



WHITE PAPER

Brocade NMS **Leveraging SaaS to Improve Application Availability and Proactive Management**

By Bob Laliberte

August, 2009

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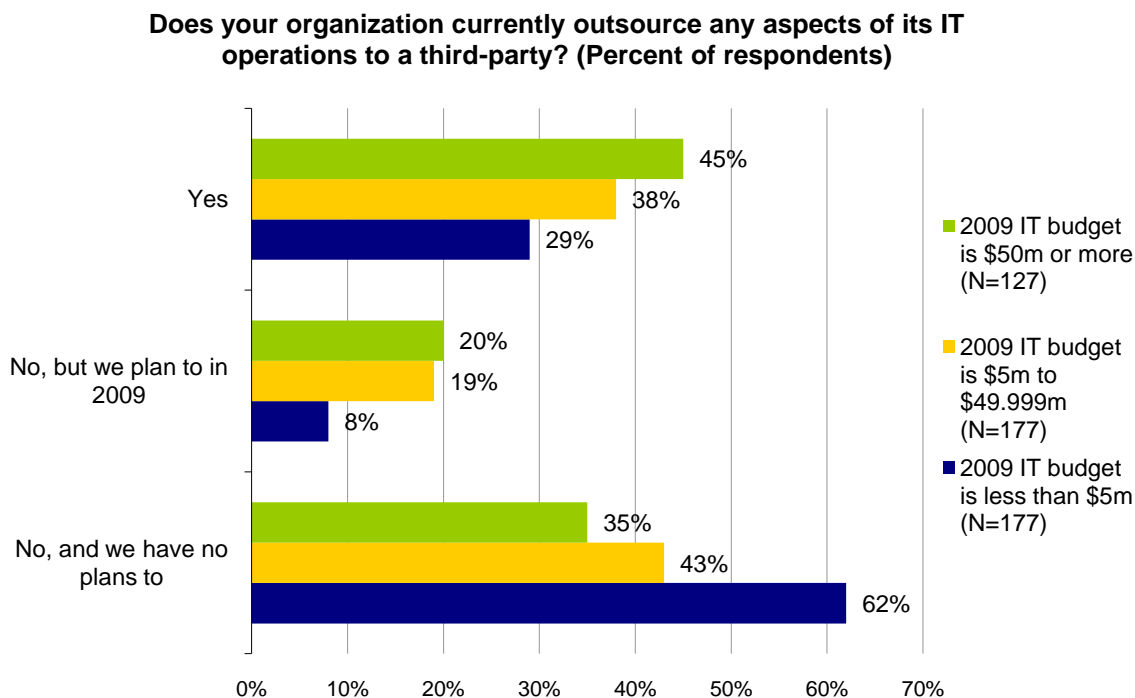
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Introduction

Businesses that want to succeed in the 21st century need to be able to adapt to change quickly. Their IT organizations need to be able to bring up new applications and keep them up 24 hours a day—forever. In order to meet those needs, organizations are turning to new technologies. Server virtualization is one of the key components driving change in the data center; however, to be highly effective, it requires a networked storage environment and, in many cases, a secondary recovery site with dedicated DR networks. Regardless of the specific environment, service levels will depend upon having a reliable, well managed network environment.

While server virtualization can deliver additional value in the form of a more dynamic and available data center, it can also create additional complexity and management requirements. Virtualized environments are highly dependent on network infrastructure—it is critical that the network is monitored and managed appropriately. Given the difficult economic times, when budgets and available resources are limited, many organizations won't be able to purchase the tools or retain the skilled personnel needed to provide effective management of the network. Indeed, for many organizations, creating a highly virtualized dynamic infrastructure may be their first exposure to these types of networks; for others, it will be about scaling an existing environment or creating a new, purpose-built network. Unfortunately, many—and in particular, those with larger, more complex environments—will not be able to keep up. Luckily, outsourcers are available to accomplish those tasks efficiently. As shown in Figure 1, ESG research validates that organizations, especially larger ones, are more likely to outsource a portion of their IT operations.¹

FIGURE 1. ORGANIZATIONS THAT OUTSOURCE A PORTION OF IT OPERATIONS



Source: Enterprise Strategy Group, 2009

According to the same ESG survey, outsourcing network operations ranks third—behind only application development and application outsourcing—on the list of IT operations that can expect spending to stay flat or increase in 2009. Clearly, networking is important to the business.

¹ Source: ESG Research Report, 2009 Data Center Spending Intentions, March 2009.

Another reason so many organizations outsource network operations is simple: networking is really hard. Doing it right requires a lot of capital (software, hardware, network operations center) and ongoing expenses (staff, training, maintenance) as well as time to integrate all the tools. From a management perspective, well defined network models have been around from the early 1980s, the most common being the FCAPS model (Fault, Configuration, Administration, Performance, and Security). This well proven model outlines the steps needed to manage a network effectively. However, compiling and integrating the management tools required to provide this functionality can be quite an effort. As the network grows, crossing multiple domains (storage, data, WAN, etc.), traversing public and private networks, monitoring, and management can get very complicated. To add to the complexity, there isn't a single software package available that can do everything. Discovering resources and tracking configurations requires one tool, determining root cause to isolate a fault necessitates another, and the same is true for performance, security, and administration. Also keep in mind that many tools were developed for service provider networks and, while they offer tremendous scalability and flexibility, the effort involved in integrating them may not be worthwhile, especially if dedicated programmers are needed to support the integration. Furthermore, none of these tools are capable of correlating application SLA to an infrastructure requirement or monitoring the network based on the needs of the underlying application.

The purpose of this paper is to outline some of the challenges associated with delivering effective network management and describe how strategically partnering with a remote network management provider can substantially reduce the risks and costs involved in delivering effective network management.

Network Management Challenges

Networks are becoming far more complex—and are increasingly becoming more integral to the business. Traditional IP data networks are being augmented by specialized DR networks and storage area networks, which are growing rapidly due to the acceptance of server virtualization techniques. As more businesses trust their critical applications to these networks, it becomes ever more crucial that they are properly monitored and managed. Element managers are not capable of delivering end-to-end visibility and even most domain-centric tools lack sufficient visibility for the complex multi-domain networks being created. Even with a full arsenal of element managers and monitoring tools, the most common complaint heard from data center administrators is that they have “black holes.” With networks becoming more interdependent, the lines between technology domains blurring, and protocols merging, these “black holes” will only get worse. Ultimately, these issues, combined with a shortage of skilled resources, create challenges in delivering the appropriate levels of availability, performance, configuration management, responsiveness, and resources.

- **Availability** – Ensuring application availability and service level agreements are met is paramount for critical business applications being used to deliver services and generate revenue. When an application goes down, it is imperative that the problem be corrected as quickly as possible; however, with multi-tier and composite applications, it can be very difficult to accurately pinpoint the root cause of an outage. Typically, the event is signified by an alarm storm from multiple technology domains indicating that there is a problem. The next step requires representatives from each technology domain gathering and insisting that the problem is not in their respective domain—which only serves to prolong the outage. Eventually, teams are dispatched to carefully inspect equipment and cabling. The problem will be resolved, but these legacy, manual methods are time consuming and costly. In a 24x7 economy, there is no tolerance for downtime—any downtime.
- **Performance** – Monitoring and tracking performance can be even more difficult than managing availability. What's more, it has the potential to be even more costly to the business. Why? Consider an application experiencing degraded performance, not an outage. It may only be down 10%, but left unchecked over time, that performance hit can really add up. System checks will reveal that all of the physical devices are operational, but may not identify a performance issue. Adding to the complexity are applications that traverse multiple networks within and between data centers. Network performance has also been a major issue with organizations deploying server virtualization technologies as there are now fewer physical connections supporting more virtual machines, which can result in congestion in the SAN

and degraded application performance. Without the ability to monitor performance, organizations may be losing money without even being aware of it.

- **Configuration** – Change is inevitable. In a data center, it is also problematic, especially if it is unplanned. The problem with most environments is not that they weren't well designed and carefully implemented—given the highly dynamic nature of the data center, changes occur and manual methods to track changes, including Excel spread sheets, Visio diagrams, and tribal knowledge, just don't scale well. Even approved, planned changes can have unintended consequences that may cause an outage. Complicating configuration issues are technology silos that limit visibility to a single domain; seldom does the SAN team have visibility into a DR network. Plus, domain centric tools tend to be vendor- or technology-specific, also limiting data center network management in context with adjacent domains. Without a good baseline of the performance and utilization of the existing environment, making configuration changes can have severe unintended consequences.
- **Reactive Management** – Given the increase in network infrastructure acquisition caused by server virtualization and DR networks and the reduction in budgets and headcount, operations teams are constantly in firefighting mode. New services are enabled and outages are fixed through acts of individual heroism, requiring long days and weekends. This type of reactive management is not sustainable; knowledgeable resources will get burned out and leave. Without adequate monitoring and management, problems become more frequent and more severe. Operating in a reactive management mode will leave the business exposed to risk and potential revenue loss.
- **Resources** – Most IT organizations find themselves fighting a constant battle for more budget, but tough economic conditions are making it even more difficult to get resources. Justifying a new product or service is much harder and the ROI needs to be demonstrated much faster. In fact, ESG research indicates that in most industries, IT budgets are flat or down.² Notable exceptions to this rule were for specific technologies like virtualization, storage, and products or services aimed at increasing efficiency. As a result of current budget woes, organizations will be forced to manage larger, more complex environments with fewer people. As these networks continue to grow, expand, and connect with different technology silos, they will be much harder to manage. Management of these environments needs to be performed with greater efficiency or organizations will suffer—starting with reduced SLAs.

What's Needed?

With a slew of network challenges, organizations may need to look beyond the four walls of the data center. Given the growing importance of networks in support of virtualization and DR initiatives, improved network management should be an imperative. Specifically, IT organizations should work to provide more proactive support, stronger alignment with the business, improved performance monitoring, and fault and capacity management. Although some may want to take on this task internally, it may make more sense to select a partner with expertise in providing:

- **Proactive Support** – In order to meet the service levels demanded by the business and stay within the constraints of the IT budget, proactive support is a must. This includes the ability to forecast capacity and detect and address performance issues, as well as quickly isolate faults. To do this, operations teams need to have accurate configuration and capacity information, along with tools that provide them with performance and fault isolation. Typically, this information is delivered through some type of dedicated operational support system (OSS). Only by leveraging software to remove manual collection and correlation processes and static data repositories can a more proactive approach be taken. Once these processes become automated, operations teams can leverage predictive intervention to avoid outages and performance degradation while optimizing the existing environment and deferring unnecessary capital and operational expenses.
- **Tighter Alignment with the Business** – The reason IT exists is to support the business, so it makes sense that IT infrastructure should be aligned with business needs. In the network, this means understanding what applications are supported by what part of the network. For example, network

² Source: ESG Research Report, *2009 Data Center Spending Intentions*, March 2009.

operators should be able to prioritize traffic from critical applications, like synchronous data replication. In a SAN environment, priority needs to be given to mission critical applications via QoS to ensure no degradation or loss of throughput occurs. Typically, this requires cross domain visibility, which organizations can use to prioritize problem resolution and ensure that critical applications are taken care of first.

- **Performance Monitoring** – While a lot of emphasis is placed on problem resolution, performance monitoring is crucial if users hope to spot problems before they cause an outage. In many cases, the ability to spot trends can indicate a physical degradation in equipment or highlight an improper configuration. For those with virtualized environments or those planning virtualized environments, performance monitoring plays a major role in ensuring the appropriate architecture has been designed. By monitoring and recording performance levels before and after the virtualized environment has been deployed, operations teams can ensure that the network has been configured appropriately. By closely monitoring performance against pre-defined thresholds, operations teams can take a proactive approach to plan more effectively and even potentially avoid problems.
- **Fault Management** – Operations teams don't want to spend all their time trying to find a problem; they just want to get the problem fixed. Organizations need systems that will collect alarm traps, correlate them, and provide root cause notification in near real time. Armed with this information, IT can dramatically reduce downtime and internal resources can be used more efficiently. Even in a well designed, high availability environment, a single fault should only create a larger issue if the environment as a whole is at risk. In environments with inadequate management solutions, that fault may not be detected until there is another failure and the application goes down. Advanced fault management solutions will be able to find and isolate faults rapidly and allow an organization to restore full network redundancy and mitigate risk.
- **Capacity Planning** – Because of the highly dynamic nature of modern data centers, under- and over-provisioning resources are serious risks. With budgets as tight as they are, it is important to implement an effective planning methodology. This means having the right information regarding existing configuration and performance trending data. It is important to be able to look at both short term and long term trending, so the ability to retain and review historical data is crucial. Having this information at your fingertips can greatly reduce over/under situations and will aid in creating a just-in-time delivery process that ensures the business can get what it needs, when it needs it—without pre-provisioning infrastructure.

The question remains: How does one get all these capabilities in place with limited resources and dwindling budgets? Organizations have turned to networking service providers to fill the void. However, most operations teams wouldn't associate the capabilities listed above with a Telco. As a result, many companies recognized an opportunity to provide these services as an out-tasked solution. These service providers are focused on delivering advanced network monitoring and management capabilities through a partnering approach with existing operations teams. They have built and integrated a fully functioning OSS dedicated to managing enterprise network environments and staffed operations centers with experienced engineers.

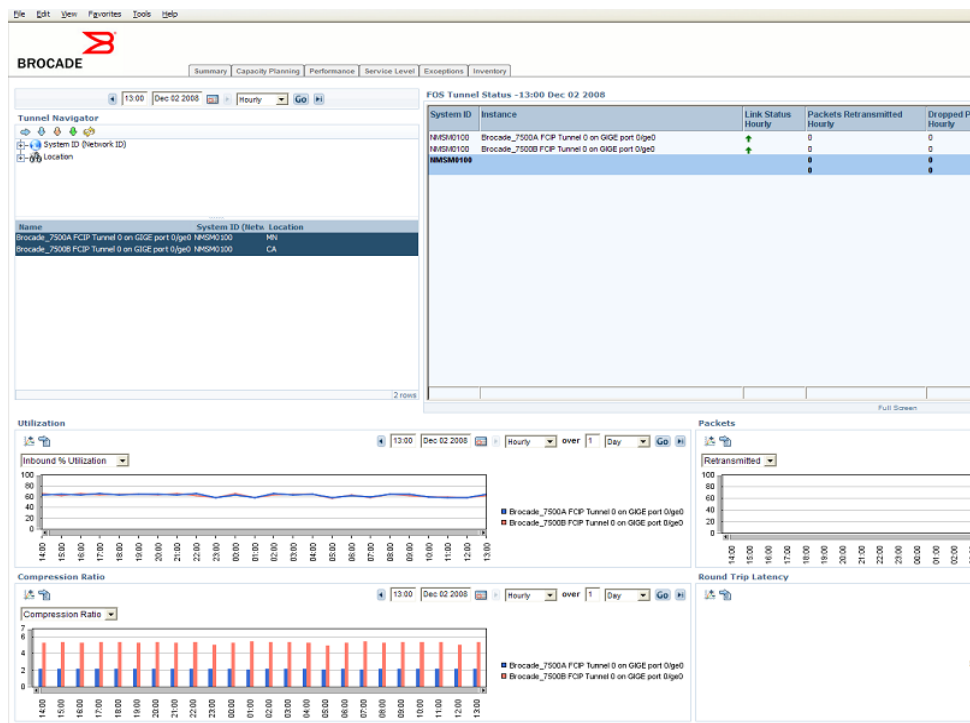
Brocade Can Help

In addition to designing, developing, and supporting world class networking infrastructure and software solutions for the data center, campus, and service provider markets, Brocade also provides remote management services for data center and campus networks. The service, acquired through Brocade's acquisition of McDATA (which acquired it from CNT), has a long history of delivering a monitoring and management service through a Software-as-a-Service (SaaS) model. It was originally created to monitor and manage CNT's suite of channel extension devices deployed in mission critical data replication environments. The service has evolved over time and now provides proactive monitoring and reporting for end-to-end IP and SAN networks. It has a proven track record of providing proactive management for some of the world's largest companies and is uniquely positioned to provide a service for enterprise data center and campus networks.

Brocade's Network Monitoring Service (NMS) is the right blend of people, process, and technology. With more than 25 years of industry experience in storage extension technology, Fibre Channel SAN, and IP networking, Brocade is unmatched in the industry.

- From a technology perspective, Brocade has spent many years and millions of dollars building, integrating, and refining the best of breed technology used to remotely manage networks specifically to provide a holistic monitoring approach with support for SAN and IP networks as well as storage extension products and third party products. The robust and flexible architecture enables Brocade to rapidly support new devices and domains as needed. This technology includes systems that collect, correlate, analyze, and report on a number of different operating parameters and performance statistics. The customer leverages all this through an easy to use Web portal that provides vital real-time and historical information quickly and easily. Detailed data and reports are only a few keyboard strokes away, eliminating the time normally wasted collecting, compiling, and correlating data. By leveraging Brocade's technology through its SaaS model, all the upfront costs of acquiring, building, and integrating software tools are eliminated and replaced with a predictable monthly fee.

FIGURE 2. BROCADE NMS WEB INTERFACE



Source: Brocade, 2009

- People and process are also important components of Brocade's network monitoring service. The combination of resources from Brocade (including Foundry, McDATA, CNT, InRange) provides a pool of knowledge with a wide range of expertise spanning multiple technology domains, allowing customers to leverage Brocade's skilled staff to offset gaps in their own environments. Rather than hiring additional personnel in-house, Brocade assumes the burden of training and staffing knowledgeable resources. With years of experience, Brocade has built detailed processes for escalation and problem management to ensure the highest levels of support are achieved. Brocade has also automated many routine processes into the OSS, with automated trouble ticketing, service case creation, and threshold violation notification being just a few examples. Brocade understands that its continued investment in automation will result in higher levels of service to its customers.

Brocade has also invested heavily in end-to-end performance monitoring and in understanding how degraded performance can have a negative impact on meeting service level agreements. The ability to analyze performance characteristics also plays an important role in providing proactive management support. By

monitoring a wide range of device characteristics like device status, power and cooling conditions, WAN errors, and circuit status, the Brocade NMS team can spot potential problems—before they cause an outage. By analyzing network traffic characteristics like throughput, utilization, latency, compression ratios, and bandwidth assignments (logical), the NMS team can track trends and spot degraded service quickly or be alerted when user-defined thresholds are crossed. Leveraging data collected on historical resource utilization and usage, users can also analyze trends and identify when additional capacity is required to enable just in time delivery.

All of this information is available via a Web-based interface. Data can be collected in as little as five minute increments and can be reported on hourly, daily, weekly, monthly, or annually. These reports can be set to auto generate based on customer requirements and can provide a summary or detailed information including data comparisons, minimum and maximum reports, and data segmented by the group or application it supports. An extension to the performance monitoring Brocade offers is the ability to benchmark customer environments, recommend new configurations, and validate architectures. Drawing on years of experience, NMS engineers can provide insight and recommendations to deliver enhanced performance and optimize the existing infrastructure.

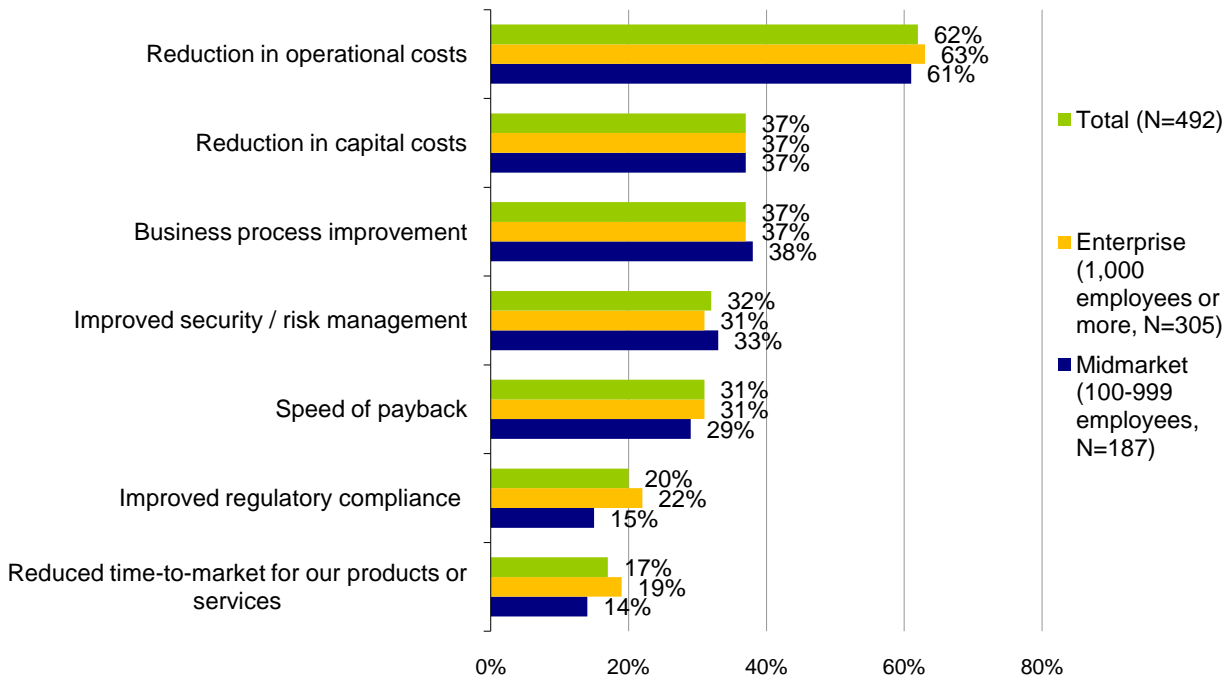
At the core of the Brocades NMS service is the ability to proactively manage faults with the goal of dramatically reducing the time required to troubleshoot faults and fully restore operations. Unlike traditional Telco service providers, the Brocade network management service proactively generates a trouble ticket and opens a service request at the first sign of a problem. This is a refreshing change for anyone who has had to wait on hold for 20 minutes just to open a trouble ticket! In addition to the automated ticketing, Brocade engineers are proactively polling devices, collecting and analyzing data to look for potential or existing problems. Because Brocade is monitoring the health and performance of these devices and the networks that interconnect them, it can reduce the amount of time to troubleshoot and isolate a failure. In some cases, this means that Brocade engineers notify a customer of a problem before it can manifest itself as an outage and corrective action can be taken. Examples of this include failed power supplies, performance threshold crossings, or a lost secondary network link. In the event of an outage, Brocade engineers can eliminate a full hour from the troubleshooting process. Depending on an organization's acceptable cost of downtime, saving an hour could save millions of dollars.

Conclusion

Organizations are under increasing pressure to deliver higher levels of service, despite an increasingly complex environment backed by ever-fewer personnel resources. By selectively choosing an out-tasking partner that leverages a SaaS model to deliver services, organizations should expect to dramatically reduce capital and operational costs, mitigate risk, and maintain or improve service levels to the business. ESG’s research (shown in Figure 3) confirms that these are all critical elements when justifying new IT services—especially in light of the current global economy.

FIGURE 3. JUSTIFICATION FOR MAKING INVESTMENTS IN IT

Which of the following considerations do you believe will be most important in justifying IT investments to your organization’s business management team over the next 12-24 months? (Percent of respondents, multiple responses accepted)



Source: Enterprise Strategy Group, 2009

Brocade’s NMS service eliminates the upfront capital investment and dramatically reduces ongoing operational costs by removing the need to hire and train dedicated operational resources to continuously monitor the environment. Additionally, because Brocade’s NMS service is staffed by knowledgeable engineers and provides proactive monitoring and management support, it can usually guarantee higher levels of service to the business and increased operational efficiency than internal IT alone could provide. More importantly, its proactive nature could save hours of downtime and potentially millions of dollars in lost revenue in the event of an outage. And, because Brocade NMS uses a SaaS model, organizations can quickly take advantage of technology enhancements—adding value without disruption and providing competitive advantages.

Not all services are created equal; it is important to do your homework. Make sure you ask the following questions:

- Does the organization have a strong track record with reference customers and repeat customers?
- How well does the service fit with your environment? Will the coverage be complete? Can they provide monitoring for an end-to-end solution that spans multiple domains?

- Is the service flexible? Can you start small and expand?
- Can they scale to meet your needs?
- If you are an enterprise, is it an enterprise ready solution? Is the organization used to working with enterprise customers?

Given Brocade's history and experience in delivering network monitoring and management services to large enterprise customers running mission critical networks, the company definitely deserves a spot on buyers' short list of quality service providers. The combination of uniquely skilled engineers, integrated technology, and automated processes enables Brocade to deliver an end-to-end service for even the most demanding environments.



20 Asylum Street
Milford, MA 01757
Tel: 508-482-0188
Fax: 508-482-0218

www.enterprisestrategygroup.com