FUJITSU

White Paper
From edge to core to cloud –
Where will the center of your data be?

The new IT landscape is distributed
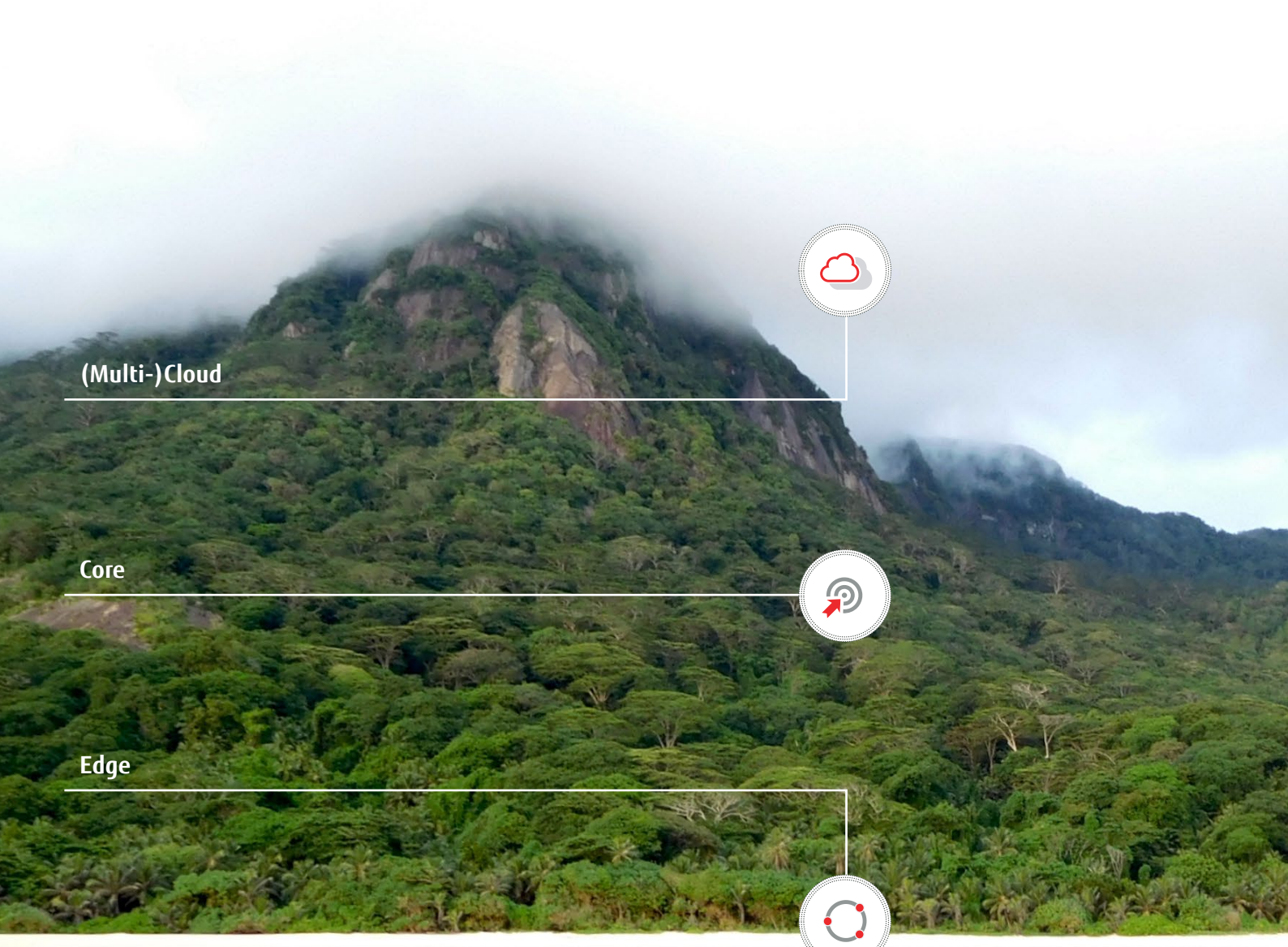
(Multi-)Cloud

Core

Edge

28% of enterprise IT spending will have shifted to cloud by 2022.

(Gartner, Market Insight: Cloud Shift — 2018 to 2022, Aug 28th 2018)

By 2022, 40% of enterprises will have doubled their IT asset spending in edge locations and nearby colocation facilities.

(IDC)

By 2025, the number of micro data centers will quadruple.

(Gartner, The Future of Enterprise Data Centers — What's Next, Apr 24th 2019)

The big escape: Data and IT everywhere

After years of consolidation and centralization IT faces the winds of change. The trend favors a distributed IT, an IT which stretches from the core (the data center) to the cloud, and now also to many remote locations, called "the edge."

The data center will no longer be the center of your data. A lot of data today is "born" in the cloud through applications which are only available there. On the other hand, the Internet of Things creates new data virtually everywhere. Sensors, smart devices, machines in factories, cars, planes and other forms of transportation all continuously create increasing amounts of data. It would not be a wise strategy to transfer all of this data to a central location, be it a data center or a public cloud. Network latency and storage costs are also big hurdles. Thus IT will process, use and analyze this data close to the area where it is created, and this trend is the current driver of "Edge Computing". Only (pre-)processed and aggregated data will be moved to central locations. Consequently data

and IT can reside anywhere. The big shift away from centralized IT has started. This process will continue to accelerate according to industry analysts. This new, heavily distributed IT architecture will stretch from the edge to the core and to the cloud. It goes without saying that such an architecture is far more complex than a central one, and it is creating many new headaches for IT managers. There is no single solution which can provide such an architecture out of the box: Extensive integration work is required at hardware and software level, and cooperation with cloud providers is also needed to make things happen. This is where Fujitsu can help you through this transformation.
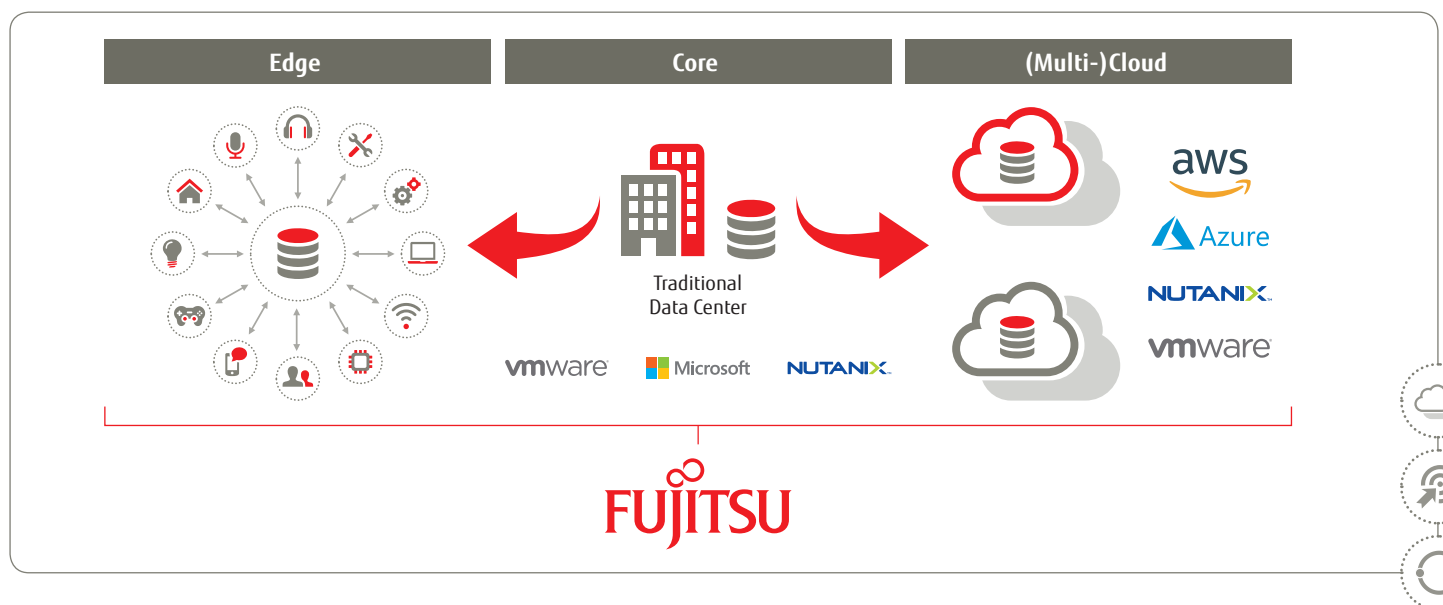
In Fujitsu you have a single point of contact for setting up a distributed IT landscape that stretches from edge to core to cloud. In addition to its own rich technology, Fujitsu maintains key partnerships with leading technology and service providers to help customers shift their IT to this new paradigm. Comprehensive service offerings ensure that customers complete this transformation smoothly and successfully.

From the core to the cloud: Hybrid IT

The world is going hybrid. However, the fact that all workload placement options still have a considerable share is not surprising, because there is no "silver bullet" placement option for all workloads. The ideal solution for an enterprise is a blend of different placement options, and that is exactly what Hybrid IT is all about. Analysts predict that by 2020, about 90% of organizations will adopt a hybrid infrastructure, a finding which underscores that the world is going hybrid.

Running a Hybrid IT approach can deliver high flexibility when using IT resources and helps leverage customers' own resources and skills. However, a mix of on-premises IT with several external cloud services can lead to new issues stemming from heterogeneous IT management approaches and business complexities like cost control and internal IT back-charging processes. One way to resolve these issues is to avoid silo approaches.

There are basically two approaches for going hybrid

The **inside-out approach** means extending the existing data center infrastructure to the cloud with a unified management experience. There may be several good reasons for this approach:
- Add capacity for peak times
- Reduce primary DC footprint
- Geo-expansion
- Build DR site/ remove secondary DR DC
- Fast adaptation to new business demands

The **outside-in approach** means expanding the cloud-native footprint to on-premises locations. This approach makes sense for the following reasons:

- Latency demands
- Disconnected solutions
- Regulatory requirements
- Security, privacy demands
- Full control over data

Fujitsu's blueprint for Hybrid IT
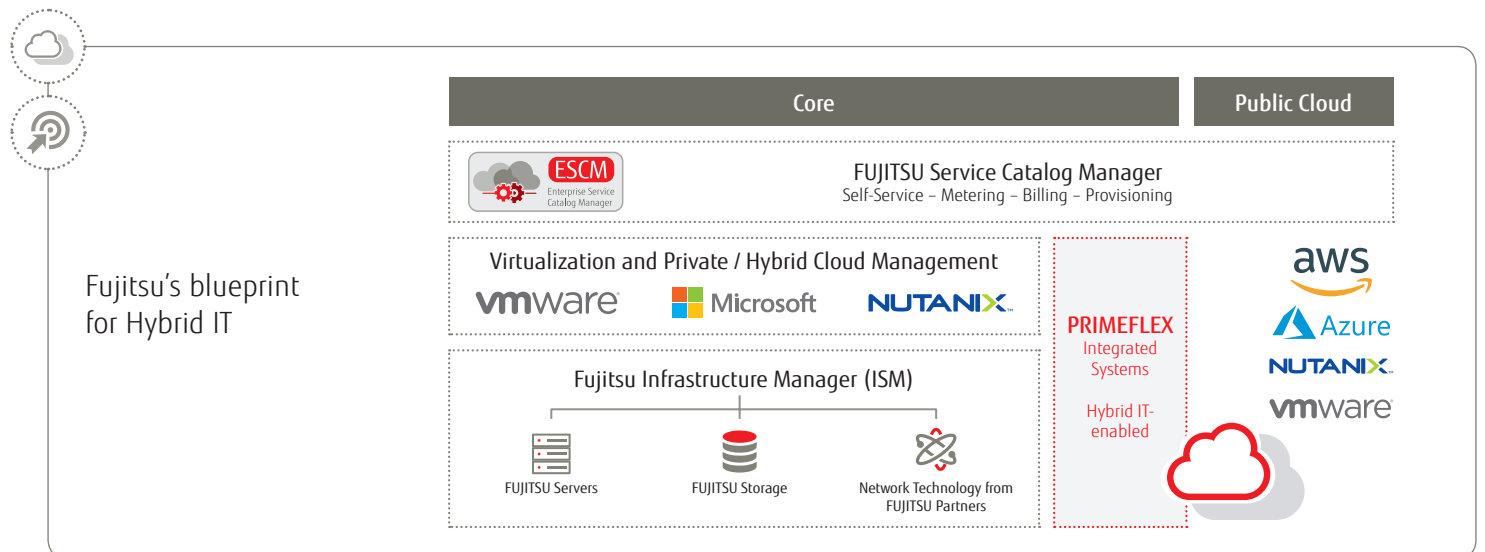
The starting point for hybrid IT is the creation of a software-defined architecture. Fujitsu combines its servers, storage and network technologies from its own development or from technology partners like Extreme Networks and Broadcom to meet this challenge. The underlying hardware can be managed, operated and updated using a single point of control with the Fujitsu Infrastructure Manager. On top of the infrastructure, Fujitsu offers virtualization and hybrid cloud management software from strategic partners like VMware, Microsoft and Nutanix. These abstract the hardware part of the infrastructure into a virtual, software-defined IT – either converged or hyper-converged – allowing

agile, on-demand provisioning. In addition, these software suites connect the on-premises infrastructure with the cloud so that workloads can move back and forth.

Fujitsu offers this solution as a customized package with specified integration of all components, or as a pre-defined solution with so-called integrated systems known as Fujitsu PRIMEFLEX. It is also important to make sure that the consumption of the resources is simple and efficient. With the help of a service catalog manager, the source of the IT services becomes transparent and can easily be accessed by users. Consumption metering, cost control and cost allocation is part of the system.

# How to simplify Hybrid IT deployment and operations

Hybrid IT is characterized by a high degree of heterogeneity. To increase agility and efficiency, the underlying complexity must be "hidden" in a uniform overall solution. For accelerating the adoption of Hybrid IT, Fujitsu provides technologies and solutions for the key areas.

A software-defined data center makes the provisioning of IT resources like compute power, storage capacities and network connections extremely agile. Nevertheless it does not relieve IT administrators from monitoring, operating and updating hardware instances. The **FUJITSU Infrastructure Manager (ISM)** is an efficient end-to-end tool that helps boost administration productivity. The ISM makes IT infrastructure deployment, operation and maintenance more efficient and agile. Compared to silo management, the ISM provides troubleshooting/cause detection that is 23 times faster, plus 90% cost and time savings through firmware updates and 50% less power consumption (power cap). The ISM is an integral part of many PRIMEFLEX solutions.

With **PRIMEFLEX Integrated Systems,** Fujitsu offers a broad range of pre-defined, pre-integrated and pre-tested systems that reduce risk, shorten time to value, increase operational efficiency and drive down the cost of data center operations. The solutions are handed over ready to run, and they are supported at infrastructure level with SPOC. PRIMEFLEX provides completely integrated solutions for all leading Hybrid IT stacks, for example for Microsoft, Nutanix, SAP and VMware.

To fully leverage the benefits of the cloud (i.e. centralized management, self-service, automated provisioning and pay-per-use), IT teams need to make sure that they have the right tools in place to make these resources fit for use in a cloud scenario, while also addressing the resulting integration, governance and administrative challenges with existing cloud services.

The **Enterprise Service Catalog Manager (ESCM)** helps organizations easily transform existing on-premises IT resources into an "as a Service" model, and to integrate these with third-party cloud services. A service catalog on a marketplace (resembling an app store) enables users to access and consume all services in a Hybrid IT environment in a consistent way.
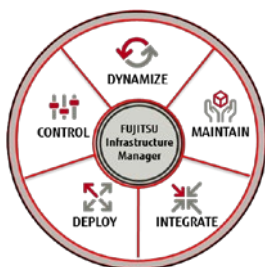
FUJITSU Infrastructure
Manager (ISM) increases IT
admin productivity end-to-end
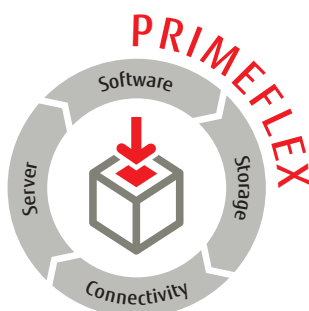
PRIMEFLEX delivers completely
integrated solutions for
all leading Hybrid IT stacks.

Enterprise Service Catalog Manager
(ESCM) provides consistency across
heterogeneous and multi-cloud
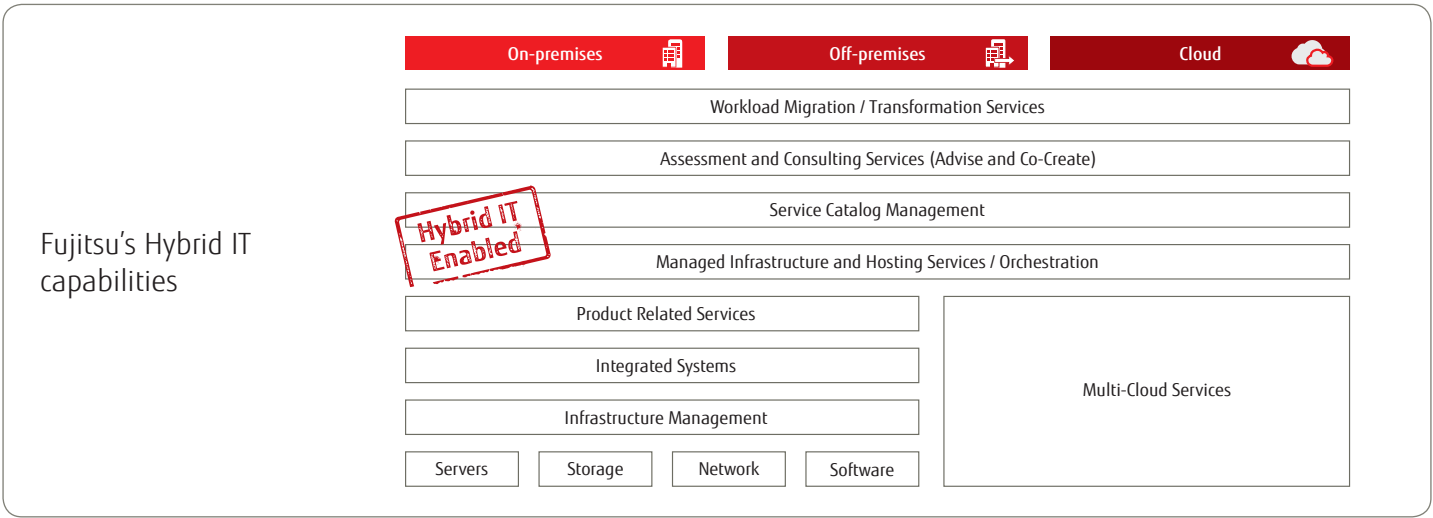environments.

One-stop shop for Hybrid IT

Fujitsu Hybrid IT seamlessly blends private, public and managed clouds with existing on-premises IT to improve business agility, accessibility and deliver better business outcomes. All of this is done within a prudent IT budget to ensure that your Hybrid IT integration is as cost-effective as possible.

It is not just PRIMEFLEX integrated systems or the Enterprise Service Catalog Manager which are excellently positioned for Hybrid IT – it is basically Fujitsu as a whole. Hybrid IT is a simple term, but it incorporates many aspects and data center components such as servers, storage, network and software. These may be integrated systems for reducing complexity, time and risk when building data center infrastructures and boosting operational efficiency. Product-related services are needed as a supplement to the components.

Managed Infrastructure Services may be required because not every organization has the resources, skills and capabilities to manage infrastructures. And hosting services are needed if you don't have enough space on your premises. Cloud services are required whenever new IT services are to be available fast and cost-effectively. Hybrid IT consulting services may be needed to identify the best mix of sourcing options. Furthermore, workload migration services are necessary to move workloads between infrastructures in a simple manner.
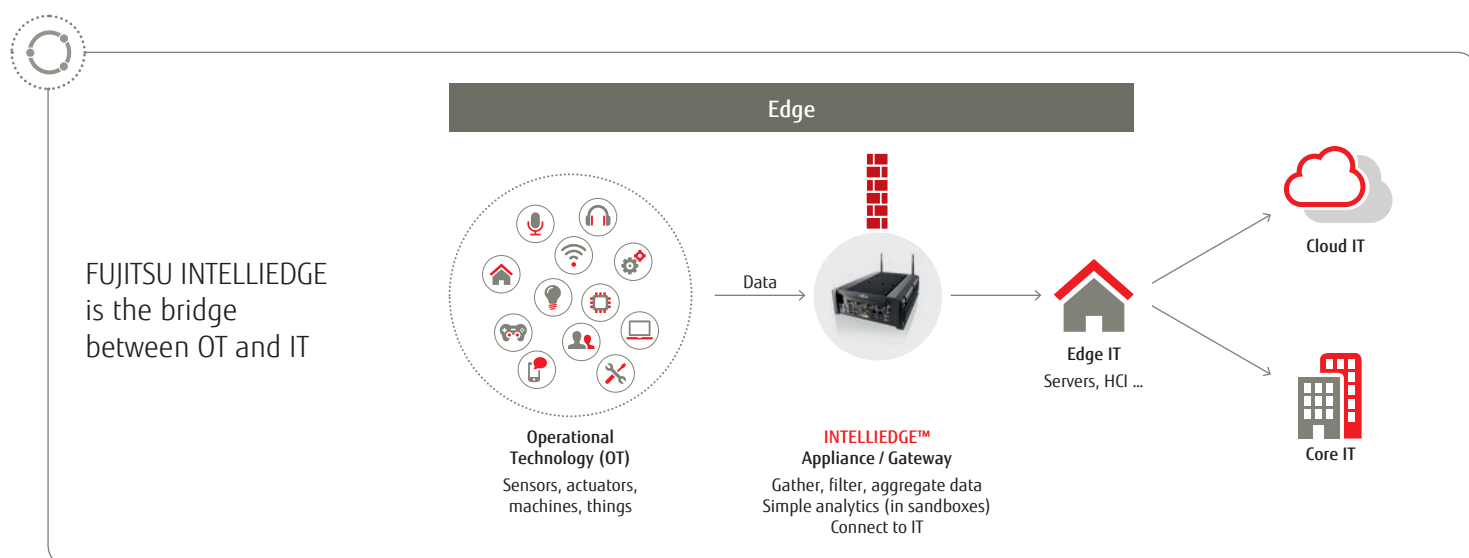
And last but not least: You should have service catalog management which brings all sourcing options together to make the consumption of IT services fully transparent for the end user. Fujitsu covers all of this (either itself or through strong alliances with leading edge partners) in its role as a one-stop shop for Hybrid IT.

With our Hybrid IT offering, we:
- Deliver a cleverly architected and seamlessly integrated IT environment with a governance framework that can adapt and evolve with changing business needs.
- Provide the perfect balance of services to enable the rapid deployment of new cloud-based solutions.
- Ensure that governance and compliance are not compromised.
- Ensure that privacy and security are not breached.
- Enable 24/7 data availability, across geographies and devices.

Fujitsu's Hybrid IT capabilities

On-premises	Off-premises	Cloud
Workload Migration / Transformation Services		
Assessment and Consulting Services (Advise and Co-Create)		
Service Catalog Management		
Managed Infrastructure and Hosting Services / Orchestration		

Hybrid IT Enabled

Product Related Services	
Integrated Systems	Multi-Cloud Services
Infrastructure Management	
Servers · Storage · Network · Software	

Reaching out to the edge

The IoT trend drastically increases the amount of data being produced at the edge; this in turn requires analysis and action. Something like 20% of enterprise data is being produced and processed outside of data centers today. But by 2022, Gartner expects the majority of enterprise data to be produced and processed outside of data centers, and it is assumed that this will rise to over 75% by 2025. Much of this data will be "low value per byte" – or only valuable for a very short amount of time, or only valuable locally, or only valuable for the immediate analysis done on a stream of similar data. Some of this data will be maintained or archived, but quite a lot of it will be used and discarded – at the edge.

FUJITSU INTELLIEDGE is the bridge between OT and IT

Edge

Data

Operational Technology (OT)
Sensors, actuators, machines, things

INTELLIEDGE™
Appliance / Gateway
Gather, filter, aggregate data
Simple analytics (in sandboxes)
Connect to IT

Edge IT
Servers, HCI ...

Cloud IT

Core IT

The edge is the physical location where things and people connect with the networked digital world. Edge computing is of great relevance for all industries – whether manufacturing, health services, transportation, multi-location retail, banking, pharmaceuticals, energy and utilities or the public sector (smart cities).

Data gravity, pragmatic limitations in network bandwidth availability, the necessity to operate even when a connection is not available, and the growth of highly intimate and regulated data storage and processing will require a change to today's centralized data center or cloud IT computing paradigm. The demand for more real-time interaction between things, people and data will necessitate the growth of edge computing.

A hard edge can be a barrier. Operational Technology (OT) and Information Technology (IT) must work together seamlessly. If data flows from everywhere, then it must be combined in a controlled way. So if sensors out in the field are collecting and sending back data, it must be sent to the right place for analysis and action. That could be on-premises or in the cloud. Data generated on the shop floor should be processed in the right place, by the right systems, at the right time.

INTELLIEDGE appliances from Fujitsu reside at the edge between your business and your marketplace to manage the collection, control and actuation of the vast amounts of data that are being generated by sensors in operational environments. The appliances are designed for use in all industries.

INTELLIEDGE is an integrated hardware and software solution delivering device, application and network management. You can connect your existing OT/IT systems to the cloud while your on-premises IoT applications are isolated in sandboxes.

The IT at the edge can be run on a small compute device, but there are also a lot of examples where it can reach the size of a small IT center. In other words, it follows the same architecture of a data center, only on a smaller scale. It comprises server, storage and networking functions and runs virtualization layers. Given a certain minimum size, the same software stacks can be used to connect the edge with the core or the cloud or both as most of the modern software layers can work in a distributed fashion.

Fujitsu's Blueprint for Edge-Core-Cloud IT

The truth is, the data center will no longer be the center of your data. But don't worry: Fujitsu helps customers create a distributed IT from edge to core to cloud by integrating its own products and those from leading technology partners to build end-to-end solutions which reduce project time and risk. What's more, comprehensive services and partnerships with major cloud providers enable quick transformation and co-created solutions.
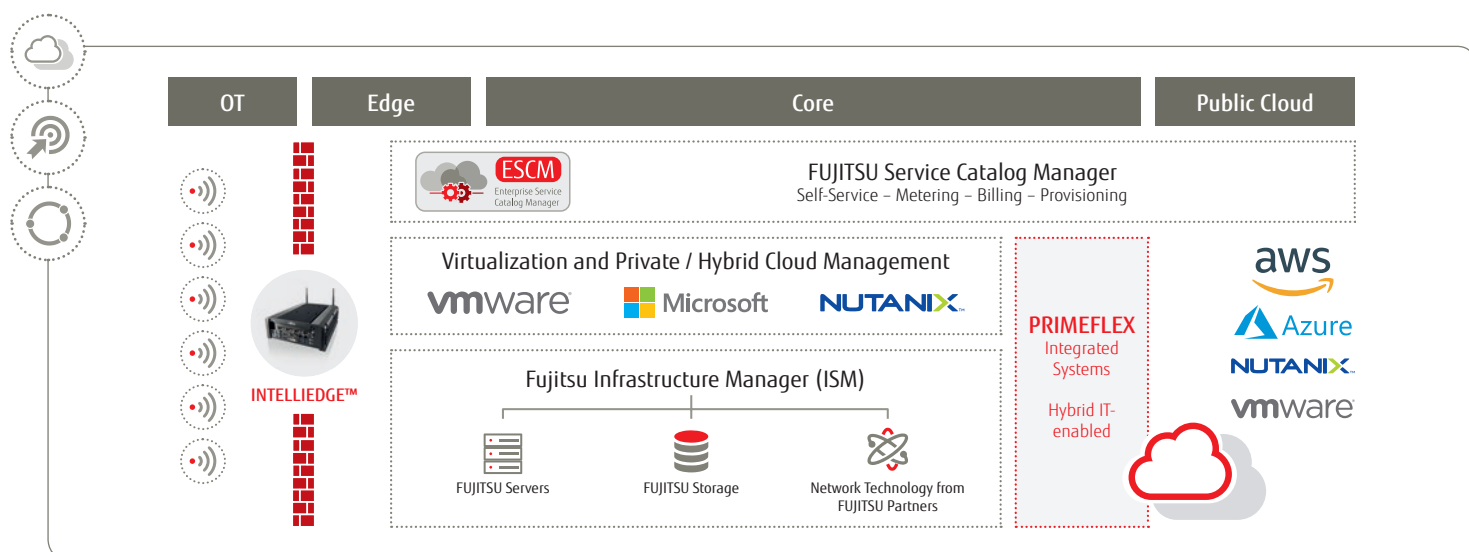
Contact Fujitsu on your journey to the edge and to Hybrid IT!

www.fujitsu.com/global/themes/datacenter-systems