

Managing the growing pains in today's expanding networks

In a rapidly changing world, devices, data and infrastructure demand a new plan



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Introduction

Change may be constant, but in today's IT networks there's one type of change that's more constant than others—growth. More people are generating more data than ever before with iPhones, iPads, Android phones and other mobile devices. Each platform and each business operation requires new applications. Work occurs across greater distance. But functions still occur on the network. The result? To accommodate increasingly sophisticated personal devices and wider ranges of service types, networks are expanding exponentially. And the pressure to expand creates larger and more complex network infrastructures, with greater challenges for network management.

The explosion in the numbers and types of devices on today's smarter planet, coupled with the increasing mobility of both devices and users, can enhance the effectiveness and productivity of the entire organization. The successful delivery of IT services to support these devices and to enable mobility, however, requires attention to IT issues that range from security, availability and cost as well as attention to administrative capabilities ranging from central management to visibility and analytics.

Given the size of today's infrastructures, traditional, manual management functions are no longer possible. Instead, dealing with IT issues and ensuring capabilities requires new strategies. This white paper addresses network expansion as a strategy

not only for accommodating technology requirements such as support for sophisticated end user devices, the complexity of interconnections, flatter network hierarchies and the growth of virtual routing—but also for helping to ensure that the network continues to function as a key player in meeting business needs to reduce costs, generate new revenues and achieve competitive success.

The need for management in an expanding network

Today, even a business that operates with a stable organizational structure and an unchanging number of users can find itself faced with a rapidly growing network infrastructure. Consider the insurance agent who 20 years ago needed only a text terminal to post client details and premiums to the mainframe; all other information was handled in hard copy using handbooks and folders on the desk. Now that agent typically consults local government records, actuarial tables, geographical data and other information online. What's more, an agent meeting a client at the client's site can access this information with a mobile device. Meanwhile, back at headquarters, the insurance company can audit the application process over the network in real time.

New work styles and capabilities such as these, supported by technology that is more intelligent, instrumented and interconnected than ever before, generate unprecedented volumes of data. The change reaches beyond office workers such as our insurance agent—to smart meters in a utility, or electronic medical records in a hospital, for example. Information from more sources than just the data center cannot be accessed, processed or used to gain insights that advance business success without network growth.

Such growth naturally prompts growth in the infrastructure that supports and manages data and devices. But an expanded network is not simply a larger version of the network the organization previously had. In deploying new systems and managing change, IT is virtually certain to encounter issues it has not encountered before.

Increasing pressure on network infrastructure

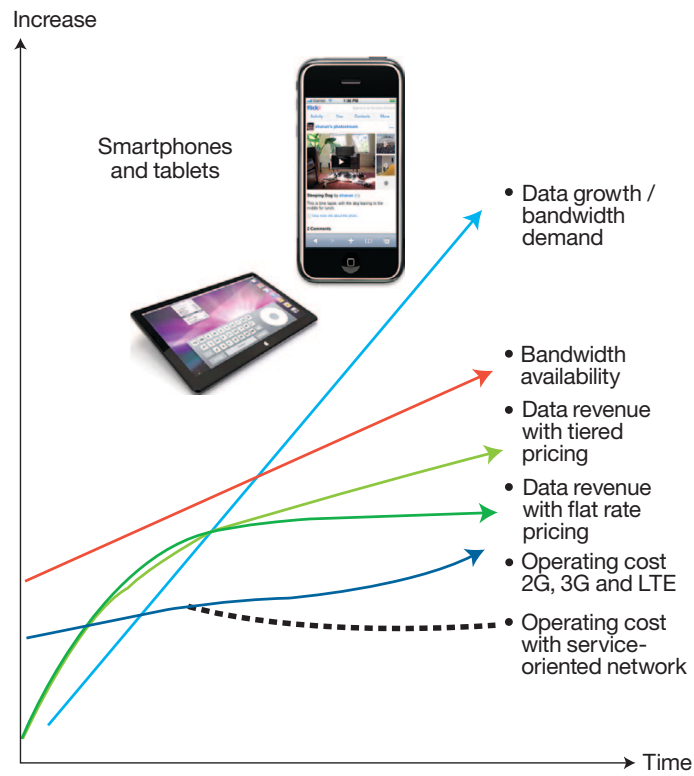


Figure 1: The need for network capabilities and bandwidth is expanding at a faster rate than either bandwidth availability or revenue to grow.

Can the organization seamlessly integrate equipment from new and different vendors, configure it properly to meet organizational policies, and manage it with the existing infrastructure to ensure ongoing regulatory compliance? Will users be allowed to use their personal smartphones for business, regardless of platform or vendor, or will there be a company-owned standard? Will the cost of equipping and managing the expanded network rise at a faster rate than the revenue flowing into the company?

For the enterprise that supports hundreds, hundreds of thousands or even millions of devices, an increase in the variety of operating systems, command sets or form factors requires a new approach. It requires solutions that can automate configuration changes, analyze performance, ensure security, support massive scalability and provide a host of other management functions.

For telecommunications companies and other service providers, providing expanded services that are both dependable and manageable—supporting IT scalability with the ability to identify and resolve problems fast, even before they happen—is key to a superior user experience that supports a growing business.

In other words, the more the organization depends on growing numbers of devices and huge volumes of data, and the more its demand on bandwidth and the addition of infrastructure is expanding, the more it needs strong capabilities for network management.

Critical challenges for managing expanding networks

The ubiquitous data gathering, processing and information sharing that characterizes today's smarter planet occurs on networks. Nowhere else can the organization implement the services, provide the collaboration, support the mobility or ensure the high performance and productivity that business requires today.

The rapid rise in the number of mobile workers—whether they are actually traveling or working at home or at some other offsite location—with their need for reliable bandwidth and secure access to applications and backend systems can present particular challenges in managing a large infrastructure.

The steady move toward virtualizing servers and storage is breaking down silos in both operations and information, but virtualization's pools of resources demand a high visibility “single pane of glass” approach to management.

Similarly, large networks—whether virtualized or physical—can present special challenges for device configuration. That's because as networks grow, the chance of error also increases, and errors introduced during manual change can cost companies money, reduce the efficiency of network and device performance, and increase security risks.

The complexity of expanding networks and the likelihood of a network outage resulting from human error, lack of visibility or another management issue make attention to availability, reliability, performance and security all the more necessary. An organization with an expanding network needs reliable and effective capabilities for event management, root-cause analysis, change and configuration management, performance reporting and endpoint management.

With capabilities such as these in place and proper attention directed at key issues, the organization can manage network expansion in a way that makes it more able than ever before to support its workforce and customers.

Managing the user experience

While network visibility is a key factor in streamlining management, it also is a means to a business end—ensuring a smoothly operating infrastructure that provides an optimum experience for customers and the company workforce. Visibility provided by

Network management value migration

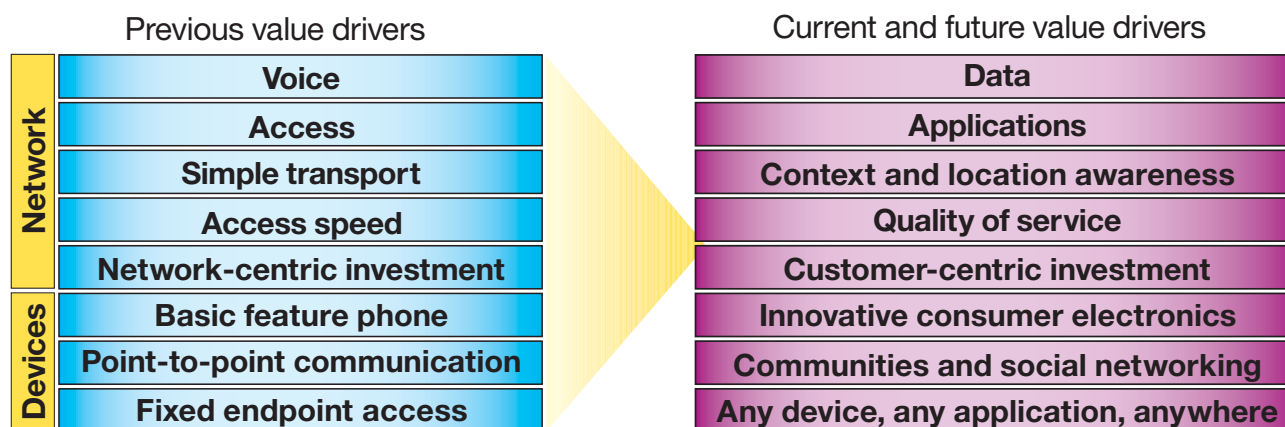


Figure 2: The needs driving network management are no longer divided between devices and the network itself—they are an integrated set of needs that are largely based on the rapid increase in mobile devices and users.

a central point of management, in fact, can deliver rapid results that the organization can measure in both time to value and return on investment.

The ability to gather, understand and act upon information such as the time employees and customers spend connected to the network or how fast their connections run during these periods can reveal both problems with the IT infrastructure and opportunities for business.

Using information to expand the network intelligently—rather than expansion by guesswork—can prioritize growth, target expenditures and focus efforts for business services. Do a bank's branch offices in one geographical area have bandwidth limitations that other offices do not experience? Do remote employees use their home office computers or their mobile devices more frequently? Which telecommunications customers spend the most time online—teenagers who are texting or business users connecting to corporate applications?

Solutions that provide answers to questions such as these and that support expansion with scalability and performance—ensuring, for example, that system configurations remain optimized for consistent and uninterrupted operations—are necessary for addressing issues and ensuring a quality user experience.

Managing a virtualization strategy

Many organizations are turning to virtualization and cloud computing as significant tools that enable network expansion. The flexibility of virtualization and cloud can be key to providing resources for a rapidly changing business. Server and storage capacity can be provisioned immediately for short- or long-term use, often without the need for additional equipment purchases. As business mobility increases—and especially as smartphones and tablet computers become interfaces for enterprise applications—the flexible scalability of virtualization becomes more central than ever to always-available operations.

Organizations with cloud-based capabilities, as a result, often rank resource allocation and management capabilities as among the most important features in purchasing and deploying network equipment. But as networks grow to accommodate more users, more devices and the increased movement of more data in and out of the environment, streamlined management also becomes increasingly important.

The ability to automate the provisioning of network services, the ability to automate backup and restore of device configuration, and the ability to automate event correlation, problem isolation and problem resolution for greater network reliability all can be key to providing the necessary management and control for an expanding virtualized environment.

Managing the bandwidth challenge

The growth of data, voice and video traffic along with today's rapidly increasing number of network-attached devices is putting a strain on many organizations' bandwidth. From smartphones used by a telecommunications' company's customers to information gathering telemetry devices installed in automobiles, the increased flow of data requires increased network capacity. The "consumerization of IT," in which employees use their personal phones and tablet computing devices for work, is moving mobile business connectivity beyond voice and email to accessing applications—with the resulting need for greater bandwidth and larger infrastructures to handle additional application traffic along with packetized voice and video to avoid jitter and delivery delays.

Bandwidth, however, is not just a pipe, and any equipment added to increase bandwidth requires managing. In addition to new equipment, new vendors for existing technologies are likely to be introduced. And in the dynamic environment that results, disparate elements must be integrated. Effective network management solutions will facilitate the process with built-in libraries for quick and simplified integrations in common scenarios, and they will provide tooling that allows the construction of integration probes in unique scenarios.

Managing compliance and security

It is no longer practical to fence a private network off from the public Internet; too much business traffic must pass over both kinds of connections. But as networks expand to accommodate this traffic, threats to security can grow at an alarming rate. As data flows in larger amounts and devices increase in numbers and variety, the network can face huge increases in vulnerability.

Compliance is a critical issue, for even when controls by industry regulators or government agencies are not an issue, the organization still must comply with internal policies, accepted standards and best practices. Even a simple device misconfiguration can cause serious network vulnerabilities, outages and performance issues.

A valuable addition to a large and complex expanding network, therefore, can be preemptive solutions that provide levels of control that are not possible manually. Such solutions continuously monitor changes to limit human error and reduce the chance of noncompliance. For organizations with large numbers of mobile workers, an effective management strategy enables IT to deploy, configure, command and control endpoint security technologies on a wide range of devices. It enables integration and management of best-of-breed mobile security technologies. For any expanding network, strong security measures are critical to any future growth.

Managing service provider growth

With the network as their source of revenue, providers of public clouds and telecommunications services must carefully manage how they expand. It is not enough to simply provide bandwidth. A provider needs to provide services of its own rather than just make a pipe available that other companies use for their services. Effective management tools, on the other hand, can support the launch of services that open new sources of revenue. Putting into place and managing the infrastructure that increases bandwidth, then using tools such as network performance analysis to discover congestion, hot spots or other problems can provide a solid foundation for a better customer experience.

Ongoing, consolidated management tools can help control or even decrease operating expenses—because they can reduce and streamline the IT workload. Supporting network capabilities for multitenancy in a secure and compliant manner can build revenue by increasing resource utilization. For the organization that provides outsourcing services, the ability to manage a scalable and reliable expanded network for customers can be a strong competitive differentiator.

A holistic approach that extends management capabilities

IBM Tivoli® Netcool® solutions enable a holistic approach to integrated network management with capabilities that span the entire network infrastructure, from monitoring and event management to network discovery and root-cause analysis to configuration change and compliance management.

Delivering the capabilities of IBM Tivoli Netcool/OMNIBus, IBM Tivoli Network Manager and IBM Tivoli Netcool Configuration Manager, this approach provides a single convenient and cost-effective solution that integrates network and event management capabilities for:

- **Event and availability management**, providing consolidation, prioritization and enrichment for events across the network, including automated event correlation, isolation and resolution for capabilities that can help achieve and maintain high network availability and performance
- **Network discovery and root-cause analysis**, enabling automated network discovery, topology-based management and network diagnostics capabilities that help improve network visibility and control with highly accurate information on connectivity, availability, performance, usage and inventory
- **Configuration change and compliance management**, automating network configuration management tasks, controlling network device access and helping ensure network policy compliance to support the configuration lifecycle of network components including routers, switches, hubs and firewalls

Management for expanding networks can be extended still further with solutions including IBM Tivoli Netcool Performance Manager, which supports capacity planning by collecting network statistics and providing reports on the performance of the network.

IBM Endpoint Manager, built on BigFix® technology, delivers real-time visibility into the state of network endpoints and provides advanced functionality for managing and securing those endpoints. It supports the discovery and inventory of resources, distribution of software, control of remote devices, and management of system changes.

IBM network management solutions provide automation, visibility and scalability that support configuration and change management across the complete network lifecycle, help ensure compliance, and enable better control, management and growth for expanding networks.

For more information

To learn more about the IBM solutions for expanding networks, including Tivoli Netcool/OMNIBus, Network Manager and Netcool Configuration Manager, contact your IBM representative or IBM Business Partner, or visit: ibm.com/tivoli/solutions/network. From this website, you can access a product demonstration and an in-depth webcast, videos as well as other white papers on this topic.

About Tivoli software from IBM

Tivoli software from IBM helps organizations efficiently and effectively manage IT resources, tasks and processes to meet ever-shifting business requirements and deliver flexible and responsive IT service management, while helping to reduce cost. The Tivoli portfolio spans software for security, compliance, storage, performance, availability, configuration, operations and IT lifecycle management, and is backed by world-class IBM services, support and research. For more information on Tivoli software from IBM, visit: ibm.com/tivoli

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