White Paper

FUJITSU

A hybrid vision for the new era of digital transformation

Contents

Executive summary

The latest wave of digital disruption is moving at a blistering pace, presenting a massive opportunity for those who embrace it, and huge risks for those who do not respond.

To survive and compete, enterprises need to:
- empower their people with cutting-edge technologies for innovation,
- drive new levels of business insight and
- re-imagine services and customer engagement.

Cloud technologies has been in the forefront for organizations who are trying to transform their business dramatically. Companies around the globe continue to search for the right cloud model that best suits their business needs. Hybrid cloud has become the front-running operating model. Enterprises are showing substantial hybrid adoption plans for the next five years, with 84% of enterprises having a multi-cloud strategy.[1]

The most important question is where to place which workload. However, there is a myriad of additional aspects to be considered.

Do you:
- run critical workloads in your own data center?
- have other workloads hosted by service providers?
- source IT services from the cloud?

There is a world of opportunity to make your business operations more versatile than ever.

Different sourcing strategies strongly influence where to place workloads. With our extensive experience and expertise as a hybrid and cloud provider on a global scale, we offer valuable insights and guidance. We help you to consider the different options available and to find the right balance of cloud-based services and legacy applications.

[1] RightScale 2019 State of Cloud Report

Introduction – the current adoption rate across different deployment models

From a technology that was initially used for cost savings and efficiency, the cloud has now gained more business relevance when it comes to adopting latest technologies, providing app developers the power to test and deploy cutting edge solutions at ease Cloud technology is also crucial to be able to respond rapidly to disruption – as the Covid-19 pandemic has recently highlighted.

When we refer to the cloud, we do not only mean deploying and accessing data over a public or private cloud. We are also referring to how applications are now written in a cloud environment, making it deployable on any premises (cloud or on-premises).

With recent developments and advancements, your organization's cloud strategy can and should be more ambitious. Your cloud strategy across hybrid and multi-cloud environments should center on delivering value to your business and your customers. It should ensure the right balance between performance, customer experience and ROI.

These are ambitious outcomes. Despite the rapid evolution of cloud technologies (and the capabilities of leading platforms such as AWS, Microsoft, and others), no single platform or provider can enable you to achieve these goals. To achieve all these objectives simultaneously, organizations combine best-of-breed technologies, placing their workloads on the right cloud with the right sizing.

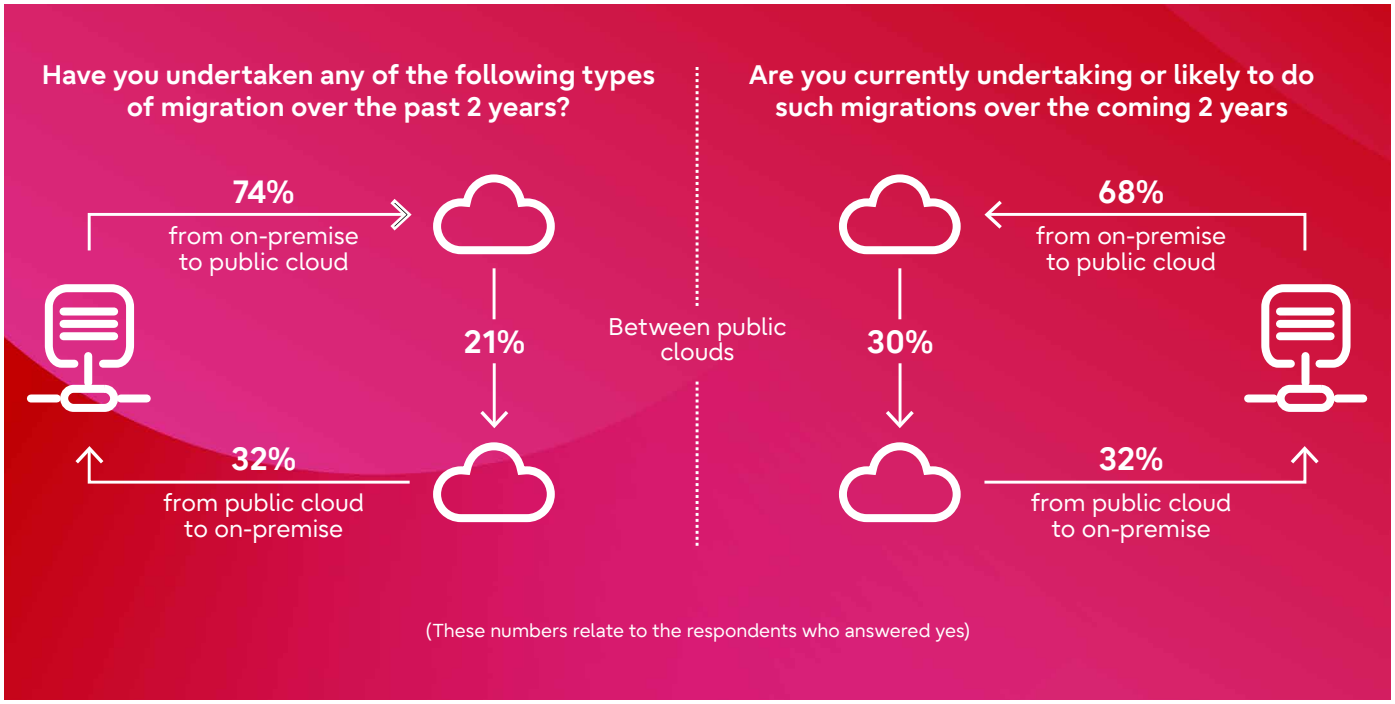
Fujitsu's 'The State of Orchestration 2018-19' market report shows that 36% of organizations are working with at least 4-10 different cloud providers and 30% are working with around 11-20 providers.

Industry forecasts predict that these numbers will rise even further. But does that mean that customers with on-premises data center environments should move to the cloud? In many cases, the answer is still no. It depends on your workload and application requirements.

An exclusive survey done by Freeform Dynamics on behalf of Fujitsu among 800 executives shows some emerging trends which can help uncover hybrid opportunities for your enterprise:

- A lot of IT service migrations are happening or will happen, both towards the cloud and back from the cloud (repatriation), which is why hybrid is so important.
- Hyper-converged infrastructures (HCI) are ideal and are most trusted to support a hybrid IT solution.[2]

This survey was conducted pre-Covid and published in January 2020. Although recent data shows that Covid has momentarily accelerated the transition to the cloud,[3] we still expect the nature of the transition to be the same in the long term. As the shift was done in haste due to scalability concerns, repatriation can be expected over the next couple of years.



[2] Freeform Dynamics 2020: The Hybrid IT Platform Imperative

[3] Flexera 2020 State of the Cloud Report

The main reasons for cloud adoption

There are various compelling reasons for enterprises to move towards the cloud. These include faster time to market capabilities, while ensuring upfront cost savings, quick and scalable deployments and centralized management. Every new application is now being written on the cloud, enabling organizations to accelerate DevOps and adopt cutting-edge technologies to deliver innovative services to customers and enhance customer experience. With these reasons in mind, it is easy to assume that the cloud is the right solution for every scenario.

In reality, however, there are several factors that show that hybrid can be a better fit. In many cases cloud technology can significantly reduce costs, but 35% of public cloud service users are overspending their budgets.[4] Despite the popularity of public cloud, 80% of customers report cloud repatriation activities. According to a survey by IDC, organizations who returned to hybrid did so for the following top five reasons: **security, performance, cost, control and centralization**.[5]

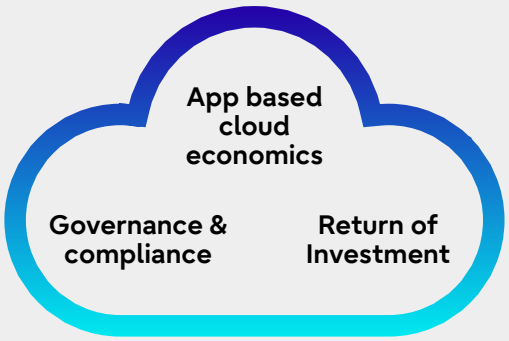
During our engagement with customers in hybrid projects, Fujitsu has concluded that there are three factors which are key to choosing the right deployment model for an application. And more often than not, the organization's environment will be best served on a hybrid foundation in order to be a data-driven enterprise.

Evaluating the following is critical to help decide the best deployment model:

- Application-based cloud economics
- Governance & compliance requirements
- ROI implication over three years & beyond

The key success criteria are control, application-based cloud economics from a long-term perspective, and data governance/compliance, which can be primarily achieved with the right hybrid cloud strategy.

Key drivers to hybrid



Steps to identify the right cloud for the right workload

Given the multitude of options available, the right solution must be based on your unique application, your data and infrastructure landscapes, and taking into account your business needs. The majority of projects are brownfield, as enterprises have to deal with existing applications, data landscapes across various locations, and other factors.

Therefore, the challenges and considerations to keep in mind when choosing the architecture and deployment options are multifold.

The following steps can help you to work out the best solution for your requirements.

[4] RightScale 2019 State of the Cloud Report

[5] International Data Corporation (IDC) Cloud and AI Adoption Survey, January 2018

Choosing the right architecture based on workload requirements
Understanding your workload requirements and choosing the right architecture is the ideal place to start your journey towards digital transformation.

Answering the questions below will help you to kick-start your journey to become a data-driven enterprise and to choose the right cloud model that best suits the needs of your enterprise:

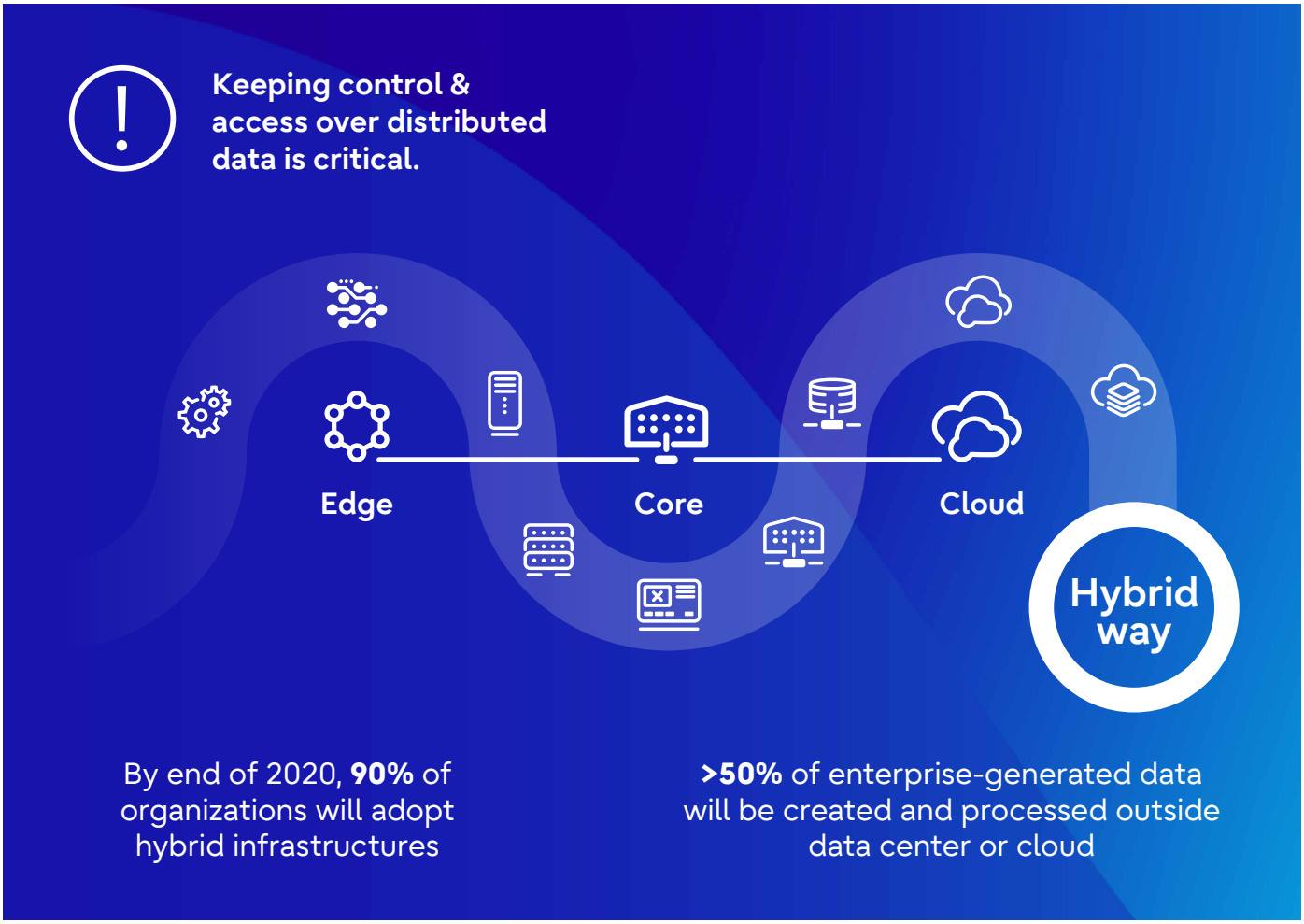
- What is your budget?
- What workloads do you run?
- How extensive is your workload scale and size (GB)?
- What are your requirements for compute and storage scalability?
- Which virtualization software vendors do you work with?

Choosing the delivery model for each application
Experience shows us that in reality enterprise data is extensively distributed across the edge, core, and cloud in different data formats and may not only reside in an enterprise's own data center, but in third-party data centers too.

Whether you are moving from on-premises to the cloud or back again, keeping control over and access to the distributed data is critical. That is why choosing the right delivery model is essential. It is about the right cloud for the right workload.

It is often observed that organizations are adopting a hybrid environment either with a combination of private cloud (hosted on-premises) and public cloud, or a combination of on-premises and public cloud or a combination of all three models.

According to different reports, by end of 2020, 90% of organizations will have adopted hybrid infrastructures and more than 50% of enterprise-generated data will be created and processed outside the data center or cloud.



Source: "Based on different studies conducted through Fujitsu"
www.fujitsu.com/hybridcloud

Integrating data architecture across all physical and virtual locations
Hybrid IT or a hybrid cloud environment can help with several key business areas. Given an organization's operations and data are distributed across edge, core, and cloud, successfully integrating and managing the data architecture is key to achieving business continuity.

This is easier said than done as various factors need to be considered:
- the individual applications running
- compliance requirements
- legal implications and
- data protection rules based on where the data resides and
- the ROI implication of the choice of deployment model.

The goal is to support business growth and meet cost, risk, and compliance requirements while ensuring increased productivity.

Support growth

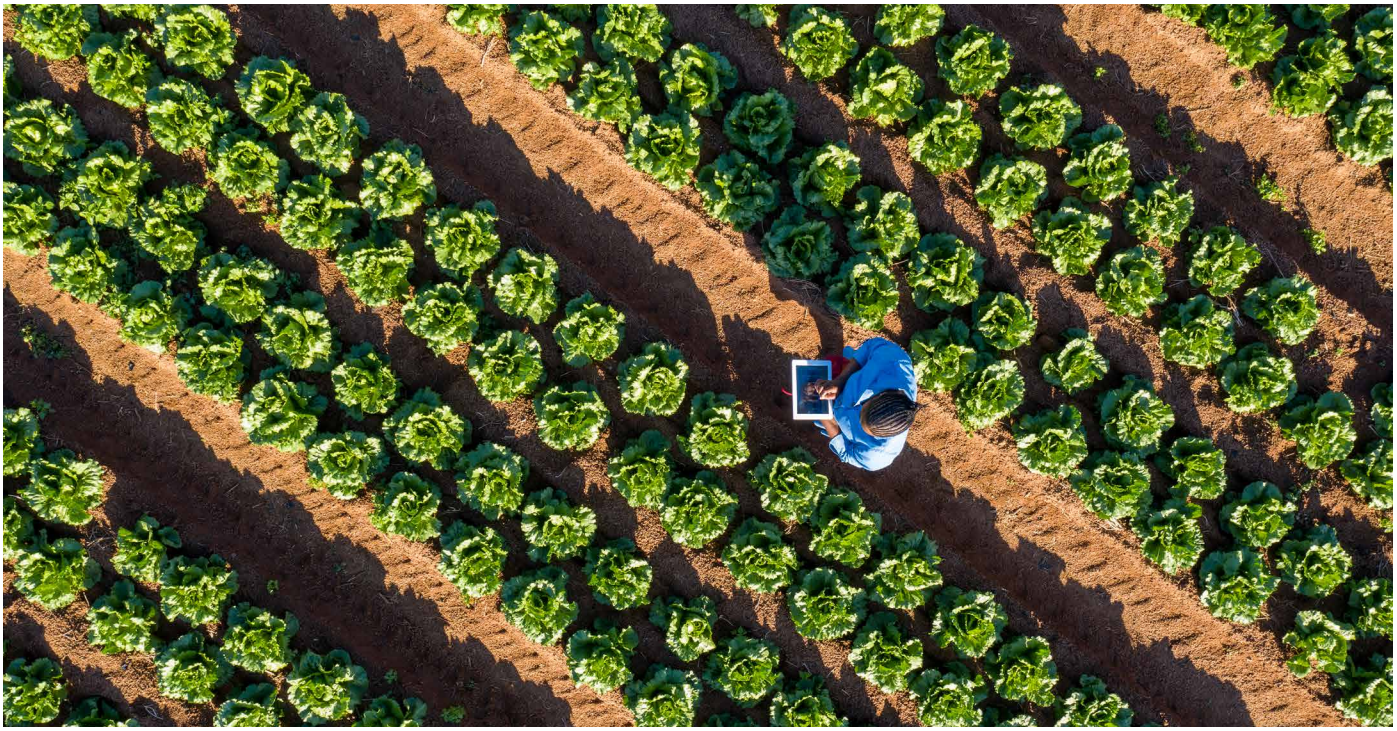
- Improve speed to scale through simple interfaces and optimized process
- No specialist resources required to meet organization's scale requirements
- Designed to augment and support existing solutions, maximizing ROI

Meet risk, cost and compliance requirements

- Provide secure and resilient infrastructures to keep organizational data safe and protected
- Flexible cost models that de-risk investment
- Ensure your GDPR responsibilities are met and upheld

Increase productivity

- Manage peak workloads with just a few clicks
- Drive new innovation to give the organization a competitive edge
- Improve operational efficiency by removing unproductive resources



Delivering hybrid architecture

There is a big difference between knowing and delivering the right hybrid architecture to provide the right balance of cloud-based services and legacy applications. The difference lies in the vast experience and expertise that is required to implement such solutions among large customers on a global scale.

Important steps to be taken while delivering a hybrid solution:

- deliver an effectively architected and seamlessly integrated IT environment with a governance framework that can adapt to and evolve with changing business needs
- provide the perfect balance of services to enable the rapid deployment of new cloud-based solutions
- ensure governance and compliance are not compromised
- ensure privacy and security are not breached
- enable 24/7 data availability across geographies and devices

On-premises data centers and the public cloud should not be separate worlds. Instead, they should be integrated and complement each other. This mandates that your on-premises infrastructure has the capability to be easily used in a hybrid scenario. This type of infrastructure is called hybrid-enabled A hybrid-enabled on-premises infrastructure ensures the consistency needed to be managed as a single, unified infrastructure.

Companies today operate in a highly heterogeneous IT environment to meet their business requirements. It is now a well-known fact that hyper-converged infrastructure (HCI) is the magic bullet to a successful deployment of a hybrid cloud environment , which makes best utilization of resources from an optimization perspective and makes it easy to build in redundancy across applications hosted in different virtual machines (VMs). Given the heterogeneous requirements, let us look at the offerings from renowned vendors and how they stack up in your environment.

VMware environments
VMware, being one of the oldest players in the market, has a large depth of virtualization solutions and holds a major market share.

VMware vSAN provides the perfect platform through a software-defined data center (SDDC) that spans across on-premises and off-premises infrastructure.

VMware Cloud Foundation is a hybrid cloud platform for managing VMs and orchestrating containers, built on full stack HCI technology. With a single architecture that is easy to deploy, VMware Cloud Foundation enables consistent, secure infrastructure and operations across private and public cloud. Increase enterprise agility and flexibility with the hybrid cloud that delivers it all.

With the drive towards hybrid cloud, VMware has enabled these platforms to support Kubernetes or container orchestrators with Tanzu and Fujitsu. As a key partner we work very closely to ensure we test our high-performing platforms, supporting organizations to adopt VMware technology to leverage containers for DevOps, adopt the latest technology such as AI and more.

Leveraging Fujitsu solutions on VMware provides the following advantages:

- flexible licensing and deployment options across private and public cloud
- simplified management: use the same operations, tools, and processes for on-premises and in the cloud
- integrated container management: optimize performance, resilience, and availability for your Kubernetes clusters
- maximized scale, IT performance and efficiency
- enhanced app performance and reliability with high-performance storage and load balancing of seamless resource pools across every environment
- an enterprise-level security full-stack HCI platform that consolidates traditional VM and modern container workloads
- one-stop 24/7 support

Microsoft environments
Microsoft's operating system holds a major market share and organizations most often use some form of Microsoft Azure service for their hybrid requirements. Microsoft has now announced a more connected hybrid environment with their new operating system HCI OS with Microsoft Azure Stack.

We provide this solution with our PRIMEFLEX for Microsoft Azure Stack HCI, enabling organizations to directly access Azure services without the need for any additional agents or tools. The solution includes features such as stretch cluster, automated disaster recovery, Kubernetes services, and more benefits for medium to large-scale node management on hybrid cloud.

Leveraging Fujitsu solutions on Microsoft provides the following advantages:

- one-stop-shop solution for seamless access to data stored on Microsoft Azure - including consulting, implementation, and support
- modernization of on-premises infrastructure and ready-to-go, tailor-made hybrid IT solutions
- seamless access to Azure data, boosting seamless working across ecosystems, with synchronized file access beyond system boundaries
- availability of Microsoft Azure Files services on PRIMEFLEX for Microsoft Azure Stack HCI (for users in Europe)
- enhanced performance, cost efficiency and increased value overall
- leveraging data via Azure File Sync on Azure Stack HCI
- access to Azure Files shares through Azure File Sync, ensuring that all files are synced between on-premises servers and native SMB shares in the cloud

Depending upon the organization's unique environment Fujitsu also delivers cloud extention through Red Hat OpenShift. The collaboration with Red Hat®, offers a high-performance cloud infrastructure by acting as a unifying layer between the public, hybrid, and multi-cloud for your Microsoft environment.

Nutanix environments
Nutanix, with its multi-hypervisor platform, provides a unique option to support different hypervisors on the same platform. Nutanix one-click management and single console monitoring provide simplicity and control over software upgrades, database migration and network virtualization.

Fujitsu collaborates with Nutanix to offer a data-driven, software-defined solution leveraging Acropolis cloud OS, Prism management and Calm orchestration. Fujitsu offers workload-specific, performance-optimized and cost-effective configurations.

Leveraging solutions on Nutanix provides the following advantages:

- excellent virtualization performance with PRIMERGY servers, delivering the best economics in terms of density, energy consumption, heat dissipation and operating costs
- working with Nutanix machine-learning innovations around workload analysis and self-healing, the solutions ensure that all the resources are the right size for your needs and provide exceptional levels of resilience without the need for specialists
- as an Intel® Select Solution, the performance on the Intel architecture is optimized for diverse and complex workloads and applications, simplifying the process of deploying hardware and enabling early deployment
- intelligent and innovative system management solutions providing all the functions for fail-safe, flexible and automated 24x7 server operations
- non-disruptive linear scalability for an endless number of systems, and an unlimited amount of raw storage
- profit from hyper-converged infrastructure using local storage with multi-hypervisor support and reduce costs for maintaining a complex external SAN infrastructure

NetApp
NetApp's Data Fabric maximizes operational efficiency, protects critical data, and accelerates business outcomes. NetApp Cloud Volumes ONTAP data management software delivers control, protection, flexibility, and efficiency to your data on your choice of cloud. Cloud Volumes ONTAP is cloud-native data management software built on NetApp ONTAP storage software, providing you with a superior universal storage platform that addresses your cloud data needs. Delivering a simple and consistent management plan in a multi-cloud environment is simple with NetApp as they already co-develop and partner with the world's biggest public cloud providers.

Leveraging solutions on NetApp provides the following advantages:

- 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 cloud-neutral data management and continuous optimization with ONTAP software
- Offers an open architecture to give customers choices and investment protection-no silos
- Has flexible consumption models
- Facilitates data protection, security, and compliance, no matter the location

Fujitsu partners with NetApp to build and integrate Data Fabric within the 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. With Fujitsu and NetApp, you can blend private, public cloud and on-premises infrastructure, all underpinned by one Data Fabric, and take the journey to the cloud at your own pace while maintaining complete control and access to your most valuable asset: your data.

Turning your global infrastructure into a data-driven engine

Enterprises often run heterogeneous environments and the complexity involved in the integration and centralized management to ensure accurate and data-driven decisions depends on how the organization has scaled their operations and their rate of growth. Hence, it is important to understand the unique situation of each organization, governance or compliance requirements and to leverage the right tools and solutions to make this transition to a data-driven engine successful.

Self-service provisioning and automation across edge, core and cloud
While we have already discussed how to make the right choice of cloud or deployment model based on the application or workload requirements, it is also key to ensure that the data across these heterogeneous environments are integrated and managed centrally by implementing the required automation across the multi-cloud environment and your private or hybrid environment.

Fujitsu collaborates with various technology partners to deliver PRIMEFLEX solutions that support containers and container management (mainly Kubernetes) across edge, core and cloud to test and deploy cloud applications swiftly. One of our key partners is Red Hat, with Red Hat OpenShift being the leading enterprise Kubernetes platform, supporting all the components you need to run Kubernetes in production: Kubernetes itself, including the underlying Linux platform RHEL Core OS, integrated networking, storage, monitoring, logging, installation, automated upgrades, as well as CI/CD, service mesh and source-to-image functionality, and so much more.

Red Hat OpenShift is platform-agnostic and can be deployed on VMware, HyperV and all known public clouds, enabling a real hybrid approach and the option to deploy and move workloads easily. This allows organizations to stay independent of the chosen cloud provider and virtualization platform.

The platform enables organizations to introduce new services quickly, ensuring faster time to market and reliable uptime without exploding operational efforts, and to effectively manage a highly scalable, dynamic environment. It also enables day-2 operations by decoupling from public cloud providers and avoiding being locked into Azure, AWS, or Google.

In partnership with Red Hat, Fujitsu also provides the necessary automation using the Ansible Automation Platform to deliver the required agility and flexibility which is a top priority for organizations due to the increased speed, scale, and complexity in hybrid and multi-cloud environments. The solution provides single, cloud-agnostic API and re-usable code, making the life of your developers and operations easy.

The agentless automation approach enables seamless automation from server, network or storage configuration, via platform, OS, or application deployment, through to application configuration. These automated deployments are made available to the end user (or developer) via the Service Catalog for self-service and hands-free deployments.

The solution includes capabilities like:
a. agentless simple language to enable automation for everyone
b. service catalog management for governance
c. Ansible Tower for centralized management
d. monitoring and reporting to provide an overview of services

Agile consumption-based model
A flexible pricing model based on consumption is one of the components that make a cloud solution attractive. Having a similar solution for the on-premises infrastructure can go a long way towards a true hybrid experience. A flexible pay-per-use consumption service supports business transformation and IT agility with scalable resources that are measurable, cost transparent and aligned to the needs of your business.

Benefits of an agile consumption-based model:
- extra installed capacity on demand
- only pay for what is used (e.g., CPU, RAM, storage)
- flexible up and downscaling
- operable with any data center products and services
- capacity adapts to business growth without interrupting operations

Offered to support business transformation with scalable IT resources, Fujitsu uScale is a pay-per-use consumption model that is measurable, cost transparent and aligned to business needs.

It is offered in two different models. **The Standard framework with flexible commit and Co-creation (opportunity-based) offering you the following benefits:**

- flexible up and downscaling
- capacity adapts to business growth without interrupting operations
- no effort required for procurement and delivery

Multi-Cloud suitability and assessment services
Investigating the service portfolio of cloud service providers can be a daunting task, as in most cases a single cloud service provider will not be able to cover all your needs, forcing you to have service contracts with more than one cloud service provider.

With the presence of leading cloud service providers like Amazon, Microsoft, Oracle, or Google Cloud you will need unbiased advice on how to create a personalized, multi-cloud ecosystem that precisely meets the requirements of your business. Fujitsu provides tailored assessment of cloud suitability for your application and organizational landscape, further identifying and delivering the right solution for optimized cloud model.

Some of the services include:

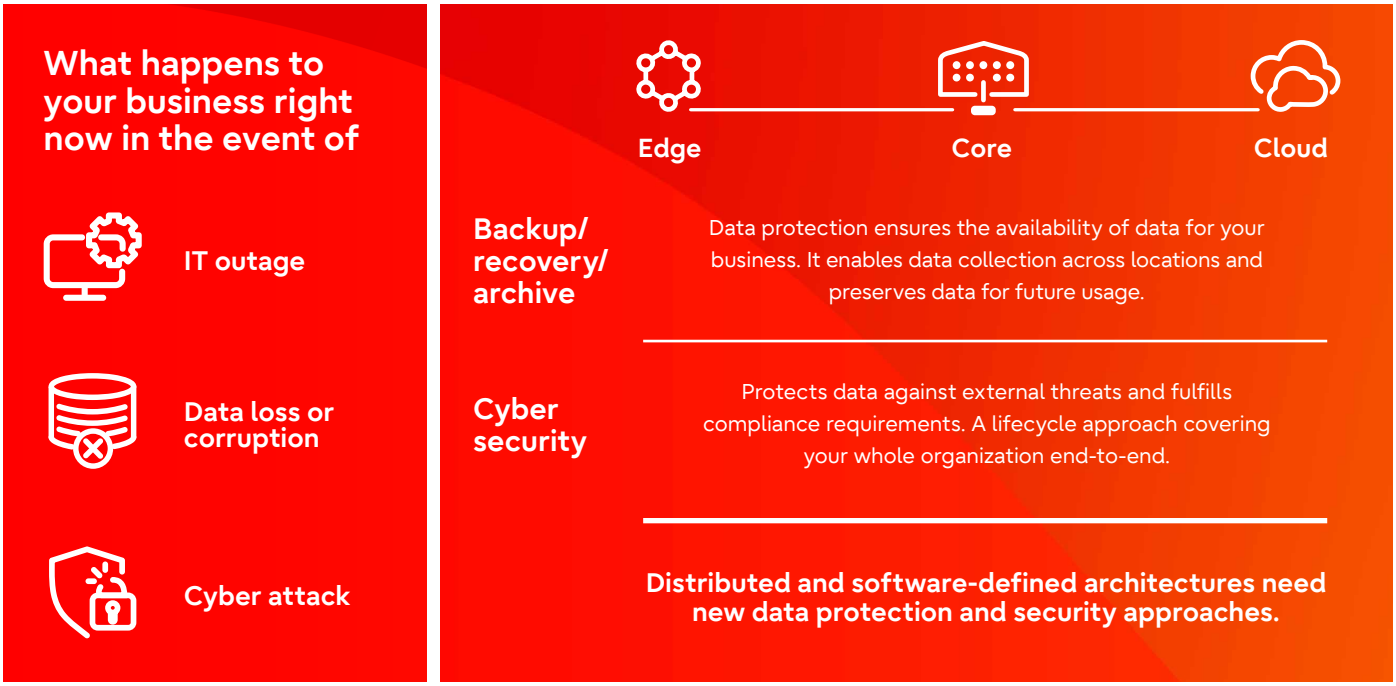
Enhanced:
- Cloud Optimize Engineer
- Tailored Assessment
- Advisory Services
- Recommendation Implementation

Standard:
- Standard Assessment
- Toolset Support

Chosen Toolset for Standard/Enhanced:
- Hyperscalers
- Fujitsu technology partners & or ecosystem partner tooling
- and more

Corporate data security and risk measures
With the speed and ease at which a new service or resource can be created, organizations are struggling to manage their live versus development estates, often leading to significant holes in security and processes. It is very easy to leave something on and forget it is running, open to everyone.

The changing marketing dynamics are driving a new IT setup, which enables higher agility to adapt to new demands. This results in highly distributed IT setups stretching from the edge to the data center to public clouds. These new architectures include more external networks and external IT in general, and the entry points for potential threats are increasing as a consequence. In fact, a recent report showed significant security breaches reported at the end of Q3 2019 that were directly related to cloud-based solutions: 5,183 breaches and 7.9 billion records exposed. With proper tools, controls, and the most appropriate infrastructure, this can be brought under control to significantly reduce the probability and impact of a security issue.



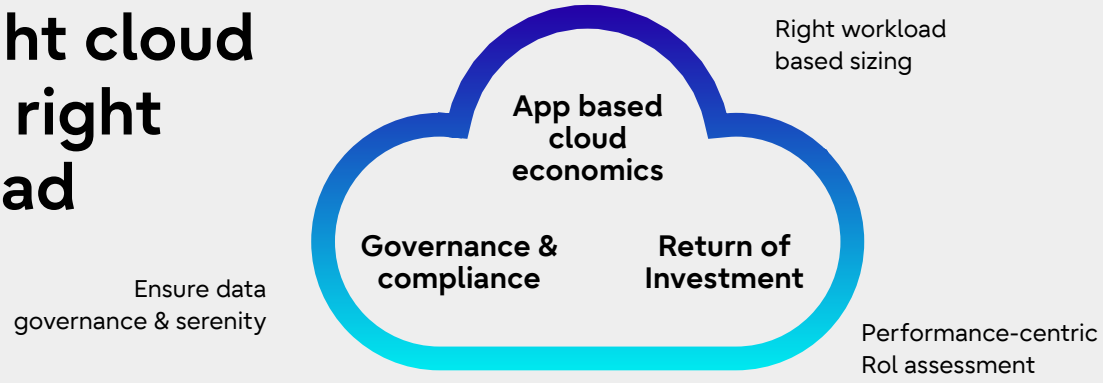
Fujitsu's offering

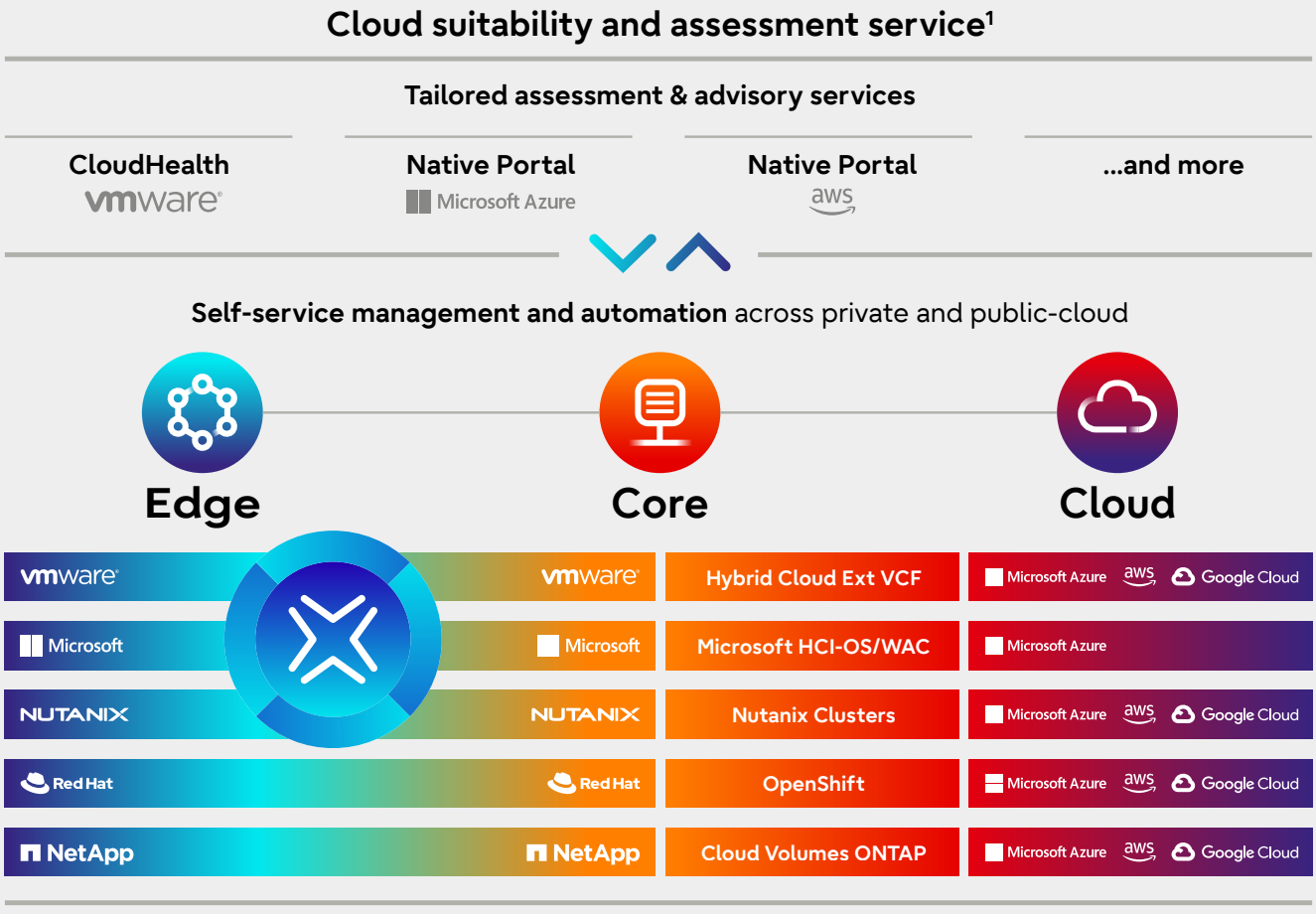
Fujitsu with its optimized solution options helps transform your hybrid cloud vision into reality:

- Right workload based sizing
- Ensure data governance & serenity
- Performance-centric ROI assesment

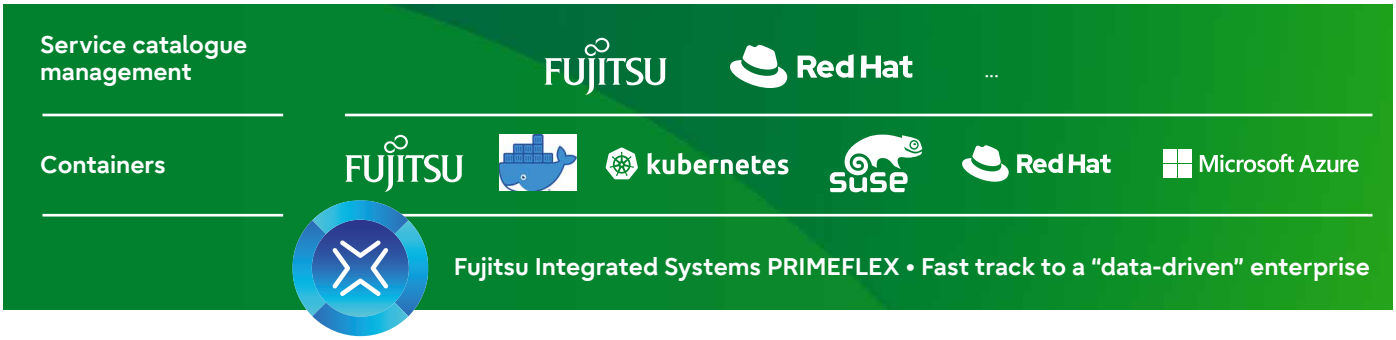
The portfolio offers solutions across edge, core and cloud (with the use of the correct extension), ensuring that your workloads can be placed wherever they are best suited, and that you always utilize the right cloud.

The right cloud for the right workload





Together with our partners, we provide the right data management option for every scenario. Depending on the option you choose, technologies from different best-of-breed partners are included.



Our **Primeflex** solution serves as a data architecture foundation, providing various configuration options to tailor it to your workload requirements. These solutions support different containers and container management solutions for DevOps new application testing like AI or ML and enable faster time to market.

Bringing your hybrid cloud vision to life

As we have shown, there are various factors to be considered based on your organization's vision, which can be achieved with Fujitsu's consulting and expertise, providing end-to-end flexible solutions to bring your hybrid cloud vision to life. If you are embarking on your digital transformation journey with cloud being an integral part, the best time to evaluate your cloud vision is now.

No matter where your journey starts, together with our strategic technology partner ecosystem and our global network of service partners, Fujitsu can bring all the products and services together to support you on your transition to a hybrid cloud environment.

If you need further assistance in choosing the right cloud for your application workloads across edge, core and cloud, please get in touch today!

Learn more about hybrid and multi-cloud solutions from Fujitsu

FUJITSU

White Paper

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