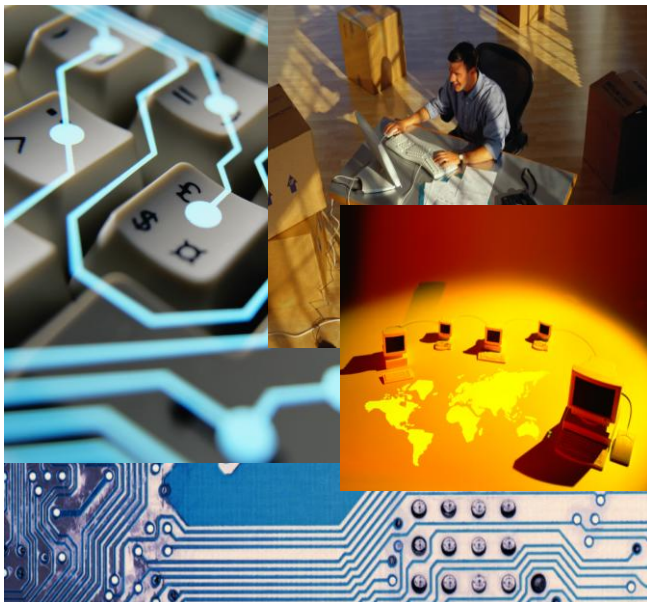




# 10 Steps to Building a 21<sup>st</sup> Century Network

## A Review of How To Build a Network Infrastructure Based on Modern Design Approaches and Options



Authored by Neil A. Rosenberg, an industry veteran holding multiple certifications and frequent speaker and author on various IT topics, this paper will discuss how to build a 21<sup>st</sup> Century Network – a network that takes advantage of current, state of the art technologies to improve reliability and availability while reducing operating costs and improving flexibility. In this white paper, we provide a strategy for helping you achieve these goals as rapidly and efficiently as possible.



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## **SAN versus NAS**

For many, the difference between a NAS and a SAN can be a point of confusion. A NAS is a Network Attached Storage device that allows you to store data (like you would on a File Server) on a relatively inexpensive appliance which is purpose-built for that function. This often leads to a de-centralized storage model.

A Storage Area Network is a different creature, in which storage is centralized into a relatively expensive disk pool with high redundancy of key components. The Storage Network, which is typically made of Fibre Channel or Ethernet switches (iSCSI), is a separate network from the Ethernet communications network, and the SAN Fabric is usually completely meshed (no single point of failure). Centralizing storage allows for faster backup, more efficient space utilization, server clustering and virtualization.

## **Introduction**

A wise man once said “the only constant, is change.” This is an expression I sincerely believe in, and we all need to be receptive to changes in the things around us, whether we like it or not. There is a tremendous amount of change that has been going on around IT infrastructure the last few years - one might say, a “sea change.” New tools and approaches are available that allow us to design and integrate networks in radically different ways than we are used to - yet many of us as IT professionals tend to do things the way we’re comfortable with, following old approaches even if newer and potentially better ones are available. As IT professionals, we’re inundated with change. So, we need to be open to new ways of thinking and take advantage of the changes that are positive and will benefit us.

I refer to these new approaches to network design and integration as “21<sup>st</sup> Century Networking.” It’s 2008, and yet many times we fall back on ways of designing and implementing technology that go back to the 1990s (or earlier). With new tools and technologies available, we need to open up to new ways of doing things, which can help us. Sometimes, this means we need to shift our paradigm and think of things in different ways.

This white paper is intended to give its readers a framework for building a **21<sup>st</sup> Century Network**, so you can evaluate your current network and your approach and ideas for future enhancements and upgrades. I believe that if you approach your upcoming projects the right way, you can realize truly significant benefits for your business.

## **1. Centralize and Manage Storage with a SAN**

One of the key steps in building a 21<sup>st</sup> Century Network is to centralize storage of data onto a Storage Area Network (“SAN”). The driver for this is iSCSI - in the past, SAN technology was often prohibitively expensive due to the cost of the Fibre Channel infrastructure needed to connect SAN components. However, iSCSI (SCSI over Ethernet) changes the paradigm and reduces infrastructure costs to 1/5<sup>th</sup> to 1/10<sup>th</sup> of the cost of comparative Fibre Channel infrastructure, while providing a similar level of performance and reliability that is perfectly fine for most medium business customers. At today’s price points, SAN technology is much more affordable than it was a few years ago.

The benefit of a SAN is that you can centralize your data into one disk pool, eliminating the challenges of some servers running out of space and others having excess. Storage can be allocated to optimize performance (RAID 1,



### **Snapshots**

As data continues to grow at an explosive rate, tape backups become more and more challenging to manage. Organizations looking for better ways to restore lost or damaged files are often turning to snapshot technology to assist here.

Snapshots are part of Windows Server 2003 and 2008 as well as Windows Vista and XP, leveraging Microsoft's Volume Shadow Copy Service. Files can be saved to retain prior versions, and changes rolled back as needed.

However, snapshots shine in SAN environments like NetApp, where they can also save storage. Instead of duplicating the entire file, NetApp simply adds the delta data and manages the duplication via pointers. So, if you want to roll back a change, it's as easy and fast as a quick pointer change on the SAN.

RAID 1+0, or RAID DP - a NetApp-specific version of RAID 6) for read/write I/O intensive applications like Exchange and SQL Server, or to optimize capacity (RAID 5), and SANs can be readily expanded as more capacity is needed. Storage can be easily "tiered" with the right platform, with fast SCSI/SAS disks for performance-intensive functions, and slower (and cheaper) SATA disk for archival storage and disk backups. Centralizing this storage is much more efficient with the right tools.

The other benefit of centralizing data onto a SAN is that the data can then be made highly available through the SAN infrastructure and through clustering of associated servers. If the shared data is on a SAN, multiple servers can be connected to the SAN and provide highly available access to the data through Windows Clustering Services, eliminating single points of failure in application access. We've done a LOT of this work in the past few years with Exchange, SQL Server and File/Print Services to make our customers' infrastructure more redundant and available. We've even eliminated the file servers using NetApp's implementation of the CIFS protocol, letting the SAN do double-duty as a big, redundant NAS.

Data on a SAN can also more easily and rapidly be backed up, particularly with some SAN vendors with advanced technology such as Network Appliance's "Snapshot" functionality, and can be replicated SAN to SAN over a Wide Area Network for Disaster Recovery purposes. By centralizing your data, it is easier to manage it.

## **2. Back Up and Archive Systems with Modern Tools**

Data is exploding and servers are proliferating rapidly in mid-sized and larger organizations, making management of storage an increasing challenge for IT. It is not uncommon for data storage requirements to double year over year in many organizations, especially email data. This is often forcing companies to cut back on their backups (exposing them to increased risk of data loss), to avoid backups running overnight into the next morning. Plus, capacities are often expanding beyond the size that tapes can readily accommodate, even with robotic autoloaders. A new approach is called for to manage backups and storage.

The first major trend is toward Disk to Disk backups. Backups to disk are faster than tape, they are more reliable, and restores can therefore be performed more reliably and faster. Because the backups are significantly faster, this deals with the "backup window" problem, while also eliminating tape changes overnight. The price of disk has come down substantially as the capacity has grown - 1TB SATA drives are increasingly normal and affordable.



**Disk Drives:  
SCSI vs. SATA**

Over the last few years, disk technology has evolved to support more choices around capacity and performance. SCSI drives – the fastest drives for data access – have evolved in speed (15,000 rpm drives are now the norm) and SAS (“Serial Attached SCSI”) are the next generation. Note that sometimes more small drives can be faster than large drives, as some applications like Exchange and SQL are optimized by a greater number of drive heads (spindles).

At the other end, Serial ATA (SATA) has replaced IDE as the de-facto standard for inexpensive storage, with capacities reaching 1TB per drive. However, the slower access speeds of 7200 or 5400 rpm make these drives more suitable for archiving and secondary data, as well as disk to disk backup scenarios. These choices give you more flexibility.

Disk to Disk backups don’t, however, get your data offsite, which is important for disaster recovery. Therefore, it is important to be able to copy these backups to tape, for offsite rotation (this can even be done during the day), or to “vault” the data backups up to hosted storage on the Internet. Symantec recently introduced its “Symantec Protection Network” to offer this solution, hosting backups from Backup Exec or from agents that bypass local backups entirely, validating this market with the entrance of a major player. By eliminating tape, but providing appropriate and needed security, IT can significantly reduce the effort needed to manage backups, while increasing speed and reliability.

The above strategies protect your data - however, protecting your servers is an increasingly challenging process. The goal should be the ability to rapidly restore servers from Disk to Disk backups, so they can come back to an operational state quickly - whether on the same hardware, dissimilar hardware, or virtual machines (see below). This can be done with tools like Symantec’s Backup Exec System Recovery, which allows for such rapid restoration (literally, in minutes in some cases).

As the volume of data we deal with expands exponentially, managing storage becomes more critical. Most organizations are unwilling (or in some cases unable) to “purge” data from their systems - users rebel against this, yet don’t have the time or desire to manage storage. Yet, having this data on your systems slows down performance (especially applications like Microsoft Exchange) and can create problems if you need to manage this data and even produce it for legal discovery. Having an archiving solution that preserves the data, but moves older data to cheaper (and usually slower) secondary storage solves this problem. Symantec’s Enterprise Vault is an example of such a product, and can provide users with the “illusion of infinite storage” while giving IT the tools needed to properly manage the steady explosion of data on our networks.

### 3. Virtualize Your Servers

Virtualization is the big “buzz word” these days in IT circles - usually, in reference to Server Virtualization. VMware has been the leading pioneer in this space, but many other vendors including Microsoft and Citrix offer solutions here, and the increasing competition is good for customers. Virtualization can be applied to many areas besides servers - applications, desktops, storage and many other system elements can be virtualized. But server virtualization is usually the starting point.

Server virtualization essentially separates the logical server operating system, and its installed applications, from the physical hardware - it breaks the one to one relationship between server hardware and server software.



### **The Future of Virtualization**

The future of virtualization is clear – Microsoft has assured that virtualization is moving from the fringe of large data centers to the center of your network, as a core component of Windows Server. Virtualization will no longer be a specialty – it will be part of what every server does over the next few years.

Hyper-V will turn virtualization into a commodity, though the pace will depend on new hardware adoption since Hyper-V requires the new Intel VT and new AMD chipsets to function.

Citrix will ride this wave by making XenServer a value-add service that stacks on top of Hyper-V, much like XenApp/Presentation Server adds to Terminal Services.

VMware currently has significant market share and will maintain much of that, but will need to truly differentiate and add value to remain strong. The battle has begun.

In a virtualized world, a piece of server hardware can run two, four, six or even ten or more “logical” servers (copies of Windows Server or other operating systems) - so, for example, the hardware that you are using today to run your Citrix Web Interface server (perhaps at 2-5% utilization) can also be used in a virtualized world to run your RSA Authentication Server, your Blackberry Enterprise Server, a Domain Controller, and perhaps other roles as well. Each server thinks it has access to its own hardware, but software underneath (in most cases, a “hypervisor”) controls access to the hardware and “multiplexes” the hardware across the multiple software instances. This reduces hardware costs, but also space required for the hardware, power and cooling required for the hardware.

In a virtualized world, each server becomes a big disk file that gets loaded up from the hard disk of the physical server it is stored on. This creates considerable flexibility, by isolating the server operating system software from the underlying hardware. It also makes the server software “portable” from one hardware platform to another, which creates considerable flexibility and potential. A virtualized server can be stored on a SAN and loaded up on any SAN-connected virtual server (this is how VMware implements their “VMotion” high availability solution), or it can be copied to another server as a backup, or it can be copied/replicated across a WAN to a DR site (VMware is now introducing a program to automate this process, providing a high-end solution for DR failover).

VMware was the major player in this space, and their name is almost synonymous with virtualization. However, last year Citrix bought the number two player in the virtualization space, XenSource, to create their XenServer and XenDesktop offerings (and they renamed their Presentation Server offering as XenApp - providing a suite of products for server, desktop and application virtualization). Cross selling these solutions into Citrix’ existing client base will allow Citrix to give VMware a run for their money, but Microsoft is also entering the market in force with Windows Server 2008 and the recently released Hyper-V hypervisor. Microsoft’s entry will start to commoditize server virtualization and bring it into the mainstream, while the major hardware vendors are concurrently starting to license and bundle VMware and Citrix’ hypervisors into the chip sets on their system boards (so these servers will have virtualization “baked into” the firmware). As a result, server virtualization will become increasingly prevalent in the mid-market, and if you do not “ride the wave” of this important new technology, your business will be at a competitive disadvantage.

## **4. Deploy an Imaged, Consistent Operating System**

Although servers get a lot of our attention, our desktop systems are what deliver business value by giving users computing capabilities. Desktop



### **Virtualization & Disaster Recovery**

One of the most appealing aspects of virtualization is its ability to finally let organizations build a viable and cost-effective disaster recovery strategy. Up to now, DR meant duplicating all of your hardware and software at a remote site. Now, there are many choices.

By virtualizing servers, we decouple the software from the hardware, making it portable. This means Virtual Machines can be moved from one site to another by SAN-to-SAN replication, host-driven replication (like Double-Take for Virtual Infrastructure) or even copying VMs to a USB drive. The VMs can then be spun up at the DR site and re-addressed (manually or using scripts) to facilitate operation at the alternate site.

Many vendors have different approaches with varying pros and cons, but you have more choices now than ever.

systems also typically consume a truly significant amount of IT staff time and resources. Most organizations spend most of their support time on their desktop systems, which are increasingly easy to use but increasingly fragile and difficult to manage.

Many systems are deployed “out of the box” based on the OEM operating system they ship with, and therefore organizations end up with inconsistent configurations across their systems. This is compounded by hardware differences, as well as differences in how different technicians roll out different systems, and how those systems are maintained. The hardware and operating system are the “foundation of the house,” so to speak, and it is important to have a consistent, reliable foundation upon which any house is built.

To address this, many organizations have turned to imaging products like Symantec Ghost, which allow systems to be deployed based on a consistent image. In some cases, that image is pre-loaded on systems before they are shipped out (Dell and others provide this service), but images are often tied to the hardware platform, and difficult to maintain and manage. For example, Ghost images often take hours to update between imaging a system, making changes, and re-creating the image. Doing this across multiple images can become un-tenable. And, once PCs are imaged and deployed, they need to be managed on an ongoing basis (patches, driver updates, software, etc.). A better approach is needed.

First and foremost, using an imaging solution that is easy to deploy and maintain is critical. It is important that your systems be “cut from the same cloth,” particularly if you plan to use software distribution tools like SMS/System Center Configuration Manager, LANDesk, Altiris (now owned by Symantec) or others to deploy software packages. Software packages depend on the underlying operating system environment, so deploying a package created on one system to a machine configured differently is like putting the body of an SUV onto the carriage of a VW - it won't fit, and will create problems when you try to run it. Having a consistent desktop image reduces support costs, and increases manageability.

QTS has had good success with Microsoft's “Windows Deployment” technology (formerly known as the Business Desktop Deployment Solution Accelerator), which allows for management of a single image for Windows Vista regardless of the underlying hardware (desktop/notebook, Dell/HP, etc.). We've been able to deploy 5-10 PCs with these tools in the same time that a customer took to deploy one Windows XP imaged with Ghost. Since this is a file-based imaging solution, it is easy to maintain - performing updates can be as simple as copying files and saving the image. Properly utilized, these tools allow an IT organization to deliver a more consistent and



### **Desktop Deployment Considerations**

When planning a desktop upgrade, either physical or virtual (VDI), the most important consideration is having a very clear understanding and inventory of your hardware and software. Only with this knowledge can you intelligently plan such a project.

Software is the biggest challenge, since many older applications will not be compatible with current operating systems. Armed with a good inventory, you can assess which apps will work as is, which will need to be upgraded or patched, and which may need to be entirely replaced. This helps define overall cost of the effort.

Hardware can be a challenge too, though, in terms of both horsepower to run the OS and apps, but also in terms of drivers for the hardware. All this requires solid planning to ensure success.

reliable computing platform, while reducing operational management and support costs.

The next level up from this, which is a growing wave with significant potential, is Desktop Virtualization. At its most basic level, desktop virtualization allows you to take a desktop system, virtualize it into a disk file, and run it from a Virtual Server using thin client protocols like Microsoft's RDP or Citrix' ICA. This approach centralizes your complexity by allowing you to use thin clients at the desktop, minimizing the components there that can break and have to be supported. In that regard, the value is similar to the value proposition of Citrix Presentation Server/Microsoft Terminal Services, but this lets you run a true Windows desktop this way, rather than a Terminal Services session. Taking things a step further, you can provision these desktops from a master image on the fly, bring down personalization through Group Policy, and bring down applications through Application Streaming (see next item) - this is what Citrix XenDesktop offers, providing integration with Citrix XenApp (streaming) and XenServer (virtualization platform) and leveraging the dynamic provisioning technology Citrix acquired from Ardenne 2 years ago, while VMware's VDI solution leverages its own VI3 platform combined with Group Policy and SoftGrid.

## **5. Stream Your Applications**

"Streaming" is a relatively new trend in application delivery, with Microsoft's SoftGrid and Citrix' XenApp Application Streaming as the leading technologies in this space. The idea behind Application Streaming is to deliver applications to the desktop on demand, without pre-"installing" them in the traditional sense. Instead, the application will be "streamed" down to the desktop as needed, with the most used/most needed components being delivered first - thus, the application can start to run even while it is still being installed. This is possible because the files are "sequenced" based on usage/need - keeping in mind that 90% of the code delivered in an installation is rarely used.

Equally important, the streamed application is isolated from other applications and the operating system (Microsoft calls this a "bubble."). This eliminates application compatibility problems and concerns, which are one of the biggest causes of desktop PC instability and support costs. This is done by "virtualizing" the application - installing it into an isolated "container" where the files go into a separate directory structure, and the registry entries go into a separate registry hive, so the application is "isolated" from other applications, and can be delivered to the desktop (or servers) without impacting other applications or the underlying operating system.



### **Hosting Pros and Cons**

"Software as a Service" (SaaS) has a great deal of appeal – simply write a check every month, and don't worry about it. In reality, however, this model is right for some companies and not others, or for some applications and not services, but not others (which is why Microsoft calls it "Software + Services").

First, you need to determine the services that run well hosted, and whether these services are generic (like anti-spam), or if the applications need customization that the hosting providers can't offer. Some hosters offer dedicated servers, which is really just moving your network to their data center at a higher cost. Others leverage shared services, but have less flexibility.

Finally, security and disaster recovery considerations need to be factored into this decision.

Streaming provides other flexibilities besides on demand installation of an application that doesn't install in the traditional sense. Streamed applications can also be more easily removed or metered, making it easier to manage software licensing. Streamed applications make software into a utility that can be leveraged as needed by users without IT intervention, reducing support costs. Software becomes a centrally managed asset, not a distributed resource drain. This model is actually quite compelling.

Microsoft offers this capability through its Microsoft Application Virtualization (formerly SoftGrid, the product of Microsoft's acquisition of Softricity), which at the moment is a fairly complex infrastructure requiring multiple servers and configuration. This technology can also be integrated with System Center Configuration Manager (formerly SMS). Citrix, on the other hand, delivers Application Streaming as part of Citrix Presentation Server (only in their Enterprise Edition), as a feature, with a separate discounted license for offline use. Both products do essentially the same thing, but in different ways and with different infrastructures and pricing mechanisms.

## **6. Move Appropriate Services to "The Cloud"**

Software As A Service ("SAAS") is an increasing trend in IT circles, and for good reason. In some cases (but clearly not all), outsourcing a portion of your IT infrastructure to a service provider can get you an economy of scale that you could not achieve on your own. "Hosted Services" can be a valuable component of your IT strategy, but almost invariably need to be combined with your own infrastructure which can be customized to best meet your needs - which is why Steve Ballmer introduced Microsoft's strategy last year as "Software + Services."

One obvious candidate in this area is anti-spam. There is very little value add an internally hosted anti-spam solution adds, assuming the product is good at what it does - users can still manage white lists and quarantines with hosted solutions, and hosted solutions can potentially be integrated with Active Directory and queue up email. However, hosted solutions also block the spam before it comes down your Internet circuit, saving valuable bandwidth. They also will "mailbag" your mail, so you can have your mail held for you if your circuit or server are down. Finally, some solutions like Microsoft's Exchange Hosted Services, provide options for Disaster Recovery capabilities, so if a disaster is declared users can log onto the hosted service as a web mail server (a great, inexpensive DR solution, particularly for smaller businesses). This can be very compelling, and we are moving many of our customers to this model.

A newer entry in this space, but one that also makes sense, is hosted backup. This one is trickier, because it is highly dependent on the size of



## **WAN Optimization**

Wide Area Networks pose particular challenges in application delivery, due to the combination of slower speeds and increased distance (latency), both of which tend to expose weaknesses in the TCP/IP protocol. This is where WAN Optimizers come into play.

The key is understanding your traffic patterns and knowing whether the traffic on **your** network can be optimized by an appliance or not. Some protocols or services don't handle this well, while others can show gains of 30-50x. It all depends on your environment and applications.

As bandwidth becomes cheaper and cheaper with more and more Ethernet and Fiber connectivity, it may seem like this is less of an issue. But as the pipes grow, so too does the data flowing through them, and its sensitivity to delay. Plan and understand.

your Internet circuit and you are placing a lot of faith in the provider. In this case, your backups go directly to the Internet provider and are stored (in encrypted format) on their disk arrays. There are often many "gotchas" here - support for 64-Bit operating systems and support for applications like Exchange and SQL Server being among the first. You also need to understand how your backups run and what throughput you need for a full backup, and be comfortable with the vendors' software on your server. Symantec now offers this solution as part of its Symantec Protection Network (which QTS offers as well), and there is also a version for Backup Exec 12 where instead of backing up Disk-to-Disk-to-Tape, you can back up Disk-to-Disk-to-Internet. This can also be a compelling solution, by eliminating all the hassles surrounding managing tapes - but be sure to understand the pros and cons of this model.

Other applications and services are also moving into the hosted space, and Microsoft is gradually progressing here. Microsoft currently offers a hosted version of its CRM software, to compete with Salesforce.com, and is rolling out hosted offerings for Exchange and SharePoint (minimal customizability). Keep in mind your ability to customize a solution is severely curtailed when you are sharing a server with other (perhaps dozens or hundreds of other) customers, so be sure to understand the "fine print" in what is being offered. That being said, solutions like this can in some cases be compelling, particularly when you don't have the staff or infrastructure to properly support them in-house.

## **7. Optimize Communications Infrastructure**

As the nature of our applications continues to change and evolve, the nature of the communications problems we encounter changes as well. Web based applications don't tend to have the same performance characteristics as Windows applications, but they can be just as demanding. Also, the physical distance between users and applications often is growing, as organizations often broaden their geographic boundaries and take on more and more mobile and SOHO-based employees. Fortunately, new communications optimization technologies are available that can help address the different performance needs of Web and Windows-based applications.

Wide Area Networks are particularly problematic. In addition to the normal issues of bandwidth, WANs typically connect distant offices and the issue of latency crops up. Latency is distance-based, so a connection from NY to San Francisco, Germany or Singapore will have more latency than a connection from NY to Washington DC. Furthermore, TCP communications are often not optimized - TCP often sends payloads in small frames rather than maintaining steady communications using the largest available frame



### **10 Steps to Secure Your Network**

Here is some guidance on how to secure a Medium Business network. For more detail on these steps see our white paper on this topic:

- 1) Develop Security Policies based on Business Needs
- 2) Manage Patches Centrally
- 3) Harden Your Network
- 4) Control Perimeter Traffic
- 5) Use Smart Antivirus Software
- 6) Redefine the LAN, Secure the VPN
- 7) Monitor for Security Incidents
- 8) Train Your Users
- 9) Really, Truly Secure your Data
- 10) Audit your Security Annually.

By focusing on these ten core elements, you'll be able to establish a much more secure network and business, with far less worries and concerns.

size. WAN optimization appliances from Citrix (WANScaler) and others address some of these issues and optimize WAN links to provide the best performance, sometimes boosting performance tremendously.

Internet connections can also be troublesome, as web servers are not really designed for significant loads. SSL encryption is CPU intensive, and managing TCP connections can overload a web server. Moving these types of functions to a hardware appliance, such as Citrix NetScaler or a similar device, can free up web servers to do what they do best - serving web content, while leveraging hardware-based compression, encryption and connection management to optimize performance.

By optimizing the communications traffic, you can deliver strong performance and meet demanding user expectations, while controlling bandwidth and hardware costs.

## **8. Implement High Availability, Redundancy and Security Platforms**

As organizations utilize information technology more and more at the core of their business, they become more reliant on that technology for basic business operations. The average business these days cannot suffer from a significant email outage any more than a phone system outage - multiple days, or even hours, of downtime can be crippling in impact. For many organizations, the same can now be said of their ERP, CRM, Document Management, Time and Billing and other operational systems - we have in most cases passed the line where manual processes can adequately cover absence of these systems. High Availability, Redundancy and Disaster Recovery are now primary concerns for most IT organizations, and most businesses.

High Availability - to me - means elimination of single points of failure. There are many ways to do this, but it starts with understanding the nature and architecture of your systems and how they typically span across multiple elements (for example, your email system also includes your firewall, your anti-spam solution, your core switch(es), etc.). To build in High Availability, one must eliminate single points of failure within all elements of the "application chain" (as we call it in our Disaster Recovery planning), typically through Clustering, Network Load Balancing and meshing of network architectures. However, other creative approaches can be taken - for example, with VMware's VMotion you can achieve High Availability by having one server instance migrate from server to server in the event of hardware failure, rather than maintaining multiple server instances.



### **10 Steps to a Disaster Recovery Plan**

Here is some guidance on how to implement a Disaster Recovery Plan for your business and network. For more detail on these steps see our white paper on this topic:

- 1) Define Key Assets, Threats and Scenarios
- 2) Determine the Recovery Window
- 3) Define Recovery Solutions
- 4) Draft a Disaster Recovery Plan
- 5) Establish a Communications Plan and Assign Roles
- 6) Plan Your Disaster Recovery Site (Hot/Warm/Cold)
- 7) Enable Remote Access to the DR Site and Applications
- 8) Document the Disaster Recovery Plan, In Detail
- 9) Test the Disaster Recovery Plan
- 10) Refine and Re-Test the Disaster Recovery Plan

However one goes, it is important to eliminate these single points of failure, throughout the chain, to minimize the risk and impact of downtime.

Disaster Recovery typically involves replication of data to an alternate site and server(s), so if the primary server(s) or site(s) go down, operations can be resumed from the DR site. This can be done by replicating data using tools like Double-Take or Microsoft's CCR technology, or using SAN-based replication like NetApp's SnapMirror. At the end of the day, the right approach depends on your uptime goals, your architecture and your budget - we have numerous different tools that all have different design considerations, strengths and weaknesses. But bear in mind there is a difference between replication and backup - Backup allows you to recover from data loss, whereas replication mirrors data loss from the primary site to the secondary site. It is important to account for both in your strategy, even if they seem inter-related (for example, Symantec's Backup Exec System Recovery allows you to do Bare Metal Restores of your server platform, even to dissimilar hardware or virtual machines).

Security is a critical consideration here as well. Security represents a major threat to network uptime, and 21<sup>st</sup> Century Networks account for security at multiple levels, incorporating defense in depth into the architecture. Perimeters are secured by firewalls and end-point inspection technologies (typically leveraging SSL VPN technology to reduce the client footprint and its support impact), with internal network secured through antivirus/malicious code management software and network access control technologies, and with proactive Intrusion Prevention as a consistent layer across all elements. Security should be fairly user-transparent, but where the need for intrusiveness exists, this needs to be balanced between business risk and possible productivity loss/user inconvenience. As users become more IT savvy, they will also better understand the importance of security, and help support a culture of security awareness.

## **9. Manage Your Systems Infrastructure and Security**

Keeping with the theme of maximizing uptime and system availability, it is important to have proactive management tools to monitor your infrastructure for problems (so they can be quickly and proactively addressed), and to help you troubleshoot and resolve problems efficiently. We've had strong success with Microsoft System Center Operations Manager in this space, and with the addition of Virtual Machine Manager (which can with the new release manage both Microsoft and VMware platforms) and Mobile Device Manager for Windows Mobile devices, and third-party add-ins and extensions, System Center can be a comprehensive platform for systems monitoring and management.



### **Microsoft's Unified Communications Vision**

Microsoft is looking at the convergence of voice and data through a software-centric perspective. They are trying to re-define voice-communications from a hardware centric perspective (big central switches and full-featured telephones) – the same way older phone vendors like Nortel and Avaya and new phone vendors like Cisco view the world – to a software-centric perspective where your identity is defined by who you are, not the device you are working on. AD is at the core, and in Microsoft's world the phone is just an appliance you can choose to communicate by voice with. Your identity follows you wherever you go, and is fully integrated over the LAN and the voice platform. It is by changing the rules of the game, and peoples' paradigm, that Microsoft hopes to dominate this market as well.

As you evolve your strategy, Security Management can then be added with centralized monitoring tools like Symantec's SSIM or Cisco's MARS, providing for improved integration and centralization of management. A well-run IT organization also has a good incident tracking/ticketing system, and solid change management/change control processes - Microsoft will be addressing these two areas later in 2009 with System Center Service Manager, a SharePoint-based tool targeted at mid-market organizations. Desktop Management can be an excessively challenging and resource-consuming area, and a strong product here can make a huge difference by allowing IT to get a handle on the desktop, and to more efficiently manage those systems and deploy software and patches. Microsoft System Center Configuration Manager is a great tool here, particularly when combined effectively with Windows Group Policy, and can be integrated with Application Streaming and Windows Imaging/Deployment for a highly efficient and effective system.

## **10. Implement Collaboration and Unified Communications Solutions**

At the end of the day, the core network architecture is plumbing - it needs to work reliably, and when it does nobody notices. The real value of technology is helping users be productive and solve business problems. Productivity and time management is the core challenge we all face, and time is our most important asset as professionals. Microsoft is squarely focused on this with its latest releases of Office and SharePoint, trying to improve user productivity and efficiency while reducing learning curves. We've been able to show tremendous ROI from upgrading Office and moving to SharePoint, empowering users to work more efficiently, often working and collaborating in ways they could not before. And that hits the bottom line.

From a communications perspective, Microsoft is focused on reducing cost and complexity in this space as well, by making telephony communications more a part of the network (or more specifically, applications) infrastructure. Telephones don't need to be a separate device and system that is loosely integrated with your PCs and network - why not make PCs and PDAs/smart phones your phones, and have your identity come from the network, and calls follow you wherever you are. In this way, Microsoft's software-centric approach contrasts with that of Cisco and other leading VOIP hardware-centric vendors, and Microsoft's Office Communications Server is quickly ramping up to meet this challenge. Whether you choose a hardware or software-centric approach to telephony, there are strong potential benefits to be achieved through integrating telephony with your LAN and software architecture, and this is a hallmark of a modern, *21<sup>st</sup> Century Network*.



## **Infrastructure Optimization**

Microsoft's Infrastructure Optimization ("IO") initiative is all about building more manageable, cost-effective networks. By reducing the cost of deploying software and managing network servers and PCs, Microsoft is hoping to allow businesses to move to the most current versions of their products faster, and realize the business benefits of these newer, more powerful technologies.

The core of IO is the desktop, as this is where most companies bleed money. By deploying desktops from a solid platform image, and deploying or streaming applications you can make the environment more reliable and easier to support.

IO is about products and tools, as well as process. You can learn more about IO by visiting [www.microsoft.com/IO](http://www.microsoft.com/IO).

## **Conclusion**

Building a 21<sup>st</sup> Century Network is not about doing things the same way, but with newer product versions. It's about new ways of thinking - new ways to use new technologies that break the mold of established thinking. We're at a key juncture in our industry, where leaders like Microsoft, Citrix, VMware, NetApp, Cisco, Symantec and others are challenging us to try new ways to reduce our costs, to create new capabilities, and to create competitive advantages for our businesses. We can choose to do so, or be left behind. QTS invites you to join us in this journey forward.





### **Highlights:**

- Frequent Computer Industry Speaker
- Author of numerous information security articles for various publications
- 20+ years of computer industry experience
- Numerous technical certifications including CISSP
- Extensive consulting and project management experience
- Attorney

## **About the Author**

Neil A. Rosenberg is the President and CEO of Quality Technology Solutions, Inc., a leading New Jersey network integration and technology services firm. Mr. Rosenberg is a 20+ year computer industry veteran with technical expertise spanning Local and Wide Area Networking and Internetworking, Host systems integration, software development and integration, Disaster Recovery and Information Security, as well as extensive consulting and project management experience.

Mr. Rosenberg holds a wide range of computer industry certifications, including the following:

- Certified Information Systems Security Professional (“CISSP”)
- Symantec Certified Security Practitioner (“SCSP”) and Technology Architect (“SCTA”) for Vulnerability Management and Firewalls
- Cisco Certified Design Associate (“CCDA”)
- NetApp (NASP) and VMware (VSP/VTSP) Certified Professional
- Microsoft Certified Professional (“MCP”)
- Novell Certified NetWare Engineer (“CNE”)

Mr. Rosenberg is a frequent speaker at information security and networking events, and has presented on behalf of Microsoft, LegalTech, the NY State Society of CPAs and other organizations. Mr. Rosenberg has also written articles for the NJ and NY State Society of CPA newsletters and magazines, and authors QTS’ QuikNews monthly email newsletter. He has also provided feedback at an executive and a product team level to Microsoft, Novell and other partners.

Mr. Rosenberg has spent the last 18+ years building QTS into one of the industry’s leading regional integrators. He has developed numerous product offerings, including the launch of QTS’ QuikDesign, QuikSecure and QuikRecover line of offerings, and QTS’ service delivery methodologies.

Prior to QTS, Mr. Rosenberg served for seven years at Blue Cross Blue Shield of New Jersey, as a manager in the Contract Development/Legal Department. Mr. Rosenberg helped modernize and automate the organization’s paper-bound workflows, installing the company’s first Novell LAN and leading development of its mainframe-based benefits administration system along with numerous other automation initiatives.

Mr. Rosenberg earned a B.A. with Honors in History and English from Rutgers College, and a J.D. degree from Rutgers School of Law - Newark. He passed the New Jersey Bar and served as a member of the NJ State Bar Association’s Law Office Management Committee for several years.



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QTS also offers:

- **QuikSecure**  
Security Lifecycle services
- **QuikAssist**  
support plans
- **QuikAlert**  
remote server monitoring
- **QuikStart**  
knowledge transfer engagements
- **QuikDesign**  
planning & architecture services
- **QuikRecover**  
Disaster Recovery Services
- **QuikDeploy**  
Desktop Deployment Services

## About Quality Technology Solutions

Quality Technology Solutions is one of the leading network integrators and security service providers in the NJ/NY metro area. QTS has been serving businesses in New Jersey and New York for over 18 years, leveraging a senior talent model to deliver award-winning service and expertise to its customers.

Quality Technology Solutions is:

- Microsoft Gold Certified Partner for Security Solutions, Network Infrastructure, Advanced Infrastructure, Unified Communications and Information Worker Solutions;
- Winner of Microsoft Worldwide Partner Awards in 2004 & 2005;
- Winner of Microsoft East Region Partner of Year Awards in 2007 & 2008;
- Winner of Microsoft NYNJ Partner of the Year Award for 2008;
- Microsoft's NJ Medium Enterprise Partner of the Year for 2001-2002 and NYNJ Partner Excellence Award Winner in 2005, 2006, 2007 & 2008;
- Winner of Novell's Service Excellence Award in 2000 and 2001, one of 15 companies in all of North America to win the award;
- Citrix Gold Partner, Symantec Silver Partner and Cisco Premier Partner;
- NetApp Gold Partner and VMware Enterprise Partner;
- Partner with HP, Double-Take, Captaris, WebSense, Blue Coat, Dialogic, SolarWinds, RSA Security, GigaTrust and others to provide a comprehensive range of network solutions.

QTS' goal is to provide its customers with Worry-Free Network Solutions - well-planned and well-implemented projects to ensure networks are reliable, secure and highly available.

QTS offers a wide range of services to help customers build 21<sup>st</sup> Century Networks. This includes:

- QuikDesign engagements for Active Directory, Exchange and SharePoint implementations and upgrades/migrations;
- QuikDeploy Deployment Services;
- QuikStart knowledge transfer engagements and services for Systems Center Configuration Manager, Microsoft Operations Manager, Microsoft Applications Virtualization and other Microsoft products;
- Server, Application and Desktop Virtualization services around VMware, Citrix and Microsoft platforms;
- Storage Management solutions with NetApp, HP and Symantec;
- Network Infrastructure solutions with Citrix and Cisco;
- QuikSecure Security Evaluation Services; and
- QuikRecover Disaster Recovery Plan Workshops and related Services.



*Providing Worry-Free Network Solutions!*

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