant contributor to the TCO. For this scenario, it was assumed that the data network was adequate for the addition of the voice functionality which is why the Additional Configuration Items is listed as "Not Applicable" (N/A) in Figure 1 and Figure 3.

Installation & Deployment

The installation and deployment process is largely a function of the actual equipment, software licensing and the number of unique servers installed and configured in the environment. For the scenario, installation was assumed to be 17% of the total solution proposal in the Nortel Networks environment and 25% for the competing vendor offering. These figures are based on research conducted of both vendors customer deployments, with the

percentage applied to the total hardware and software cost for the IP telephony solution initial configuration. Therefore, the scenario yielded a 51.1% cost advantage to Nortel Networks due to fewer servers and components to configure in the environment.

Ongoing Maintenance & Support

Maintenance and support are integral to deploying and managing a converged solution. While each vendor has a slightly different model and pricing for maintenance services and support, the TCO model assumes conservatively and objectively that the two vendor solutions would provide the same level of support. A blended annual maintenance and support fee of 15% per year was applied to the initial IP telephony solution pricing to determine the annual maintenance fee. This amount can yield a significant difference when taking into account the total solution, in this case a 28.0% premium over the three year period.

Administration & Operations

A major cost elements omitted from many TCO analyses is the cost to administer and operate the total solution over the course of time. The level of administration effort and skill required is dependent on the number of unique components (or servers) in the environment, the intuitiveness of interfaces and the reliability of the components. In the scenario analysis, we assessed the cost implications involved in administering and operating Nortel Networks IP PBX deployment versus the competing vendor deployment. Based on the configuration and feature requirements, it led to a configuration of four unique servers to manage in the Nortel Networks environment versus 14 in the competing vendor environment. The need to support over three times as many servers for the competing solution resulted in a costs that were 52.4% higher than the comparative Nortel Networks environment over the three year period.

Hidden & Other

In addition to the general server and component administration, there are other unique cost drivers which affect a customer's TCO. Two such primary cost drivers for converged network deployments are the process of updating and "patching" the underlying O/S software, and the management of virus-related patches and fixes for vulnerable components of the voice and data system. Through independent research, it was determined that much less effort was required in the Nortel Networks environment based on a more efficient and less error-prone upgrade/update process and the protection against viruses that affect some commercial operating systems. While not as costly from a dollar perspective, the resulting difference for the competing solution totaled a surprising 96.2% higher over the three year period. Also pertinent to the TCO analysis are the post-installation cost of adding users, adding new features and services. This is sometimes referred to as scalability, and it is better to review the cost associated with these activities as part of the overall TCO analysis.

When combining the above six analysis areas into an overall comparison, Figure 3 illustrates that the compounded impact can be significant in terms of the total cost of ownership paid over the IP telephony investment.

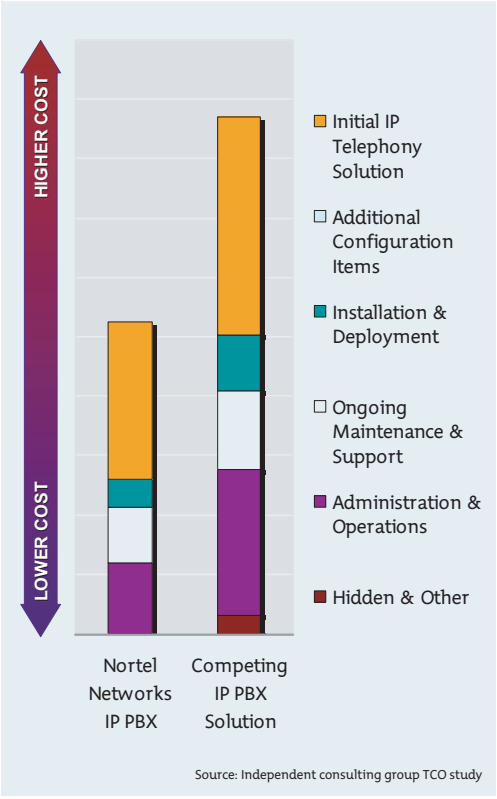

Figure 3. Total IP Telephony TCO Comparisons

Understanding the TCO Comparison Finding

This analysis reveals that total cost of ownership is an important benchmark for measuring the relative benefits of a given IP Telephony solution, and for predicting the complete and long term budgetary impacts – on both the capital and operating budget. This paper describes in detail the fact that total cost includes up-front cost, the cost of installation, on-going administration, preventative and trouble-based maintenance, support and service related

charges, user and feature based additions & upgrades, hardware management, operating system management, security management, time and people management, and more.

This analysis detailed a medium sized comparison based on a 300 users implementation and the model generated a like-for-like configuration for a Nortel Networks IP PBX, and a data-centric competitive IP PBX. All the outputs were converted to percentage differences for the purposes of this paper, and to avoid global monetary differences. The TCO analysis presented in this paper clearly details the superior TCO value that the Nortel Networks IP PBX delivers to enterprise customers.

Examination of the Primary Research

The assumptions in this analysis are supported by independent primary research. Interviews were conducted in the second half of 2003 engaging IP telephony resellers highly experienced in installing, deploying and maintaining both the Nortel Networks and the competing vendors IP telephony products. The following are excerpts from the interview sessions.

General Commentary

The competing IP telephony vendor lacks a forward migration path. It must completely duplicate a voice environment. One large company required a $400k voice assessment just to understand how their sophisticated voice infrastructure could be mapped to the competing vendor's architecture.

The competing IP telephony vendor typically prices installation at about half of actual cost, leaving out blades from switch or routers, side cards for phones, required memory upgrades and additional expert resources required. The competing IP telephony vendor does not address true investment considerations leading to budgetary issues downstream as well as relationship issues with resellers. Furthermore, there are additional post-installation costs which usually run at about 10% of the total initial installation cost.

Each competing IP telephony vendor implementation sees at least 2-3 return visits of several days each with every installation completed. This results in the total cost of consulting and implementation expertise of AT LEAST twice the quoted and budgeted price. Specific feature complaints include complexity of speed dial, call forwarding/ transfer.

IP Telephony Installation Issues

A competing IP telephony vendor large 800 user trial had several reported issues that resulted in it being stopped. All but the smallest installations have been removed. Most of the deployments have basic application requirements, using standard telephony features.

Value Drivers/Feature Requirements for IP Telephony

The competing vendor implementations are usually chosen because people have learned to trust the competing IP telephony vendor in their data and networking environments. Companies seek seamless unified messaging and toll by-pass. Intuitive sell to IT departments, granting IT jurisdiction over voice. IVR, exchange, unified directory all work very well with the competing vendor environment. There is a virtual elimination of toll-bypass, with tail-end hop off. One unified infrastructure promises simplicity. Just run additional applications on the vendor backbone and operating system environment. Any lack of success on the competing IP telephony vendor's part seems to be due to lack of voice expertise.

Key Vendor and Product Differentiation

The competing IP telephony vendor also lacks the breadth of voice applications. Speed Dial and Call Forwarding require a user to scroll through a long list of features (leading to user dissatisfaction).

Implementing the competing vendor's solution required almost twice as expensive IT skilled expert over a typical IT voice manager.

Administrative and Operational Support Requirements

Nortel Networks implementation requires moderate voice and data expertise (this level of person requires $30-50/hour); typically two or three people. The competing IP telephony vendor implementation requires a voice expert with fairly advanced networking skills (this level of person is typically twice as expense as a typical voice installer) as well as one or more competing IP telephony vendor engineers. It is common to have at least two-three return visits of several days each with every installation completed. The overall cost of consulting and implementation expertise is AT LEAST twice with the competing vendor solution

Common Issues Deploying IP Telephony (i.e. software upgrades, viruses, downtime?)

Downtime with the competing vendor solution is not a big issue once architected correctly. A few operating system issues, maybe, but have not seen any significant problems.

The competing IP telephony vendor frequently requires a change in user feature habits, including six buttons to transfer a call (instead of two) was one common complaint.

Some memory leak issues with one installation's use of a competing IP telephony vendor switch that not only took down part of the data network but the phone system as well.

Applying the TCO Model

As reviewed in this paper, TCO analysis also goes well beyond a particular proposal provided by a vendor sales representative. Up-front costs are part of the full costs incurred over the lifecycle of an IP telephony deployment and are only a starting point for understanding the total cost for a given vendor's solution. The TCO analysis model developed as the bases for this analysis is highly flexible, and can be used to generate similar benchmarking for many different sizes and types of deployment comparisons. The model depends on accurate input, in order to yield meaningful results, and a sensitivity analysis is a good practice that will help to ensure a valid and reliable comparison. The TCO analysis presented in this paper clearly details the superior TCO value that the Nortel Networks IP PBX delivers to enterprise customers.

In conjunction with a TCO analysis, a network assessment provides critical information regarding the relative "readiness" of an IP network for convergence. IP network operating parameters that are critical for transmitting voice packets need to be measured and maintained in all types of traffic conditions. This requires upfront network engineering along with post-installation monitoring (equipment and process) to ensure that the network remains "tuned" for the real-time requirements of telephony. Ideally, the TCO analysis and network assessment should be done as early into the project as possible. Another item that should be addressed prior to an IP telephony deployment is end-to-end network security. Security can impact many aspects of network performance, and is best assessed during the TCO analysis and network assessment.

To help customers better understand their own TCO and resulting business case, Nortel Networks has developed a suite of tools to assist in identifying and quantifying investment opportunities, including the Convergence Business Case Tool which is available on-line at: **www.nortelnetworks.com/voip_tool** (registration required for access). Further business case and TCO analysis assistance can be obtained from your Nortel Networks sales representative.

In the United States:
Nortel Networks
35 Davis Drive, Research Triangle Park, NC 27709, USA Phone: 1 800 4 NORTEL

In Canada:
Nortel Networks
8200 Dixie Road, Suite 100, Brampton, ON L6T 5P6, Canada Phone: 1 800 4 NORTEL

In Europe:
Nortel Networks
Maidenhead Office Park, Westacott Way, Maidenhead, Berkshire SL6 3QH, England Phone: +44 1628 432 000

In the Caribbean and Latin America:
Nortel Networks
1500 Concord Terrace, Sunrise, FL 33323, USA Phone: 1 954 851 8000

In the Asia-Pacific region:
Nortel Networks
Level 5, 495 Victoria Avenue, Chatswood, NSW 2067, Australia Phone: (61) 2 8870 5000

In Greater China:
Nortel Networks Tower
Sun Dong An Plaza, 138 Wang Fu Jing Street, Beijing 100006, China Phone: (86) 10 6528 8877

Nortel Networks is an industry leader and innovator focused on transforming how the world communicates and exchanges information. The company is supplying its service provider and enterprise customers with communications technology and infrastructure to enable value-added IP data, voice and multimedia services spanning Wireless Networks, Wireline Networks, Enterprise Networks, and Optical Networks. As a global company, Nortel Networks does business in more than 150 countries. More information about Nortel Networks can be found on the Web at:

www.nortelnetworks.com

For more information, contact your Nortel Networks representative, or
call 1-800-4 NORTEL or 1-800-466-7835 from anywhere in North America.

NN108780-060704

NORTEL NETWORKS
BUSINESS WITHOUT BOUNDARIES