White Paper

Fujitsu Storage ETERNUS and Commvault software

Over the past two decades, demands regarding backup and the associated data management activities have consistently increased. By combining Fujitsu Storage ETERNUS with Commvault software, companies can get to grip with the complex process, consolidate backup and archive infrastructures, and dramatically reduce hardware investments as well as operating costs.

Content

Introduction

Over the past two decades, demands regarding backup and the associated data management activities have consistently increased. The reasons are manifold, and each of these influence factors would already be problematic by itself. Trying to master them simultaneously, however, causes consequences that are even more dramatic.

Primarily IT departments are facing the data explosion – a virtually unrestrained multiplication of customer, product, and employee information that has produced annual growth rates of 60 percent or more. This is not just a result of the organizations' eagerness to collect, analyze, and provide as much information as possible to staff and customers alike. Statutory regulations and compliance standards obliging companies to operate legally secure backup and archiving solutions play an equally important part.

Moreover, increased mobility and changing work habits require that relevant information must be available anytime, anywhere – even across different hardware platforms such as desktop PCs at the office, laptops at home or tablets and smartphones on the go.

Finally, the transition to virtualized infrastructures, cloud services, "big data" and digitalization bring some entirely new challenges for IT departments as well as for business executives. To keep control of the situation, most companies still run multiple, separate solutions for backup and recovery, archiving, data management and storage resource management in parallel. Unfortunately, many of these platforms are not suited for todays and future demands. Worse, assigning each task to independent hardware systems has induced and still induces considerable manual integration efforts, so that errors can never be ruled out.

In short, although operating costs keep growing, companies still run the risk of storage, server, and application failures. This has led to significant frustration among users. Reports indicate that the vast majority of IT managers are looking for contemporary, flexible solutions for backup and data management that combine as many features as possible and yet can be efficiently administered. The new platform should be technically up to date, help reduce operating costs and be easily and flexibly adaptable to future requirements. This ensures an early ROI as well as protection of necessary investments.

Against this backdrop, Fujitsu and Commvault have expanded their strategic partnership and developed a set of integrated data protection and data management solutions in which sophisticated hardware and advanced software functions merge into a consistent whole. This paper focuses on integrated solutions for various data protection scenarios where Commvault's data management software is used together with Fujitsu Storage ETERNUS CS appliances, ETERNUS DX hybrid series, and/or ETERNUS LT tape storage systems.

For highest data protection demands, Fujitsu has developed the ETERNUS CS8000, the data center storage solution for backup and archive automation, whose interaction with Commvault software describes the separate white paper: Fujitsu Storage ETERNUS CS8000 and Commvault Software

Concepts for modern data protection

As outlined above, conventional approaches to data protection and data management have come under increasing pressure. Thus, it is no surprise to find that many companies are looking for a "perfect replacement" for their legacy solutions, in which backup and recovery, archiving, data and storage management, information retrieval and management of access rights were all implemented as isolated processes. This compartmentalization often has fatal consequences:

- A study by the Enterprise Strategy Group (ESG) revealed that 27 percent of all respondents complained about "unacceptably long downtimes" after a crash and called for significantly faster recoveries of data and applications. 23 percent of the participants criticized the extent of data losses and expect restores to be as complete as possible. In other words, about a quarter of employees believe that the solutions they currently have to deal with are insufficient.
- More and more data centers report that they can no longer perform full or incremental backups within the predefined timeframes.
- At the same time, data transfers necessary for backups require more processing power and network bandwidth than available or initially planned. As a result, data protection slows down production systems.
- Although data recoveries eat up considerable amounts of time, their results are often inadequate. Moreover, even completely successful rescue operations are of little use if afterwards employees have to sift through thousands of emails, folders, and files to find a particular piece of information. The legacy solutions deployed offer no targeted, granular recovery options.
- Following the trend towards BYOD, increasingly mobile workforces use more and more mobile devices that they have purchased themselves and manage autonomously. These so-called edge systems and data stored on them frequently go unregistered, and backups of these systems remain incomplete or are at worst impossible.
- Most backup products are isolated solutions, that is, they only support a limited number of servers, storage devices, operating systems and/or applications. Integrating these point solutions is complicated and time-consuming, which in turn obstructs the data protection and data management processes.

This long list clarifies why many analysts – and even more administrators in company data centers – think that traditional approaches to data protection and data management are obsolete or useless. They demand coherent concepts for a state-of-the-art data protection that solves the above-mentioned problems. In addition, they criticize that traditional methods not only drive operational costs and stretch already thin budgets, but also prevent meaningful modernization. For example, it is difficult to implement server virtualization or establish cloud services when they are restricted to traditional means. Hence, IT retains its status as a misfit and cost factor instead of supporting business processes in a flexible, ef ficient manner and contributing to a firm's value in the way that data center directors and C-level executives expect.

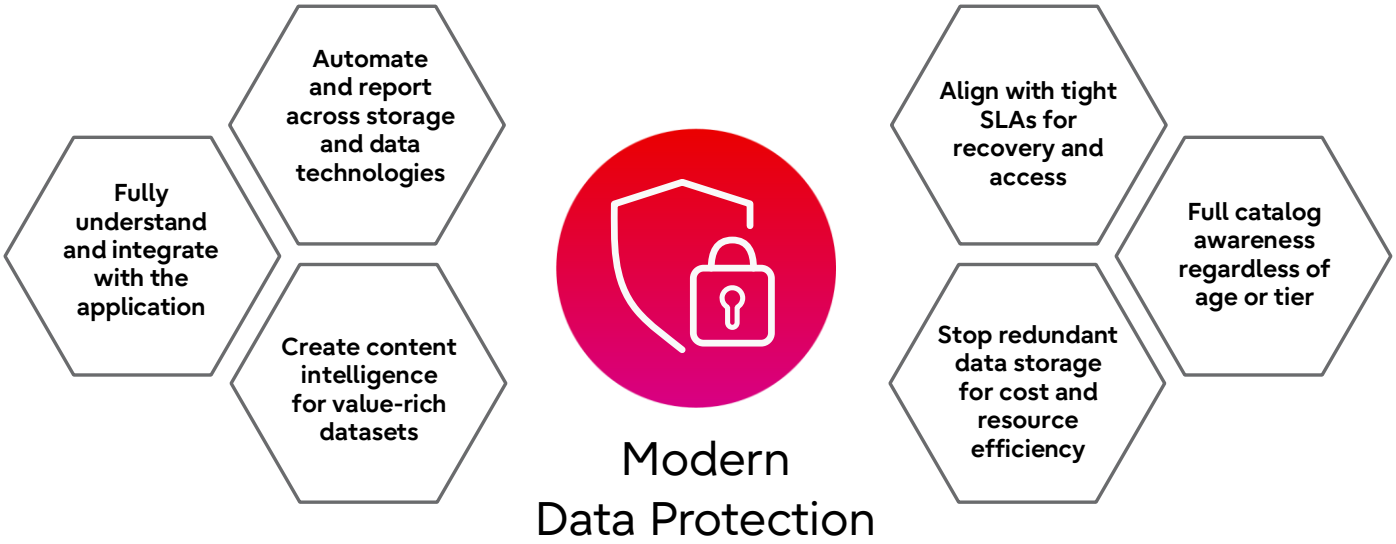
Fujitsu and Commvault replace these outdated and ultimately dysfunctional methods with their own, modern data protection architecture. The idea is to clean out the affected IT processes and simplify them as much as possible. The risk of losing – or worse: not even capturing – important data has to be eliminated; costs for data protection and related data management need to be reduced. The following figure shows the core requirements such a modern backup and archiving solution must fulfill.

On closer examination, these requirements can be grouped into four functional categories, namely data protection, data and storage management and information distribution, as represented by Commvault's catchphrase **"Protect – Access – Comply – Share"**.

The combination of ETERNUS storage hardware and Commvault Software positively lends itself to implementing this new strategy on site. To this end, Fujitsu offers its line of "Business-Centric Storage" – scalable, unified disk storage systems and data protection appliances. Their extraordinarily reliable architecture allows radically simplified operation, and customers can flexibly manage growing data volumes at a much lower cost. Moreover, Fujitsu's ETERNUS DX hybrid series feature a unified set of management tools that works across systems of all sizes, thereby differing greatly from the dedicated, but unrelated entry-level, midrange and high-end storage solutions offered by other infrastructure providers. Both customers and partners benefit from this approach because it increases flexibility and helps to keep operational expenditures and the cost of growth under control.

To complete its "Business-centric Storage" strategy, Fujitsu also attempts to streamline IT infrastructures for backup and recovery, long-term data retention, and archiving. This is the underlying concept for all ETERNUS CS products, which ensure shorter recovery times (RTOs) and a reduction in maintenance and operating efforts. For tape storage, Fujitsu offers its ETERNUS LT systems that enable customers to adapt to data growth with the pay-as-you-grow concept. Products from leading technology partners supplement Fujitsu's own technologies and comprehensive service offerings, so that customers can build and operate businesscentric infrastructures for data management and data protection.

Commvault software enhances Fujitsu's approach by providing a single, modular, and scalable software architecture with robust data structures. Put another way, Commvault software is a perfect match and logical extension for ETERNUS hardware, resulting from a long and close collaboration between both companies that led to a strategic partnership in 2011. Since then, Fujitsu has augmented its ETERNUS storage systems and Integrated Systems PRIMEFLEX with Commvault software as well as related maintenance and management services. Both companies aim for an even deeper integration of their hard- and software platforms in existing and future products and solutions.



Fujitsu storage hardware

Primary hybrid storage: ETERNUS DX

FUJITSU Storage ETERNUS DX series are the ideal hybrid storage for on-premise storage of business-critical data in data centers, branch offices and self-operated IT of SMBs, something every business can afford, with integrated and powerful features for business growth, efficiency and continuity. Latest capacity and performance optimization capabilities contribute to overall business efficiency, outstanding data-safe technologies and all-inclusive encryption guarantee uncompromised business continuity.: Fujitsu Storage ETERNUS DX

Target-based backup appliance: ETERNUS CS800

The ETERNUS CS800 is a one-for-all deduplication appliance working together with all backup software suites. The appliance provides a simple and affordable solution for customers which follow a backup to disk strategy with deduplication. The advanced deduplication technology reduces typical disk capacity requirements for disk-to-disk backup by up to 95%.

ETERNUS CS800 provides maximum disk performance and high scalability. Backup data replication between sites uses global deduplication to reduce dramatically typical network bandwidth needs. ETERNUS CS800 is ready to be the backup target in cloud hosted disaster recovery sites. Overall, the ETERNUS CS800 is a turnkey solution that enables a simple, economical implementation of next generation backup, replication and disaster recovery methods.

Within Fujitsu's and Commvault's integrated solutions portfolio, it serves as a building block for centralized backup and information management scenarios and offers the best performance among current midrange systems. For configuration options, please refer to the data sheets on Fujitsu internet page: Fujitsu Storage ETERNUS CS800

Data protection solution: ETERNUS CS8000

More than twenty years of user-driven development have made ETERNUS CS8000 the most reliable central repository for backup, archive, second tier and object data. ETERNUS CS8000 consolidates data from mainframe and open system environments. Intelligent process automation and the pooling of storage capacities automatically manage backup and archive data between different storage tiers, including SSD, disk, and tape technology as well as different performance and availability levels. ETERNUS CS8000 is the most versatile and flexible solution of its kind, reducing the TCO for complex data protection environments by 60%. Designed to flexibly fulfill various data protection service. levels, ETERNUS CS8000 provides automated 24/7 operation, comprehensive high availability with zero downtime and disaster recovery capabilities. Unique scalability in capacity and performance makes ETERNUS CS8000 a viable solution, that enables continuous cost savings.

More information about the product on Fujitsu internet page: Fujitsu Storage ETERNUS CS8000

Read the white paper: Fujitsu Storage ETERNUS CS8000 and Commvault Software to get a deep understanding about the combination and interaction of ETERNUS CS8000 and Commvault software.

Tape storage: ETERNUS LT

Fujitsu offers a comprehensive range of LTO tape libraries and media for businesses of all sizes. The focus is on the ETERNUS LT series, which offer impressive scalability and reliability. The affordable ETERNUS LT meets a wide range of demanding data storage requirements including longterm retention, disaster recovery and unattended backup for companies of all sizes. The libraries are certified for market-leading backup and archiving software. Highly automated, simple and remote operation enables usage without any demand for local expert skills.

The pay-as-yougrow concept means that customers avoid unnecessary initial investment and remain flexible. Latest LTO technology features high capacity, high speed and low cost. The ETERNUS LT family provides hardware-based data encryption offering enhanced security and compliance.

For detailed information, please see the data sheets on Fujitsu internet page: Fujitsu Storage ETERNUS LT.

Commvault software

Commvault's data platform and solutions portfolio is uniquely positioned to help customers activate their data by accelerating the transformation from legacy data management to a modern data environment to unlock critical business insight and drive new value from customers' technology investments. The Commvault solutions portfolio is comprised of an industry-leading product offering in the areas of data protection and recovery, cloud, virtualization, archive, and file sync and share that addresses evolving market trends, growth areas, and customer use cases. The Commvault data platform is open and standards-based, helping customers better leverage data, improve IT operations, and enabling third-party innovation.

The Commvault Data platform consists of four product pillars:

Commvault Complete™ Backup & recovery	Commvault HyperScale™	Commvault Orchestrate™	Commvault Activate™
Includes everything you need to conduct backup, recovery, and archiving activities, enable operational reporting, and perform hardware snapshot management, all in one complete solution.	Software leverages the cost and scale efficiencies of the cloud on- premises using a software- defined scale-out architecture.	Simplifies disaster recovery, development and testing, and workload migration through automation and orchestration.	Extracts data insights for better data governance and business outcomes

Commvault Complete™ can be extended with each module to address customer scale and complexity challenges

With a flexible, yet comprehensive data management platform, you can quickly deliver actionable insights from data stored across your IT infrastructure. Commvault Software protect, manage and access a broad range of data types across primary infrastructure, cloud and secondary storage locations. You can quickly test a new customer application, support a new overseas office, and have the confidence to protect your organization from a ransomware attack. Commvault's data protection solution supports all major operating systems, applications, and databases on virtual and physical servers, NAS shares, cloud-based infrastructures, and mobile devices.

Commvault enables progressive enterprises to rethink data management across the organization addressing the following:

Protect your data.

- Commvault keeps it simple: all customer data is protected and secure, whether in a physical, virtual or cloud environment, whether on desktops, servers or endpoints.
- That gives customers the confidence and freedom to focus on what really matters: their business.

Access your data.

- Only Commvault safeguards all customer data – backups, snapshots, archives, etc. – in virtual native format, with full indexing.
- That means customers know everything about that data: where it is, what it is, who owns it, when it was protected and much, much more. And that means Commvault customers are guaranteed the most immediate availability in the industry.
- No more static copies or dark data – Commvault customers get back data that is actionable and ready to put to maximum strategic use.

Be compliant with your data.

- Commvault solutions enable customers to produce, retrieve and review all discoverable information, on demand. No waiting.
- Leveraging powerful indexed search across multiple data types with a single platform not only saves money and time, it minimizes risk and exposure.

Share your data.

- People share things. For enterprises that can be a problem, as employees use consumer tools to share company information. While user collaboration and productivity are served, security and data protection become huge issues.
- Commvault brings control back into enterprise data management with secure file sharing and anytime/ anywhere data access, powered by enterprise-grade backup. Users get powerful sharing and access, IT gets comprehensive backup and security for all enterprise data, and the company benefits from powerful analytics and reporting to help optimize data use and value.

For more information, please refer to www.fujitsu.com/commvault or www.commvault.com

Pain points and hot spots

The growing importance of IT results in a double dilemma for both business departments and data centers. On the one hand, they are faced with exploding amounts of information and tightening SLA requirements, on the other with shrinking budgets. With regard to backup, recovery and archiving, this means that more data have to be processed simultaneously while errors must be eliminated – all without additional efforts and expenses. At the same time, businesscritical data must be permanently available, without backend processes slowing down access. Finally, IT departments need to make sure that all parts of an organization's IT infrastructure are part of the centralized backup and archiving process, that way prohibiting the loss of vital information.

But what is the situation in most companies today? Historically grown data centers typically use different server systems and a wide variety of storage arrays and tape libraries, all of which support different (often proprietary) technologies, media, file formats and interfaces. Hence, IT departments need one software package for backups, another for archiving, and yet another for disk and array management. Snapshot software is used to create images for fast recovery, but snapshots are almost never integrated into regular backups. As a result, administrators must constantly keep control of assorted tools and processes to ensure that everything works correctly and prevent unexpected malfunctions that could lead to system or application failures. These problems are only exacerbated if a company decides to upgrade or replace its server systems, which oftentimes means it has to swap backup solutions as well. In addition, many organizations fail to include IT systems in remote locations and endpoint systems used by mobile or external staff in central backups. Consequently, such data may be accessed locally and/or by authorized individuals, but headquarters cannot control what is going on. Against this backdrop, implementing efficient disaster recovery or high availability requires massive financial and operational efforts – if it is possible at all.

Mastering these complex challenges requires a powerful solution that can access multiple target systems in parallel and allows for a gradual modernization of backup and archiving processes. By combining ETERNUS hardware with Commvault Software, Commvault and Fujitsu provide customers with such solutions. The integrated solutions enable customers to build reliable, highly efficient infrastructures for a plethora of use cases, to meet legal and professional standards and to reduce operational expenditures. Compared to traditional solutions, the advantages are:

- Reduction of administrative burdens and costs through automation and centralization of core functions
- Extreme scalability – maximum performance can be achieved with minimal administrative costs
- Utilization of synergies between backup and archiving to reduce daily backup efforts
- Investment protection through better utilization of backend infrastructures
- Simple planning and implementation of storage levels and hierarchies, guaranteed data availability according to company guidelines
- Transparent, policy-based archiving and indexing of application data
- Central classification, comment and search functions for archived content
- Stable, reliable performance even in case of server, storage or network failures through excellent error correction
- Significant acceleration of backups and reduction of backup times even in Big Data environments
- Easy integration of heterogeneous storage hardware and virtual storage
- Automated deduplication
- Increased security

The following chapters explain how this combination works in standard usage scenarios and how it helps IT departments to consolidate storage infrastructures and raise their efficiency.

Use cases

Traditional backup with ETERNUS and commvault software

Let us first look at a typical backup infrastructure as it can be found in most companies, regardless of revenue or

number of employees. The figure shows the path that data from production server have to follow during the regular backup and restore process. Whenever a backup is initiated, application servers (that store information on internal hard drives, dedicated disk arrays or networked storage) send copies of production data to so-called backup or media servers, which in turn pass it on to the target backup storage, the physical data stores like disk, deduplication disk, appliance or tape. For restores, that process is simply reversed. Numerous organizations use similar infrastructures for archiving.

To evaluate the true strength of Fujitsu's and Commvault's integrated solutions, let us now have a closer look: There are three primary components in a Commvault software environment: CommServe, MediaAgents and client agents. The CommServer module of the Commvault Software is a piece of server software. It coordinates and administrates all Commvault Software components. The CommServe server acts as management server and communicates with all agents to initiate data protection, management and recovery operations. The MediaAgent provides high performance data movement and manages the backup storage. For scalability, there can be more than one MediaAgents running on another physical or virtual server. The CommServe acting as a management server coordinates MediaAgent tasks. Client Agents are software modules that perform data protection and data recovery or archiving operations for specific operating systems or applications. Multiple agents may be used to protect all types of data residing on a computer. There are different types of client agents: Backup, archiving, continuous data replication (CDR), compliance archiving, storage resource management (SRM), etc.

The integrated solutions introduced in this white paper support all traditional backup methods, regardless of whether they rely on disk arrays, tape libraries, appliances or a combination of them. Each method has its advantages and is suitable for different settings.

- Backup-to-disk (including backup to flash) suits for rapidly and immediate recovery of productive data. Multiple data streams can be processed simultaneously. This main technical advantage permits speedier access to individual files and much faster restores. In addition, disk backups offer greater reliability and easier access for administrators and end users.

- Backup-to-tape is ideally for data that require long-term retention due to compliance standards, such as contracts or healthcare information. The advantages of backup-totape lie in the significantly lower storage costs per gigabyte and greater durability of the storage media – under appropriate conditions, tapes can protect data for decades. In addition, they can store information in WORM mode (for "write once, read many"; indicating protection against subsequent changes), are easily transferred to a second secure location and consume less power than hard disk drives, which draw current even in idle mode.

- To meet the requirements of a more sophisticated tiered backup strategy, IT departments may also deploy virtual tape libraries (VTLs) or data protection appliances that work as connection hubs to enterprise-level libraries and dedupe disk systems for replication to a secondary site. The data protection appliances with backup-to dedupe disk like ETERNUS CS800 eliminates all redundant data, allowing for better utilization and reduces storage capacities to one twentieth of the original demand thanks to the advanced deduplication algorithms. Thus, users save on disk space and at the same time need much less bandwidth for data transmission to remote sites or corporate headquarters. Therefore, data protection appliances are ideally suited for backup in branch and remote offices as well as for large enterprises with central and remote offices.

Today, most companies have to deal with different types of data and hence use several technologies and hardware platforms. The Fujitsu ETERNUS portfolio fits for all these basic backup scenarios. Thanks to a high level of automation, the combination of ETERNUS hardware and Commvault software brings about substantial gains in efficiency when performing standard tasks such as scheduling backups or retrieving new application servers and desktop PCs. With all data being kept in the centralized ContentStore, all critical information remains constantly available for fast and easy restores to the production systems. Built-in encryption, integrated reporting on capacity utilization, and improved search functions for end users make backups to the different storage targets - located in the virtual repository - safer and more efficient.

Backup in virtualized environments

The benefits of server virtualization are indisputable and in the meantime have prompted most companies to use the technology on a large scale. The goals of these projects aremanifold and range from saving on hardware investments through server consolidation to increasing a company's flexibility and responsiveness. The rapid proliferation proves that these hopes have been fulfilled for the majority ofusers. As a result, virtualization has turned into a cornerstone in modern data centers, where more and more mission-critical applications such as databases and mail programs are shifted to virtual machines (VMs). However, building such data center infrastructures is increasingly complex, error-prone, time-consuming, risky and expensive.

Fujitsu offers integrated systems for virtualization, named as Fujitsu Integrated System PRIMEFLEX, to reduce complexity and risk, shortens time to value and reduces cost. PRIMEFLEX is a pre-defined, integrated and tested combination of servers, ETERNUS storage, network connectivity and software. It comprises ready-to-run factory-installed solutions and reference architectures, which are easily adjusted to customer-specific requirements. However, virtualization frequently entails unexpected and unwanted consequences for data protection. Simply put, the consolidation of physical server capacities at the typical 10:1 ratio means that the server administrator has to take care of 50 systems where he formerly managed five – that workload is not uncommon in large environments with hundreds or even thousands of machines. Further fueled by unrelenting data growth, the consolidation leaves less and less time for standard tasks such as backup and recovery. Hence it was of vital interest to rethink and modernize traditional approaches to backup and recovery.

The key to solving these issues lies in virtualization itself. In principle, VMs are nothing more than large data sets that are assigned to a specific server or LUN and that are backed up following a standard method. For this purpose the administrators usually quiesce VMs – i.e. applications – to create consistent backups. A software agent (Virtual Server Agent, VSA) then reads the data and sends it to a predetermined target system. Once the transfer is finished, the VMs leave the backup mode. The disadvantage of this simple but proven method is that there is still a large amount of data that needs to be moved, which naturally takes time – and time is scarce in large or heavily used IT environments/company networks.

Commvault Complete™ Backup & Recovery for virtual environments, a module of the Commvault data management platform, is designed to deliver a complete and holistic set of backup, data protection and recovery capabilities for virtual environments. The software leverages deep integration in virtual infrastructures and offers policy-based auto-protection of virtual machines, regardless of whether they are traditional, converged or hyperconverged. To reduce the impact on production systems and ensure data security, the software provides enhanced data protection and data transfer features such as proxybased backups, advanced transport support, hardware-agnostic media management, deduplication, compression, and encryption. Commvault Software speeds up the entire backup process significantly, as it only creates full copies during the first backup. Afterwards, the software permanently switches to incremental mode, which means that from here on out backups merely include information that was changed or added since the last run. Moreover, Commvault's IntelliSnap module generates consistent snapshots, rules-based and nearly in real time. The software helps protect businesses against the failure of VMs, servers and applications, which can

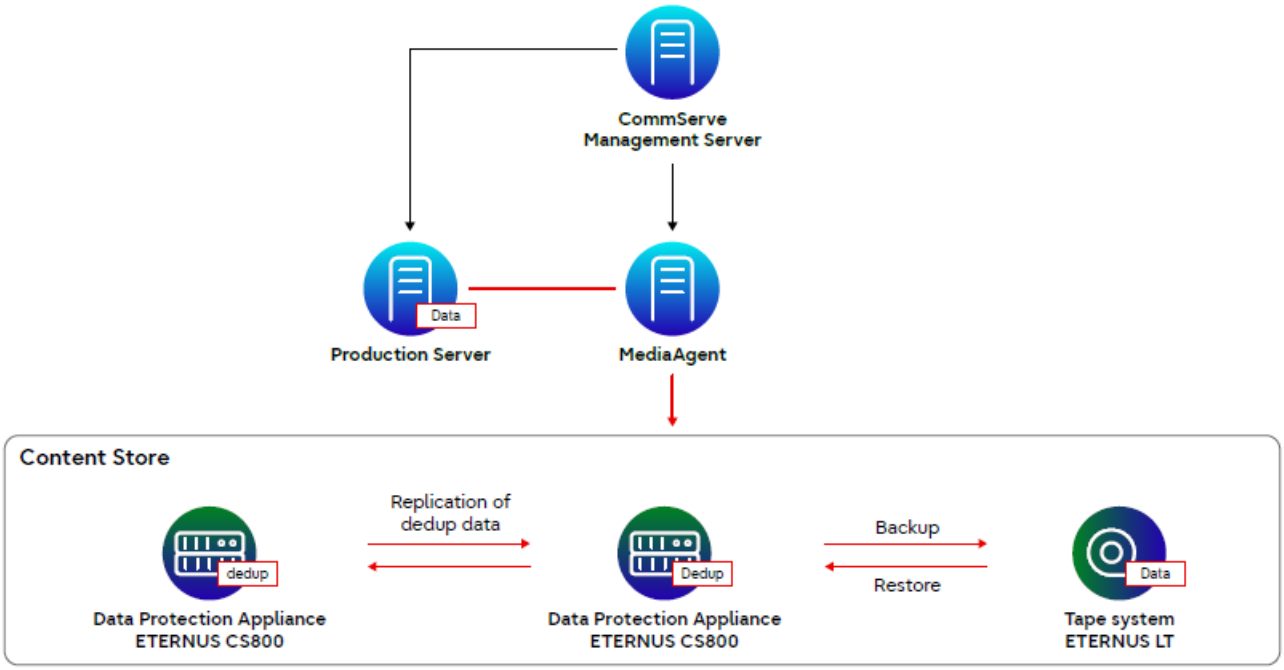
be restored to the last good state within minutes. That way, IT departments are able to reduce downtimes considerably, to minimize the risk of data losses, and to comply with even the most rigorous SLAs. To simplify management of virtual machine data, Commvault Software provides a single, central administration console for different virtualization platforms, policy-based protection, job management, scheduling, and reporting features. The chapter Commvault Books Online: Virtualization delivers a deep insight into the virtualization capabilities of Commvault Software.

Fujitsu Storage hardware ETERNUS and Commvault Software provide a reliable backup and recovery solution across the entire lifecycle of each virtual machine – meaning that business-critical data is constantly protected, even if disaster strikes. In addition Commvault Software combined with Fujitsu Integrated System PRIMEFLEX is an ideal solution providing virtual infrastructure including backup for businesses of all size.

Backup in distributed environments

With revenues and employee numbers increasing, companies soon have to integrate multiple remote locations into the backup schedule. At the same time, quality requirements regarding data protection and data management keep getting stricter, even more so since an SMB's company value largely derives from its customer, product, research and development data. Consequently, these companies should no longer restrict themselves to the use of local systems for backup, recovery and archiving – because if they do, any catastrophic event (such as fires, floods or earthquakes) will cause the loss of invaluable information.

To refine their data protection strategy, they should replicate particularly sensitive information to remote data centers, hosting services or cloud service providers (CSPs). If a branch office belongs to a larger firm, local backups must be integrated into the company-wide process, and data should be replicated to the main office. The figure shows how the scenario with the target-based backup appliance ETERNUS CS800 by using the Commvault Software looks like. The ETERNUS CS800 already contains the replication feature and in addition, you can move data to the ETERNUS LT tape library thwarting cyber-attacks.



The newly created infrastructure enables branch offices to substantially accelerate their backups and manage their data more flexibly. In essence, each shop runs a "miniature edition" of the overarching storage solution that has been tailored to meet smaller capacity and bandwidth requirements. Thanks to built-in deduplication functions, the solution can eliminate all redundant data, allowing for better utilization of available storage capacities and remarkable acceleration of data transfers from remote/branch offices to the central data center. Administrators from the main data center may now manage and monitor local backup and archiving processes and incorporate them into the company-wide solution. This is the first and most important step towards consolidating data protection and related administrative functions.

Snapshot integration

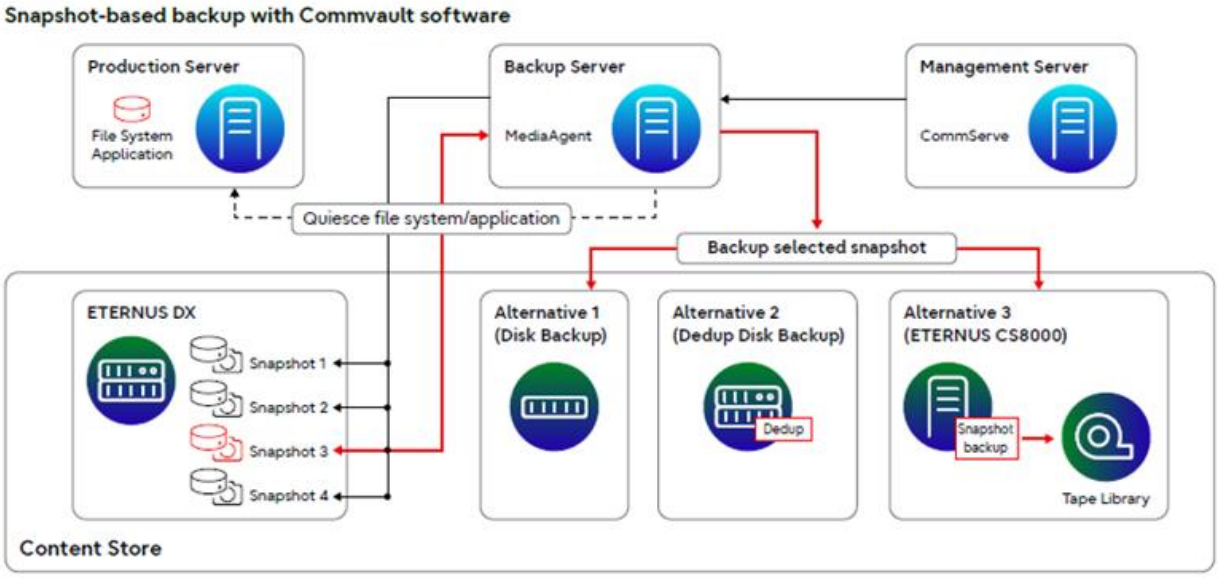
Why snapshots?

Exponential data growth, the proliferation of virtual server systems, stricter SLAs, and the persistent threat of data losses have posed the question how backup and recovery can be further refined to meet the ever-growing demand for fast, time-critical restores. Technically, IT departments encounter the following problems:

- Considering the amount of data to protect, backup windows are often too small, so that the process may extend well into office hours, slow down other systems and impede regular business.
- Difficult to meet SLAs; in particular, it is often impossible to revert to a "last good state" from hours or minutes ago.
- Deploying additional hardware not only brings no relief, but also complicates storage management.

Against this backdrop, many companies have determined that snapshots are the best method to complement traditional backups. Analyst surveys show that nearly 60 percent of all users have already rolled out snapshot solutions. The reason for their popularity is obvious: since snapshots are mere virtual copies of the data stored on a disk system, are rapidly created, occupy little space andhardly affect the performance of production systems. In other words, snapshots are ideally suited for swift and consistent data and application recoveries after a server failure. Unfortunately, the technology may at first cause a number of problems, some of which occur due to misconfigurations while others result from technical limitations. Primarily IT departments occasionally tend to store snapshots on the same primary storage system as the productive data. If this system crashes, both the original copy and the snapshot are lost, and quickly reverting to the latest consistent state becomes impossible. Second, nativearray-based snapshot tools or third-party solutions vary widely in terms of functions and often only support specific hardware platforms and applications. Third, these tools at best offer a small degree of automation, which complicates integration into existing backup processes, because administrators have to rely on a variety of scripts. That is especially true in heterogeneous environments, where IT departments can rarely unlock the full snapshot potential.

Commvault software solves most of these problems with the help of its IntelliSnap technology. IntelliSnap supports 95 percent of all storage arrays as well as most business-critical applications, including DB2, Lotus Notes, Exchange, and software from SAP and Oracle (for details see Commvault BooksOnline: Snapshot management). Moreover, it cooperates with VMware's and Microsoft's virtualization platforms and various file systems for Windows, Linux and UNIX. Even more important, the module serves as a central hub between the applications and the array-specific tools, governs snapshot generation and automates snapshot management. Put another way, it serves to fully integrate snapshots into the rest of the backup process.



In the setup illustrated above, IntelliSnap supports the snapshot capability of Fujitsu Storage ETERNUS DX hybrid storage systems. The following steps are required:

- The iDataAgent module of Commvault Software quiesces applications, databases, and file systems on the production server and sets it to backup mode.
- File systems, applications, and virtual machines are now in a consistent state so that a snapshot of the associated storage arrays can be created. Administrators can manage all snapshots using Commvault Software and need no additional array management software.
- Afterwards, the snapshot is transferred to the MediaAgent, which acts as a proxy host and hands over selected snapshots to other backup target systems at the backend (disk, dedupe disk, tape or cloud).
- The MediaAgent writes a catalog of the files in the snapshot in the same way it would during a regular backup. The catalog can be used for targeted information retrieval and granular restores of specific information. In addition, the MediaAgent can also perform "offline mining" operations that let users view and recover individual Exchange messages, SharePoint documents or Active Directory objects.
- During office hours, snapshots can be taken on a regular basis in order to generate as many restore points as possible and meet relevant SLAs. To prevent the loss of snapshot data (or minimize its impact), IntelliSnap automatically creates rule-based backups of select snapshots, which are then transferred to a proper backend target like ETERNUS CS backup appliances.
- Since this backup copy is created by a proxy host, the process doesn't affect the production system. Consequently, administrators may induce hourly snapshots and back up the last one of the day.

Customers can choose between different target systems for storing snapshot copies:

- With online disk and flash arrays like the ETERNUS DX, they opt for fast restores.
- Deduplication appliances also allow for rapid recovery but help to reduce storage expenses as well – meaning they are a particularly good choice for cost-conscious SMBs.The ETERNUS CS800 appliance feature extra-fast hard drives and use efficient deduplication algorithm to save space when storing backups. Unlike purely software-based solutions, the preconfigured appliance is easy to install, ready for use and optimized for maximum performance.
- Data center storage solutions for backup and archive like the ETERNUS CS8000 are the ideal backup targets for an economical combination of short-term data protection with long-term data retention on disk, dedupe disk or tape.

Commvault Software also includes the IntelliSnap API, which opens up two alternate paths to data recovery from snapshot-based backups besides browsing the catalog:

- **Full revert –** The entire snapshot is restored using the appropriate hardware features. Users should exercise extreme caution, since all files on a LUN or volume are reverted to an earlier state. IT departments planning to use this feature must configure each application carefully and ensure that there is only one database running on each volume. Full Revert is by far the fastest restore method and thus particularly suited to meet stringent RTO requirements.

- **Granular restore –** The second option is to mount the snapshot and copy back individual files or folders to the production system. The restores can either be performed over the LAN or independently (LAN-free). To use this option, the snapshot must be mounted on the production server.

The Commvault software feature IntelliSnap supports Fujitsu Integrated System PRIMEFLEX for SAP Landscapes powered by FlexFrame orchestrator. Basic functions and operations correspond with the ones named above and specifically address the underlying database. Moreover, the module adds some attractive expansion options to FlexFrame Orchestrator backups. For example, retention periods for snapshots, which usually last between one day and four weeks, may be configured individually. As a result, administrators can now keep select snapshots for a longer timeframe and develop sophisticated snapshot strategies, whereas end users can access older database versions quickly and easily if required. To achieve this, the long-term snapshots are moved to an ETERNUS CS backup appliance and/or ETERNUS LT tape libraries, from where they are retrieved via so-called Commvault software proxy system – essentially a backup server running the Commvault software media agent. Similar functions can be realized by creating a clone, or full copy, of the SAP database, which is also kept on a secondary storage system. In all these scenarios, the close integration of snapshots and backups induces a continuous or near-continuous data protection process, which in turn improves the quality of backup and recovery, increases data availability and data security, and safeguards the productivity of the entire IT environment.

"Commvault software which provides intuitive backup can be extended to support our non-SAP applications, giving us value for money. The Commvault IntelliSnap technology provides snapshot-based backup which reduces recovery time of multi-terabyte SAP application data from hours to minutes."

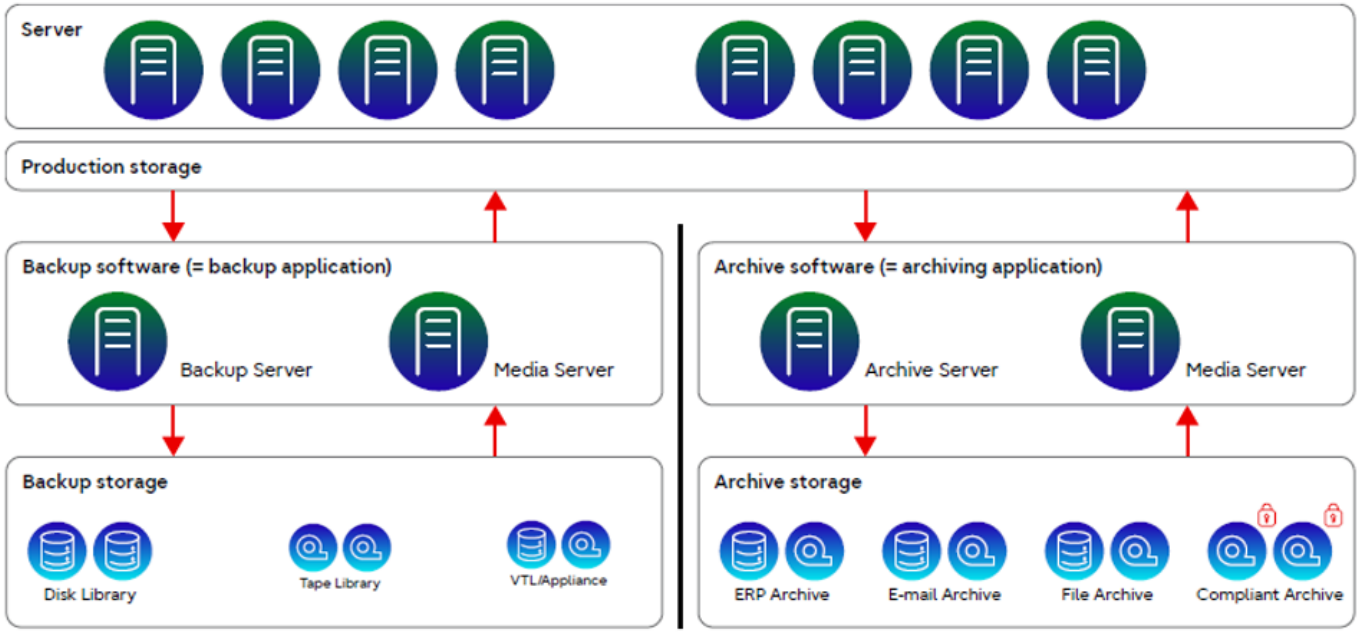
Pradeep Kumar, Head of IT operations, Al Ahli Holding Group, UAE

Read more →

Archiving and Storage Tiering

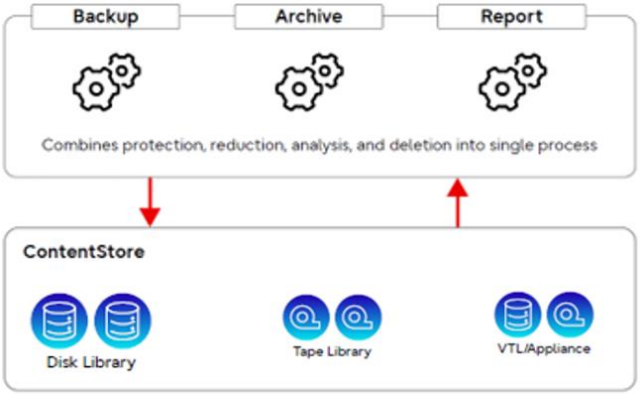
General

To disburden production systems and streamline the backup process, many companies have employed a two-tier backup strategy for years. Usually, this means that inactive data as well as those picked for long-term retention are stored onseparate archive systems. As before, the idea is to enable IT departments to reduce the volume of necessary data transfers and the demand for expensive primary storage. The main drawback of this approach, however, is that it also forces IT to build a parallel archive infrastructure that causes additional administrative overhead – even though backup and archive systems are very similar to each other.



Even so, one major difference exists between the two. Unlike conventional backup programs, archiving solutions isolate certain data sets and transfer them to separate back-end systems – instead of copying the entire stock. Most programs also provide necessary parameters with regard to retention periods, access rights, and legally secure preservation on steady, non-rewritable WORM media. Yetarchive management is still a complex task that often calls for separate admin teams. Archiving has rapidly gained in importance for various reasons. On the one hand, virtually all companies and most public authorities have switched to electronic communication and the "paperless office." A more important factor, on the other hand, are stricter legal requirements concerning the long-term retention of important financial and business data. For adhering to these rules, the term "compliance" was coined; the corresponding data collections are therefore called "compliance archives." Email archiving plays a particularly important role in this context, simply because mails often contain information about impending mergers, the issuance of corporate bonds etc. and offer proof that all parties involved did abide by the law. Still, many IT departments run into massive problems when trying to build a standards-compliant email archive – because the sheer amount of messages that are sent and received is simply unmanageable if they must rely on traditional software solutions. Fujitsu technology and Commvault Software provide the much-needed remedy.

Commvault OnePass and ContentStore



Commvault OnePass™ and ContentStore are key software components of Fujitsu's and Commvault's integrated solutions. Both help IT departments to regain control over the exponential growth of information and to drastically cut the number of redundant data protection and data management processes. At the same time, they bring simplicity to the most complex management tasks. The overriding principle is that each data set – whether it is an Office document, an email or multimedia content – is only captured once, whereupon it is available to all relevant applications. But how is that supposed to work? Usually, all backup, archiving and storage management programs collect data separately and place them in separate repositories. The resulting "silos" inflate the volume of information stored and add unwanted complexity, as they are typically managed by different administrative teams working with their own limited tools. From this description, it is easy to see that conflicts and friction will arise and result in time-consuming, costly coordination processes. By contrast, OnePass™ collects, classifies, and stores data on the appropriate backup and archive systems in a single run. All backup storage systems are then merged into a unified, virtual storage pool – the ContentStore – regardless of the hardware, media types, file systems and formats or applications they may be associated with. For all other tasks, administrators as well as end users simply pull data from this central pool. With isolated repositories and separate data collections being abolished, capacity demands, and complexity decrease massively, and the time needed to capture data is halved. What's more, capacity requirements for future use remain at a low level thanks to continuous incremental backups. A unified "smart index" and powerful search tools that integrate into Microsoft's Windows Explorer or VMware's vCenter allow for targeted, direct information retrieval and help to save time. These functions alone are enough to significantly reduce hardware and operational costs for storage infrastructures and notably raise their efficiency.

Details – Archiving and storage tiering

Thus, Commvault's and Fujitsu's integrated backup and archiving solutions also allow for the implementation of

company-specific storage tiering concepts – essentially, of rules-based, automated and customized data and storage management. The most common version of a tiered backup strategy is to remove rarely used data from local primary storage after a given amount of time, e.g., three to six months, after transferring them to a tape library at the main data center. With Commvault software IT departments can easily automate the process; all they have to do is to install the iData Archive module on the clients. Administrators can then select the proper archiving option from the Commvault Software GUI and store multiple copies on different media for different retention periods.

For example, files from a productive system may be kept unchanged on a disk backup solution for six weeks to enable fast restores, while a copy or backup of the same files can be archived on a tape library for three years. On the production system, each archived file is represented by a so-called stub (placeholder).

Since Commvault software keeps all data in its virtual repository (ContentStore), users may transparently access archived objects regardless of the medium they are stored on. For file archiving use the Commvault OnePass™ function, which combines backup and archiving in a single job. In addition, the Commvault software features numerous automation options that simplify archiving considerably. For example, administrators can define simple sets of rules that specify which messages must be archived and where. The unified ContentStore index gives a detailed overview of the data in the central repository and thus ensures they have access to random subsets of data (backups, snapshots, archives, replicated DR copies etc.). Based on message journaling and full-text indexing, integrated reporting and analysis tools provide comprehensive information regarding employment and utilization of the storage systems that further help to improve service quality. These features ensure that company management and legal departments have immediate access to crucial files or mails in emergency cases.

Depending on the individual scenario, an archive may either reside on a disk array (if data must be accessed more frequently, e.g. ETERNUS DX) or tape storage system (if the focus is mainly on long-term retention, e.g. ETERNUS LT) or data protection appliances which are suitable for backup and archive (e.g. ETERNUS CS). Tape libraries and data protection appliances are capable of reading and creating WORM (Write Once, Read Many) media in order to prevent the subsequent, illicit alteration of source material and warrant legally secure archiving. Especially the ETERNUS CS8050 NAS is an economical and reliable stand-alone storage appliance to support the archiving needs of small to medium-sized environments and branch offices. The solution provides comprehensive, competitively priced storage including SoftWORM features for legal compliance, integrated archive replication and snapshot-based backup processes that ensure ongoing business continuity. For high availability scenarios, we recommend the use of the ETERNUS CS8000, the data center storage solution for backup and archive. See the separate white paper: Fujitsu Storage ETERNUS CS8000 and Commvault Software.

For all these scenarios, the combination of ETERNUS hardware and Commvault Software can provide individual, customized and cost-effective solutions.

Endpoint data protection

Mobile computing has driven massive gains in productivity – while introducing new data management complexities and risk for IT and security administrators. Unlike servers, which are always connected to a high-speed network backplane, laptops are frequently turned off or may be connected to low-bandwidth networks, making it difficult to schedule and perform automated backups. At the same time, many employees are storing work-related files using personal cloud-sharing services outside the control of the IT team.

Commvault Complete™ backup & recovery for endpoint users, a module of the Commvault data management platform, provides automated data protection, robust security features and integrated search that provide total visibility into corporate data stored on laptops, desktops and in cloud file-sharing services. The comprehensive endpoint backup capabilities of Commvault Software make it easy to regain control of and more effectively manage the files and folders living outside the data center. The ability to quickly search through files and documents is essential to compliance, internal investigations and litigation matters. Commvault's content-based search capabilities allow you to run automated advanced keyword searches for compliance and eDiscovery across all endpoint backup data that has been collected and stored in the virtual content repository – the ContentStore. The streamlined approach to endpoint data protection reduces IT risk and keeps your corporate data protected, no matter where it lives.

Find out more at www.commvault.com/endpoint and technical insights on Commvault Books Online: Edge Endpoint Solutions

Fujitsu support services

Fujitsu offers its own pre- and post-sales service and maintenance services for Commvault Software as well as for the whole infrastructure. Fujitsu was the first certified Tier 2 support service partner of Commvault.

Fujitsu delivers maintenance and support services through certified support engineers for individual products as well as heterogeneous infrastructures out of one hand: From installing new products to providing fast and uncomplicated multivendor support for hardware, software and infrastructures. With the right mix of maintenance and support services, Fujitsu enables the early planning for the availability of IT systems required for state-of-the art business operation.

Fujitsu was the first leading IT service provider to comply with four of the currently most significant quality standards for ITIL-based processes and IT Security and Management: ISO certificates 20000-1 (IT service management), 27001 (IT Security), 9001 (quality management) and 14001 (environment).

Fujitsu product support services comprise the following modules:

- Startup services and InstallationPack help customers get their servers and storage systems up and running on site.
- Hardware maintenance complements the product warranty and covers diagnosis of hardware failures as well as repairing or replacing defective products. Fujitsu offers two distinct packages, SupportPack and ServiceContract.
- Software support includes the diagnosis of software failures and provision of temporary solutions and/or the right to receive corrections, updates and upgrades, if applicable.
- Solution Support includes proactive and reactive maintenance services for both hardware and software components of an infrastructure solution.
- Managed Maintenance precisely coordinates third-party hard- and software services in heterogeneous, complex, internationally distributed environments.

Further support packages include managed infrastructure services, IT consulting services, application services, financial & remarketing services, and maintenance logistics. More information is available on Fujitsu internet: Fujitsu Product Support Services.

Conclusion

By combining Fujitsu Storage ETERNUS family with Commvaultsoftware, organizations can effectively consolidate complex backup and archive infrastructures and dramatically reduce hardware and operating costs. Moreover, the integrated scenarios described in this paper help to accelerate and streamline numerous, otherwise time-consuming and cumbersome processes and pave the way for all companies that want to build more flexible, agile IT infrastructures. In short, the combination of ETERNUS hardware and Commvault software ensures that users will be able to handle future exponential data growth, retain control over their information assets at any time, and own infrastructures that remain secure, expandable and reliable for years to come.

For more information: www.fujitsu.com/emeia

White paper

Fujitsu Storage ETERNUS and Commvault software

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