

White paper

Looking for the Fast Track to Your Data Center Infrastructure?

Building data center infrastructures is increasingly complex, error-prone, time-consuming, risky and expensive. FUJITSU Integrated System PRIMEFLEX reduces complexity and risk, shortens time to value and reduces cost.



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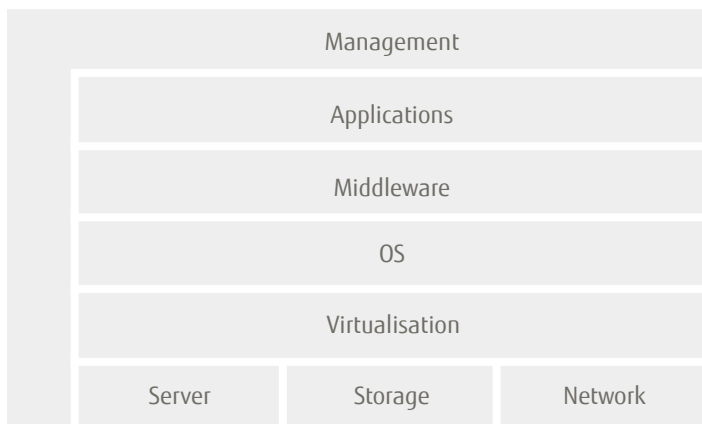
Business requirements facing IT

The job of an IT manager is not easy, because he is always in areas of conflict with pressure from three sides. Management expects maximum flexibility from corporate IT in order to respond quickly and effectively to ever changing business demands. This requires adjustments to existing IT services and above all fast delivery of new services. At the same time, financial managers are looking for more efficiency. This includes less complexity and lower costs, in addition to more cost transparency and predictability, minimized risks and full compliance with IT directives and legislation. And finally, end users expect highest service levels as a prerequisite for highest levels of productivity and satisfaction.

It is true that the demands for flexibility, efficiency and high service quality can be contradictory, but it's the task of the IT manager to balance them in-line with the business.

Building a data center infrastructure is complex

One of the tasks IT managers are faced with again and again is building IT infrastructures for their data center, which often proves to be extremely complex. The main reason for this is the complexity of the infrastructure itself, which is composed of diverse components, such as servers, storage, networks, virtualization layers for all these components, databases and other middleware, as well as applications. In addition, a management layer is needed to keep these components under control.



When building the infrastructure in a DIY (Do-It-Yourself) approach, you first of all need to select the right components from a myriad of options, procure and configure them, before you integrate the individual components onsite. As the compatibility of the components is not guaranteed at all, extensive testing is a must. The fact that these components may originate from multiple vendors does not make things easier. All these activities are time-consuming and expensive, while presenting businesses with multiple risks.

A deep knowledge of all components involved is required, and an understanding of their various interdependencies on each other. Often the coordination among the various administrators who are in charge of the individual components seems to be endless. And because every installation is different, maintenance will be complex too.

In other words, a DIY approach can cause serious headaches, which in turn is certainly in conflict with the business requirements previously discussed.

These considerations raise the question of whether building data center infrastructures on your own and re-inventing the wheel for every project is really the best way to go. Nowadays, nobody would come up with the idea of building a PC himself. Manufacturers have demonstrated that they can build them better, faster, more reliably and at less cost. The same is true for servers. Therefore, questions such as "why stop with servers" and "why not move up to complete infrastructures" are justified.

Integrated Systems

This is exactly what an Integrated System is about. It is a pre-defined, pre-integrated and pre-tested combination of data center components, such as servers, storage, network connectivity and software. While management software is mandatory, depending on the use case, software for virtualization, automation and orchestration, as well as databases and applications may be optionally included.

Based on real-life project experience, an Integrated System is designed in a way that its components will work optimally together.

Depending on which components are included in an Integrated System, we distinguish between systems built for general purposes and purpose-built systems. General purpose systems are applicable for various usage scenarios, while purpose-built systems are optimized for a specific use case.



Numerous benefits

The benefits resulting from Integrated Systems are manifold. Complexity is reduced, because introducing a new infrastructure in your data center becomes much simpler. You will experience less trouble through trial-and-error testing, because the compatibility of all components is absolutely guaranteed. At the same time, risk is minimized and the skill sets required in your IT department will be less demanding.

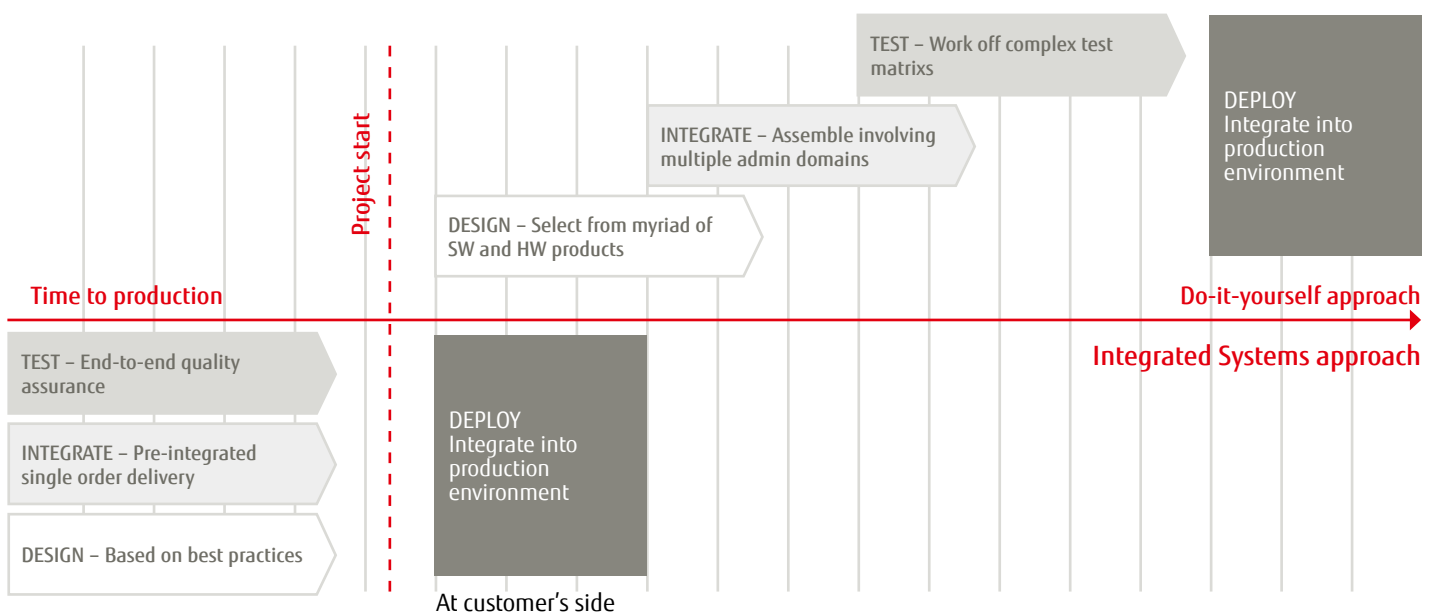
Apart from this, you need less time for planning, and deployment is tremendously accelerated which shortens time to production and time to value.

Due to the optimized design of Integrated Systems, resource utilization will also be optimized. This can have a positive impact on data center space, cabling, energy consumption and cooling efforts.

Moreover, an Integrated System represents a perfect foundation for efficient operations and reduced maintenance efforts. All these aspects help reduce cost, both CAPEX and OPEX.

Finally, we should not ignore the fact that all these benefits enable IT organizations to focus on the really important aspects of the business. Moving away from a build and maintain focus means improved responsiveness to new business requirements, or even driving business to a new level.

The subsequent figure demonstrates quite impressively the enormous savings in time that can be achieved by choosing the Integrated Systems approach instead of the DIY approach.



With a DIY approach, all typical activities have to be done after the project has started. You have to design the infrastructure, integrate the individual components and test the integrated combination of selected components before the actual onsite deployment and integration into the production environment.

With an Integrated System, necessary things such as the infrastructure design, integration of components and testing, have been done before project start. The required activities after project start are confined to the onsite deployment and the integration into the production environment.

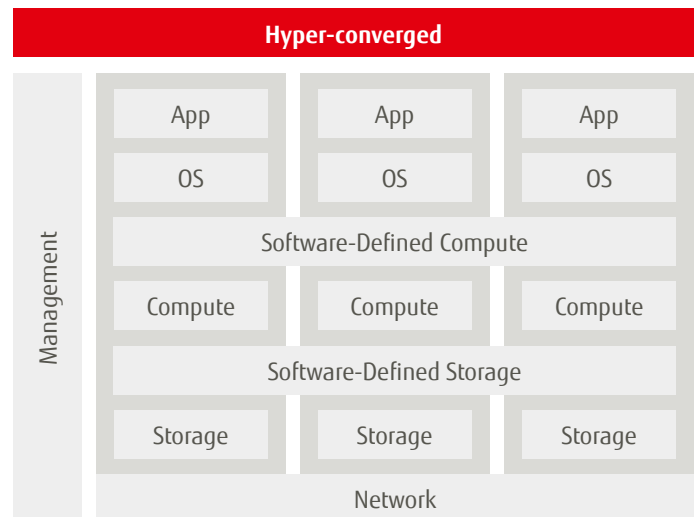
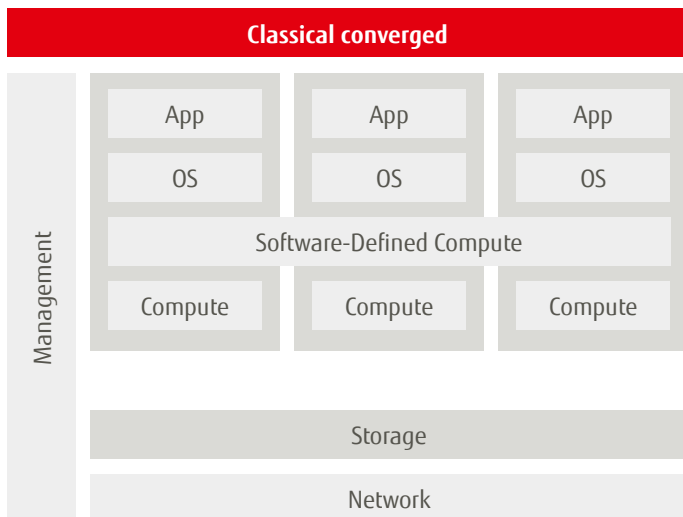
Due to all the advantages mentioned, organizations today are adopting Integrated Systems faster than just individual infrastructure building blocks. And this trend will be ever increasing in the future.

Hyper-converged systems

The era of integrated systems started with the classical converged systems approach, with servers, storage, network connectivity and software being pre-integrated to accelerate deployment, minimize compatibility issues and simplify management.

Hyper-converged systems go a step further, as they tightly integrate all resources in a commodity server node, making a dedicated physical Storage Area Network (SAN) with its management superfluous. Instead, data storage spreads across the local disks of the server nodes. The built-in data services, such as data replication, snapshots, deduplication and data tiering turn hyper-converged systems into a software-defined storage platform. The unified management for both compute and storage resources brings simplification to a new level. While classical converged systems scale on a component level, hyper-converged systems enable scalability on a node level. Compute performance and storage capacity can be scaled by just adding or removing servers.





Hyper-converged systems provide diverse benefits in addition to those resulting from Integrated Systems in general. Having compute and storage resources integrated in a single box makes deployment even easier and faster. The single pane of glass management for both, compute and storage resources, reduces administration effort and skill demands. As there is no external storage included, data center footprint will often be reduced just as energy consumption and cooling requirements. Due to their high scalability, most hyper-converged systems can be easily aligned to growing business demands, while business continuity is always ensured. Finally, all aforementioned benefits often have a positive impact on capital and operational expenditure.

Classical converged or hyper-converged – The use case matters

If your workloads scale horizontally, hyper-converged will be a perfect fit, especially if compute and storage resources need to scale in tandem. This applies to workloads, which require a fixed amount of CPU performance, main memory, disk space and IOPS. Typical examples are Hosted Virtual Desktops and Hosted Shared Desktops. If your workloads scale vertically, or they require a granular expansion on the component level, hyper-converged might be less appropriate. An example is monolithic applications, which cope with increasing data volumes using a scale-up approach.

For hyper-converged infrastructures, virtualization is a pre-requisite. Therefore, they cannot be used for workloads which run on bare-metal only, maybe because a virtual environment would be ineffective and slow them down. Moreover, as most implementations of hyper-converged are based on a single hypervisor, they won't fit if a mixed operation of multiple hypervisors is needed to run different workloads.

Hyper-converged has become an attractive option for remote offices and branch offices. As no external storage infrastructure needs to be maintained, frequent costly onsite visits can be avoided. There are customer cases where travel time could be reduced by 99%, just by replacing a physical SAN by a hyper-converged infrastructure.

If your workloads benefit from the data services coming with hyper-converged, you may use these services without any additional investment. If you don't need them, you will pay indirectly for things you don't use. Another aspect worth considering is the expected growth. The more frequently you have to expand your infrastructure, the more you will benefit from the ease of scalability that features hyper-converged.

The unified management of compute and storage resources reduces operational complexity, administration efforts and cost. However, bear in mind that going this new way will change existing staff roles and require other organizational changes. You may expect resistance from your IT staff, especially in the storage area. Will you counter this resistance? This aspect is also closely related to your storage strategy. If you intend to utilize existing storage, hyper-converged will hardly fit to your strategy. If in contrast you intend to replace your existing storage sooner or later, going for hyper-converged may be a good start.



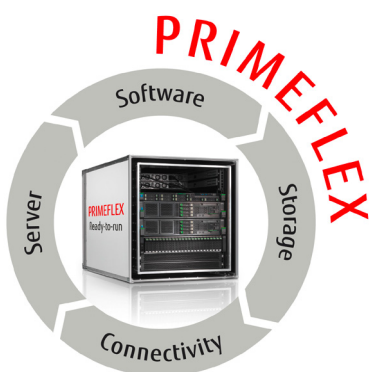
The storage capacity of a hyper-converged infrastructure is limited by the number of server nodes. If you have to cope with amounts of data which are larger than the maximum storage capacity of your server cluster, hyper-converged will be no option. Though hyper-converged promises linear scalability, predictable network performance with larger deployments is sometime questioned, mainly caused by a lack of experience.

Beside the technical appropriateness of workloads, it is also software licensing aspects which should be taken into account. For instance, a database application may be a perfect fit for hyper-converged, but if you have to pay license fees per CPU socket or even per CPU core, hyper-converged will quite likely be a no-go for commercial reasons. At the end, it will be all about cost. As mentioned before, operational expenditure always tends to be much lower with hyper-converged infrastructures compared to classical converged ones. However, when it comes to capital expenditure, it is hard to make a general statement. Typically, from a hardware cost perspective, hyper-converged is certainly more attractive than classic, from a software cost perspective it is just vice versa. On the other hand hyper-converged requires a minimum number of server nodes; it requires special, certified hardware components, and license fees need to be paid for the virtualization software either. You will find lots of examples with cost advantages on either side. Make a simple cost comparison for your concrete project and you will find out, which is the more cost-effective option for you.

All told: When it comes to the question “classical converged or hyper-converged”, the use case matters. There are good reasons to look at both architectural approaches. It is recommendable to take the decision specifically per each use case, and go for hyper-converged systems, if their benefits outweigh the drawbacks.

FUJITSU Integrated System PRIMEFLEX

What is Fujitsu’s role in the area of Integrated Systems? Under the PRIMEFLEX brand, Fujitsu offers a family of Integrated Systems built for general purpose and purpose-built systems. In addition to the classical converged systems, the PRIMEFLEX line-up includes hyper-converged systems, enabling customers an easy path to a software-defined data center. Fujitsu’s Integrated Systems are built from best-in-class components, either own technologies, as for instance our FUJITSU Server PRIMERGY or FUJITSU Storage ETERNUS, or 3rd party technologies from leading technology partners who are recognized as leaders in the market.



Converged lifecycle management

FUJITSU Infrastructure Manager (ISM) enables a converged lifecycle management of integrated systems, across servers, storage, networking, and even 3rd party devices. The impact of the unified management for all components included is simplified operations. Statistics say that troubleshooting and root cause identification are done 23 times faster compared to silo management, while installation time for operating systems is reduced by 70%. Agility is increased, because the intuitive software provides actionable insights, workloads can easily be re-assigned, and traffic can be redirected based on policies. This increases the responsiveness of IT to business. Another result of using ISM is cost reduction. According to the statistics, time and cost for firmware updates is reduced by 90%, while power consumption is reduced by 50% due to the power cap function built into ISM.

Delivery options

Fujitsu’s integrated systems are either delivered as appliances or reference architectures. Appliances are built and tested in exactly the same manner as servers or storage systems, thus achieving the same quality level you expect from any product. They are not just pre-configured, pre-integrated and pre-tested; they are also fully pre-installed at the factory before being shipped ready-to-run to the customer. Therefore, the onsite activity is confined to the deployment and integration into the existing environment. Procurement is very easy; often there is a single order code for the entire Integrated System. With appliances, there is no design effort at all, you are freed from any potential risk, and have chosen the fastest way to operation.

If more configuration flexibility is required, reference architectures are the better choice. Reference architectures are pre-tested, validated design blueprints based on a proof-of-concept. However, they can be easily adapted and custom-tailored at a certain extent to customer-specific requirements. With reference architectures, component integration and installation happen typically onsite. In order to ensure a smooth set-up, Fujitsu provides detailed configuration and installation guidelines as a standard.

Depending on the individual offering, onsite deployment by Fujitsu or a certified partner is a mandatory part of the integrated systems offering, meaning that reference architecture based systems will be handed over ready-to-run to the customer. Hence, you will gain similar benefits as with appliances, but with an additional flexibility advantage. As an option, reference architectures or adjusted reference architectures can even be pre-installed in one of Fujitsu’s staging centers, shipping the reference architecture even ready-to-run “ex-factory” to the customer, while accelerating time to production even more.

For all these reasons, PRIMEFLEX reference architectures are certainly more than just the norm.



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Professional Services for PRIMEFLEX

Although most of the typical activities have been done by Fujitsu before project start, some activities still need to be done onsite. But even with these remaining activities, its partners do not leave you out in the rain.

A more challenging task than the onsite deployment, which is, as aforementioned, often an integral part of the PRIMEFLEX offering, is the integration into the existing production environment, which is covered by Fujitsu's Integration Services that customers may order optionally. Even if additional services are needed, for instance database migration or anything else, it makes sense to have a word with Fujitsu.

By the way, we should not ignore Consulting Services, which often represent a groundbreaking element for organizations at the beginning of any IT journey. Examples include assessments, customer briefings, IT investment decision support, configuration and sizing support, and many others.

Attractive add-ons for operation and maintenance

For sure, fast deployment and short time to production are obvious advantages of Integrated Systems. However, we should not ignore the fact that Integrated Systems can still cause substantial effort during operation.

Fujitsu Solution Support relieves you from headaches caused by unpredicted problems during operation, while ensuring operational efficiency. As the name implies, Fujitsu provides support for the entire Integrated System with aligned service levels for all its components, be it hardware or software, be it from Fujitsu or its technology partners. This even applies to reference architectures, which have been adapted to customer-specific requirements. It goes without saying that there is a single point of contact for all support matters related to your Integrated System.

Beside reactive services based on optimized processes, optional proactive services are offered, comprising a regular system health check. Thus, critical system conditions can be detected early and preventive maintenance measures initiated.

There are various service level options for reactive and proactive services, which differ in service scope, response time and recovery time. Likewise the frequency of proactive services can be defined by the customer.

Due to Fujitsu's global capabilities, support services can even be delivered consistently across geographic borders and globally.

If you want to go a step further and disburden your administrators from standard operational tasks and problems that could occur during operations, **Fujitsu Data Center Services** will be the best choice. Fujitsu takes over the operation of your data center infrastructure on your premises (Managed Data Center), or in any of its own data centers (Managed Hosting). Managed hosting additionally counteracts a lack of data center space and all related issues such as heating and air conditioning. Both options represent all-round care-free packages providing peace of mind for IT managers, as well as cost transparency and the opportunity to focus on your core business.

Many years of experience

Fujitsu's Integrated Systems are unsurpassed when it comes to best practices and extensive project experience. Fujitsu has a long track record. The first Integrated System was shipped back in 2002, long before the term of Integrated System was used in the market.

Since then, the processes for end-to-end solutions have been continuously optimized. This is underpinned by a dedicated product management for each Integrated System. In addition to the quality assurance (QA) for the individual hardware and software components, quality assurance also happens on the Integrated System level, which is a guarantor for the benefits you receive. The same applies to the manufacturing processes of the appliances. Finally, let's not forget the established support processes on the Integrated System level, which enable hassle-free operation.

Integration of new solutions into existing data center environments has been one of Fujitsu's core activities over decades. And the fact that Fujitsu operates more than 150 data centers in over 20 countries across the globe might be sufficient proof of its data center service capabilities.

These might all be good reasons why many customer organizations have chosen Integrated Systems from Fujitsu.

Financing Options

One question remains: What if your wallet is not jam-packed? In order to be flexible and competitive, you will have to use your limited resources intelligently and focus your expenditures on your core business. You might want to avoid costs due to technical obsolescence, protect existing credit lines, or protect CAPEX and minimize OPEX, just to mention a few of the challenges.

Attractive financing options from Fujitsu, including cloud-like financing models, will help you meet the challenges



PRIMEFLEX for many important use cases

After having discussed Integrated Systems in general, Fujitsu's view on Integrated Systems and all the attractive supplements offered by Fujitsu, let us now have a closer look at Fujitsu's Integrated Systems portfolio. In all its Integrated Systems activities, Fujitsu focuses on what its customers demand. In doing so, various topic areas are addressed correspondingly.

These areas of high relevance for our customers are, for example virtualization and cloud infrastructures, analytics including artificial

intelligence, as well as SAP environments. The subsequent figure shows the PRIMEFLEX line-up of systems and their mapping to the topic areas mentioned above.

The availability of the individual offerings may differ by region.

All PRIMEFLEX systems seamlessly integrate with public cloud services, ensuring a consistent user experience across locations. PRIMEFLEX is excellently positioned in all scenarios. Hence, PRIMEFLEX is a family of Hybrid IT Enabled Integrated Systems.

General Purpose

Virtualization and Cloud

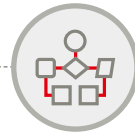
- PRIMEFLEX for VMware vSphere
- PRIMEFLEX for VMware vSAN
- PRIMEFLEX for VMware Cloud Foundation
- PRIMEFLEX for Microsoft Azure Stack HCI
- PRIMEFLEX for Microsoft Azure Stack
- Nutanix Enterprise Cloud on PRIMERGY



Purpose Built

SAP

- PRIMEFLEX for SAP HANA
- PRIMEFLEX for SAP Landscapes



Analytics

- PRIMEFLEX for HPC
- Zinrai Deep Learning System



What makes PRIMEFLEX different?

Although most has been said, let us recapitulate what makes PRIMEFLEX different.

Fujitsu provides flexibility and choice in various regards: in terms of architecture (classical converged or hyper-converged), in terms of the storage used in classical converged systems (hybrid or all-flash from either Fujitsu or NetApp), in terms of virtualization software and cloud management software (VMware, Microsoft, Nutanix), in terms of licensing (OEM, resale or bring your own), in terms of configurations and sizes, as well as in terms of financing and services options including service levels.

To make your life simple, configuration and installation guidelines are available as a standard for PRIMEFLEX reference architectures. A converged lifecycle management simplifies operation, while our end-to-end services cover all you may need. Solution support on infrastructure level means a single point of contact will resolve issues during operation. Various complements, such as data protection appliances deeply integrated with PRIMEFLEX, and the fact that all systems are Hybrid IT enabled, make PRIMEFLEX even more attractive.

To protect your business against outages and cyberattacks, Fujitsu offers a broad portfolio of backup and archive solutions (data protection appliances, tape systems and backup software) that perfectly integrate with our PRIMEFLEX solutions and allow you to simplify and consolidate backup and archive infrastructures. These solutions offer advanced storage management capabilities, such as deduplication, replication, archiving and cross media mix. Fujitsu provides a solution for every business size, whether small, mid-size or enterprise-scale.

For customers who want to transfer a local virtualized data center infrastructure based on PRIMEFLEX to a cloud, Fujitsu offers Enterprise Service Catalog Manager (ESCM). ESCM is a self-service portal to centrally manage service delivery, life-cycle operations and user access for all IT services in a hybrid IT environment. IT organizations can introduce new services quickly, keep control of service usage, and report and charge service consumption. Business users have access through an intuitive self-service portal on which they can easily find and consume services that are managed on or off-premises.

PRIMEFLEX is built on industry leading hardware, which excels in performance, reliability and efficiency, ensuring optimal resource utilization by design.

Fujitsu's long track record in integrated systems, looking back to the 1st ever shipped integrated system in 2002, a lot of customer projects that we can refer to, our proven track record for engineering quality and reliability, Fujitsu's global presence and its financial stability, may be good reasons to take PRIMEFLEX into consideration.

Summary

Integrated Systems relieve you from the pain caused by building data center infrastructures on your own, because they help reduce complexity, time and risk, while increasing operational efficiency. FUJITSU Integrated System PRIMEFLEX is focused on customer requirements. Together with its add-ons, you get all you need, from quick time to value, and more. So, if you're tired of the DIY model and want to choose the simple fast track to your data center infrastructure, then choose PRIMEFLEX from Fujitsu.



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Published by
Fujitsu Technology Solutions GmbH
Mies-van-der-Rohe-Strasse 8
D-80807 Munich

www.fujitsu.com
2019-05-16 WW EN

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