FUJITSU

Resilient Data Platforms: Key value for your IT

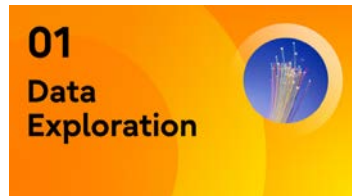## Reliable and efficient data services with Fujitsu Storage Solutions ETERNUS

Data is your most precious jewel.
Explore it, store it, manage it, protect it, perform with it!

The world is data-driven and our way of working is completely changing. As a result, every company is in an ongoing process during which all data is changing all the time. In fact, today, and much more in the future, data is a key element that drives businesses.
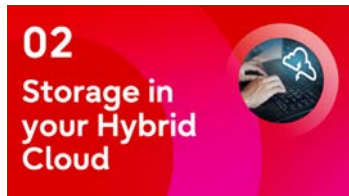
If you want to profit from this precious asset for your company, you need to challenge your data strategy. This is especially true for your storage strategy, the heart of your data-driven business.

We have listened closely to our clients. Based on their thoughts and feedback, we identified key challenges and formulated possible solutions. With 5 data and storage scenarios, we provide you with orientation and comprehensive support on the way to turning your data into the most precious jewel for your company.
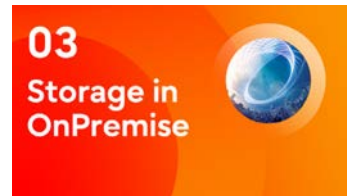
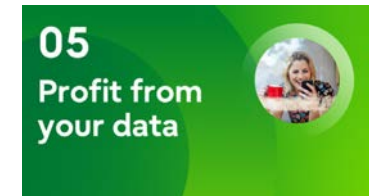| 01 Data Exploration	02 Storage in your Hybrid Cloud	03 Storage in OnPremise	04 Data Protection	05 Profit from your data
How can you best adapt your IT areas and data management to the rapidly changing world?	What does it take to enable your employees to work flexibly? Maybe a hybrid cloud solution.	What place for your data provides the reliability, flexibility and efficiency you really need in the digital transformation?	What about your precious data, in terms of data protection, ransomware, disaster recovery and cyberattacks?	How can you ensure that your data is always where you need it right now for your business success?
With an affordable, AI-based and standardized assessment service, we provide guidance and point out how you can optimize your entire infrastructure – be it on-premise or in the cloud.	Together with our partners, we help you find the right cloud for the right data and workloads – on-premise or in the cloud, and highly efficient and flexible.	With decades of experience and best-in-class RAID and software-defined storage, we help you realize the best storage solution for you, enabling you to efficiently access, use, maintain and manage your data at all times.	From our experience, we know that these topics are often not given the necessary attention until you have had the damage. With comprehensive solutions for data backup, archiving and recovery, you will be able to prevent damage in the best possible way	Your data only becomes precious data when it's there. With our Customer Experience Lab (CX Lab) approach, we develop agile and efficient data distribution solutions together with you so that you can always benefit from your data.

Fujitsu Storage Solutions – benefit from your data

The ability to monetize data is essential for digital transformation. However, data relevant to business decisions no longer resides in the data center alone – it is extremely dispersed and also located on user devices, in the cloud, at service providers, customers, partners, suppliers, documentation archives and many other places. To benefit from your data you need to challenge your IT strategy. Depending on your business scenario, you need storage technologies that optimally support your requirements to control this ever-increasing chaos:

• In real-time business analytics, large data volumes require faster storage response times for as long as the data sets are relevant.
• Storage systems for business-critical data need to be more scalable and provide stronger fault tolerance.
• Extreme growth of unstructured data triggered by data services like online archives, file sharing, video streaming, etc. drive the need for new mid-term and long-term storage architectures for a second storage tier.
• What's more, backup and archiving needs to scale to greater dimensions.

Fujitsu Data-Centric Storage is comprised of effective solutions that help your IT team provide the right data service levels with reduced cost per gigabyte for all business scenarios.

Data and storage are the basis for your data-driven enterprise

With Fujitsu's storage solutions, you can master any challenge arising from digital transformation. ETERNUS systems provide better business support at lower cost. They enable you to align existing storage resources with business priorities by providing features like automated quality of service. At the same time, new performance levels contribute to better system utilization, which has a direct impact on ROI.

The ETERNUS storage line-up combined with leading technologies of our partners is comprised of compelling solutions for all tasks ranging from applications that demand ultra-fast response times, consolidation of different types of data in a single system, and deployment of hyper-scale, software-defined storage to extremely powerful data protection solutions that can be managed very easily and efficiently.

You can always rely on the right storage for the right data scenario:
• **ETERNUS AF** all-flash storage excels in recognized benchmarks by delivering incredible storage performance and extremely reliable data services at highly competitive prices.
• **ETERNUS DX** hybrid storage allows you to achieve a maximum of storage consolidation for structured and unstructured data by balancing speed, capacity and cost in one system.
• **ETERNUS AB/HB:** end-to-end NVMe-ready all-flash and hybrid storage systems with the performance and efficiency of block storage systems, offering best-in-class IOPS and balanced speed, capacity, and costs. Extremely scalable, shipped with software that considerably simplifies configuration and data management.
• **ETERNUS CS** data protection solutions enable you to rigorously consolidate your backup, archive and second-tier storage infrastructures and support the business with top service levels.
• **ETERNUS LT** systems perfectly meet the requirements of low-cost backup and long-term archiving in hybrid IT environments and provide the last line of defense against cyberattacks.

ETERNUS Storage

ETERNUS AF
accelerates data flows with all flash storage

ETERNUS DX
hybrid storage effectively consolidates storage infrastructures

ETERNUS AB/HB
NVMe-ready flash and hybrid block storage for stand-alone applications

ETERNUS CS
backup & archive solutions leveraging disk, deduplication and tape technologies

ETERNUS LT
tape systems offering the most cost-efficient backup and archive infrastructure

Your storage for on-premise and hybrid cloud environments

Your storage for backup and archiving

Accelerate your data with ETERNUS AF all-flash storage

The Fujitsu ETERNUS AF delivers flash performance plus seamless management integration with existing disk storage environments, thus ensuring a smooth transition of data centers to flash. Customers benefit from ultra-fast response times that set performance records thanks to sophisticated inline efficiency technologies. What's more, mirroring and transparent failover ensure nonstop operation, and automated quality of service substantially minimizes administration. In addition, ETERNUS AF cuts operational costs by reducing storage space by up to 66 percent, power consumption by 95 percent and administration costs by 40 percent.

How ETERNUS AF differs from other flash arrays

- Based on an end-to-end optimized performance architecture, ETERNUS AF storage delivers leading response times that provide large-scale data performance headroom for all types of applications.

- With selective use of data reduction technologies, automated quality of service and full management integration with ETERNUS DX hybrid systems, ETERNUS AF systems are unmatched in operational efficiency.

- ETERNUS AF provides the most comprehensive HA and DR capabilities, including mirroring, replication and transparent system failover. This works not only between different ETERNUS AF models, but also with ETERNUS DX hybrid storage to enable cost reductions at recovery sites and a smooth transition from disk to flash.

Synergy effects provided by the ETERNUS AF/DX family concept

- **ETERNUS Storage Management Software** is the unified management system for the ETERNUS AF/DX family. It ensures that an IT administrator, once trained to operate a specific system, will also be able to manage the other models within the family.

- **ETERNUS Family Concept** ensures the unified management of all ETERNUS AF/DX storage systems via the ETERNUS SF platform. And you also benefit from easy upgrade options and very efficient disaster resilience solutions, such as ETERNUS Storage Cluster.

- **ETERNUS Storage Cluster** automatically executes failover in both directions and between different ETERNUS DX hybrid storage and ETERNUS AF all-flash models, thus supporting nonstop operations very efficiently.

Fujitsu ETERNUS AF – superior performance and high-availability at reasonable costs
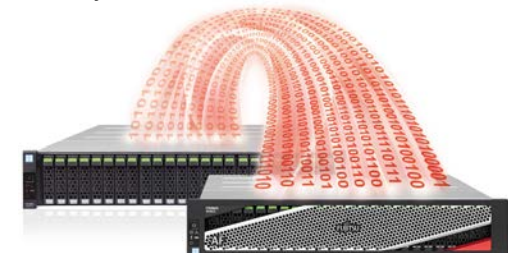
- Performance of more than 900,000 IOPS, 22 GB/s throughput with latency of only 0.3 ms at full load
- Highest business continuity with transparent failover (flash to flash and flash to disk)
- All-inclusive management, deduplication/compression, mirroring and replication functions at no extra cost

ETERNUS AF150

ETERNUS AF250

ETERNUS Storage Cluster

Consolidate storage with ETERNUS DX hybrid storage

ETERNUS DX hybrid storage is ideal if you want host data for performance-hungry applications like virtualization, databases or OLTP alongside unstructured data, online archives and other "lukewarm" data in a single system. These systems allow you to achieve a maximum of storage consolidation for structured and unstructured data by balancing speed, capacity and cost in one system. ETERNUS DX hybrid storage systems, with their SSD tier, deliver "all-flash-like" performance, thus allowing for a gradual transition to all-flash, while high-capacity hard disks store unstructured data at the lowest cost. The very latest automation technologies enable you to manage hybrid configurations (SSDs, SAS, Nearline SAS) with a minimum of manpower. Just define the needed response time per volume, and ETERNUS DX does the rest by assigning bandwidth and/or invoking storage tiering.

How the ETERNUS DX Storage Series differs from other hybrid storage systems

- **Performance:** ETERNUS hybrid storage offers the performance advantages of all-flash drives alongside conventional HDDs. The latest models can handle up to three times more transactions, and host 50 percent more virtual machines than before.

- **Automation:** ETERNUS DX hybrid storage offers the latest automation technologies. The systems are intelligent enough to move data between flash and disk drives, depending on usage. And automated Quality of Service management and failover take care of complex storage management tasks.

- **Mainframe class robustness:** ETERNUS DX hybrid storage provides constant data protection supported by the highest levels of built-in system security to prevent access to valuable business data. Business continuity is increased thanks to a boost in data availability of up to 99.9999 percent – which corresponds to less than one minute of unplanned downtime per year.

One consistent family – one system management service, economy to data center storage

ETERNUS DX100　　ETERNUS DX200　　ETERNUS DX600　　ETERNUS DX900　　ETERNUS DX8900

Entry-level and midrange storage　　　　　　　　　　　　　　Enterprise storage

ETERNUS SF storage management software

90%

Boost capacity utilization up to **90** percent with no performance bottlenecks

24/7

Ensure business continuity by boosting data availability to **99.9999** percent

Turn your data into competitive advantage with ETERNUS AB and ETERNUS HB

Fujitsu ETERNUS AB All-Flash Storage and ETERNUS HB Hybrid Storage are NVMe-ready flexible SAN storage systems with the performance and efficiency of block storage devices. The modular, RAID-only storage systems are extremely scalable and come with software that greatly simplifies configuration and data management. While ETERNUS AB is exclusively configured with SSDs, ETERNUS HB has a mix of SSDs and HDDs. Leverage enterprise-class performance for the workloads of your core applications and databases such as Microsoft SQL Server, Oracle, SAP, and others. At the same time, benefit from advanced data protection capabilities and sustainably reduce your costs.

Distinctive features of ETERNUS AB and ETERNUS HB

NVMe
End-to-end support for NVMe from host to drives
- Makes ETERNUS AB and HB the ideal systems for very demanding and compute-intensive enterprise, cloud and edge data environments
- Reduces total cost of ownership and empowers you to drive key lines of business with maximum performance and an infrastructure with a small footprint

Restful API
The logical choice for modern application environments
- Powerful API for reporting performance at the system and logical component level
- Enables automation and orchestration
- Ensures seamless integration in existing eco systems
- Supported by a strong eco system of partners

Cloud backup
Cost-effective basic backup and recovery in the cloud
- Support for full-block and file-based backup and restore
- Deployment for use with existing Amazon S3 accounts possible
- Incremental backups save bandwidth and costs

Superior performance and efficiency
- Ultra-fast response times of less than 100 microseconds
- End-to-end NVMe storage platforms purpose-built for high performance
- Extremely scalable secondary cache for the highest operational efficiency

High reliability and availability
- Drive encryption does not negatively impact performance
- Nonstop operation if a cable or drive shelf fails
- Fault tolerance – continued I/O even if a drive failure occurs
- Guaranteed validity of all stored data
- Autonomous ransomware protection, based on machine learning

Unmatched flexibility
- Configurations easily tailored to performance and capacity requirements
- Support for multiple drive sizes and for a wide range of host interfaces
- Cost-effective options for improving daily operations

NetApp's comprehensive hybrid Cloud portfolio

On premises, hybrid Clouds, or public Clouds: Better together

Fujitsu partners with NetApp to build and integrate Data Fabric within hybrid cloud. We help customers maximize the potential of their data in a Hybrid Cloud environment through a well-crafted Data Fabric strategy and data management expertise. NetApp's Data Fabric maximizes operational efficiency, protects critical data, and accelerates business outcomes. Offering NetApp hybrid cloud offers a single user and management experience wherever the data resides:

- Drives high performance and efficiency to the cloud while bringing simplicity to the enterprise
- Delivers a cloud-neutral data management and continuous optimization with ONTAP software
- Offers an open architecture to give customers choice and investment protection – no silos
- Has flexible consumption models
- Facilitates data protection, security, and compliance, no matter the location

Benefits – Customers get more out of IT investments with hybrid Cloud

Business agility

Build a flexible Data Fabric to manage your hybrid IT environment
- Use a mix of clouds for a business, activate when needed with seamless integration.
- Add workloads anytime, deploy and scale anywhere.

Financial control

Respond easily to changing requirements with unified, scalable storage
- A flexible consumption model and automation reduce financial risk.
- An agile infrastructure allows choice of location to optimize costs.

Security and compliance

Accelerate your speed of business and transform your data center economics
- Maintain compliance with multinational regulatory bodies.
- Maintain business continuity; mix cloud and on-premises options for data security.

NetApp All-flash FAS:

- Scale-out all-flash storage
- Industry's most advanced data management

Best for:
- Modernizing shared infrastructures
- Accelerating applications
- Consolidation of mixed workloads

NetApp Hybrid Flash:

- Made for growing requirements
- Rich data management
- Easy cloud connection

Best for:
- Enterprise applications
- Virtualization
- Microsoft solutions
- Back-up/recovery

Software-Defined Storage tackles challenges of new-age workloads, big amounts of data and massive data growth

An explosion in unstructured data is one of the biggest headaches of the digital era – with digital businesses tackling ever-increasing amounts of information that needs to be stored and accessed on different locations and applications. Fujitsu is providing market leading Software-Defined Storage (SDS) solutions from Qumulo (for file storage) and NetApp (for object storage) to manage explosive data growth, better support modern workloads and provide greater compatibility for multi-cloud environments. Share and control data across a multitude of locations and between different applications for broader business usage.

Qumulo Data Storage:

Fujitsu is teaming up with Qumulo to provide a seamless combination of the security and dependability of on-premises scale-out NAS storage with the flexibility of cloud storage. The Partnership enables unifying unstructured file data from Edge, Cloud and Core into a single solution.

Scale-out-file
The Qumulo solution rapidly scales hundreds of TB into PBs, handles tens of billions of files and serves thousands of users with cost-efficient storage for different files. It intelligently adapts to your growing needs and supports billions and billions of large and small files in a single namespace.

Machine learning management and real-time analytics
Qumulo provides a flash-first architecture using NVMe and SSD caching. It delivers real-time visibility into data and users, enabling effective data management. Potential performance issues, such as massive spikes in demand, and longer-term trends can be identified at a glance. Built-in machine learning enables more than 90% of read request to be handled in under one millisecond realized by an unique approach on meta-data management.

Enterprise solution
Qumulo provides a ready to use certified storage solution including certified hardware platforms for trouble free operation and easy support.
Rebuild times of less than one hour deliver uninterrupted operations at scale as no treewalks are necessary. Share data across all user types – Windows, Linux, Mac – with shared data across NFS and SMB protocols.

File Storage, which best fits for:

- File Share
- Healthcare
- Video surveillance
- Analytics
- Hybrid Data Centers
- xSP
- HPC

Highlights:
- All-NVMe cluster (option)
- Automation/RestAPI's
- Real-Time Analytics
- 10s of Billions of files (of any file size)
- Flash-First Architecture

NetApp StorageGrid

- Software-defined, object-based storage platform that provides intelligent policy-driven data management
- Massively scalable and easy-to-use global data repository for unstructured data
- Support of standard object storage protocols like AWS S3 and OpenStack Swift
- Support of file system storage protocols like NFS and SMB
- Hybrid cloud enabled

Object Storage, which best fits for:

- Media streaming
- Data analytics
- OLTP and OLAP environments

Optimized for enterprises:
StorageGRID software-defined object storage suite is ideal for use cases across public, private, and in hybrid multi-cloud environments seamlessly. It optimizes the data durability and availability across multiple geographies and enables hybrid cloud workflows – whether your data is on premises or in a public cloud – to fit your business demands.

Enable Hybrid Cloud
Industry-leading hybrid cloud integration with user-controlled platform services. Keep your data in a local private cloud while taking advantage of public cloud offerings. Storage tenants can configure mirroring of select objects at the bucket level to an S3-compatible public cloud.

Proven software designed for nondisruptive operations
StorageGRID is an 11th-generation object store with nearly two decades of production deployments in the most demanding industries. With advanced features such as the NetApp Active IQ® intelligence platform for proactive, immediate response, it is a solution to trust with critical data assets.

Ensure fast recovery with data protection appliances

Data is the "new gold" in the digital world. But due to data explosion and data sprawl, it is incredibly difficult to implement an efficient backup, as well as a mid-term to long-term storage strategy for object data, file data and the archive without adding to complexity. This is different with Fujitsu's data protection solutions which make it easy to keep backup and archiving speed, capacity, and cost in balance. Our appliances combined with leading partner technologies safeguard data integrity, enable rapid recovery after downtime, and protect sensitive data from threat, corruption, or loss across your hybrid IT estate. Fujitsu ensures that the right data service levels are delivered to provide 24/7 business continuity, prevent cyber-crime and ensure GDPR compliance from on-premises to the cloud.

How Fujitsu's data protection appliances differ from other solutions

- Leading scalability and performance enable rigorous consolidation of backup infrastructures and ensure that service levels can be reliably fulfilled with regard to capacity, speed and costs.

- Highly developed, automated high-availability and disaster recovery functions ensure an easy and efficient guarantee of backup and restore service availability.

- Appliance concept with leading backup, archiving and deduplication functions makes the management of backup and restore operations simple and efficient.

Fujitsu's data protection appliances align capacity, speed, and costs – effortlessly

The right data protection solution for every need

ETERNUS CS8000 – central backup and archive storage
- Most reliable central repository for backup, archive, second-tier and object data
- TCO reductions by 60% in complex environments

ETERNUS CS800 – the one-for-all backup appliance for medium-sized environments
- Scalable and high-performance backup appliance supporting all major backup software suites now on the market
- Advanced deduplication technology reduces typical disk capacity requirements for disk-to-disk backup by up to 95 percent

Fujitsu Reference Architecture & Commvault Appliances – achieving IT agility through a scale-out infrastructure
- Both are flexible, hyper-converged solutions that integrate computing, storage and full lifecycle data protection
- Protect, access and manage all of your data across the data center and the cloud

Veritas Appliances – fully integrated solutions from one mold
- Integrated appliance with optimal backup that takes less than 30 minutes to deploy
- Embedded cyber-security detects intruder threats to mitigate risks

Utilize tape libraries against ransomware

As data volumes continue to grow at a breathtaking pace, backup and archiving can quickly become a huge challenge that may negatively impact business processes. In addition, cyberattacks, especially with ransomware are skyrocketing and increasingly threaten the success of digital transformation.

Therefore, more organizations are re-considering tape in their data protection strategy to safeguard business data from cyber threat. Tape storage is inherently offline and provides an 'air gap' between live data and protected data which is essential to thwarting ransomware and malware. Fujitsu ETERNUS LT and Scalar tape libraries from our partner Quantum offer impressive scalability, rock-solid reliability and the most cost-effective way to store, protect and recover your data.

How Fujitsu tape portfolio differs from other tape libraries

- Flexible connectivity – both for connection to storage systems and servers, and in the choice of media
- Highly automated, simple, and remote operation enables intuitive use without local expert skills
- Pay-as-you-grow plan and flexible scaling options help customers avoid unnecessary initial investments and respond flexibly to data growth
- Guarantees data security and fulfills compliance regulations with features like write protection, hardware encryption and partitioning

Fujitsu tape storage provide secure and cost-effective backup and archiving

Combining Fujitsu storage systems with leading partner technologies from Veritas, Commvault and Veeam, we form an extensive ecosystem to safeguard data integrity and to guarantee always-on data availability – a key factor determining business success. We have the expertise to ensure that the right data service levels are delivered with the right protection at the right cost. With over 50 years of experience providing storage solutions including disaster recovery, data backup and data archiving, we master any challenge arising from digital transformation and data growth.
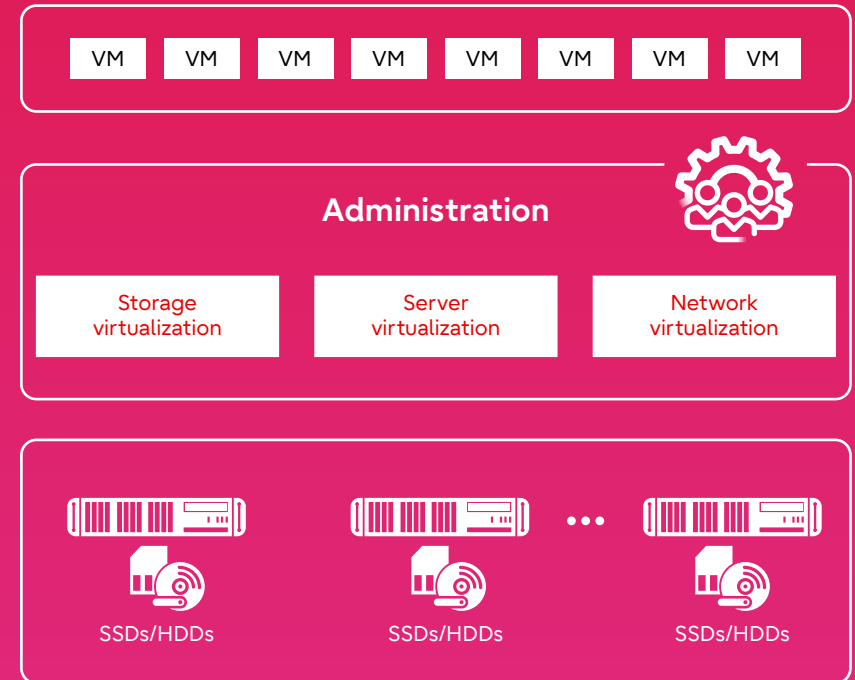
Go Hybrid - but how?
Storage in hyper-converged infrastructures

Hyper-converged architectures are gaining momentum as an alternative to discrete storage: Hyper-converged infrastructures embed server and storage functionalities in one building block. Storage capacity and performance can thus be increased at the same time by simply adding more building blocks. Fujitsu supports this new form of storage implementation with the Primeflex family of integrated systems.

Fujitsu Primeflex represents a wide range of pre-defined, pre-integrated and pre-tested combinations of data center components, such as servers, storage, network connectivity and software. Since infrastructure design, component integration and testing have been completed before starting your project, the deployment of the integrated system and integration in the production environment is the only work needed to be done on-site. Fujitsu addresses highly relevant use cases with the Primeflex family. Here are two examples:

- PRIMEFLEX for VMware vSAN is an integrated system that helps customers to reduce complexity and risk in deploying a hyper-converged infrastructure based on the VMware HCI software stack including VMware vSphere and vSAN.

- PRIMEFLEX for Microsoft Storage Spaces Direct is an integrated system that helps customers to reduce complexity and risk in deploying a Windows Server-based hyper-converged infrastructure.

→ **www.fujitsu.com/global/primeflex**

Accelerate your business with agile pay-per-use IT services

Agile and innovative platforms, delivered by Fujitsu uSCALE, empower your organization to enhance customer experience, capture new market opportunities and unlock the power of your people.

Fujitsu uSCALE provides flexible on-premises IT infrastructure and services. These sustainable and scalable pay-per-use capabilities enable you to leverage your business potential. Choose the appropriate services you need to accelerate your digital transformation journey and de-risk your infrastructure investments with a cloud-like consumption model – where you only pay for what you use.

What is uSCALE?

Fujitsu uSCALE allows you to consume infrastructure, on-premise, with monthly pay per use billing as a service. In practice, Fujitsu deploys sufficient capacity to meet your initial demand plus a buffer zone for growth. Each month billing is based on actual usage subject to a minimum volume lock. With a broad range of certified infrastructure, workload-ready platforms and software solutions to choose from, Fujitsu uSCALE is ready to support your business transformation needs by:

• Consistently meeting and exceeding the needs of your business.
• Delivering infrastructure as if it was a consumed experience.
• Operating transparently so that you meet your financial goals.

Principles of uSCALE transformation

1 Build the solution you need to accelerate your business

→ leverage the power of the Fujitsu EcoSystem

2 Select the appropriate services to support your transformation

→ flexible services from the foundation to full managed service with clear and transparent billing and metering

3 Scale on demand

→ pre-provisioned buffer capacity is deployed to meet the needs of the business and to capture market opportunities

4 Cloud-like consumption with on-premises control

→ utilization is reported monthly and you only pay for what you use

Compute as a Service
Storage as a Service
Virtual Machines as a Service
Containers as a Service
Integrated Systems / HCI
VDI-Ready Platform as a Service
SAP-Ready Platform as a Service
Back-up as a Service

Build your data-driven enterprise in unique co-creation

Money follows data: There is a huge value in data and understandably a drive towards digital transformation initiated in every organization. More enterprises than ever are assessing the opportunities hidden in their treasure troves of data to supercharge their business and take the lead in their field. We guide our customers holistically on their journey with our data-driven approach.

Become data-driven with Fujitsu

The data-driven transformation journey with Fujitsu comprises four main layers, culminating in business value. Each layer is critical to the success of the transformation:

• Define data transformation baseline
• Create target data architecture
• Protect and secure data
• Deliver business value

Innovate your business with our unique co-creation approach

Every organization is unique in its processes and complexities, which is why Fujitsu makes the co-creation workshop with your stakeholders the heart of the process. Everything else follows from there.

Fujitsu partners with customers on every aspect of data-driven transformation and throughout every phase of projects, from initial consulting through to designing and building the solution. Many organizations have already benefited from Fujitsu's expertise to unlock value in data to drive business outcomes.

Take the next step – with our Customer Experience Lab (CX Lab)

Fujitsu has the co-creation process at the heart of its human-centric innovation. To enable this, Fujitsu operates Digital Transformation Centers in all its regions, conducting on average 250 workshops every 18 months.

Before you dive into a digital transformation workshop you can embark your very own data-driven transformation journey with our CX Lab. This digital event format welcomes you to a 3D world that we will travel together. The CX Lab is a new virtual co-creation metaverse designed to facilitate early-stage creative dialogue. In this small but content-rich event, you gain new insights and make strategic decisions for your business.

→ **We are looking forward to the journey. See you soon – in the CX Lab environment!**

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Whatever storage challenge you may have, Fujitsu has
the right solution for every data scenario.

www.fujitsu.com/storage