

The Virtual Enterprise Requires a Network That Is More than “Good Enough”



by Zeus Kerravala | May 2009

Executive Summary

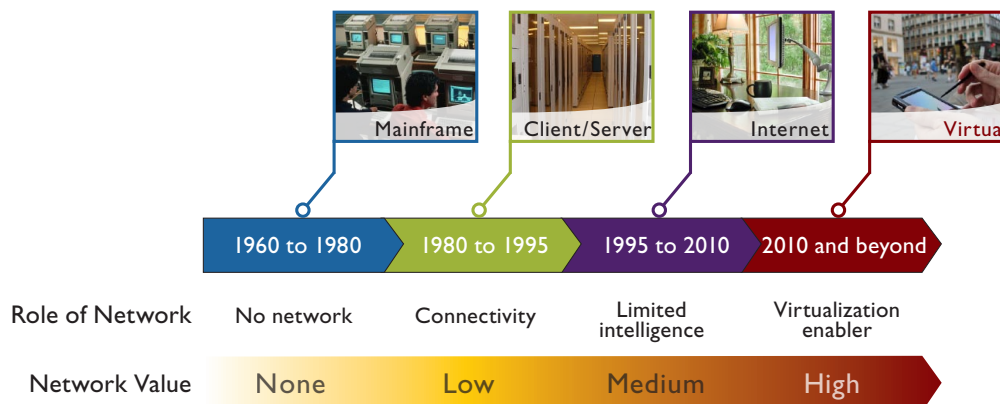
Through the years, the role of the network has changed with computing transitions. Each computing transition has also increased the network's value and reshaped the vendor landscape. Exhibit I shows the major computing transitions that have happened since the dawn of the mainframe through the transition to a virtual enterprise. The transition to a virtual enterprise will have an impact on the network similar to the previous computing shifts. The network will become a strategic point of competitive advantage for companies that use it to accelerate virtualization deployments. For this to occur, network decisions-makers can no longer settle for any part of the network infrastructure that is “good enough” simply because it is from the market brand leader. Corporate network managers that seek to leapfrog the competition need to adopt bold new thinking and embrace the following concepts:

- Virtualization will extend out of the data center and expand functionality all the way to the desktop, creating new demands across the network.
- Data center class reliability, performance and features are required not only in the data center, but also at the aggregation edge and wiring closet.
- Open and standards-based solutions need to be the norm, not the exception. The network's tight coupling with the compute infrastructure will drive greater ecosystem support, meaning that closed, proprietary systems will only act as long-term barriers to adoption.
- Good enough is no longer good enough. It's easy to evaluate different vendors and just choose the incumbent vendor or brand leader. However, as the market transitions, this decision can often be the wrong one as legacy vendors with a large installed base can't protect their install base and transition with the market simultaneously.

This report provides an overview of how virtualization is transforming organizations, describes the role the network plays and provides some practical advice on how IT decision-makers should evaluate network solution partners to support virtual computing.

Exhibit I.
Computing Transitions Have Increased Network Value

Source: Yankee Group, 2009



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I. The Evolution of the Network

Since the dawn of IT, computing has continued to evolve to meet the challenges of the business, giving rise to several waves of computing. Each computing wave has changed the face of IT and made the network increasingly more important.

In the 1970s, most workers resided in just a handful of large locations. The work force was static and the computing platform was a mainframe. During the mainframe era, there really was no network. What little connectivity existed was used to connect “green screen” terminals to the mainframe. Because the computing platforms were used for basic data entry and the majority of workers were fixed to a single location, this type of computing platform and “network” met the challenges of the time.

In the 1980s, workers started to migrate out of headquarter locations into branch locations and information moved with the workers to these remote locations. This gave birth to the client/server era and the local area network (LAN). The role of the network was to connect the users that were located in that particular branch or department to the servers that stored the information. There was no standardized LAN protocol and companies often had multiple types of LANs because the decision about what protocol to use was made departmentally. Although important, the network still wasn’t considered strategic to an organization.

During the 1990s, workers continued to move away from the headquarters, the number of branch offices continued to grow and users even started to work from home. This enabled organizations to hire individuals in locations where there was no corporate presence, including other countries. To provide better, faster access

to information, many standardized applications were converted to Web delivery, giving rise to the Internet computing era. Internet protocol (IP) became the standard protocol on which to build networks and all of the LANs created in the client/server era were connected to a single network. This also enabled organizations to interconnect branch offices, and eventually connect home workers, over a wide area network (WAN). The network was able to provide some limited intelligence by using quality of service and securing traffic and other advanced network features, but it still was not considered as critical as the application or server infrastructure.

Today, workers are highly mobile. They carry a wide variety of endpoints and can be located anywhere. The growth of collaborative applications and the ascendancy of supply chain management have eroded the border of the enterprise (see Exhibit 2 on the next page). As a result, distinguishing between an employee, partner supplier or other constituent in the extended enterprise is nearly impossible. The number of users on the corporate network combined with the use of collaborative applications will have a staggering impact on network traffic. The January 2009 Yankee Group Report “Introducing Anywhere IT” predicts that network loads will increase 1,000 percent during the next five years.

Even within the corporate walls, workers are highly mobile and rarely tied to a fixed location. Because of this shift in work style, the computing platforms are yet again being transformed—this time to virtual computing.

To deliver information to all the constituents in the extended enterprise, the compute resources need to be componentized and disaggregated from the physical hardware. Ultimately, applications will be composed of “mashupable” application components that are quickly assembled and delivered via the network to the user’s device. This will create new demands on the network because it will need to become much more scalable and take on the role of the “backplane” of the virtual enterprise. Because of this transition, the decision process around how we choose our network vendors will also need to change.

II. Traditional Networks Were Designed to be “Good Enough”

Historically, networks have been designed based on the theory that the value in the network increases from the wiring closet to the core inside of data centers (see Exhibit 3 on the next page). Because of this disproportionate value, network managers spent the majority of their time evaluating network infrastructure in the data center and settled for infrastructure that was “good enough” in the aggregation edge and wiring closet. Often, the hardware that was used in the areas perceived to be of lower value carried with it a price premium that was as much as 50 percent more expensive

than alternative vendors’ hardware due to brand familiarity. The lack of time spent in the evaluation process of the wiring closet and aggregation edge meant many evaluators would pay a hefty price premium for the comfort of a product that was “good enough” and carried the logo of the market-share leader. The role of each area of the network is reviewed below to show why this purchase criterion was used.

Data Center

Traditionally, the data center is where an organization’s most critical assets reside. The data center includes multimillion dollar software installations, mission-critical storage systems and business-critical server farms. To leverage the data center investments, network managers typically seek best-of-breed network infrastructure.

Because of this, network managers undergo a comprehensive due diligence process to ensure the network hardware has the features, performance, scale and reliability to meet the rigorous demands of the data center. Typically, data center networks are powered by large, modular systems that are fully redundant and have a robust set of features uniquely designed to meet the mission-critical, always-on demands of the data center.

Exhibit 2.
The Borderless Enterprise
Source: Yankee Group, 2009

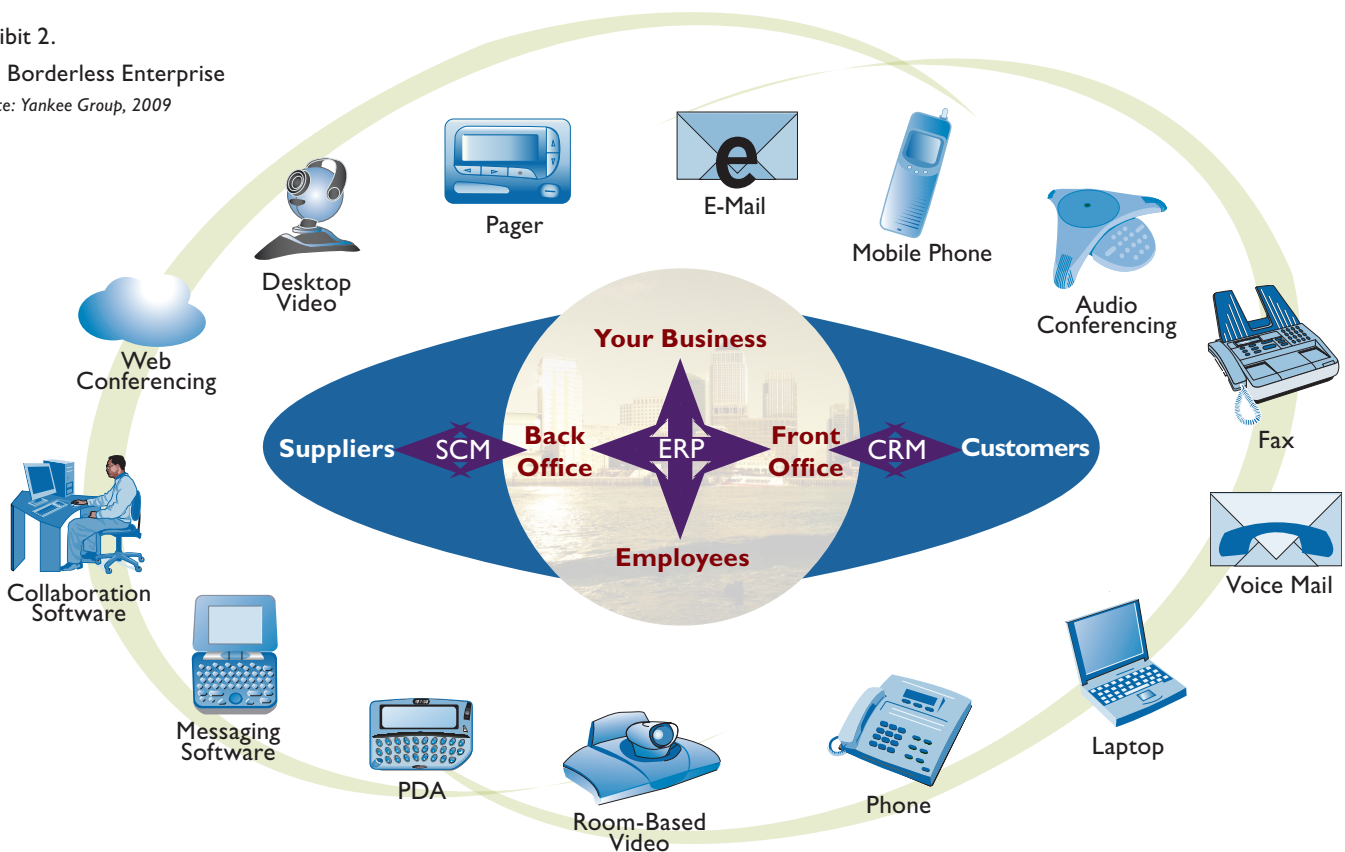
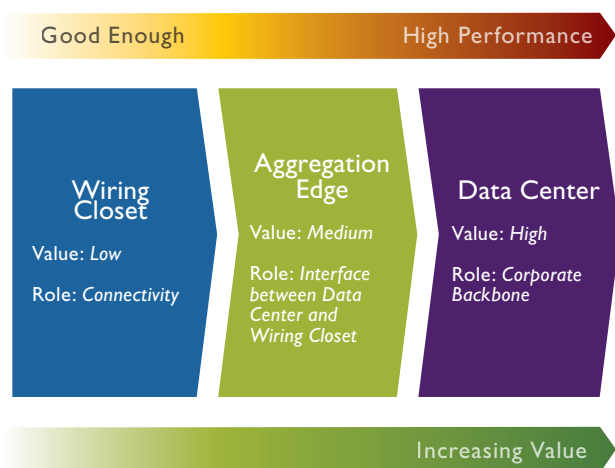


Exhibit 3.
Traditional Networking Increases in Value to the Data Center
Source: Yankee Group, 2009



Because the historical measure of market leadership for data center networking has been performance, this area of the enterprise network has been among the most competitive. In the data center, performance and reliability have a direct impact on application performance. This is why performance-focused network infrastructure vendors have continually been able to consistently win business versus products that carry the logos of more well-known vendors. Good enough has never been sufficient in the data center.

Aggregation Edge

The aggregation edge is where the wiring closet interfaces with the data center. In many cases, the aggregation edge is managed as an extension of the wiring closet, although other organizations manage it as part of the data center. No matter what scenario is being used, the aggregation edge’s main function is to aggregate wiring closet switches into a smaller number of higher-speed links that will pass network traffic to the data center. It’s common for network engineers to focus less on the aggregation edge than the data center. This strategy was sufficient several years ago when corporate network traffic was not mission critical but it will be insufficient moving forward. Because of the lower level of perceived importance, many network managers have settled for network hardware that meets the minimum requirements of the current situation but little thought has been given to future needs.

Wiring Closet

The wiring closet is easily the most undermanaged part of the corporate network. In many cases, the wiring closet is often a small, cramped maintenance room with little to no air conditioning. While the data center is protected by different types of security cards or biometric readers, many wiring closets are left unlocked so even the level of physical security is lower than other areas of the network. The main function of the wiring closet is to connect company endpoints such as desktop computers, printers and wireless access points. Because the majority of these endpoints tend to be low value, commodity hardware, network managers tend to perform the least amount of due diligence with wiring closet purchase criteria. This is why many companies take the path of least resistance with vendor evaluation and choose the brand leader. If an alternate vendor is chosen, the main decision point for selecting a vendor tends to be acquisition cost. In most cases though, infrastructure that meets the minimum requirements of port density is typically “good enough” to fulfill the needs of the wiring closet.

There have been exceptions to this rule, however, led by a small number of organizations who treat the whole network—including the wiring closet, aggregation edge and data center—with the highest level of strategic value. Typically, these are specific departments in verticals where the network plays a key role in the business. An example of this would be the trading desk of a brokerage firm where any network downtime or performance problems could cost millions of dollars or the research and development group within oil and gas companies that push huge amounts of data over the network. The trends in computing virtualization will make the network even more of a strategic asset for all organizations. This means that network equipment that is “good enough” and meets the minimum connectivity requirements will no longer be sufficient.

III. Networking in the Virtual Enterprise

As outlined above, virtualization has had a profound impact on IT. It’s changed how software vendors license their products and completely redefined computing platforms. It will have an equally big impact on the network.

Server virtualization is widely deployed today. The Yankee Group Anywhere Enterprise—Large: 2008 U.S. IT Infrastructure Survey reveals that 42 percent of organizations already use virtualization in production environments, another 22 percent in test and development and another 12 percent plan to deploy within the next 12 months. That means more than 76 percent of organizations will have virtualization up and running in less than a year from now. However, Exhibit 4 shows that the percentage of servers that are virtualized is relatively low. All of the top inhibitors around broader use of virtualization are network-related or have network-related implications. The top inhibitors include virtual machine (VM) movement, access and security, compliance and traffic inspection and visibility (see Exhibit 5 on the next page).

As virtualization touches more areas of computing, increased network performance is becoming an increasingly important requirement. In the Fibre Channel world, for instance, the need to better support server virtualization and the associated quality of service has sped up the adoption of 8 Gbps technology in recent months.

In time, virtualization will move into other areas of the network. The first wave will be the total virtualization of all data center assets. Storage, communications, application resources and other

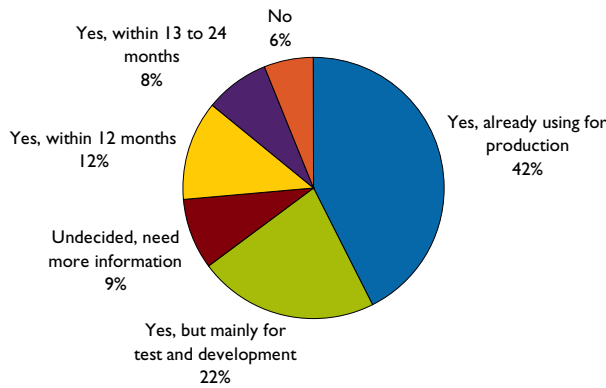
data center resources will be available to applications as virtual pools that can be accessed when needed.

Exhibit 6 on the next page depicts how the data center network will interconnect all of these virtual computing pools. In essence, the data center network will become the backplane of the virtualized computer. This means instead of having computing components connected to physical backplane within a server, the computing components will be connected over the data center network. This is the reason that data center managers have focused so much energy on evaluating their data center network solution provider, which is the main reason why alternative vendors to the brand leader are often preferred. Simply being the brand leader or “good enough” may be sufficient to win business in the wiring closet and aggregation edge today, but not in the data center because of the role the network plays. In the virtual data center, the network will have a direct impact on a company’s ability to pursue a broader virtualization strategy, making it even more important for organizations to evaluate network vendors carefully.

Exhibit 4.
More Than Half Of Enterprises Already Use or Are Considering Virtualization

Source: Anywhere Enterprise—Large: 2008 U.S. IT Infrastructure Survey

Are you currently using or planning to use server virtualization?



What percentage of your servers are virtualized?

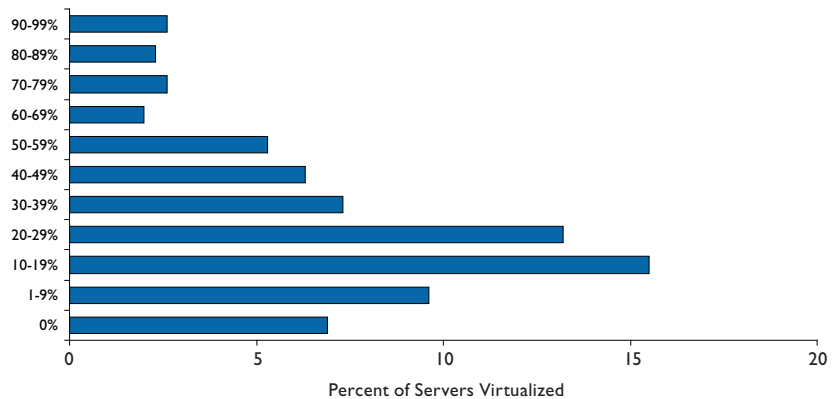


Exhibit 5.
Barriers to the Broader Use of Virtualization

Source: Anywhere Enterprise—Large: 2008 U.S. IT Infrastructure Survey

What are your top three network management/security concerns around data center virtualization?

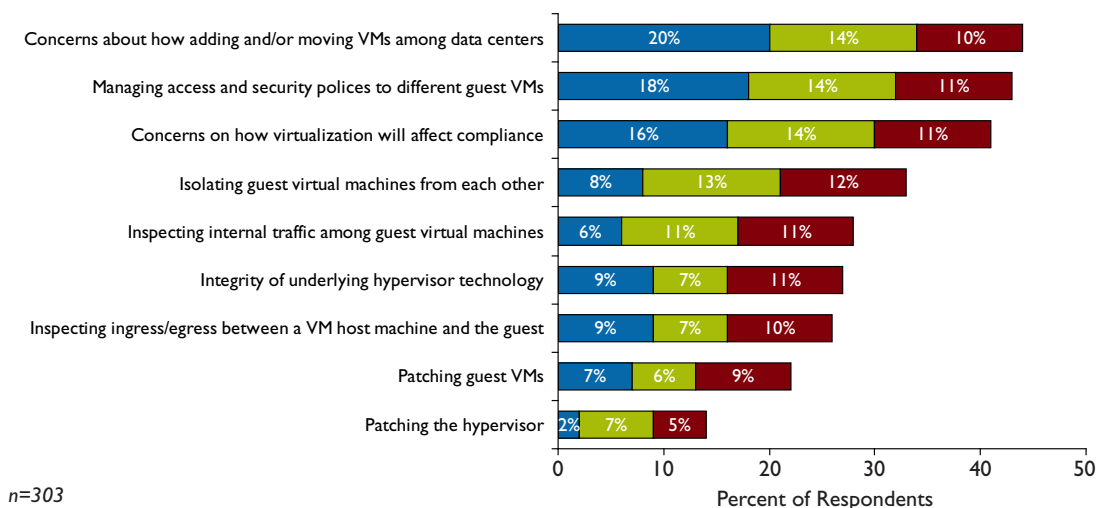
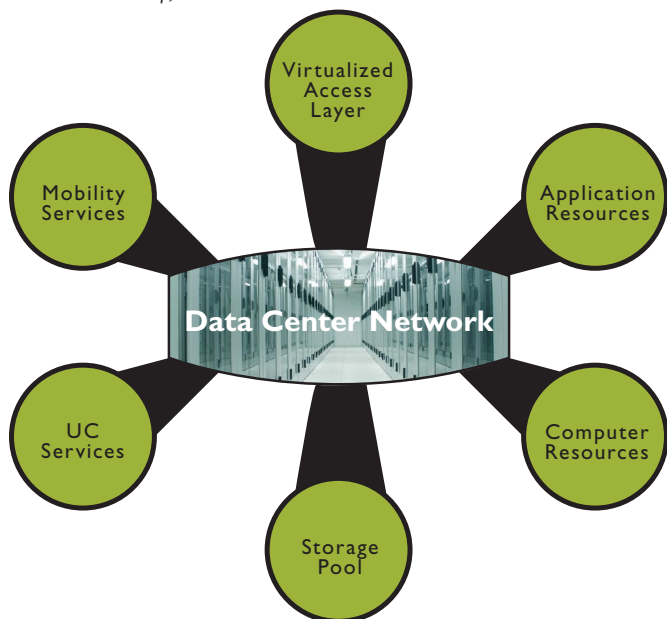


Exhibit 6.
The Virtual Data Center
Source: Yankee Group, 2009



As virtualization continues to evolve, computing will move to “the cloud” and virtualization will move all the way to the user desktop. Applications will be quickly assembled from the various computing pools and then streamed to the workers’ desktops. This will change the role of the network significantly, where it will be the primary delivery mechanism for all applications and information. This will raise the bar for the wiring closet and aggregation edge because the role of the network will be equally important across the three tiers (see Exhibit 7 on the next page).

For decision-makers, this means that the same level of due diligence, testing and scrutiny that is used to choose a data center solution needs to be applied to the aggregation end and wiring closet.

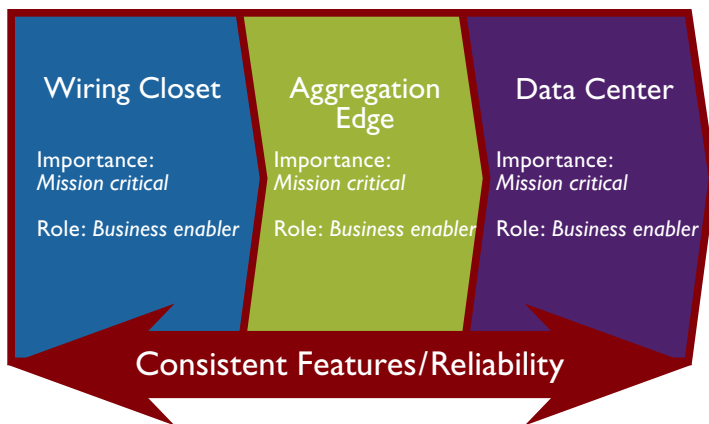
IV. What to Look for in a Solution Provider

Organizations looking to meet the challenges of the virtual enterprise and leverage the network for competitive advantage will need to re-evaluate all their network infrastructure decisions. However, a full understanding of what to look for in a solution provider may not be obvious, especially with the ongoing computing transition under way. Key criteria to consider when evaluating a solution provider are highlighted in the following sections.

Exhibit 7.

The Value of the Network in the Virtual Enterprise

Source: Yankee Group, 2009



Data Center Reliability Across the Network

With the enterprise network growing in importance from the data center core to the wiring closet it's important that the same reliability characteristics found in the data center exist in the other points in the network. When evaluating a vendor, organizations should ensure that all the products are built with data center reliability in mind. This means proven, high-quality technology and strong peer reference accounts.

High Performance

When the corporate network was used to deliver Internet traffic, e-mail, file services and other non-real-time applications, performance of the network wasn't always the top criteria. Many vendors would sell products that were highly oversubscribed or could not operate as consistently with high amounts of traffic as it could with low amounts. With organizations using the network to deliver virtualization, VoIP, unified communications and video, high performance is a must. Key consideration points are market-leading performance, support for demanding applications and future-proofing to handle future data center speeds.

Operational Simplicity

Yankee Group research shows that the largest contributing factor to network downtime is human error related to operational tasks. Some network vendors have dozens of operating systems, product lines that do not interoperate with each other and overly complex environments to manage. Operational simplicity should focus on an intuitive interface and consistent management.

Built for Green Computing

During the past two to three years, a slowing economy and an all-time high in fuel prices in 2008 have made organizations much more "green"-aware when it comes to IT purchases. Although fuel prices have dropped considerably since then, the awareness has been raised that energy efficiency is important. Any vendor evaluated today should undergo comprehensive testing for energy efficiency. In the network industry, this would include high-density platforms and modules to minimize the amount of equipment, low heat generation and low power utilization.

Optimized Life Cycle Costs

There is more to network total cost of ownership (TCO) than just acquisition price. Organizations should evaluate TCO on the entire cost of the network life cycle. This includes not only acquisition cost, but also the cost of management, maintenance, sparring, upgrades, etc. Additionally, products that are designed to be future-proofed help protect the investment longer. Many vendors work to optimize the cost across the network life cycle and this should be given serious consideration.

Intelligently Innovative

Some vendors tout that being a "Swiss Army knife" is a good thing. However, organizations often purchase products that are loaded with features that never get used. When evaluating a vendor, organizations should look for innovative features that help them meet their business challenges and avoid paying for features that are likely to never be used.

Breadth of Portfolio

Understanding that the network touches everything from users to systems and applications, it's important that the chosen vendor has a broad product line and can deliver high-quality, reliable infrastructure at all the network's critical points. This includes storage networking, data center, wiring closet, metro and the aggregation edge.

Ecosystem-Centric

The networking industry has always had a large ecosystem around it. However, the ecosystem has primarily been in place to support the network infrastructure. Because the network now has direct impact on how applications perform, how virtualization functions and how well users can communicate, it's critical that a vendor puts the ecosystem at the center of its strategy, not at the edge. Vendors can only do this if the product strategy is to have an open, standards-based architecture and world-class, market-leading partners.

V. Conclusions and Recommendations

Computing and application virtualization is transforming the workplace like never before. Workers now need real-time access to content instantly no matter where they are. This demand is placing the network in a position to be a key enabler of broader use of virtualization and a point of competitive differentiation—a role reversal for the network from a decade ago. Organizations that embrace this transition will reach new levels of productivity and gain a competitive advantage. Those that do not will struggle competitively and fall further behind their peers.

However, for the network to realize its full potential, it needs to undergo a transition. The conventional wisdom that states that network value decreases as connectivity moves further away from the network must change. The value of the network needs to be treated consistently across the data center, aggregation edge and wiring closet. Data center reliability and features need to be pervasive across the entire backbone because the network now takes on the role of being the backplane of the virtual compute environment.

With that in mind, Yankee Group makes the following recommendations for organizations looking to use the network as a virtualization enabler and a point of differentiation:

- **Take an open, standards-based approach to networking.** Many vendors tout new features that are built with closed, proprietary technology. Although this may seem attractive at the moment of evaluation, it may lead to long-term vendor lock-in and an inability to interoperate with a larger ecosystem, meaning the short-term gain will be offset with years of long-term pain.
- **Be willing to use alternatives vendors.** Traditional thinking is that one never gets fired for buying the market leader. However, this isn't true during times of transition. History is filled with vendors such as Honeywell, Lucent and Cabletron that were market leaders and missed significant market transitions. During this transition, organizations should not let incumbency blind them and instead make a decision based on the long-term view of what the network needs to do.
- **Embrace virtualization as a way to increase efficiency and reduce costs.** To date, only 6 percent of companies have no interest in virtualization. Less than half of enterprises are actually using virtualization in production environments. Virtualization technology is mature enough to be used in production environments. Additionally, organizations should look to virtualize more than just servers and extend virtualization to the other areas of the data center and desktop.
- **Deploy a rock-solid, data center-class network to support virtualization.** Although virtualization can provide organizations many benefits, it's important to have the proper network foundation in place prior to broader use of virtualization. A comprehensive wiring closet-to-data center strategy will ensure that organizations will maximize the investment in computing virtualization.

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