THE TITAN 3000

BUSINESS VELOCITY ON A NEW SCALE

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INTRODUCTION: BUSINESS VELOCITY ON A NEW SCALE

It's no secret: The scale and pace of business change today is challenging all of us to do more – better, faster and with ever greater efficiency. Customers are demanding more and wanting it now. Market expectations for product and process innovation are growing. Mergers and acquisitions in many industries are at or near all-time highs. Complex global supply chains and highly distributed organizations are the norm. Unexpected competitors are entering adjacent markets with ever increasing frequency and speed. New business models are changing the landscapes of B2C and B2B markets alike. The craving for content and information has never been greater.

Experts everywhere are commenting on the "unprecedented" demands and pressures facing business, government and society today. Ben Bernake, Chairman of the Federal Reserve, says the present "scale and pace" of globalization is "unprecedented." The consulting firm Accenture states in a recent report on High Performance Business: "In an environment of unprecedented complexity, traditional explanations and prescriptions are no longer adequate. Leaders in business are brushing off the dust and asking themselves: what does it take to achieve and sustain high performance."

It's Business Velocity on a New Scale. And it's impacting and driving business and government organizations everywhere.

All these new pressures and requirements add up to an environment in which business velocity – the capacity to move operations and new forms of information at an accelerated and highly efficient pace – is a must-have. Not only do organizations need to respond, and react quickly to rapidly changing demands, they need to do so on a grand scale, with more and more information required at the ready to move the process along.

Information technology, of course, is a major factor behind the accelerating pace of change. Indeed, harnessing its capabilities is essential to being on the right side of Business Velocity on a New Scale. To reference Accenture's research on High Performance Business once more, enterprise technologies "have the potential to provide organizations with distinctive capabilities," enabling companies "to differentiate from competitors and outperform industry peers." For example, traditional business processes are being replaced with Web based solutions offering greater customer choice and improved sales and servicing capabilities. The result is improved customer satisfaction, reduced costs and the ability to launch new products faster and with much greater impact.

At the same time, companies in all markets are grappling with processes that have grown increasingly data-intensive and complex. Increasing file sizes, the unpredictable elasticity and rapid growth of user bases, and the global proliferation of remote offices requiring 24x7 real-time access to expanding volumes of data are all factors in this transformation. Indeed, the nature and structure of business information itself is morphing – from traditional structured transactional data to today's preponderance of unstructured digital content. From an estimated 15 billion e-mails a day that are sent and received,

to a new generation of desktop applications, such as Microsoft PowerPoint, that now incorporate audio, video and images, to a forecasted 1 billion video views per day that will occur on YouTube by the end of the year – there is ample evidence of an explosion of data that is not formally structured or formatted. IDC predicts that the information added annually to the digital universe will increase to 988 exabytes by 2010, a compound annual growth rate of 57%. And some analysts estimate that up to 80% of all information in an organization is already unstructured. That constitutes nearly 6 million new libraries the size of the Library of Congress of unstructured data in two years!

THE IMPACT ON IT INFRASTRUCTURES

Business Velocity on a New Scale is creating the need for entirely new levels of performance, flexibility, and scalability in today's IT infrastructures. Driven by new market and business requirements, IT systems and processes need to access unprecedented and dynamic scalability, easily and quickly, while still maintaining control and flexibility to adapt to rapidly changing requirements. From Web 2.0 applications for collaboration and social networking, to oil and gas exploration, visual effects rendering, credit card processing and a wide range of enterprise activities – demand for storage flexibility and performance is exploding. IT and storage demands fluctuate with new applications and users, requiring the ability to continually manage performance and capacity.

Compliance mandates and regulations around information archiving and retrieval have also increased the need to access, retrieve and protect data. According to IDC, the archiving portion of the storage software segment grew 18.5 percent year over year in 2007. "First was the need for compliance, e-discovery and litigation support. Second was the growing need to retain information for extended periods of time and to be able to use the information in order to improve business. It's no longer just data; it's being viewed as information that might give an organization an edge in its competitive environment," stated Noemi Greyzdorf, research manager with IDC.

Along with performance, scalability, and flexibility, business velocity often requires servers and storage systems to be consolidated into a single platform that can handle multiple levels of service, security and performance and can scale to handle massive volumes of data. This process of enhancing efficiencies through consolidation while dramatically increasing performance and scalability can be a tricky one– but it is vital in terms of cost effectiveness, environmental considerations, space/lighting/cooling requirements, and management simplicity.

Network storage infrastructures must keep pace with business growth and change. Any platform that cannot scale and expand with need becomes a bottleneck – part of the problem rather than a solution. High performance storage is critical in current era applications: The more time it takes to store and retrieve critical information and files, the larger the financial impact on an organization. In today's fast-moving world, time is indeed money. Potential fines can be involved in failures in e-Discovery. Major issues and costs can be incurred if a system cannot meet spikes and surges in demand for online applications, commerce and content.

NETWORK STORAGE FOR BUSINESS VELOCITY ON A NEW SCALE

The remainder of this paper will explain why and how BlueArc's Titan family of ultra high performance unified network storage solutions, including its new generation Titan 3000 Series, is optimized for Business Velocity on a New Scale. The Titan family offers unmatched performance, capacity and application diversity to meet the critical needs of data-driven businesses in an era of unprecedented business change. The Titan 3000 Series doubles down on what was already the world-record-holding performance and capacity of the previous generation of BlueArc Titan 2000 servers. And it is designed so that customers can add this capability in the field by simply replacing existing modules with new ones. In addition, BlueArc has expanded its leadership in harnessing the massive growth of unstructured data, through the introduction of an open application programming interface (API), enabling even greater flexibility and customization through an expanding partner network. This API extends the Titan's unique strength as The Intelligent Platform For Files Services, further enabling the consolidation and simplified delivery of advanced file services across the storage infrastructure.

CURRENT OPTIONS FOR NETWORK STORAGE SYSTEMS

Based on hardware designs, there are two or three distinct approaches to network storage systems on the market today. Those approaches are analogous to the networking sector's earlier evolution in delivering routing functionality. At first, routing took place on standard UNIX servers, then on specialized CPU-based appliances, and finally on much higher performance hardware-based router and switching systems capable of intelligently moving and managing much higher volumes of Ethernet and TCP/IP traffic at far greater speeds. The packet flow processing of these much higher performing networking systems takes place in hardware, not in software, using custom firmware and operating systems to drive the chipsets.

BlueArc, a leader in scalable, high-performance unified network storage, offers the industry's only line of hardware-accelerated network storage systems. The company's Titan Series is uniquely based on a massively parallel architecture implemented in field programmable gate arrays (FPGAs). FPGAs are similar to ASICs (Application Specific Integrated Circuits) used in high-performance networking equipment. However, unlike ASICs, BlueArc's FPGAs can be reprogrammed in the field, enabling critical flexibility to assume new features and support new and changing protocols. Similar to today's high performance network switches and routers, the Titan's highly parallel architecture is optimized for data movement.

By comparison, all other vendors compete with solutions that are analogous to the earlier generations of networking routers and switches. They are systems built on off-the shelf processors similar to those used in PCs and laptops. Because these microprocessors are optimized for general purpose computing, not for the specific tasks associated with network storage, they solve these issues with software. Competitors are limited to what the microprocessor vendors do, and what they can build on top of that with software. This approach uses only a small part of the microprocessor's capacities (wasted capabilities make the solution more costly). In addition, these systems are highly serial; events must be programmed to happen one step at a time, rather than occurring in parallel as with BlueArc's Titan system.

THE TITAN ADVANTAGE

Applying a general purpose microprocessor or microcontroller for a single specific purpose simply cannot be as effective as using BlueArc's hardwired approach. Running at high speed with big bandwidths, even well-balanced, general-purpose servers can be crippled by bus contention, resource bottlenecks, and software overhead. While traditional computers are filled with shared buses requiring arbitration between processes, BlueArc's FPGAs connect directly to high speed data pipelines, eliminating these conflicts and bottlenecks. BlueArc's patented, massively parallel architecture can do disparate actions at wire speed. By using 12 high-density FPGAs with 32 gigabytes of distributed memory and multiple pipelines, Titan can simultaneously read/write data using the native CIFS and NFS file-based protocols, the Internet Small Computer System Interface (iSCSI) block-level storage networking protocol, and Network Data Management Protocol (NDMP) for NAS backup.

The Titan's hardware-based, massively parallel architecture enables truly breakthrough performance, scalability and flexibility. Introduced in March of 2008, the new Titan 3000 Series can scale up to 200,000 IOPs, 1900 MBps throughput and 4 petabytes of storage capacity. With the ability to support up to 64 virtual servers and 8 cluster nodes, the Titan 3000 allows customers to tap this tremendous speed and scalability to achieve new levels of business, application and price performance.

The Titan has been adopted rapidly in the world's most demanding and data-intensive environments, where time to vast amounts of data is critical to revenue generation and competitive success. Leading companies worldwide utilize BlueArc, for example, to accelerate critical processes that drive life sciences discoveries, award-winning digital movie effects, oil & gas exploration, scalable Internet services and e-Discovery. Indeed, these industries are highly sensitive to the requirements and value of Business Velocity on a New Scale. Consider, for instance, the fact that the total cost of discovery for a single new drug can surpass $100 million.

Yet, increasingly customers in all markets are grappling with business processes that have grown incredibly data-intensive and complex due to increasing files sizes, rapidly expanding and often unpredictable user bases, increased mergers and acquisitions, global office expansion, the need for 24x7 access to huge volumes of data, and other factors. IT and storage demands, in terms of volume and velocity, are growing at unprecedented rates in global businesses worldwide – particularly due to the explosive growth in the number and size of unstructured data files. At the same time, businesses are retaining data and content longer. For example, healthcare records, various regulatory reporting requirements, and user and customer demands for access to content are all leading to prolonged storage periods.

In other words, the challenge of Business Velocity on a New Scale is not limited to a few highly specialized industries or applications. It is a general condition in today's digital business environments. As a result, high performing organizations increasingly need a storage platform that can scale in any direction. It must scale up in terms of main storage IO performance, and out in terms of its ability to handle the heavy throughput requirements of an ever-increasing array of new applications and client requests.

The Titan family and most certainly the Titan 3000 Series are uniquely capable of standing up to the many and varied demands of Business Velocity on a New Scale. Being implemented in hardware, it also provides predictable performance across a wide spectrum of scenarios and because it communicates externally through widely adopted standard protocols like CIFS, NFS, and iSCSI, it also provides transparency to applications and clients. It can dramatically improve performance and price performance for high transaction database queries, file storage, e-mail, streaming media or high performance computing applications. Its unparalleled performance diversity can address requirements for large files or small files, ERP or database, increased throughput or IOPs, reads or writes, sequential or random, block or file.

SIMPLIFYING BUSINESS VELOCITY ON A NEW SCALE

For many companies, the IT costs and complexity of keeping pace with Business Velocity on a New Scale has gotten out of hand. The explosive growth of unstructured data, the proliferation of new data-intensive applications, and the segmentation and isolation of that information across highly distributed enterprises is creating a complex patchwork of application servers, storage arrays and NAS filers. This is a complicated and inefficient infrastructure that is extremely costly to manage and maintain. It's no wonder that a recent IDC survey found that 80% of IT organizations are actively trying to consolidate storage.

Today's enterprises, driven by Business Velocity on a New Scale, increasingly need unparalleled and flexible scalability, but also need to maintain operational control of their environment. The unstructured and unpredictable nature of today's Web 2.0 business environments, however, is not well suited to the rigid and inflexible storage architectures of the past.

The tremendous performance diversity and scalability of the Titan 3000 makes it the ultimate platform for high-performance consolidation. BlueArc Titan 3000 customers can add storage at any time to meet new application or business needs or to consolidate diversified storage nodes into a single point of management. The Titan can enable thousands of users on different operating systems. Its object based file system scales to 256 terabytes and can support multiple file systems for a total capacity of 4 petabytes. When a larger single file system name space is required, the Cluster Name Space option scales up to 4 petabytes and supports the mixing of multiple storage tiers, enabling global access to all the data in the storage infrastructure regardless of operating system or file system location.

In addition, BlueArc Virtual Servers can be created for different departments, user groups, projects of application. Each Virtual Server can then have different IP addresses and management policies. The Titan also includes Virtual Volumes and Storage Pools that enable storage administrators to manage data capacity with policies and quotas that can expand and contract to meet changing allocation requirements. The specialized Cluster Read Caching function lets read- intensive workloads be accessed concurrently across up to 8 nodes, dramatically increasing read intensive aggregate workload performance.

THE INTELLIGENT PLATFORM FOR FILE SERVICES

Essential to tackling Business Velocity on a New Scale is the ability to successfully integrate storage into key business processes and into the overall management of the IT infrastructure. The Titan 3000 is uniquely positioned as an intelligent platform with the ability to handle critical file services, which, in other storage environments, could only be handled by dedicated servers that add to the cost, clutter and complexity of running IT operations.

The Titan's unique and powerful architecture delivers the headroom to run file services at wire speed across a diverse range of workloads. It allows IT managers to virtualize resources for simplified management and improve data management for better utilization. As a result, IT organizations can leverage the Titan 3000 within the infrastructure to converge multiple functions into a single device. In addition, the Titan 3000 series features a new open API for partners and customers of create or adapt applications to take advantage of BlueArc's software suite and hardware capabilities. Customers and partners can build intelligent file services without concern about degrading storage performance.

The Titan 3000, in conjunction with leading BlueArc technology partners, already delivers a wide range of high-value file services that benefit in being close to the file system and help IT organizations achieve new levels of management and price performance. It provides full-text indexing and search and life cycle management services for improved archiving and retrieval. It provides critical virtualization services, including integrated cluster namespace and global namespace for mixed environments, as well as logical storage pools with thin provisioning. It also provides data reduction services, including compression and de-duplication, and data retention services, such as a WORM file system, policy based management with extended attributes, authentication, encryption and shredding. The range of file services optimized for the Titan 3000 will continue to grow, further expanding the Titan's role and value at the heart of IT operations.

CONCLUSION

As organizations move ahead into the 21st century and Business Velocity on a New Scale continues to escalate, the critical need for a new more flexible, scalable and intelligent platform for high-performance storage and file service will only increase. The pace of business change, including the inexorable evolution toward Web 2.0, 3.0 and beyond, will continue to demand the rapid integration of new data-intensive applications and the capacity to store, manage and retrieve data more effectively. Unstructured data will continue to explode, creating new requirements for cost-effective and yet high-performance storage infrastructure. Regulations will continue to put pressure on enterprises to be able to protect and recover information. And data-intensive applications at the heart of business in industries like entertainment, life sciences and oil and gas will continue to crave more performance in order to improve cost efficiencies and, more importantly, time to money.

BlueArc's Titan 3000 is uniquely position to deliver on both the promise of, and the need for, Business Velocity on a New Scale. This next generation server represents a quantum improvement in Titan's industry leading performance and capacity. It provides unmatched performance of up to 200,000

SPECsfs IOPS (Standard Performance Evaluation Corp. System File Server Input/Output per second) and maximum throughput of 1900 megabytes per second. It is the first storage solution to consolidate and manage up to 4 petabytes of data in a single storage pool while also supporting a Cluster Name Space (CNS) option to create a unified directory structure providing global accessibility to data resources. It supports both CIFS and NFS connectivity with seamless extensibility from 2 to 8 nodes in a cluster and is architected to go well beyond.

Titan 3000 can handle more than 60,000 user sessions and thousands of compute nodes concurrently, while maintaining data access at dramatically higher rates than those found in traditional network attached storage systems. Users with even the largest data sets will obtain performance improvements in information storage and retrieval, increasing productivity to deliver a solid return on investment. Titan's dedicated non-intrusive backup and replication technology enables uninterrupted high-speed data access. Productivity never suffers to accommodate a backup or replication window.

In addition, it is the intelligent platform for an expanding array of critical file services that improve system management and data management and protection – without adding to the complexity and cost of your IT infrastructure. It also builds upon the expandable upgradeable chassis of earlier generations with updated blade architecture. Most storage system upgrade options require an entirely new product installation or "forklift" upgrade. Titan reduces hardware replacement costs, using its unique modular approach with maximum flexibility to upgrade with firmware feature enhancements or server modules without replacing the entire system.

The Titan 3000 Series once again proves that BlueArc is delivering on its promise of network storage technology that future-proof's your IT organization. That promise is more important than ever in an era of Business Velocity on a New Scale.