



**PROFESSIONAL
SERVICES**

Taking Control of Your IP Networks: Brocade Best Practices

Brocade provides networking best practices that allow our customers to take control of their IP Networks instead of worrying about them.

As a network or systems technology professional it is difficult to stay on top of the latest emerging technologies while providing day-to-day support for your customers and end users. Just when you think you are making headway on one project, priorities are changed. Among the many challenges are a few that represent the core responsibilities of network administrators:

- Network and application performance**
- Service availability, redundancy, and resiliency**
- The ability to scale quickly and efficiently to meet the evolving demands on the network and data center**

We understand the daily challenges that IT organizations face. Our consultants work directly with IT staff to ensure that we understand the issues and offer products and services to respond to immediate and ongoing needs.

Due to reductions in headcount and decreased technology budgets, IT organizations are discovering that the demand for convergence, consolidation, and virtualization is putting them in a tough position. And network and application performance is suffering as a result. Single points of failure are causing network-wide outages that directly affect the bottom line. New business initiatives are being delayed due to issues with data center scalability. The critical issues that many are struggling with include:

- How can we increase the performance of the existing network without having to replace it?
- The data center equipment is full and we need to add new sites and applications. What are our options?
- Most of our outages cause the corporation to lose money from lost productivity. How can we improve the availability, redundancy, and resiliency of our network and applications? How can we create predictable resiliency?
- With corporate growth many people have expressed the need for a redundant data center. How should we evaluate the need and feasibility?
- How can we grow the business, going into new areas of business to increase revenue streams, while still maintaining and enhancing current systems and infrastructure?

PERFORMANCE

There are many potential causes of performance issues on the network or in the data center:

- Incorrectly configured equipment is a very common problem, which can contribute to an unsatisfactory end user experience. From auto-negotiation issues to routing protocol configuration errors to multi-port trunk anomalies to incomplete and non-operational Quality of Service (QoS) deployments.
- The use of servers hosting business-critical applications may have increased to a point where transactions take much longer than they once did. This can negatively impact the cost of doing business as each application user takes more time to accomplish the same set of tasks they once accomplished in less time.
- Saturated links at any point in the network cause delays, and often failures, of certain applications. Without accurate trending analysis, this issue can catch an organization by surprise, forcing them to behave in a reactive mode instead of being prepared when failures occur.

Performance issues are unique, and in order to understand network and application performance you must have a thorough understanding of traffic patterns, user experience, server loads, service availability, and so on. To properly understand you must have data that can be analyzed over time, starting with a reference baseline, and then visibility into performance trends. This will allow you to make informed decisions about fine-tuning devices in the current configuration and provide guidance for recommended future design changes.

SCALABILITY

Scalability is a term that reflects the ability of a system to grow and respond to new business requirements. Most IT business decisions focus on immediate needs and tend not to take into account potential growth requirements or other dynamics. So it is quite common for hierarchical network layers to provide little room for expansion as demonstrated in the scenarios described below:

- New services in the data center are forced to connect at lower speeds due to the lack of open high-speed ports.
- The network core supports server and end-user connectivity, preventing the addition of needed high-speed modules.
- Distribution switches are deployed with fewer slots than needed to support predicted growth.
- Access switches are forced to daisy-chain due to distribution layer port density.
- VoIP convergence is put on hold due to lack of adequate infrastructure.
- Bandwidth limitations cause issues with new applications resulting in unhappy users and customers.

These are examples of situations where scalability planning and trending awareness could have put an organization in a position to grow efficiently with a level of predictability. Without this planning it is a constant struggle simply to catch up to the demand placed on your enterprise.

NETWORK AND APPLICATION REDUNDANCY AND RESILIENCY

When it comes to designing a network and system of applications two characteristics go hand in hand with survivability when an outage occurs: redundancy and resiliency:

- Redundancy is the use of duplicate components to provide an alternative in the event of a single system failure.
- Resiliency is the ability of the entire system to return to its original state, or capability, after an outage.

Outages can typically be reduced by deploying redundant hardware components and hardware and software with high availability built into their design, deployment, and connectivity. Proper configuration of protocols that react to outages and network monitoring that notifies the right people at the right time can also improve network and system uptime.

Without fully understanding the mechanisms and metrics of redundancy and resiliency business continuity could be impacted by a single device or link outage. Single points of failure, both in hardware and in connectivity, have the potential to interrupt or in some cases halt business critical processes. Resiliency and protocol reconvergence must be understood and predictable at every point in the network in order for network administrators to make informed and logical decisions related to design changes. They must be designed into the network systems and must be dynamic in nature so that manual intervention is not needed. It is imperative that these factors be taken into account when you evaluate how robust your current design really is.

In the past often little emphasis was placed on the collaboration between the network group and the server group, until there was a problem—then everyone pointed their fingers at the other group. Today's increased demands on both the network and the server systems, coupled with convergence, mobility, and virtualization, have blurred the lines between the two groups. Network engineers must now understand application requirements, intricacies, and capabilities in order to provide adequate performance, redundancy, and resiliency. IT application owners must now understand network design, how end-user experience is affected by the network, and how their application interacts with the other applications and is used by internal customers.

CRITICAL SERVICE REDUNDANCY AND RESILIENCY

Business services such as e-mail, DNS, databases, financial applications, Web-based services, order management and fulfillment systems, and other specialized business-critical services must be available at all times, 24x7 across the world. Servers that are unavailable due to failure may cause your business to stand still until a resolution can be found. Server overloading and related performance issues have a direct correlation to the cost of doing business. As performance decreases, end-to-end response times suffer, and employee efficiency is reduced. A thorough review of business continuity, with a focus on service availability and performance, should be performed regularly to ensure that corporate objectives can be met even during outages. The top priority of an IT organization is to provide end-to-end services in an efficient manner—even when during server, service, or network outages.

Critical service redundancy and resiliency goals can be met, but not by accident. Specific policy and process initiatives need to be taken and subsequent results evaluated based on explicit, pre-determined criteria. Difficult decisions must be made, such as the number and location of critical systems. Design must take it into account, implementation must include it, and test plans must verify it.

OPERATIONAL RISKS

Operational risks are present in IT environments today, and the truth is that it is impossible to eliminate risk altogether. The goal is to determine the right amount and type of resources to dedicate to risk assessment and management. Too few resources and you are susceptible to risks; too many and you are wasting time and money that could be better spent on other initiatives. It is critical that resources be allocated appropriately such that there is a balance between the cost and the benefit.

Risk is not just about the latest computer virus. IT organizations often get caught putting bandages on the symptom without addressing the root cause. Instead, they need to take a holistic approach to risk and develop a plan for evaluating risks, classifying risks, and mitigating risks of all kinds. Common areas of consideration are:

- What happens when the one engineer with "tribal knowledge" not available elsewhere decides to leave the company?
- Is it time to look into a second data center to increase redundancy and availability to all users? Is a disaster recovery vendor really my best option for business continuity?
- Will a Voice over IP (VoIP) convergence rollout adversely impact my other applications?
- How do we prioritize the issues we know about? What about ones we may not be aware of?
- What happens when I implement virtualization solutions and can't troubleshoot adequately due to the complexity of the network?
- Is my network protected from outside influences? What about internal influences?

HOW CAN BROCADE HELP?

At Brocade we focus on the two things that allow our customers to concentrate on their core business instead of worrying about the network:

- Hardware and software for building a stable high-speed network infrastructure
- Services that provide expert assistance and guidance in all areas of network ownership

We understand the daily challenges that IT organizations face. Our Professional Services consultants work directly with the IT staff to ensure that we understand the goals, risks, customer processes, and core business. If you are trying to launch new initiatives, such as deploying or upgrading an ERP application and you do not have the in-house staff or expertise, consider services to review and revise current architecture to support the new application. Brocade can perform installation and provide your staff with documentation and knowledge transfer to enable a smooth transition. Moving forward we can continue to provide services such as hardware and software upgrades on an ongoing basis to ensure that Service Level Agreements (SLAs) to your corporate business partners are met. Over time, Brocade can become a trusted advisor to keep your business on track and with cost-effective and robust operations.

Specifically, Brocade Professional Services span the life cycle of assess, design, implement, and manage. Offerings include:

- Data Center Networking (Energy Efficiency Review)
- IP Network Infrastructure Services
- Data Center Virtualization
- Data Migration
- Data Protection (Backup and Recovery, SAN Security, others)

For more information about Brocade products, services, and solutions, visit www.brocade.com.

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