

White paper

How to Overcome the Challenges of Virtual Desktop Infrastructure

Virtual Desktops enable flexible working while reducing security risks and helping better meet compliance demands. However, to make it happen, complex infrastructures with a diverse range of technologies have to be built and operated, which poses serious challenges to IT. This whitepaper will illustrate these options and shows how the challenges of virtual desktops can be met.



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Organizations need a dynamic workforce

There is no doubt that the new workforce has the potential to be more dynamic than ever before. They know exactly what they want and what they need in order to do their job in an optimum way. The number one demand is flexible working. They want to be able to access their working environment anywhere, anytime and from any device. This may even include their own devices and tools they use in their day-to-day life, because these can often be more innovative compared with what they get from their employer – on demand, on mobile and personalized to their individual preferences. From personalized and contextual workplace they expect best user experience which in turn is the foundation for end user satisfaction and highest productivity. To be very clear: Flexible working provides benefits for both, the employee and the employer. For the employee it enables a better work-life balance, while the employer will take advantage from a highly motivated and productive workforce, and maybe even reduced office costs.

However, the demands of the workforce are often conflicting with the objectives of the IT organization. IT wants to deliver standardization all over the place, stay in control, keep all data safe, and meet security and compliance demands. Their mandate is to maintain operational stability, keep up with changes, drive innovation while maintaining legacy applications and reduce costs. How can all these conflicting demands be met?

Traditional PC workplaces

A traditional PC workplace is not the best prerequisite to meet these conflicting demands. Productivity applications, user profile, user data and operating system are all on the device and tightly coupled with each other. The tight coupling of the various workplace layers means a strong dependency between them. Any change in one of these layers will impact the neighboring layers, too.

Moreover, by changing settings and installing new applications, most employees transform their PC from a standard user environment into one which is unique to them. And the more personal the PC workplace, the more difficult it is to manage. PC hardware is distributed all over the enterprise, and there are more and more remote and mobile users who are not always connected, but have to receive software updates and patches on a regular basis. When a PC fails, it often takes a considerable amount of time until the problem is resolved and the PC is available again for productive usage. Sometimes even expensive desk-side visits are needed. As a backup by all end users is not ensured on a regular basis, there is always the risk of data loss. Further security risks result from the multitude of vulnerabilities which can potentially cause unauthorized manipulation or destruction of data, as well as data theft. All these risks conflict drastically with regulatory compliance. For all reasons mentioned, the total cost of PC workplaces is extremely high and not fully transparent. And besides, you may access your workplace environment only, if you are where your PC is, or if you take your PC with you.

Desktop virtualization and centralization

The main cause for the high complexity of traditional PC workplaces is the tight coupling between the individual workplace layers. Breaking the tight coupling will make the components and their lifecycles independent from each other and correspondingly expand their lifetimes. This is exactly what virtualization is about. Managing single instances of components instead of many unique monolithic desktops reduces complexity, simplifies management, increases flexibility and speed, improves service quality and finally reduces costs.

Virtualization can happen between any of the layers, between hardware and operating system, between operating system and applications, and you can even separate user personality from your workplace image. The more layers you separate from each other, the more advantages you can achieve, of course. Decoupling all layers from each other enables a dynamic workspace, which is basically created at logon and ceases to exist after logoff. A dynamic workspace is fully context-aware; i.e. workspace content and usage options may dynamically vary depending on time, the user's location and his device.

Virtualization enables IT to move applications, data, user personality or even entire workplace environments from the PC into the data center. Instead of a fully equipped PC, a thin client is sufficient for the access. Certainly, the network becomes much more important than ever before.

Desktop centralization enables a flexible access to your workplace environment from anywhere and any device. Workplace management and maintenance become more simplified, because nearly everything is in the data center. Software can easily be deployed and updated, and patches become effective without touching numerous end user devices and disrupting the end user. Onsite visits for end user support are a thing of the past. The level of application and workplace availability is significantly increased; even disaster recovery concepts can be set up. Furthermore, the flexible workplace infrastructure helps react rapidly on new or changing requirements. The fact that all data is hosted centrally minimizes the risk of data theft. Data backup no longer depends on whether the device is turned on or whether it is connected, minimizing the risk of data loss and increasing security levels. All this helps meet compliance demands. Although additional infrastructure is required in the data center, the overall energy consumption can be reduced, if thinner low-current device hardware is deployed. All these advantages contribute to cost reduction.



Delivery options

When it comes to centralization, there is not just one optimum concept for every situation. There may be various types of end users in your organization. As their requirements can be very different, there are different workplace delivery options which we are going to have a closer look at.

Hosted Shared Desktop

For the task workers who use only the same limited set of applications every day, the Hosted Shared Desktop (also known as server-based computing or terminal server) is absolutely sufficient. Applications run on a central terminal server farm, either bare-metal or in a virtual environment, and can be shared among several users. Due to sharing resources, Total Cost of Ownership is very low compared with traditional workplaces.

But there are also some restrictions. To avoid application conflicts, applications have to be made multi-user capable what can be a very complex task. The separation from other users is limited too. If, for instance, any user initiated a restart, other users would be affected. Besides this, the level of individuality is limited; users have to accept the scope of available applications; there is no way of getting additional applications for individual purposes. These restrictions don't make the Hosted Shared Desktop applicable for real knowledge workers who need greater flexibility and personalization.

Hosted Virtual Desktop

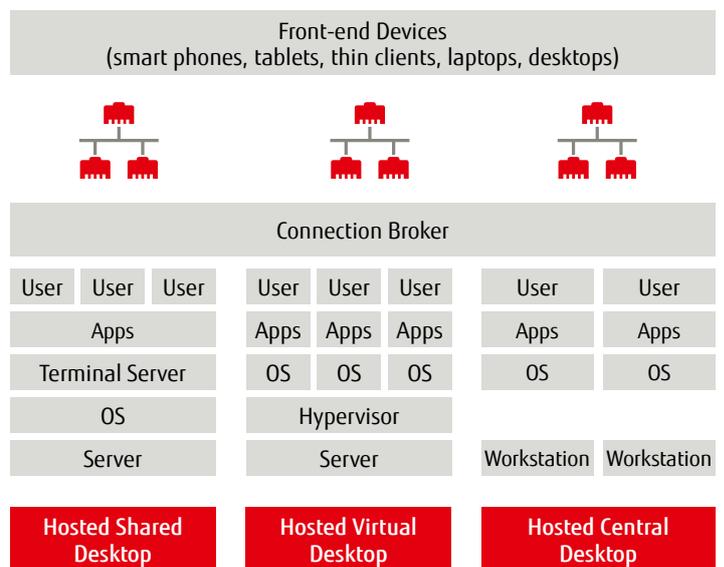
For knowledge workers, the Hosted Virtual Desktop (also known as VDI or Virtual Desktop Infrastructure) is the appropriate choice. Individual desktops with potentially different types and versions of operating systems run as virtual machines on servers in the data center. They are isolated and therefore fully protected from each other. They can be personalized to fit personal needs. And in contrast to "Hosted Shared Desktop", applications need not be adapted. Basically, the "Hosted Virtual Desktop" provides the advantages of the "Hosted Shared Desktop" without its restrictions. End users are authenticated and dynamically connected to their virtual desktops by a connection broker.

Hosted virtual desktops are available in two flavors: persistent and non-persistent. A non-persistent virtual desktop is newly created every time a user requests it. So it is at its best, unfettered by multiple software patches and updates, and it will be obliterated when it's virtually switched off. While this model is targeted at highly standardized environments and employee roles, the persistent virtual desktop model is optimized for individual user requirements. A persistent virtual desktop is booted from a virtual machine image which is conserved across sessions.

Central Hosted Desktop

Power users with extremely high graphics performance demands sometimes need dedicated physical workstations. In order to let these power users also benefit from the advantages of centralization, workstations can be moved into the data center and remotely accessed. The connection broker will connect the end user to the respective workstation. This concept is known as "Hosted Central Desktop". Apart from increased security and a flexible access to the workstation from anywhere, power users are faced with less heat and noise, and will have more space at their desk.

Nowadays, servers can be equipped with high performance graphic cards; hence, the demands of power users can be mostly met by "Hosted Virtual Desktops", too.



Market-leading desktop virtualization software

Regarding desktop virtualization software, there is a variety of options available in the market. The dominant ones are VMware Horizon (including Horizon Apps) and Citrix Xen Desktop (including XenApp) followed by Microsoft VDI (including RDS).

Where to run your desktop virtualization software?

Basically, as with any other workload, there are three options where to host your virtual desktops: on-premises, off-premises (in the data center of a hosting provider) and the public cloud. Which option to choose depends on a number of aspects and on the customer's strategy. An on-premises virtual desktop infrastructure is still the best choice to meet strict security and compliance demands, if latency is an issue, and if the IT organization wants to have everything optimally under control.

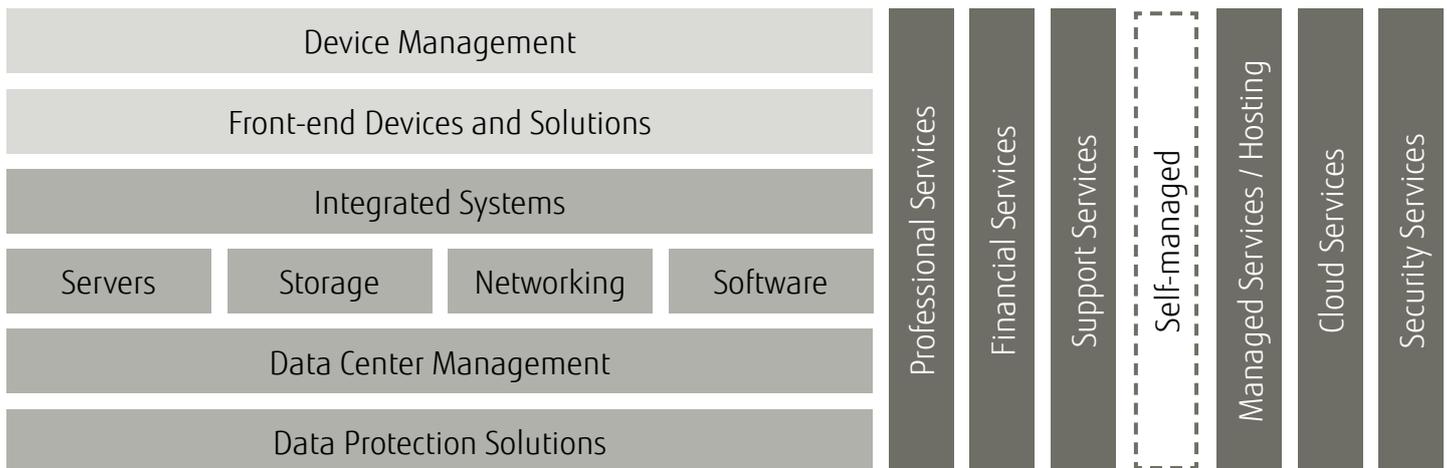
If the demands afore-mentioned are less strict, outsourcing your virtual desktop infrastructure to an off-premises data center of a hosting provider with an outcome-based pricing may be the alternative. If the demand for agility and cost-effectiveness dominates, virtual desktop delivery from the public cloud should be considered.

There are use cases, where depending on the user profile and specific demands, a hybrid scenario may make sense, for instance with virtual desktops of employees being hosted on-premises, while virtual desktops of contractors will be hosted in the public cloud.

What is needed for virtual desktops?

After having laid the basics, let us turn to the question what is needed for virtual desktop infrastructures. The answer is quite multifaceted.

Regardless whether you want to go on- or off-premises, you will need a back-end infrastructure in the data center based on servers, storage systems, network components, the respective virtualization software, and a management environment to keep the data center infrastructure under control. To get access to your virtual desktops in the data center, you will need front-end devices and a respective management environment. In addition, you might require a selection of various services. You might need professional services including consulting, infrastructure design, maybe a proof-of-concept to ensure best user experience, deployment of your new infrastructure, its integration into your existing production environment and migration services. If you don't have the required budget for the virtual desktop project at hand, attractive financing options may be helpful. When once the new infrastructure is in place you will need someone providing maintenance and support for it. And if you want to focus on your core competencies rather than managing your infrastructure, you will have a look at managed services alternatives, maybe even in combination with hosting services, in order to save space in your own data center. Or maybe cloud is the ideal option for your situation. As said before, virtual desktop infrastructures per se tremendously increase data security; but maybe you want to increase security levels even more; in this case, additional security services could supplement your overall solution.



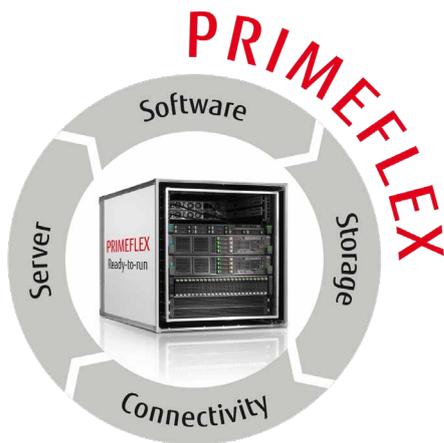
Though certainly not everything is relevant for a project, you will nonetheless be faced with a broad variety of aspects to consider. And certainly for each aspect there are multiple vendors you can engage with. But the more vendors are involved, the more complex the entire exercise will become. Therefore the key question is: Who is able to deliver all this? Let us have a look at how Fujitsu can help.

Data center infrastructure at the back-end

For the back-end data center infrastructure Fujitsu delivers a broad range of server and storage systems. Server options are FUJITSU Server PRIMERGY and FUJITSU Server PRIMEQUEST; for storage, customers can choose between the hybrid FUJITSU Storage ETERNUS DX and the All-Flash FUJITSU Storage ETERNUS AF, or storage from our partner NetApp (FAS and All Flash FAS). In the networking area, in addition to

Fujitsu's own technology, we are in close partnership with best-of-breed vendors, such as Extreme Networks, Brocade and others, which is the same in the virtualization area where we work with the leading technology vendors such as VMware, Citrix and Microsoft. We use all these technologies to build the ideal infrastructure for our customers.

FUJITSU Software ServerView Infrastructure Manager (ISM) serves for converged management across servers, storage and networking in a consistent manner, drastically simplifying IT operations. ISM supports automated provisioning of the infrastructure components. Its intuitive user interface provides actionable insights, re-assigns workloads, and redirects traffic based on policies. This increases agility and responsiveness.



Integrated Systems

It is well known that building a data center infrastructure is complex. Components such as servers, storage, network components and software need to be selected from a myriad of options, procured and integrated. Moreover, extensive tests are conducted, because the compatibility of the individual components is not always guaranteed. This in turn requires a deep knowledge of all components involved and an understanding of their interdependencies on each other, if you do all this on your own. Consequently, such a do-it-yourself approach is error-prone, time-consuming, risky and expensive.

FUJITSU Integrated System PRIMEFLEX is a pre-configured, pre-integrated and pre-tested combination of best in class data center components, such as servers, storage, network connectivity and software based on Fujitsu and partner technologies, as well as best practices and extensive project experience. All typical activities, such as infrastructure design, component integration and testing have been conducted by Fujitsu before project start. The onsite activities are correspondingly reduced to the deployment of the Integrated System and the integration into the production environment. This reduces complexity, shortens time to production, minimizes risk, and contributes to operational efficiency, better resource utilization and considerable cost savings.

Some of the PRIMEFLEX integrated systems are completely pre-installed at factory and shipped ready-to-run. Others are provided as reference architectures which can be adapted to customer-specific requirements. All reference architectures are shipped together with installation and configuration guides by default, and are supported by flexible services options including an end-to-end support service with a single point of contact covering the complete technology stack.

Converged or hyper-converged?

PRIMEFLEX includes converged systems including external storage as well as hyper-converged infrastructure systems, which tightly integrate all compute and storage resources in a commodity server node, making a dedicated physical Storage Area Network (SAN) with its management superfluous. Instead, storage spreads across the local disks of the server nodes. As there is no external storage included, data center footprint will often be reduced, just as energy consumption and cooling requirements. Having compute and storage



resources integrated in a single box makes deployment even easier and faster. The built-in data services, such as data replication, deduplication and others 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 by reducing administration efforts and skills demands. While classic infrastructures scale on a component level, hyper-converged systems enable scalability on a system level. Compute performance and storage capacity can be scaled by just adding or removing servers. Hence, hyper-converged infrastructures can be easily aligned to growing business demands, while business continuity is always ensured. And of course, all benefits aforementioned have often a positive impact on capital and operational expenditure.

The horizontal scalability with compute and storage resources scaling in tandem makes hyper-converged infrastructures a perfect fit for VDI and terminal server deployments. The typical bottlenecks of shared storage, such as fiber channel connection and overloaded drives don't show up. Especially for VDI deployments in remote offices and branch offices, hyper-converged infrastructures are predestinated, because you need not look after an external storage infrastructure including SAN arrays, SAN switches and their management, which might have caused a huge amount of travel time and cost.

Despite this perfect match, there are a few aspects that may give reason to caution, at least for some organizations. It is those whose storage strategy is based on external storage for all their workloads; it is those whose existing staff roles are not ready yet for entering the hyper-converged world, and those who still question the maturity of hyper-converged.

As said, hyper-converged infrastructures help reduce operational cost. But when it comes to capital expenditure, it is hard to make a general statement. Hardware costs will definitely be lower, but due to the additional software licenses needed, the overall purchase cost may be higher compared with classical infrastructures. Make a simple cost comparison for your use case, and you will find out which is the more cost-effective option for you.

	PRIMEFLEX for VMware vSAN	PRIMEFLEX for VMware Cloud Foundation	PRIMEFLEX for Microsoft Storage Spaces Direct	PRIMEFLEX for Microsoft Hyper-V	PRIMEFLEX for VMware vSphere	NFLEX
Architecture	HCI	HCI	HCI	CI	CI	CI
Server	PRIMERGY RX / CX	PRIMERGY RX	PRIMERGY RX	PRIMERGY CX / RX	PRIMERGY CX / RX	PRIMERGY CX
Storage	Local disks	Local disks	Local disks	ETERNUS DX / AF	ETERNUS DX / AF	NetApp FAS / AFF
Hypervisor	VMware	VMware	Microsoft	Microsoft	VMware	VMware
SDN	No	Yes	Yes	No	No	No
Scalability	2-64 servers	8-256 servers	2-16 servers	2-64 servers	2-64 servers	2-64 servers
VDI software	VMware, Citrix	VMware, Citrix	Citrix, Microsoft	Citrix, Microsoft	VMware, Citrix	VMware, Citrix
DR option	Sync / Async	Async	Sync / Async	Sync / Async	Sync / Async	Sync / Async
Delivery model	Reference Architecture	Ready-to-run / Reference Architecture	Reference Architecture	Reference Architecture	Reference Architecture	Ready-to-run

Integrated systems from Fujitsu – a platform for virtual desktops

The above table shows Fujitsu’s integrated systems which can be used as a platform for virtual desktop infrastructures. The systems differ in the architecture (converged or hyper-converged), hypervisor technology (VMware or Microsoft), scalability (number of server nodes), disaster recovery option (asynchronous or synchronous) and delivery model (ready-to-run or reference architecture). In addition, the VDI software options running on the respective systems are shown. Among these offerings, you will always find the right solution whatever your requirement will be.

The maximum number of servers shown, reflect what the respective hypervisor supports. In order to get an idea of the infrastructure needed at the back-end, assume as a rule of thumb that a dual socket server with 12 cores per socket takes 80 virtual desktops of office users.

Powered by FUJITSU Server PRIMERGY, Fujitsu’s integrated systems benefit from all proven PRIMERGY values. PRIMERGY is the best performing server platform for running virtual machines. Their long and proven track record is reflected in top rankings across all VMware VMmark benchmark categories. Its patented Cool-Safe® technology drives world records for energy efficiency. Moreover, PRIMERGY is shown as a leading platform in global server reliability reports. PRIMEFLEX includes various configurations which are particularly designed and optimized for VMware Horizon and Citrix XenDesktop.

Data protection

Continuous operation, ideally with no downtimes, is vital for all companies who depend on IT. System outages for whatever reason have immediate negative impact on the business. This will not be different, if virtual desktops are concerned. As soon as continuous operation is the goal, high availability concepts for server and storage hardware, such as data mirroring, snapshots or other data replication techniques are applied on a data level. But be aware: High availability doesn’t help against data corruption. You also replicate corrupted data, viruses or user errors such as an accidental deletion of data. And major catastrophes can easily destroy all data copies, too.

To increase data availability, backup offers the ability to “travel back in time” to access (multiple) older data copies in case the newer ones are damaged or have been deleted. Also, most businesses need to keep business records for an extended period for compliance. Therefore, it is essential to have a good data protection strategy which not only provides backup but also a fast recovery of data to keep your businesses running without downtime.

Fujitsu provides one of the world’s leading end-to-end portfolios for all kinds of data protection technology and services. Its data protection appliances simplify and consolidate backup and archive infrastructures. Moreover, Fujitsu specializes in mapping the right technology for its customers’ individual needs, depending on their business size, spanning from small, mid-size and enterprise-scale businesses. Fujitsu enjoys strong relationships with a number of market leaders in backup and archive software, as well as tape solution partners, also pursuing joint developments. Fujitsu’s data protection solution keeps your data safe for years, simplifies management, mitigates risk, minimizes downtime and protects your business against outages and cyber-attacks.



What about the front-end?

The typical access device for Hosted Shared Desktops, Hosted Virtual Desktops and Central Hosted Desktops is a thin client. As usually no user applications are executed on a thin client, and no user data is stored locally, you neither need a fully featured desktop operating system nor a hard disk. Instead, an embedded lean operating system which – together with some device settings – resides on a flash memory is sufficient. The CPU need not be as powerful as that of a rich client, which means that the entire hardware of a thin client is much thinner.

Thin clients feature high security. Due to their write-protected file system, the stability of the operating system cannot be affected by malware. In addition, USB ports can be blocked. As there are no local data and the device cannot be operated stand-alone, the risk of theft is also reduced. Thin clients come up with high system stability. As there are no moving parts, the number of support calls is close to zero. There are no fans; therefore thin clients won't generate any noise which contributes to high ergonomics in the same way as their little space requirement and low weight. Furthermore thin clients are characterized by extremely low energy consumption and simple management, long lifecycles, and correspondingly minimized costs. Compared to a rich client less components and less raw material are needed, and at the end of their lifecycle, most of the components will be recyclable.

Thin Clients for flexible usage

There may be different requirements depending on application characteristics and generated content to be displayed; just compare the performance you need for graphics or multi-media to standard office applications. Another influencing parameter is the number of screens or other peripherals you want to attach to the thin client, and the type of interfaces needed for this purpose.

To meet different requirements, Fujitsu's FUTRO product line includes various models, which are all certified for the market-leading virtualization technologies, be it VMware, Citrix or Microsoft. FUTRO comprises stationary and mobile devices with advanced security features, such as SmartCard and biometrics support, enabling multi-factor authentication, multi-monitor and UC&C (Unified Communication and Collaboration) support. The back-pack solution with the thin client device attached to the display helps save space at the end user's workplace.

A special FUTRO appliance combines FUTRO thin clients with Fujitsu's patented PalmSecure technology for palm vein recognition.

If you need more performance and flexibility than a classical thin client can offer, a powerful Fujitsu ESPRIMO desktop PC can be turned into a thin client using a thin client upgrade kit. The same is applicable for LIFEBOOK notebooks and STYLISTIC tablets, turning these devices to mobile thin clients.

Thin clients „Made in Germany“

FUTRO thin clients are designed in Germany from the scratch, be it the system board, the BIOS, or the entire system. And they are manufactured in the most modern computer factory in Europe, on the same campus where they are developed. This guarantees highest reliability. The perfect symbiosis between R&D and production ensures fast reaction time in case of issues. Software and hardware development by Fujitsu makes sure that no unwanted components, such as spyware, are integrated.

Thin client operating systems

Thin clients always require an embedded operating system which is usually highly customized for the specific use case. Unnecessary device drivers and applications are removed from the image. The operating systems offered for FUTRO are eLux® (an embedded Linux derivative) and Windows 10 IoT Enterprise LTSB (Long-Term Servicing Branch).

Windows 10 IoT from Microsoft provides excellent hardware support and enables all market standard software to run. It can be managed using the same management tools which are used for rich clients. However, due the large image size it is resource-hungry, it might be vulnerable to viruses, and license costs are higher.

eLux from Unicon – a 100% Fujitsu company – is an embedded Linux version especially designed for thin clients. Due to its extremely small footprint, it is resource-saving and features shortest boot times. It ensures that FUTRO fits perfectly into any environment, no matter if Windows-based or Unix-based terminal server environments, virtual desktop infrastructures, mainframe environments or anything else. eLux has a strong focus on security, and provides an optimum price performance ratio. Although it is a Linux derivative, no Linux knowledge is required.

Management of thin clients

It is a matter of fact, that thin clients are much easier to manage than fully-fledged PCs, but at least once their system image needs to be prepared and from time to time even be updated. SCOUT Enterprise Management Suite® from Unicon enables an easy preparation, change or adjustment of local images from a central console. After plugging the thin client to the corporate network, it will be deployed automatically. So a fully automated rollout is possible with no action required onsite. Already while generating the image, software dependencies and hardware compatibilities are checked. In order to avoid unnecessary network load and save time, only a differential update is performed. SCOUT is the perfect management tool for FUTRO with eLux, but can be used for Windows 10 IoT, too. It is used for the largest thin client deployment world-wide with over 200,000 devices.

A much beloved detail is worth mentioning, this is the inheritance of licenses. Customers purchase a license once for a certain device. But when this device is replaced, the license will be transferred to the new one. This license model is true for SCOUT and for eLux.

More and more customers try to avoid the infrastructure setup which is needed for thin client management using SCOUT. There is a very attractive solution which makes it happen: SCOUT as a Service. This lowers the barrier for proofs-of-concept and administration.

Thin clients optimized for dedicated use cases

FUTRO thin clients can be configured for any use case. If the use case of a FUTRO thin client changes during its lifecycle, you just reconfigure the device using the SCOUT management tool, and it can immediately be used for another purpose. This flexibility means investment protection and further cost savings at the end of the day. However, if there is only a single use case for thin clients in an organization, the flexible usage option of the thin client will not be needed.

Hence, Fujitsu offers FUTRO thin clients based without an embedded operating system. Their flash just incorporates the protocol required for the communication with the central infrastructure. These devices are based on the hardware codec from Teradici, delivering highest PCoIP experience in hosted virtual desktop and central hosted desktop environments.

Additional thin client solutions

In addition to the thin client products there are additional thin client solutions which deserve attention. If you want to leverage existing PC hardware and expand its lifecycle rather than investing in new thin client hardware, we can provide an easy transition from your rich clients to thin clients. The migration can be done remotely and effortlessly. This will reflect in a reduced TCO.

And finally there is FUTRO as a Service, a concept making hardware and its management available in a modern way. Going this path, you will avoid upfront costs and reduce your capital expenditure. You will be able to scale up faster and avoid obsolescence in terms of hardware and software.

Virtual desktop infrastructures won't work without services

Until now we have discussed infrastructures at the back-end and devices at the front-end. But all this won't work without services. That is why Fujitsu offers a broad range of services related to virtual desktop infrastructures, in order to make things easier for its customers. As detailed at the beginning, not every service will be required in every project. But it's important to give you a choice in selecting what you need.

Professional Services

Professional services encompass all flavors of consulting including the challenging subject of licensing. We help design your infrastructure at the back-end and for the front-end, conduct a proof-of-concept on demand, deploy your infrastructure, integrate it into your production environment, and provide migration services, if needed. All these services are either delivered by Fujitsu itself, or by trained and certified local partners.

Financial Services

Not every customer has budget available to invest in a virtual desktop infrastructure upfront, despite wanting to take advantage from the benefits it provides. Fujitsu Financial Services has a multitude of solutions, such as sales and lease back, price per seat and other that can help overcome initial capital expenditure blocking points. By shifting fixed costs into variable costs, we allow our customers to maximize their operating budgets. This increases their flexibility, and allows them to maneuver within their budgets.

Infrastructure support

Fujitsu infrastructure support relieves you from headaches caused by unpredicted problems during operation. Besides reactive services based on optimized processes, optional proactive services are offered, comprising a regular system health check, and patch information management (regular evaluation of patch status concerning firmware and BIOS versions). Thus, critical system conditions can be detected early and preventive maintenance measures initiated.

It goes without saying that there is a single point of contact for all support matters, be it related to hardware or software, components from Fujitsu or 3rd parties. For proactive services, a technical account manager with technical skills and local support know-how is dedicated to the customer. Local dependencies, regulations, and customer policies are well understood. As a result, problem resolution can be optimized, while minimizing downtime, and reducing operational risk through collaboration and connected services.

There are various service level options for reactive and proactive services, which differ in service scope, response time and recovery time. The frequency of proactive services, as well as contract duration and payment schedule can be individually defined.

Self-managed or managed by Fujitsu?

Different organizations may have different strategies with regard to infrastructure management. There are organizations that have the resources, skills and capabilities to manage their infrastructures on their own, while others don't have these prerequisites. In this case, Fujitsu will manage and operate your infrastructure for you.

Fujitsu recognize that every business has a different starting point when transforming their workplace. With Fujitsu's Workplace Anywhere we've securely combined Cloud, Virtual and Managed Workplace Services to get the right blend for your organization. Each of our workplace services can help transform the way you work. So, your workforce can be more agile, collaborative and productive.

With our Virtual Workplace Services, we can help you find the best way to virtualize your infrastructure – using public, private or hybrid cloud. We offer a range of virtualization options including, hosted virtual desktops, hosted shared desktops, virtual desktop as a service and application solutions.

We deliver multi-device Workplace Anywhere environments that reduce cost, increase agility, improve efficiency, maintain security, and enhance the end user experience. Our desktops, applications and fully virtual desktops support users' diverse needs effectively and securely. Our highly flexible services adapt to the user, allowing them to access resources and information where, when, and how they want to increase their efficiency and productivity.

Our flexible, tried-and-trusted yet innovative approach covers all steps in the virtualization journey, combining virtualization technologies with proven infrastructure products and end-to-end lifecycle services from a single source. We provide:

- Initial consulting and business case assessment to maximize your ROI
- Full lifecycle support from device delivery through to retirement
- Hosting options that include Fujitsu data center, customer data center and cloud
- Remediation, full testing and interoperability services
- End user performance baselining and analytics services
- Integration in existing IT infrastructures

We offer the security of an assured route to the world of virtualized services, where you can better meet increasingly diverse demands for device types, working hours, mobility and user roles.

Why should you work with us? Here are just a few of the reasons:

- We're a leader in the Gartner Magic Quadrant for Managed Workplace Services in Europe, with the highest rated placement for our ability to execute.
- We can offer a complete, end-to-end service, from service to product
- Our consultative approach helps customers find the most cost-effective ways to increase productivity
- We have global capabilities available both onshore and offshore, 5 global delivery centers and local service desks in more than 30 countries
- We're secure—our clients include military, security, central government, and major financial services organizations

Cloud hosted virtual desktops and applications

Fujitsu's capabilities are not just limited to building, hosting and operating virtual desktop infrastructures. As a cloud service provider, Fujitsu delivers proven IT services from its Public Cloud K5.

With Fujitsu's Cloud-based Virtual Desktop and Applications as a Service, you will get your virtual desktops immediately when needed. The cloud service is easy to try and easy to buy, hence lowering the barrier to virtual desktop adoption. It is just 5 clicks and you are there. You log on to our cloud service portal, create a new tenant, create your virtual desktops, assign them to the end users and then end users can already log in. The time you spend for these activities is some 5 minutes. You may start with a small number of users and grow on demand – fast, flexibly and without any risk. In the same way as you may easily scale up, you may scale down too, if the number of users once decreases. Moreover, 24x7 availability is guaranteed.

There is no upfront cost or any other CAPEX; it is all about OPEX, and this OPEX is even exactly predictable. Operational skills are not required. You just pay a monthly subscription fee for your desktop SLA and use it. Fujitsu hosts virtual desktops in multiple data centers. You may decide from which data center you want to get your desktops delivered.

The integrated Simple Standard Service Pack provided by Fujitsu comprises the services for data center facilities (space, racks, power, cooling, security mechanisms), hardware, software and support as well as the set-up and the integration into the customer environment. Optionally, Advanced Service Packs are available covering virtual desktop management, provisioning and support of access devices, the creation, deployment and maintenance of system images, desktop operating system licenses, application virtualization, e-mail, collaboration platforms, directory services, file services and print services, as well as anti-malware and backup services. These services are either provided by Fujitsu or its local partners. It goes without saying, that the infrastructure in the Fujitsu cloud is based on Fujitsu's data center products and technologies from its best of breed technology partners. Fujitsu's Cloud-based Virtual Desktop and Applications as a Service can also be deployed as an appliance, highly standardized and based on a T-Shirt sized delivery model on the customer's premises. A hybrid model is an option, too.





Security services

Though virtual desktops increase security levels compared with traditional workplace environments, there are organizations that want more. For this purpose Fujitsu provides a series of Security Consulting and Managed Security Services for virtual desktop environments:

When it comes to guarding confidential data, network security and access control are not sufficient. It is important to protect the data itself. Organizations need to be aware where their confidential data is stored, where it is going to and what to do in case of data breaches. With its Data Loss Prevention services, Fujitsu supports organizations in risk assessment, the definition of policies and the monitoring of confidential data.

Users must have access to systems from a variety of platforms as well as operational and hardware environments. Fujitsu's Identity and Access Management provides users access to systems, applications, data and resources. It allows convenient access to resources in heterogeneous IT environments – on-premises or in the cloud – and ensures that all compliance requirements are fulfilled.

Fujitsu Email Security services protect against inbound and outbound email threats including spam, malware, viruses, phishing and other malicious content. It enforces security policies preventing data loss and alignment with Acceptable Use Policies.

Increasingly attackers are performing multi-stage incursions that exploit vulnerabilities, social engineering, data theft and spear-phishing techniques to create a persistent threat that is advanced and targeted. Fujitsu's Advanced Threat Detection services support organizations' defenses against advanced threats and are underpinned by market leading technologies which enable us to identify and mitigate the threats across the lifecycle of the advanced attack.

With Endpoint Protection and Encryption we ensure consistent endpoint protection across the enterprise. The service covers Anti-Virus, Anti-Spyware, application and device control, desktop firewalls, host intrusion prevention and endpoint encryption.

How to get started?

There is no need for a big bang change. You may start small, prove your business case and scale up later according to your needs. To lower the barrier to entry, Fujitsu suggests as a first step its Workplace Assessment, which is about a packaged advisory engagement with the objective to define the workplace strategy that meets your business needs best, identify the potential cost savings, elaborate recommendations and investigate migration scenarios.

Summary

Doubtlessly, desktop centralization helps meet the requirements of both, the modern workforce and the IT organization. However, the many ingredients and options of a virtual desktop infrastructure and its operation are challenging. Fujitsu has got the capability to build the infrastructure for the back-end, be it on-premises or off-premises, and provide integrated systems as a platform for VDI to reduce complexity, time, risk and cost. Alternatively virtual desktops are hosted in Fujitsu's public cloud, while hybrid scenarios are also supported. For the front-end, various thin client solutions are available, combined with an extraordinary thin client management that has proven to cope with a 7-digit number of devices. Flexible services options including overall solution support with a single point of contact complete Fujitsu's capabilities in the VDI space. This enables us to provide the ideal solution for you, optimally customized to your needs.