Why Choose Desktop as a Service (DaaS)?

A TCO Study

by

fordway

Introduction

Physical desktop computer infrastructures no longer make sense for the corporate world. Not only are these infrastructures expensive, insecure and maintenance-heavy, they also cannot effectively support the changing business IT landscape. The need to develop Windows 7 migration plans, an ever expanding virtual workforce, the growing popularity of mobile devices and tighter IT budgets all point to the need to review desktop strategies.

While virtual desktop infrastructure (VDI) seems like a promising alternative, in reality it can be costly and complex for many companies to implement. Why move the complexities and costs of managing physical desktops to another complex and expensive infrastructure? By moving virtual desktops to the cloud, companies realise all the promised benefits of virtual desktops - centralised management, improved data security and simplified deployment - without the high capital investment costs and management issues of an internally deployed and managed data centre.

This study compares the total cost of ownership (TCO) of physical PCs, virtual desktops and cloud-hosted desktops as a service (DaaS). Cloud-hosted desktops have many benefits in addition to TCO, as many organisations want the convenience of outsourcing this IT function, but these are not considered here. The numbers in this study are based upon list prices, when applicable, averages of industry standard solutions and/or published analyst numbers, including those from Gartner and IDC.

The tipping point for change

Desktop computing has become a major cost issue for IT departments. While it is essential for delivering must-have applications and services to end users, IT managers are increasingly concerned about the tremendous amount of time, complexity and cost inherent in managing and securing physical PCs. At the same time the increasingly technically aware user base is becoming increasingly frustrated because their computers lack the flexibility and capabilities that they have come to expect.

Businesses have been aware of these issues for years, but it is only now that the tipping point for change has arrived. The introduction of Windows 7, increased mobile access devices and tighter IT budgets have created the perfect storm for desktop computing change. Looking at each of these issues:

- **Migration to Windows 7**: With Microsoft dropping support for Windows XP in April 2014, most companies are looking at a Windows 7 refresh. According to IDC, nearly 90% of businesses plan to move forward with Windows 7 by end of 2012. However, many older PCs are not equipped to run Windows 7, which means that businesses need to purchase new desktops in order to migrate workers. Gartner estimates that many businesses will end up replacing about 25% of their PCs before the end of their lifecycle to accommodate Windows 7 migrations. Organisations that decide to upgrade existing computers instead of replacing them won't save much money because of the new parts and labour needed to upgrade memory, hard disks and/or video adapters.

- **Expanding mobile access:** IDC estimated that 1 billion workers would be mobile at least part of the time or remote from their firm's main location by the end of 2011. Mobile workers will be accessing business applications and services from a variety of devices, including increasingly popular iPads, Android-compatible tablets and smartphones. Companies need a way to enable anywhere, anytime access for their mobile workers.

- **Tighter IT budgets:** PCs can consume 7-10% of IT budgets, yet provide no competitive advantage. With continued economic constraints, businesses are keeping a closer rein on IT expenditures. Wholesale PC refreshments and Windows 7 upgrades are becoming progressively more difficult to justify with reduced budgets, and the cost of supporting an increasingly dispersed user base needs to be reduced.

Comparing desktop options

The goal of this study is to evaluate and compare several different desktop solutions on a per desktop cost basis. The categories for comparison are PCs, on premises VDI and DaaS.

PCs - standard desktop
This is the traditional manner in which organisations deploy desktops. Each user or workstation receives a physical desktop running a locally installed operating system and applications.

Enterprise managed VDI
With enterprise managed VDI, organisations build and maintain a VDI solution in their data centre. This requires them to manage desktop infrastructure, servers, storage and hypervisors, as well as the virtual desktop images and applications.
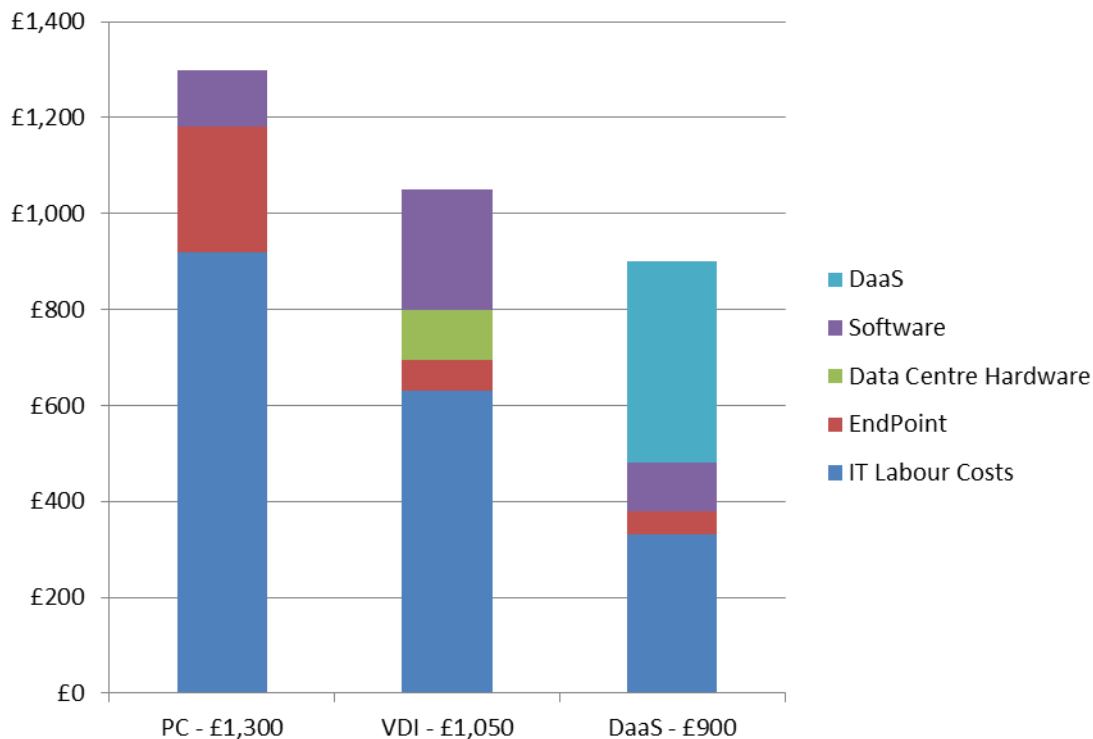
DaaS: cloud-hosted desktops
For organisations using cloud-hosted desktops, the virtual desktops and relating infrastructure are run as a service in the cloud. The organisation is responsible for managing the desktop image and applications, but is able to offload the cost and burden of the virtualised infrastructure to a third party service provider.

The table below compares the benefits of the three solutions.

Benefits of solution	PC	VDI	DaaS
Genuine, customisable windows client environments	☑	☑	☑
Centralised desktop management		☑	☑
Walk off data security		☑	☑
Simplified issue resolution and recovery		☑	☑
Simplified desktop deployment		☑	☑
No upfront CAPEX			☑
Pay as you go			☑
Instant use payback			☑
Leverage of critical mass architecture			☑
Easily expandable geographic coverage			☑
Reduction of complexity and risk			☑

The following graph summarises the annual costs by architecture approach for a standard Windows 7 desktop. The remaining sections of this article show how these costs are calculated in each category, enabling organisations to compare them with their own budgets.

There are several significant findings when comparing physical PCs to on premises VDI and DaaS in the cloud:

- Virtual desktops, and specifically cloud-hosted desktops, can deliver savings of more than 30% over average desktop PC costs

- Cloud-hosted desktops can deliver savings of 15% and upwards against on premises VDI

- The ability to offload end point costs, or simply extend the lifecycle of an existing PC, can deliver significant savings of up to £250 per year per desktop

- On premises VDI delivers savings in terms of IT labour costs and at the endpoint, but many of these savings are offset by significant data centre expenses, including servers, storage and labour costs

- The performance requirements of virtual desktops necessitate adoption of SAN storage systems, which add substantial costs (upwards of £60 per year) to the desktop cost.

Categorising desktop TCO

There are several key items that define the cost of a desktop, be it physical or virtual. The following is a breakdown of these categories by solution, with a TCO analysis for each category.

End point costs

The first category of hardware costs is the end point device; this is the device that enables the end user to access their desktop. For standard PCs there is a single choice: buy a new PC on the given refresh cycle. With VDI or DaaS solutions there is flexibility in terms of the end point device.
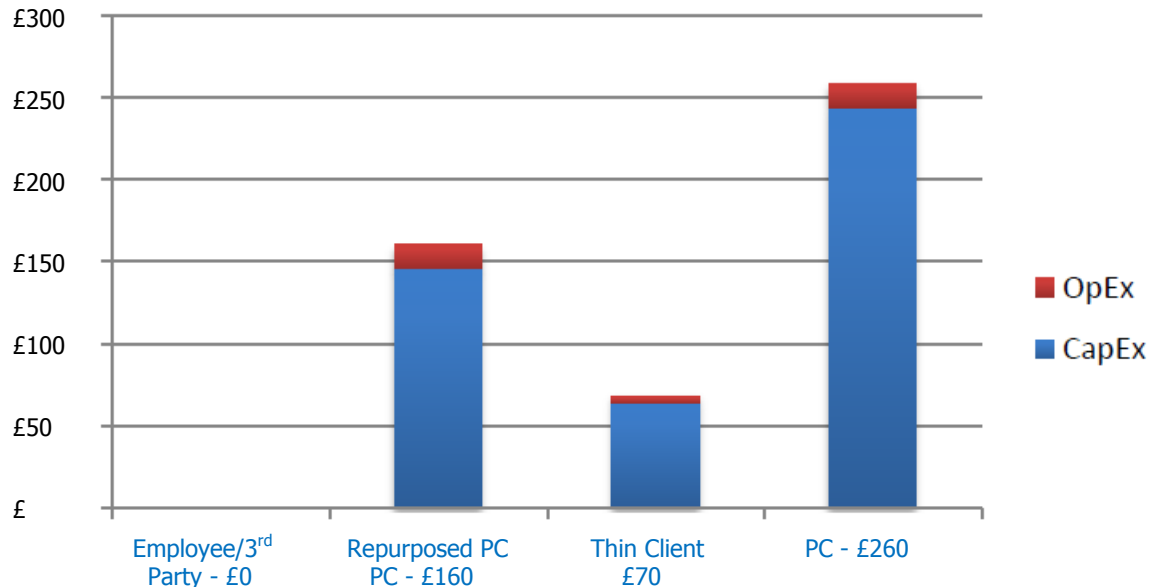
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PC:	This is a standard average corporate desktop PC with a basic monitor. Annual cost: £245 CapEx, £15 per year in power costs.
Employee/third party:	Since the desktop image can now be delivered through a web browser, there may be scenarios where there is no need to deliver a physical asset to end users. Annual cost: £0 per year in power costs as this is borne by the third party.
Repurposed PC:	Organisations can significantly extend the life of existing PCs, utilising the PC as a terminal, and no longer running the desktop OS locally. This is an attractive model for organisations that need to move off existing hardware but do not want the cost or headache of purchasing new PCs. Windows 7 is driving many PC refresh requirements. Annual cost: £145 CapEx, £15 per year in power costs.
Thin clients:	Thin clients are an attractive alternative to physical PCs as they have a significantly smaller power footprint, a longer lifecycle, and are easier to manage as a near stateless device. Annual cost: £64 CapEx, £5 per year in power costs.

Cost assumptions:

- Thin clients with monitor average cost of £450, amortised over 7 years
- PC average cost of £750, amortised over 3 years
- Repurposed PCs, average lifecycle extended to 5 years
- PC with monitor has an average power usage of 82 Watts
- Thin client with monitor has an average power usage of 25 Watts
- Each end point device has 2,000 hours of usage per year
- Electricity costs are 9 pence per KWh.

Data centre hardware

There are many areas of up front data centre hardware costs needed to run the infrastructure for VDI. These large up-front capital investments are impeding the adoption of VDI. The two primary cost areas are servers and storage.
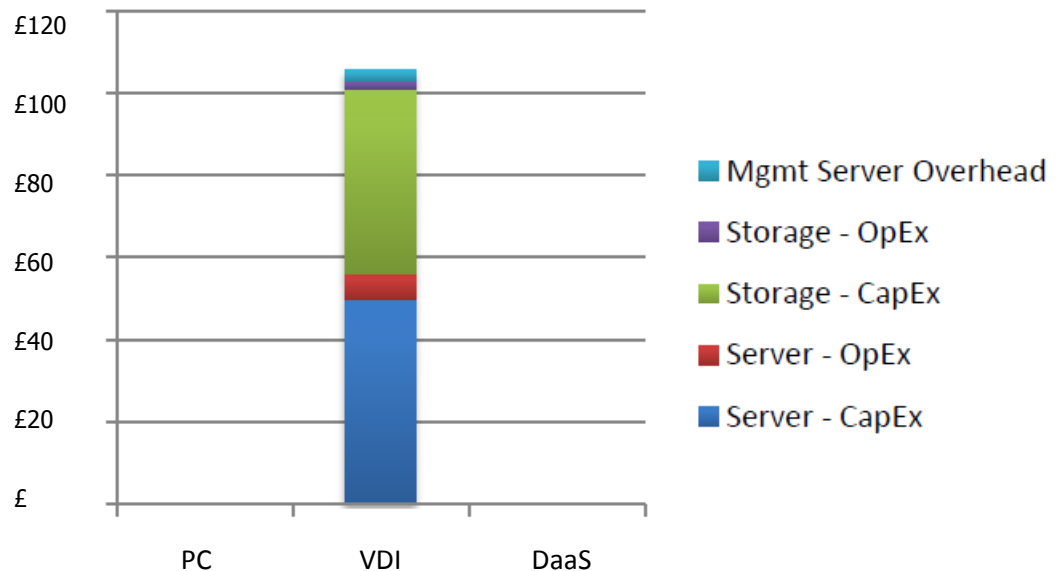
Servers

When deploying an internal VDI solution, there is the added cost of the servers needed to run virtual machines. When sizing the server for desktop density there are two important considerations: the number of virtual CPUs per core and the amount of RAM per virtual desktop.

vCPU per core: This is the number of logical virtual CPUs that will share a single core inside of a physical processor. This directly correlates to the processing power of a traditional desktop. For calculation purposes a ratio of 10 vCPUs per core was used. This assumes servers are leveraging Intel Neahlem Xeon or AMD Opteron processors.

RAM: This represented the memory provided in a normal desktop. In the case of this customer the RAM is not oversubscribed. Since we are assuming Windows 7 desktops, we have used 1.5GB of memory as the average number.

Annual cost: £50 per desktop CapEx, £6 per year in power costs.

Data centre cost assumptions:

- Floor space, cooling and racking is £50 per tile per year
- 50 desktop server, £7,500 including support and facilities, amortised over 3 years
- Server power consumption of 380 Watts
- 9 pence per KWh.

Storage

VDI solutions require storage for the virtual desktops. In planning the storage system there are two primary considerations; IOPS for performance and GB for disk space. Average IOPS inside a Windows 7 desktop can range from 4 to 50 IOPS per desktop. For the purposes of calculation 15 IOPS per desktop is used, as this is the average between a task worker and a power user. From a footprint perspective, 25GB was used as the average Windows 7 image. Given the performance requirements of virtual desktops, local disk inside the server is not a recommended option as it cannot deliver a sufficient number of IOPS.

The choice to use SAN or NAS storage depends upon the preference of an organisation based upon cost, performance and familiarity. To determine TCO we examine the cost of acquisition per GB, not the specific technology used. Mid-tier enterprise SAN or NAS can be bought for £7 per GB, including power and racking space (using the previously stated data centre assumptions).

Cost assumptions:

- Floor space, cooling and racking is £50 per tile per year
- Mid-tier NAS solution used as average
- £7 per GB, amortised over 3 years
- 25 GB desktop image, £135 total cost, £45 annual cost
- Power costs of £1.82 per 25GB annually.

Management server overhead

When deploying a VDI environment in-house, additional hardware overhead is needed to run the VDI platform. Most commercially available VDI platforms are .NET based software products and run on a Windows server. This overhead is for management servers and storage running the Windows Servers and the associated data store. The deployed infrastructure looks like a pair of Windows servers, for HA, plus a SQL Server repository. To determine average cost, the management overhead cost was amortized over three years and spread across 1,500 users, as that is a reasonable number to support with a pair of VDI servers acting as the connection broker.
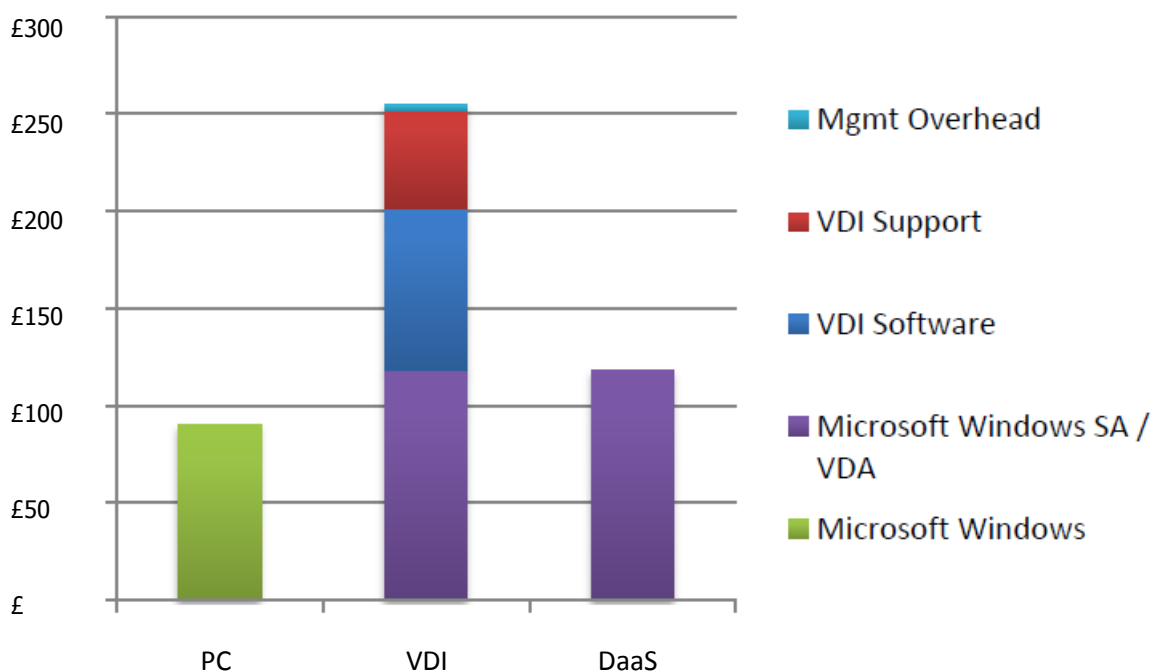
Cost assumptions:

- Management server to run Windows server £6200
- Power costs of £222 per year
- A pair of the above supports 1,500 desktops, resulting in a per desktop cost of £2.83 annually.

Software

Software costs account for a large percentage of any desktop solution. In any model the Windows desktop license is needed from Microsoft. Additionally, if a customer is to access their Windows license in a virtual machine, SA (Software Assurance) from Microsoft is also needed. If the virtual desktop is accessed from a non-Windows end point, then an additional Microsoft license, VDA, is needed. To deploy and manage a virtual desktop environment a connection broker or VDI platform is needed. These solutions range in cost but the industry average of £250 can be used.

The aforementioned VDI management software also requires a Windows Server to run on, as well as external relational databases for the data store. It is a best practice to run a pair of management servers, accounted for in the management overhead, and a single SQL data store.

Cost assumptions:

- Enterprise VDI software license £250, amortised over 3 years
- Support for VDI platform costs £50 annually
- Microsoft Windows 7 Enterprise license with SA is £90 per year average
- Microsoft Windows SA with VDA is £118 per year
- Microsoft Windows Server License is £1,029.

IT labour costs

IT labour is a large portion of the expense for standard desktops, and an area where virtual desktops deliver significant savings as the desktops are now a centralised and controlled resource. Once the desktop is running inside a virtual machine, it becomes easy to rebuild, reset and troubleshoot remotely. IT labour costs include the following areas:
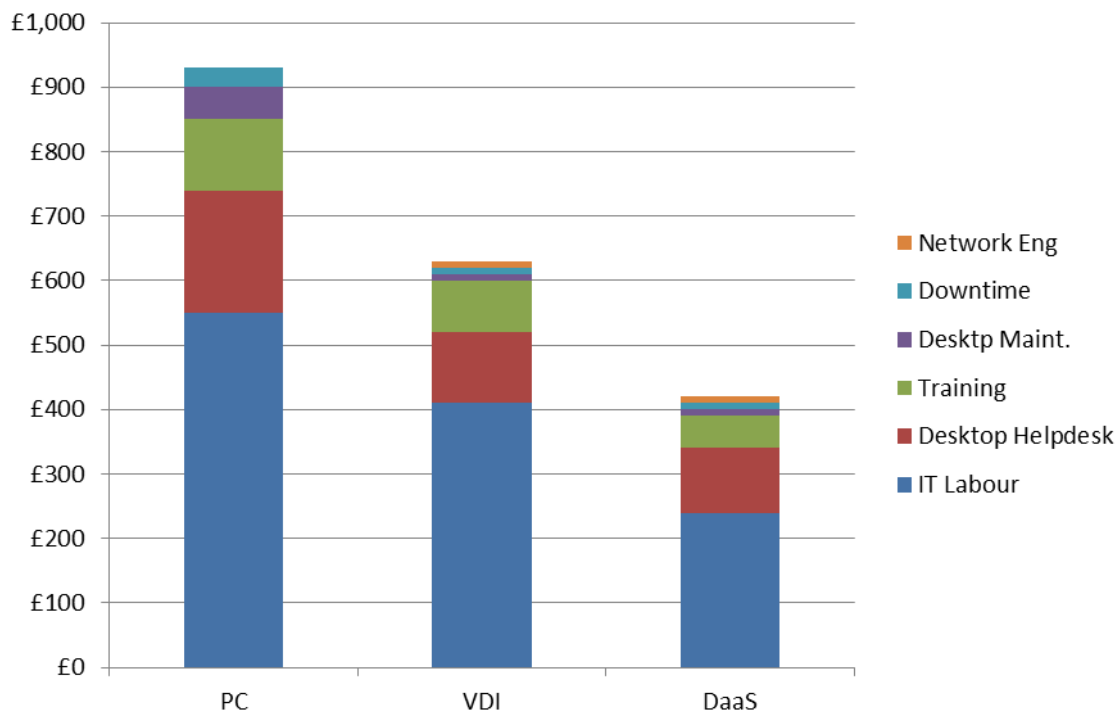
Helpdesk:	The helpdesk cost represents tier one and two desktop support and the first line of response. With virtual desktops this cost is significantly reduced as the user state is no longer associated with the physical device in front of the user.
Desktop maintenance:	Desktop maintenance is the cost associated with supporting and managing the physical device in front of the end user. With virtual desktops this cost significantly decreases, as the end point device is a dumb terminal, thin client or a third party device.
Training:	Training refers to cost associated with educating the end user on the solution, as well as chosen enterprise applications. Virtual desktops allow organisations to deliver training and updated content without requiring end users to be physically present.
IT labour:	This is a broad category that includes desktop engineering, image engineering, OS patching, maintaining and updating desktop related infrastructure. It also includes the overhead of the IT related functions: administration, finance and application delivery and maintenance.
Downtime:	Downtime refers to lost productivity of end users associated with an offline device. This is generally recognised as a major point but is hard to quantify. Virtual desktops deliver savings here as the desktop is now tied to an SLA.
Network engineering:	Virtual desktops create additional costs in the network engineering category. Virtual desktops, internally or as a service, are a network delivered service and organisations need to invest cycles to maintain and update the network.

Conclusion

The desktop market is ready for change. Windows 7 migrations, new flexible business models, the need to reduce desktop TCO and demand for mobile device support are driving organisations to reevaluate their desktop strategy. VDI was supposed to address many of these challenges; instead, it can create formidable new issues. Because of VDI's inherent complexity and large upfront CAPEX, virtual desktop adoption has stalled and is impossible for many organisations, especially those without large data centre capacity.

Cloud-hosted desktops as a service eliminate many barriers to adoption, delivering a complete desktop from the cloud, and providing all the benefits of VDI without any of the hassles. Businesses can eliminate the cost and complexity of deploying and managing desktops while providing the flexibility that users require. Cloud hosted desktops require no upfront infrastructure investments and, by transforming desktops from the CAPEX outlay inherent in onsite VDI and physical PC refreshes, businesses benefit from a predictable, easy to budget OPEX-based desktop environment.

Fordway DaaS

Fordway provides Desktop as a Service (DaaS) with hosted virtual Windows desktops customised to each client. The service provides all elements of the infrastructure and desktop streaming service required to allow the client access to their desktop from anywhere. It uses Quest vWorkspace plus Quest's EOP Xtream protocol to remotely deliver high definition video and audio over WAN connections to any client device, including Windows and Linux PCs, Apple Mac, iPad and iPhone, Android phones and tablets and Windows Smartphones. If required Fordway can also supply Windows terminals plus screens and keyboards as part of the service.

The Fordway Desktop as a Service is offered in two variants:

- Shared, where all users from the client organisation are provided with a common standard desktop with limited user personalisation
- Personal, where each user has their own individual personalised desktop.

User authentication is carried out using Active Directory with optional two factor user authentication available at additional cost; we can either extend the client's existing Active Directory or create a new one for the service provision. If we create it we can customise the standard Active Directory policies to suit and enforce the client's existing operational and IT security policy.

Fordway's Desktop as a Service is delivered from UK located TIA Tier 3 data centres, with all data hosted within the UK. Each hosted desktop includes 50GB file share per user, cumulative between all users from the same client organisation on the service. All data hosted on Fordway's DaaS is snapshotted every 2 hours and replicated to a second datacentre, with all data changes separately backed up daily. Additional servers required to deliver other applications in the client DaaS environment can be hosted within Fordway's Infrastructure as a Service (IaaS) server instances and deployed to the desktops. Organisations taking both Fordway's DaaS and IaaS services can take advantage of a 25% reduction in the cost for Fordway IaaS server instances. Additional storage space is available at additional cost.

For DaaS initiation and migration from an organisation's current desktop environment, Fordway offers an application packaging and deployment service which packages and delivers existing client applications inside the service. We also provide data migration services to ensure all relevant user data is migrated onto the DaaS infrastructure and made available to the organisation's user community on service initiation.

Fordway DaaS is offered with an SLA of 99.5% or better uptime during core hours, 6.00am to 8.00pm daily. Outside these hours 99.2% availability is guaranteed. 24 x 7 telephone and web support are provided as standard for the core DaaS Service. End user and application support for specialist applications delivered from Fordway IaaS or other remains the client's responsibility unless a separate agreement is taken out to cover this with Fordway's Service Desk. Clients have access to service availability information for service availability for their combined instances.