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Why Storage Is Broken:
Surviving The 21st Century Data Deluge

The past two decades have seen profound changes in the nature and volume of data that is business-critical for enterprises. The accelerating shift from structured to unstructured data—video, documents, logs and even social media sentiment—have created an exponential increase in the data we collect, store and use to make critical business decisions. However, the underlying architecture of enterprise storage systems has largely remained the same since we measured storage in terabytes, not petabytes and exabytes.

This paper discusses these changes, all of which have created a crisis for senior IT staff who are charged with delivering ever-higher data availability to meet 24/7 business demands, while dealing with ever-increasing growth in data of all types in a hybrid, multicloud environment today and into the future. Further, it discusses how object-based, software-defined storage deployed on Intel standard hardware helps solve scalability, availability and performance challenges while lowering total cost of

ownership and delivering demonstrable ROI.

The changing nature of data

Structured data, including that stored in Oracle and DB2 databases, has been the powerhouse that fuels commerce for decades—and the demand for network-attached storage (NAS) and storage-area networks (SANs) will only increase as the volume of transactions hitting those databases continues to climb, driven by an increasingly global market for just about every kind of good and service. However, unstructured data including new sources of information like social media sentiment, audio and video, images, documents and even transaction logs has grown in importance over the past decade, and the Internet of Things (IoT) promises to serve up billions of new sources of data in just a few years, further increasing the impact of unstructured data on enterprise IT.

In today's information-driven age, every business is in some way data-defined, with new, data-intensive use cases such as predictive analytics and deep learning constantly being added to the enterprise quiver of information arrows.

Although the types and variety of data have changed, for many enterprises, the storage systems in use have not. That means many organizations are pigeonholing new data types—video images, for example—on systems better designed for files and tables. Traditional storage systems provide critical functionality but can be slow to deploy and difficult to scale quickly to meet emerging needs. For example, RAID technology is now more than 30 years old and isn't the most effective solution for large data sets. The problem is that disk capacity has continued to increase while disk rotation speed has effectively maxed out at 15K rpm. As such, latency is increasing proportionally with capacity. The increasing size of disk drives also has resulted in an increasing time for rebuilds in the event of a failure for the average datacenter. And if a second failure occurs during a rebuild, loss of data could occur.

The IT data dilemma

Pressure on IT comes from every direction. Today's "app for that" economy puts new performance demands on IT infrastructure and increases the demand for data from every corner of the enterprise. In some instances, an organization's existing storage deployments just can't handle the growth and increasing variety of data types. And organizations that do business around the world must operate in a 24/7 mentality, where business users demand

truly continuous uptime for every application and its data.

The demand for access is countered by demands for security and governance, which insist that data be stored securely, in accordance with federal and local regulations, and kept cyber-secure and safe from prying eyes and attacks from within or outside the organization.

The IT mantra has evolved from "do more with less" to "do everything with nothing." IT budget pressures can make it impossible to fund new technology solutions, and lack of a clear upgrade path for many technologies means that forklift upgrades are often the norm, although generally frowned upon. So, what is IT to do?

Rethinking storage

Many organizations are seeing a dramatic shift to very large objects with tremendous growth demands, causing them to rethink how they deploy and use storage devices and augment existing SAN and NAS devices with object-oriented storage devices added to the mix and leverage the same kind of flexibility and cloud economics that virtual machines do.

Some businesses—like Facebook, Instagram and Shutterfly—take an object-first approach to storage. What are some key approaches that drive the economics of object storage? Many start by replacing purpose-built storage controllers with industry-standard, scale-up and scale-out hardware that is readily available and easily procured. Utilizing standard hardware components enables enterprises to take a software-defined approach that the rest of the data center has already adopted and reapply those principles to storage with a high degree of

scalability in mind.

Taking lessons from IT network virtualization, object storage can also separate data, connectivity and management planes to allow each to scale and grow as needed without impacting the other elements of the system. And using industry-standard hardware for each of those planes in a new storage solution offers three additional advantages. First is uptime. By interconnecting 3, 6, 9, 12 or more nodes to form a mesh, data in the storage system can enjoy essentially continuous uptime. Second, inherent connectivity enables delivery of any type of data to any user protocol, enabling virtually any user or device to access all business-essential data, whether object, NFS or CIFS as applications demand. Finally, a supervisor server provides the comprehensive management and automatic re-routing around any failed system element, whether disk, controller, power supply or entire server, until it can be replaced. It then seamlessly adds it back into the cluster to further ensure continual availability for all users.

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This approach to object storage provides the ability to scale capacity and performance while providing exceptional availability. It enables an enterprise to remove bottlenecks anywhere in the system and add capacity only where it is truly needed. Additionally, having the flexibility to support any type of data, from any client, anywhere in the world, enables object storage to integrate seamlessly with existing tier-one SAN or NAS storage, data, applications and users. As organizations of all kinds increasingly turn to a hybrid IT environment that encompasses both on-premises and multiple clouds, the ability to move data seamlessly between hosted and local environments means storage remains in step with enterprise strategy as business demands change.

Performance and scalability aren't the only benefits of taking a software-defined approach to object storage. The economic benefits are multifold as well. Utilizing industry-standard hardware enables organizations to get the best value from their object storage dollar. The roll-as-you go approach of object storage enables scalability of storage, connectivity and management totally independently of one another. IT and departmental budgets aren't wasted on unnecessary upgrades to every plane simultaneously.

Learning from example: The Cisco-Scality solution

Cisco has partnered with Scality to deliver a great combination of hardware and software for object storage systems. This partnership lets any business deploy enterprise cloud-scale object storage solutions with an "easy button" for simple, nearly cookie-cutter deployment of servers and software on a single-site, multi-data-center or multi-cloud global deployment. Proven industry-standard Cisco hardware delivers the form factor, density, manageability and

economics to support deployments of even the largest systems with confidence.

Scality software automatically manages and rebalances the I/O workload across the system as it grows and supports the repair of failures before they impact data access. According to Gartner, a single network admin can typically manage only about 300 TB of storage, while Cisco-Scality customers have successfully operated 18 PB installations with just a single storage administrator yielding over a 50 times savings in administrative costs alone. This can result in a dramatic reduction in the TCO and operations for storage.

Scality found a number of solid reasons for partnering with Cisco to deliver this solution. Cisco redesigned its servers from the ground up, gathering feedback from customers and users to create a new line of servers that are based on user requirements, not what servers currently are. For example, Cisco Unified Computing System (UCS) servers have management built in from the start, eliminating the need for intricate setup or a slew of agents to integrate software and hardware.

And to further speed deployment, Cisco UCS service profiles, which are policy- and model-driven, become templates for deploying a few, dozens or even hundreds of servers that are functionally exactly alike, all the way down to the BIOS. Having everything the same translates into predictability and stability, while simplifying IT management overall.

Cisco supports the new generation of infrastructure requirements all the way from design to deployment and beyond, with a broad range of service offerings that can be fulfilled by Cisco or trusted third parties you already work with.

Getting started

Scality RING is a massively scalable, software-defined storage system that gives you unlimited storage for your cloud environment. It features an object storage architecture designed to achieve enterprise-class reliability, scale-out capacity, and lower costs running on an industry-standard server platform.

Cisco UCS S3260 Storage Server, designed from the ground-up for data-intensive applications, is optimized for object storage solutions, making it an excellent fit for unstructured data workloads such as backup, archive, and cloud data. The S3260 is the platform of choice for object storage solutions.

Both solutions together, Scality RING and Cisco UCS S3260 Storage Server, deliver a robust, scalable and cost-effective solution for enterprise scale-out storage.

What can software-defined object storage do for your organization's performance, scalability and budget? Simply click here to learn more about the Cisco-Scality solution and try it yourself.