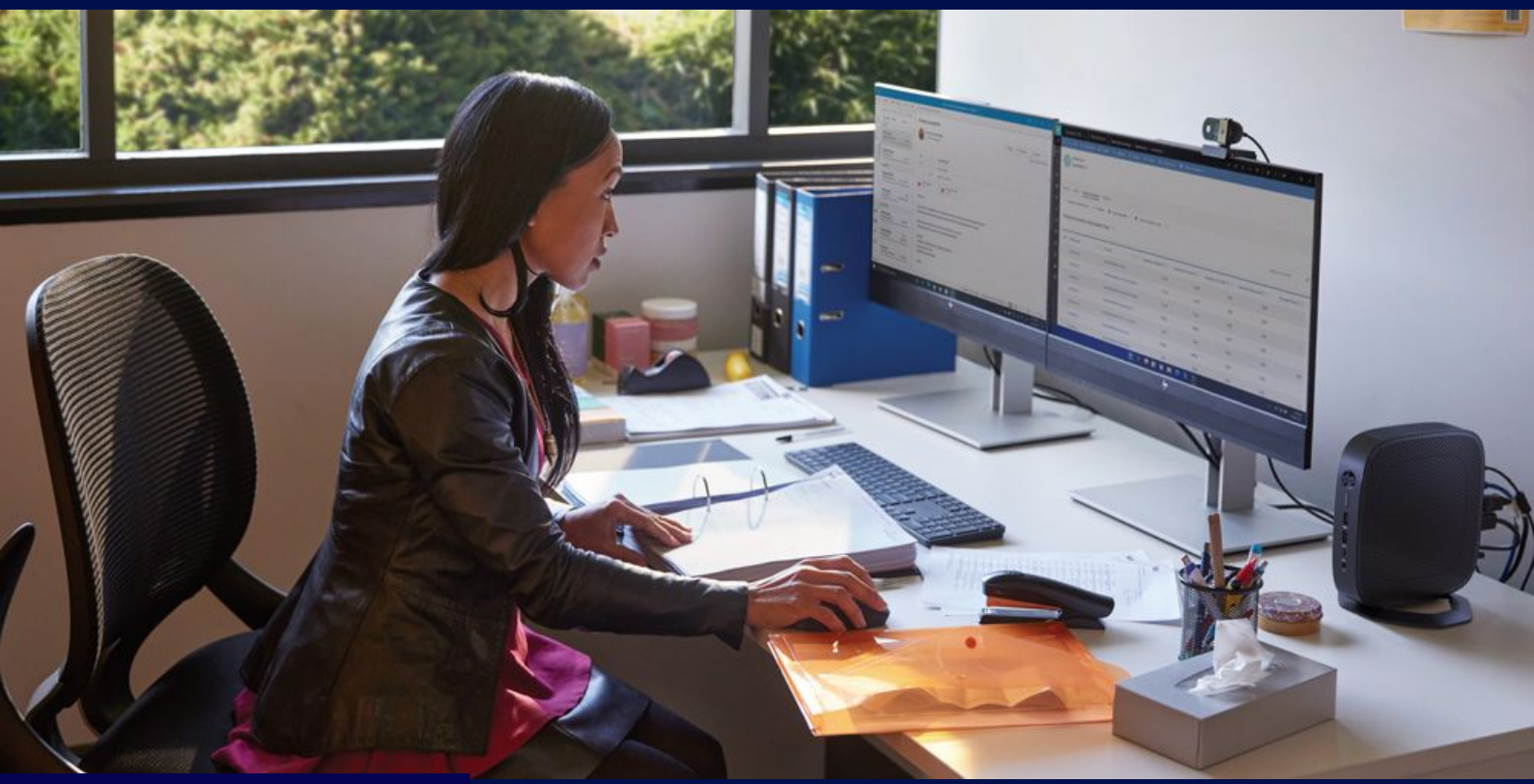
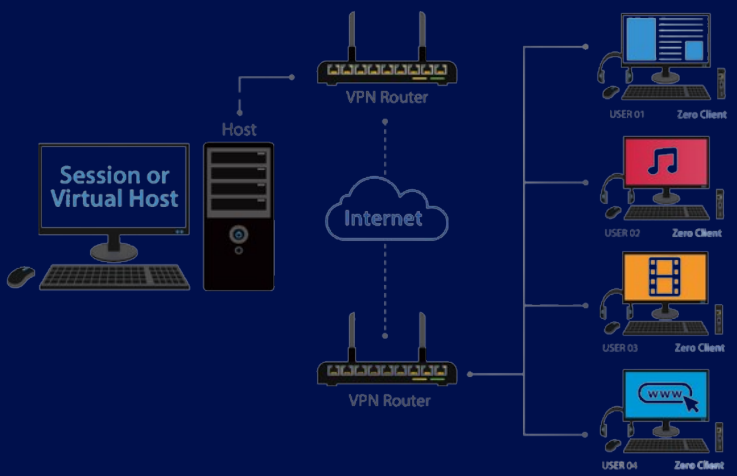
AN INTRODUCTION TO THE CLOUD-BASED APPROACH

Zero client VDI & DAAS Strategy With Private GPU Cloud



- Internet Virtualization
- ISP Internet Virtualization
- On-Premises Switching Mode
- Auto-Scaling
- Zero clients with VDI solutions
- Cost Reduction
- Simplified Management
- Enhanced Connectivity
- Scalability
- Software access on-server as demand
- Private GPU Cloud



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Before making any decision or taking any action that may affect your business, you should consult a qualified professional advisor.

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About This Paper

Traditionally, organisations adopt the strategy of hiring dedicated VDI specialists or outsourcing a VDI project to an external consultancy to set up the infrastructure and handle all possible contingencies. While this approach has been the go-to solution, it is often associated with high costs, inflexibility and insufficient performance.

This paper will highlight an alternative approach called "Private GPU cloud" which provides all the benefits of cloud computing while overcoming the challenges of traditional VDI.

Introduction

The modern distributed workforce is challenging old IT methods for managing the end-user desktop environment. VDI has emerged as a promising technology that helps companies ensure data security and effective distribution of computing resources to accommodate a new way of working. Telecommuters, mobile workers, outsourcing partners, and contractors can now collaborate and connect to resources in a safe environment, from remotely or outside the corporate offices.

This desktop environment is hosted on in-house servers, known as on-premises VDI. It is one way that IT administrators can centralise all the computers or specifically computing resources in one place, without compromising security and controls. Organisations can obtain easier management and deployment of virtual desktops whenever needed. However, the challenge of on-premises VDI is the complexity of setting it up and keeping it optimised. VDI involves many technologies and techniques that require both trainings and knowledge. It is definitely not for the novice, as it riddles with minefields and disasters that can happen if it is not built and managed properly.

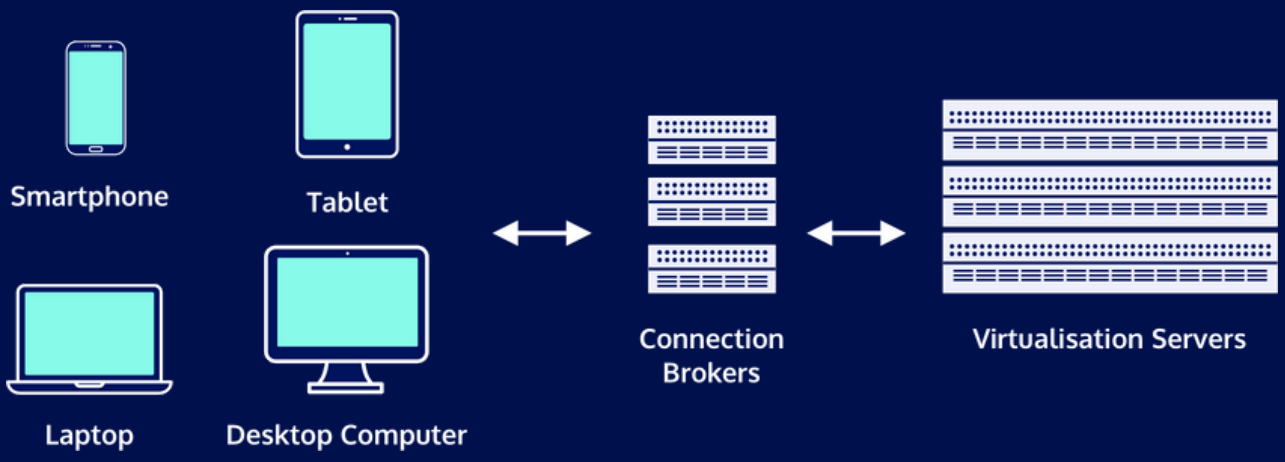
Because of its high failure rates while deploying, maintaining, and provisioning the virtual desktops, organisations traditionally adopt the strategy of either hiring dedicated IT specialists or outsourcing the implementation to external consultancies. It is not a one-size-fits-all approach, as this strategy represents both advantages and disadvantages. Moreover, as the demand for graphical acceleration, use-case optimisation and flexibility of in-house VDI environments increases, this traditional approach can pose additional challenges that may hinder a firm's IT transformation process and growth.

The good news is, due to the rise of cloud computing and its immense impact in all parts of IT, a new VDI model called "in-house private cloud" was developed to provide all the benefits of cloud computing and overcome the challenges of traditional VDI.

CHAPTER ONE

Virtual Desktop Infrastructure

Organisations can choose between two VDI implementation options: hosted-cloud VDI by a third-party provider or on-premises VDI deployment with dedicated hardware housed in a data centre of choice. The decision of on-premises versus hosted cloud is often based on use cases and business needs. Within the scope of this white-paper, we will deliver into the on-premises VDI model.



On-premises VDI

At its simplest, VDI is a desktop virtualisation technique that refers to the creation and management of a virtual compute system, known as virtual machines (VMs) on a centralised server. A VM is a software-based computer functioning as a traditional physical computer. Each VM is completely independent of one another.

In contrast with traditional IT infrastructures where physical and portable personal devices are utilised to access computing resources, VDI makes application and desktop an on-demand service, anywhere, and anytime. The data centre hosts the virtual machines and desktop workloads while end users access these resources and corporate files remotely via a variety of endpoint devices, including PCs, laptops, tablets and smartphones. This desktop virtualisation technology therefore provides businesses with greater flexibility and improves productivity.

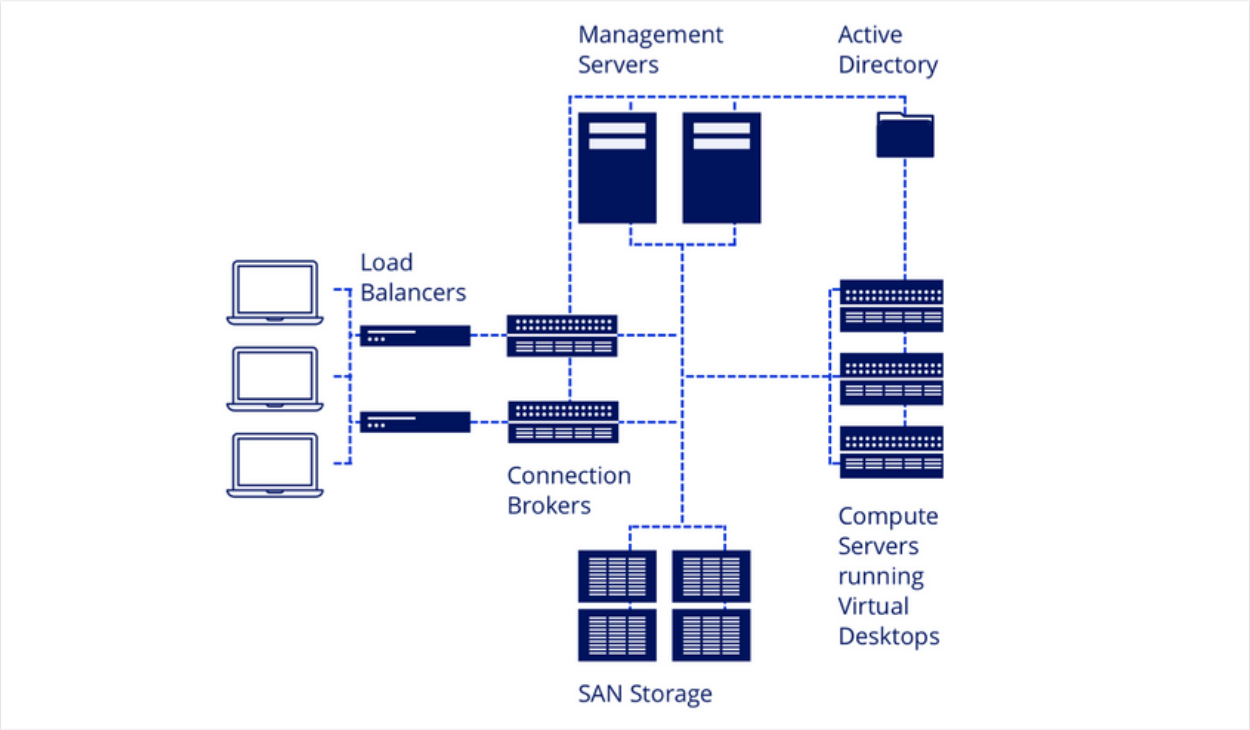


Figure 1: Traditional On-premises VDI – Architecture

DECISION FACTORS

For larger organisations, on-premises VDI remains a vital approach because it offers greater security and controls over organisational standards. However, VDI implementation is only effective when an organisation considers the right decision factors and appropriately weighs the benefits over trade-offs.

1. Support large teams or high-volume departments of 25 or more employees
2. Manage widely fluctuating head counts, for instance due to seasonal employment or time-based projects
3. Support mobile workforces
4. Enable Bring-Your-Own-Device (BYOD) policies
5. Support external collaboration with third-party contractors
6. Manage user access to multiple environments, such as training and production
7. Secure sensitive or confidential data and comply with strict data regulations or standards

Table 1: Decision Factors for On-premises VDI implementation

BENEFITS

Simplified IT management

It enables organisations to streamline management by consolidating and centralising all the virtual desktops or computing resources in one place - operating system and application updates are handled once, at the centralised server level that results in operational efficiency.

Cost-savings

The majority of the savings comes from the management of the system and the productivity of users. IT management and support are streamlined and centralised resulting in faster and more cost-effective service with fewer IT personnel. VDI also saves on energy costs, especially if more employees are able to switch to remote offices.

Greater Control

IT departments can control user access to specific applications. They can also better control the installation and update of application versions for end-users.

Accessibility

It provides end-user mobility and the freedom to access virtual desktops and their professional software or project files anytime, from anywhere, on any device. This is advantageous for companies that support BYOD. No matter which device is used, the user experience is the same.

Enhanced Flexibility

Businesses can become more agile with VDI, as it provides ease of rolling out resources without manual configuration. There is no need for a dedicated IT department to handle this process. Virtual desktops can be provisioned mostly instantaneously for any projects and any user profile.

Data Security

Data security is always a crucial concern for almost any large or highly regulated organisation. With VDI, confidential or sensitive data will reside on-premises with high-level redundancy or regular backups. This centralisation makes it more protected and secure.

TRADE-OFFS

Implementation Complexity

Many VDI pilots fail before a larger roll out, because it demands specialised skills and technology knowledge for a proper implementation. In addition to the technical complexities, it requires careful examination of the licensing requirements of operating systems.

3D capacity and endpoint performance

Standard or low-end virtual desktops will reduce productivity for work that demands high-compute or graphic-intensive performance. This puts a strain on a traditional CPU-powered VDI solution that does not benefit end users with high-end needs. Companies will need to know how to implement both hardware and software that specifically work with advanced GPU-accelerated computing technology and specialised protocols. This can add extra complexity to the implementation of VDI.

Inflexibility

To scale up a VDI solution, the server and networking infrastructure must scale up accordingly. Given that end-point devices often lacking computing performance, the VMs must be scaled up to compensate with more computing resources. Growing these components can be expensive and time-consuming to implement, as it requires highly-skilled professionals and business-wide downtime to execute.

Capital intensive

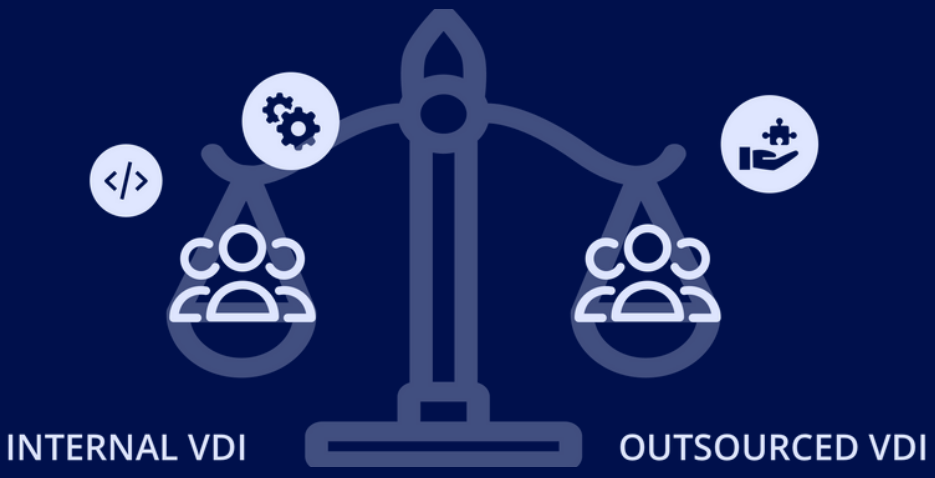
On-premises VDI is cost-intensive because it requires upfront hardware procurement as well as investment in trained and certified IT staff. The IT departments will face with setting up, installing, and configuring desktop PCs, along with managing upgrade and maintenance needs, largely accounts for the move to virtualisation. These tasks can take up valuable time that the IT department could invest elsewhere.

CHAPTER TWO

The Traditional Approach

The traditional approach refers to the strategy that an organisation takes to implement an on-premises VDI infrastructure. Because of the complexity and technical risks highlighted above, on-premises VDI requires a careful selection of the right business strategy. The common and traditional practices include insourcing IT staff or outsourcing to an IT consulting firm.

With internal VDI, the IT department takes on the project from A to Z: from direct hardware purchase to the deployment of virtual desktops. With outsourcing on the other hand, companies can decide on their own projects given their current situation. This chapter will explore the business aspect of traditional practices with an in-depth analysis of the outsourced VDI strategy with IT consultancies.



Business Strategy

Internal VDI benefits organisations in terms of control, ownership and customisation by keeping IT operations and processes on-site. However, the outsourcing model is often applied to obtain tech resources that are only required occasionally. There is no one-size-fits-all. An organisation may need to outsource at least a subset of its VDI services that have very specialised platform or support requirements. Ultimately the decision depends on several factors:

DECISION FACTORS

1. The availability of IT personnel and expertise in-house
2. Concerns about control and data security
3. Guaranteed performance or successful implementation
4. Cost and time frame

Table 2: Decision Factors for Business Strategy

While using internal resources is ideal for businesses without tight budget and deployment schedules, outsourced VDI can add value especially if there is a lack of in-house IT resources.

Outsourced VDI with IT Consultancies

An IT consulting firm is a professional service firm that provides expert advice and services for a fee. These consulting firms may have one consultant or thousands. They may consult in broad range of IT domains or as specific as VDI. Consulting projects are often done in teams and in phrases, typically a strategy advisory team followed by an implementation team.

The services for VDI typically include assistance with hardware and software procurement, architecture design, infrastructure implementation, solutions integration, health checks and network optimisation. Depending on the level of knowledge and expertise requirements of a VDI project, consultancies deliver these services often by leveraging their in-house specialists or outsource some tasks to other specialised firms in their network to present their clients a complete package.

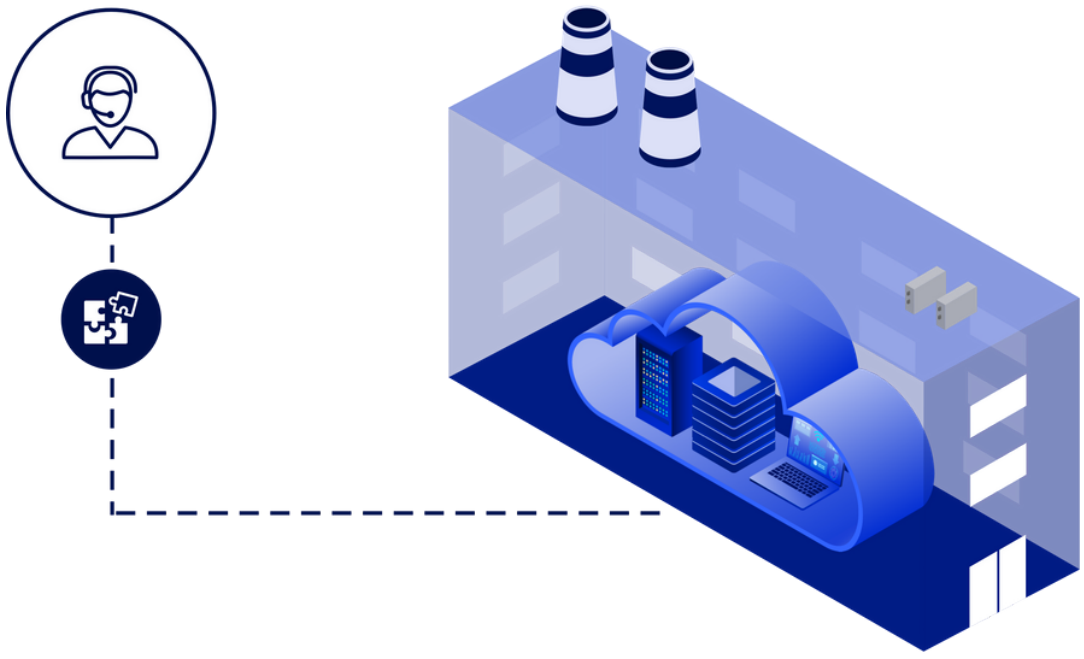


Figure 2: Outsourced VDI with IT Consultancies

BENEFITS

Fill Resource Gaps

In large businesses, IT staff are usually busy with the maintenance of the current systems. They can be IT generalists or hired by a specific technology function: desktop PCs, network, servers, storage or virtual servers. Adding a new complex IT environment or technology such as VDI often require the blending of these skill sets, specialised expertise and manpower to design and implement it.

Consultancies provide extra capacity and knowledge transfer to help companies handle their VDI projects for a limited timeframe or until the new infrastructure is fully integrated.

Obtain Specialised Expertise

Consultancies have specialists with hands-on experiences and capabilities that companies do not have internally. For example, consultants are skilled in researching and uncovering solutions. Even with uncommon requirements, they are experienced enough to know where to find the answer or ask the right referral. Internal IT staff may face a steep learning curve. The experience level obtained from consultancies is, therefore, highly valued when it can speed up the deployment time frame.

Increase Success Rates

VDI involves many technologies that require knowledge, trainings and expertise to successfully master and deploy it. Thus, VDI failure rates can be quite high for internally developed implementations. Consultancies study their successful clients or past failures to help new clients achieve success in their VDI projects instead of dealing with all their first-time mistakes.

TRADE-OFFS

Change Orders

In an IT market with a shrinking talent pool, it can be tough to find in-house experts who know VDI in and out. Companies end up needing to out-source most the work to expensive and specialised consultants for weeks or months just to get a proof of concept together, let alone making the change to actual production. Consultancy costs can also add up quickly because every minor change in requirement or every small effort made comes at a price.

Not Sustainable

Many VDI consultancy projects are drafted at a single point in time and designed to fit with the current business climate or goals and do not take into account what their clients' future needs will be. When a new business application will be demanded, future applications or hardware purchases should be reflected in the initial rollout and need to be mitigated by some cost safety measures. Companies often overlook the switching cost associated with external consultants: the re-engineering or integration necessary to account for potential change.

Third-party Risk

Consultancies may have a host of new capabilities by bringing in a diverse set of vendors to a complex VDI project. For example, companies may need new technologies to enable AI or graphical acceleration. However, the more IT vendors involved, the more precautions and controls are required to mitigate delays or issues. Information security, provider sustainability, as well as geographic and socio-economic factors can impact a consultancy's ability to maintain reliable service. Thus, it is better to opt for a complete solution rather than a pool of many consultancy projects.

CHAPTER THREE

The Cloud-based Approach

As the global business landscape is increasingly digitalised, organisations must adapt their IT infrastructures to the changing business requirements and digital service priorities. The VDI infrastructure thus needs to become agile, powerful, scalable and simple to manage.

The cloud or cloud computing has reshaped how we think about virtualisation and paved the way for the development of cloud-based alternatives. As a modern business strategy towards VDI implementations, this chapter will explain the cloud computing concept with a focus on the new deployment model: in-house private cloud.

Cloud Computing

Cloud computing is the on-demand delivery of IT resources to many users over the Internet. These include data storage, computing power and even virtual desktops. Instead of buying, owning and maintaining physical data centres and servers, these technology services are provided on an as-needed basis from a public or private cloud provider. The difference between a public cloud and a private cloud is in the level of privacy. “Private cloud” refers to the private compute environment, dedicated to one organisation. It therefore provides a higher level of control or privacy than a public cloud.

Cloud-based VDI alternatives include cloud-hosted VDI (Desktop-as-a-Service) and in-house private cloud. In the Desktop-as-a-Service (DaaS) model, a public or private cloud service provider (CSP) provides virtual desktops from its data centre and is responsible for all the maintenance.

While this service might be appealing in financial terms - because it eliminates the need for having to own, set up and maintain an internal infrastructure necessary for virtualisation needs, it does not satisfy organisations that want to take all the advantages of cloud computing and maintain control over their virtual desktop environment and security. In-house private cloud, in contrast, is a new deployment model developed as an alternative to traditional VDI by bringing all the benefits of DaaS or the cloud in-house.

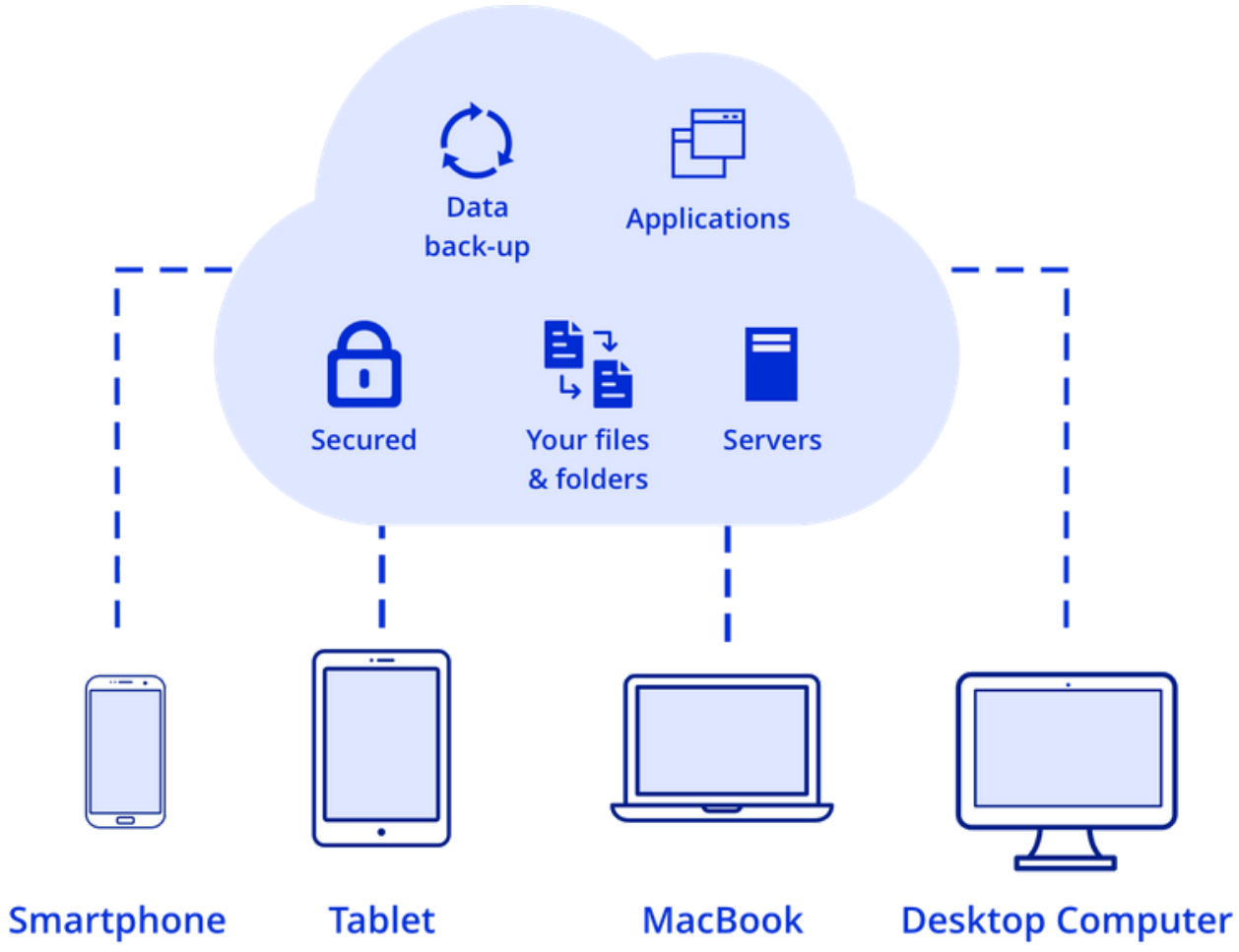


Figure 3: Cloud Computing – Architecture

Private GPU Cloud

Even though the cloud was born as a resource-sharing service, it does not mean that it is restricted only to an external deployment model. Instead, it is possible to use the cloud internally. For example, an organisation can have the requirements to house its own equipment and have the ability to deploy digital services quickly by using an externally developed end-to-end solution in their own environment.

As organisations are increasingly moving towards third-party VDI solutions built in the cloud, for the flexibility and access to cutting-edge technology that they provide, an in-house private cloud can be the best of both worlds. In this new approach, a cloud service provider delivers a range of different cloud services (cloud workstations, cloud rendering, Artificial Intelligence, etc.) on the customer's premises and on the customer's network. The costing model includes a one-time cost of the hardware and the installation. Afterwards, clients only need to pay for a virtual desktop per month. The monthly expense covers the operational aspect in which the cloud provider manages all back-end resources, such as desktop storage, compute, networking and the virtual machines that run the desktop operating systems.

This approach is really about simplicity for both IT and the user. Companies do not need a team of expert staff to make it work and users just need a web browser to access their virtual desktops. It allows companies to employ VDI and enjoy all of its advantages while overcoming all of its associated technical hurdles.

THE PACKAGE

With this delivery approach, the private cloud provider will deliver the following:

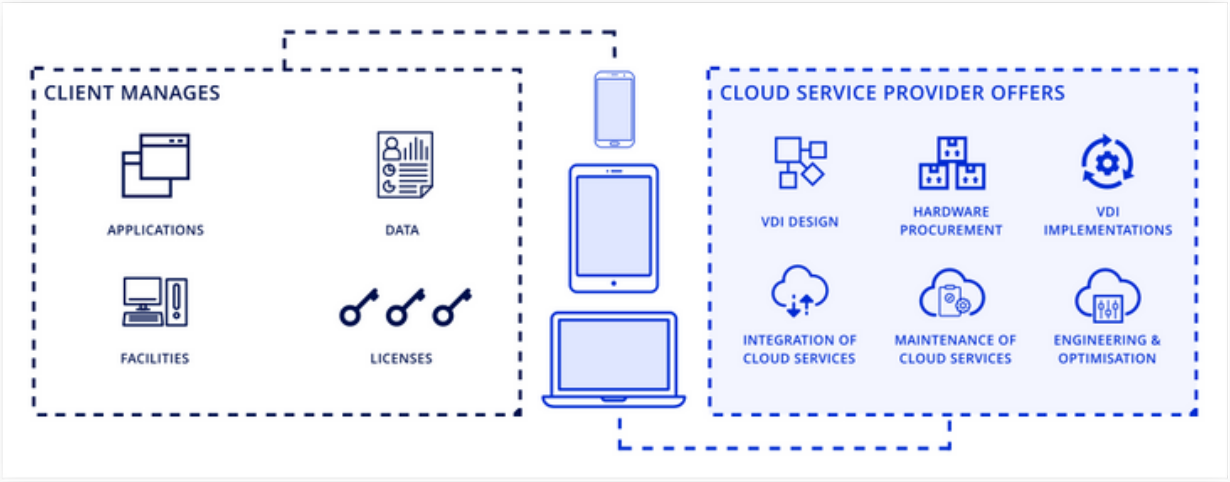


Figure 4: Private GPU Cloud – Service Package

All cloud services provided in the client's environment is managed through a Service-level agreement (SLA). It is a commitment between a service provider and a client on particular aspects of the service: quality, availability, responsibilities.

THE VALUES

Exceptional User Experience

User experience is primarily driven by latency, processing power, and storage performance. A low latency on-premises VDI approach can be combined with an optimised architecture to provide an exceptional user experience.

Private cloud providers are specialised in desktop virtualisation and have to constantly optimise their own cloud environments. This experience allows them to better apply their knowledge to an in-house private cloud deployment.

Supporting High-End Graphics Needs

With the right cloud solution or technology, organisations can harness the power of multiple GPUs to address the needs for more computing power. By adding a virtual GPU layer to your VDI infrastructure, companies can deliver superior performance of graphics-intensive applications to support their customers, clients, and staff from anywhere. To enable a GPU-accelerated VDI environment, it requires the use of both hardware and software that specifically work with the technology.

Private cloud providers usually offer a package of both to ensure a powerful virtual environment.

Reduced Costs

In-house private cloud can substantially reduce the costs for directly purchasing the systems and software to install VDI and then manage internally. There is no need to hire expensive internal staff or external consultants with specialised skills in the deployment, ongoing management and support of an in-house VDI.

Clients can avoid the escalated or unexpected engineering costs when changes are required or when desktop issues arise, because in-house private cloud offers predictable monthly operational costs.

Speed in IT Transformation

Compared with traditional deployment approaches, IT specialists have to develop everything from scratch. Testing in a full production capacity can also be difficult. Thus, projects take a long time to get going.

In-house private cloud can greatly reduce the time it takes to implement VDI and speed up your IT transformation. Cloud service providers have their own proprietary end-to-end solutions. Their technologies are proven and ready to be tested in their own infrastructure and deployed in another data centre anytime.

Customisation

Even though cloud services are managed by a third-party enterprise, it provides all the flexibility for customising the environment with different cloud services and the virtual desktops with user specific applications and security settings.

Greater Security

As the internal cloud infrastructure and VMs are joined to the client's domain, the client's security controls and policies are inherited by the installed cloud system. Moreover, the desktop data is instantly secured. All user data resides in the client's data centre or on premises and is isolated between departments, teams, or projects with access rights authorised by the company.

CHAPTER FOUR

VoltCloud's Private GPU Cloud

VoltCloud is a pioneer in delivering GPU-powered cloud services, such as heavy-duty cloud workstations, application streaming and Kubernetes for Artificial Intelligence.

We help companies modernise their work environment and IT operating models, through our cloud-enabled platform and deployment methods. As cloud adoption is the backbone of digital innovation, we offer Private GPU Cloud - an in-house private cloud service that surpasses traditional VDI options.

Why VoltCloud?

Voltcloud specialises in GPU-accelerated VDI and offers hosted cloud services from two hosted data centre locations (India, Europe and North America). Product flagships include heavy-duty Cloud Workstations (Desktop-as-a-Service) and App-streaming (Application-as-a-Service) from one single and unified platform.

Private GPU Cloud by VoltCloud brings its cutting-edge GPU-powered technology, cloud optimisation expertise and hardware flexibility in an on-premises package for high computing needs. Organisations will benefit from guaranteed performance, exceptional user experience, cost optimisation, speed in IT transformation and greater security.

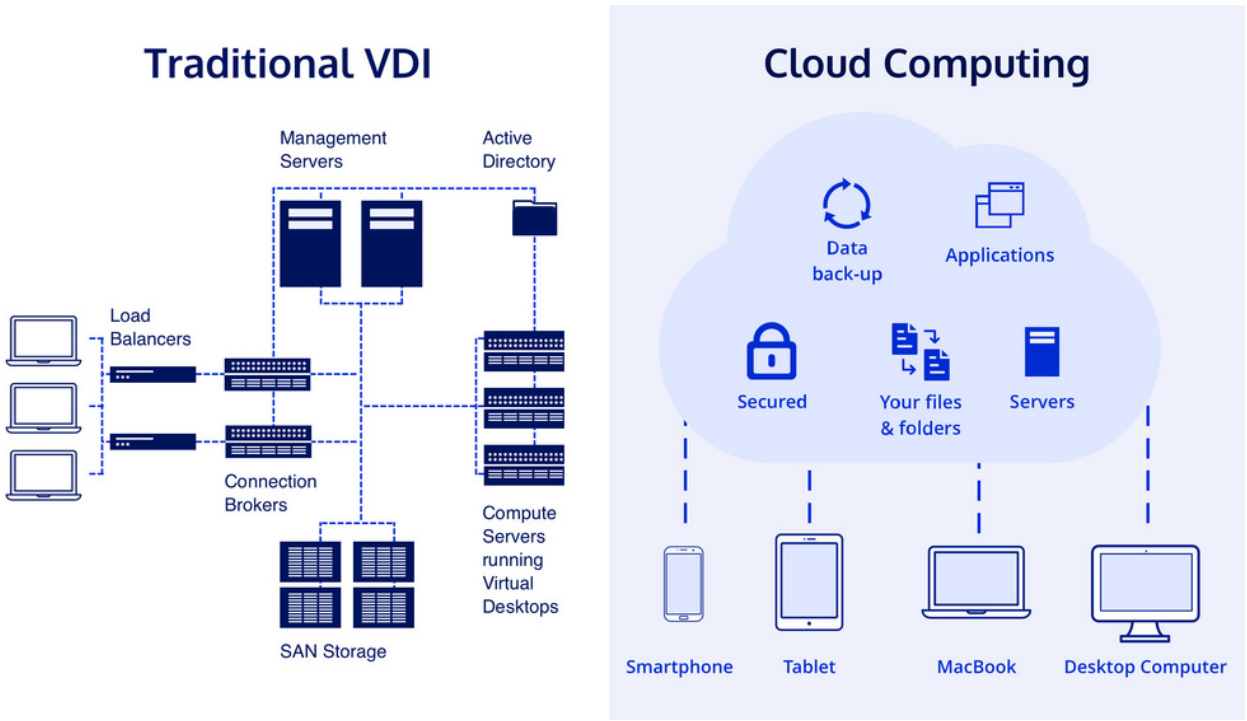


Figure 5: Traditional On-premises VDI Vs. Cloud Computing – Architecture

THE VALUES

Proven Technologies

VoltCloud's hosted cloud services are market proven with an expanding customer base in India, North America and Europe. Our technologies are unique and proprietary. They were developed to cater the special needs for a high-end cloud. We support users with growing demand for GPU power – accessible anywhere and on any device.

No Hidden Costs

Unlike the traditional approach, deploying an in-house private cloud with VoltCloud means transparency and no surprises. We offer a competitive hardware deal and an on-going support of our cloud services in your internal environment. Change orders and escalating engineering costs simply do not exist.

Multiple Digital Services Enabled

VoltCloud aims to support not just one but multiple digital initiatives with your VDI rollout. You can have a digital office, a real-time collaboration environment or an application streaming delivery solution for your products. Any of these cloud services can be deployed from a single and unified platform. You can reduce the extra resources needed for reconfiguration or reengineering every time a new business application is demanded.

Easy IT Management

VoltCloud's mission is to make cloud simple, clear and easy-to-use for both end users and administrators. Private GPU Cloud has a straightforward Admin Portal. It is the mission control of Private GPU Cloud for your organisation. From it, you can easily manage users and their access rights. You can create blueprints for different roles or teams in the organisation and deploy the blueprints with pre-installed software as needed.

Better Security

Private GPU Cloud gives organisation better security and overall control over the physical infrastructure. Internal users and trusted external partners can all have access to the GPU-enabled resources. Moreover, by applying the multi-factor authentication method, all traffic can be encoded and secured on the VoltCloud 's platform.

Cloud Optimisation

VoltCloud is specialised in desktop virtualisation for 3D and graphics-intensive workloads. We have in-depth knowledge and expertise in building an optimised cloud for heavy-duty software, such as demanding CAD, CAM, VFX or any specialised virtualisation needs.

Scalability

VoltCloud developed automations at the infrastructure level to support quick installations of new hardware. This overcomes the inflexibility of a traditional VDI solution when it comes to scaling the server and networking infrastructure to accommodate changing demands. VoltCloud can reduce business-wide downtime to execute infrastructure changes.

THE COMPARISON

To illustrate how this new in-house private cloud approach can provide greater value than the traditional VDI deployment options, the table below shows a comparison between traditional deployment options and VoltCloud's Private GPU Cloud on key decision factors.

	VDI Approach		The Cloud-based Approach
	INTERNAL VDI	**OUTSOURCED VDI**	**VoltCloud's PRIVATE GPU CLOUD**
Speed of Deployment	SLOW	SLOW	**FASTER**
Engineering Cost	**PREDICTABLE**	FLUCTUATING	**PREDICTABLE**
Graphics Accelerators	DIFFICULT	EXTERNAL IT DEPENDABLE	**EASY**
Ready-to-use Platform	NO	NO	**YES**
Testing	DIFFICULT	DIFFICULT	**STRAIGHTFORWARD**
End-user Experience	VARIES	VARIES	**POSITIVE**
Performance	INTERNAL IT DEPENDABLE	EXTERNAL IT DEPENDABLE	**GUARANTEED**
Specialised Skills Required	YES	**NO**	**NO**
IT Operational Impact	VERY HIGH	**MODERATE**	**MODERATE**
Manageability	LESS	LESS	**BETTER**
Infrastructure Flexibility for Multiple Digital Services	LOW	VARIES	**HIGH**

Table 3: Comparison between the Traditional VDI Approach and the Cloud-based Approach

Learn more about our on-premises private cloud offering at
www.voltcloud.tech/private-gpu-cloud

www.voltcloud.tech

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