Eating the Cloud-Based Solutions Elephant

How Virtual Desktop Infrastructure (VDI) and Data as a Service (DaaS) can change your business...or not

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Much has been written about the promises and benefits of cloud-based solutions. In particular, two cloud-based solutions, Virtual Desktop Infrastructure (VDI) and Data as a Service (DaaS) have drawn much attention… and many ill-timed predictions about their explosive growth and dominance in the IT infrastructure world.

This writing will attempt to clarify the definitions of these cloud technologies, explore issues surrounding these technologies, and probe the considerations to determine if these solutions hold potential in your enterprise.

With more technology available than most of us can care to consume, diving into the subject of several cloud solutions can seem a bit like eating an elephant. When asked how eating an elephant is accomplished, the logical answer is of course, "one bite at a time." So lets' use this methodology to explore VDI and DaaS. Lets start by defining what these solutions are and what the expected benefits are before we go deeper into discussions about their uses and business fit. Bon appetite!

Step One - Find the Elephant

Before we begin any in-depth understanding, let's identify exactly what we are talking about and level set what these two cloud technologies are, and what their reported benefits might be.

Virtual desktop Infrastructure (VDI) is a desktop-centric service that hosts users desktop environments on remote servers and/or blade PCs, (specialized personal computers) which are accessed over a network using a remote display protocol. A connection brokering service is used to connect users to their assigned desktop sessions. For users, this means they can access their desktop from any location, without being tied to a single client device. Since the resources are centralized, users moving between work locations can still access the same desktop environment with their applications and data. For IT administrators, this means a more centralized, efficient client environment that is easier to maintain and able to respond more quickly to the changing needs of both users and businesses.

A great deal has been written about why virtual desktops are the right answers for business and as a result of these obvious benefits, that this is the year for explosive deployment growth. A fair amount has also been written about how, despite increases in deployments, the explosion always seems to be just around the corner. Leading industry experts often provide an interesting perspective on this situation.

There is no doubt that virtual desktop technology is "hot" right now. The technology industry is tripping over itself to announce solutions, partnerships and innovative offerings. The analysts are making ever-increasing predictions about VDI technology scaling rapidly. Almost every organization out there when asked the question, "Are you looking into some sort of virtualization of the desktop?" will reply with a firm "Yes". Everyone is at least considering it, many are beginning to pilot it and some are even rolling it out to certain user groups. In

short, despite the missed predictions about when VDI will reach "escape velocity", there's not doubt it has successfully been launched. Common adoption is only a matter of time.

Data as a Service, or DaaS, is a cousin of software as a service --where software and associated data are centrally hosted on the cloud. Like all members of the "as a Service" (aaS) family, DaaS is based on the concept that the product, data in this case, can be provided on demand to the user regardless of geographic or organizational separation of the data provider and the data consumer. Additionally, the emergence of service-oriented architecture (SOA) has rendered the actual platform on which the data resides also irrelevant. This development has enabled the recent emergence of the relatively new concept of DaaS.

DaaS brings the notion that data quality can happen in a centralized place, cleansing and enriching data and offering it to different systems, applications or users, irrespective of where they were in the organization or on the network. As such, Data-as-a-Service solutions are reported to provide the several advantages over "traditional" data management models:

- *Agility* – Customers can move quickly due to the simplicity of the data access and the fact that they don't need extensive knowledge of the underlying data. If customers require a slightly different data structure or has location specific requirements, the implementation is easy because the changes are minimal.
- *Cost-effectiveness* – Providers can build the base with the data experts and outsource the presentation layer, which makes for very cost-effective user interfaces and makes change requests at the presentation layer much more feasible.
- *Data quality* – Access to the data is controlled through the data services, which tends to improve data quality, as there is a single point for updates. Once those services are tested thoroughly, they only need to be regression tested, if they remain unchanged for the next deployment.

For both these technologies, VDI and DaaS market acceptance and scaling seem to be taking a little bit longer than many have predicted and quite a few hoped. Some of the early predictions would have these technologies nearly "wall-to-wall" by now. But perhaps like eating an elephant, the task is harder to achieve than the recipe might first indicate.

So is there a problem? Does these technologies deliver less than predicted? Or is business just too slow to pick up on something obviously wonderful? The answer is complex and varies business by business, but there are some patterns emerging.

Goal/business Driver Complexity

Sometimes conversations on the potential benefits of virtual desktops with business or IT leaders can seem a bit like opening Pandora's Box. Once you start to challenge the previously accepted model of the physical PC for each user, the possibilities seem endless. A brief, and non-exhaustive, list of impacted areas includes:

- Security (e.g. no data on the end-point)
- Major upgrade risk and cost reduction (splits hardware and OS upgrade)
- Office space savings (enables hot-desking)
- Speed to open new offices (less kit in the office, e.g. thin clients and internet access)
- Business continuity (can be accessed from home or another office easily)

- Enables bring you own computing models (e.g. for third parties)
- Supports iPads or MacBook's for the Board
- Maintenance advantages (e.g. patches can be applied overnight)

While the benefits can be contemplated, evaluated and cost-factored to the point of "analysis paralysis". The issue with all this is that if a business works all of these through to their logical conclusion before doing anything, it could take years to react. So let's address a few items that could impede the process of evaluating VDI.

Technical Complexity

There are a number of flavors of virtualization out there in the desktop space and some lack of consistency about what to call them (have you seen the "desktop virtualization" vs. "virtual desktop infrastructure" discussions?). There are also a very large number of technical solutions all claiming to solve every issue you have ever heard of with the words "desktop" and "virtualization" in the title.

It is easy to see how businesses can become confused by many offerings and why it is difficult to compare these offerings. This often causes decision-making delays, but more importantly, it can mean that a bad experience with one technology or provider can lead to discounting of other viable technologies with similar nomenclature. Said another way, other providers or technologies that might inherently solve a problem run the risk of being discounted because they have the same word in the title.

Scale of Investment

Most of the solutions on the market today, require a fairly substantial up-front investment from the client. In many cases, it involves buying the server, networking and storage infrastructure to host the desktops and all the associated licenses as well as paying for a third party to put it all together and run a project to implement it. Depending on the size of the business, this cost can be considerable. As a result VDI solution decisions are ones enterprises want to consider carefully – often taking considerable time to weigh the options.

In summary then, when considering virtual desktops it is complex to work out what you are trying to achieve and complex to work out how to achieve it and then it is expensive to implement. No wonder the implementation "explosion" hasn't happened yet, despite lots of good reasons why it might be the right thing to do.

To expedite this process and inject experienced, third-party objectivity into the decision making process. Before reaching out to an objective, independent, technology guide or "project Sherpa" remember a few tips:

- Start with the simple use-cases with the best benefits (eat the elephant one bite at time).
- Focus your attention on a hosted solution if you can (to reduce up-front investment and so that you don't need to worry about the technical solution as long as it meets its SLAs) or
- Follow a proven, step-by-step deployment approach that delivers a positive business case at each step

In this first of a series of four articles we will pick-out some high points of what we think customers of a good VDI or DaaS service should expect.

VDI General Business Considerations

While every business has a unique combination of requirements there are numerous issues to consider and to keep in mind with most VDI projects. Here's a run-down of many of these considerations

Business Continuity

Virtual desktops should be accessible from almost any device connected securely over the Internet from any location (this isn't true of every technology, but it is rapidly getting there). Your people could work from home, a hotel or seamlessly from an alternative office. Their virtual desktop is device independent, so wherever they log-in from, they get the full desktop experience as if they were using a local PC, but without being tied-down.

Speed to Value

A DaaS provider will have a service up and running already, which should give you a fast-track to a proven design and possibly even spare capacity already built. This will enable you to get going very rapidly. Even if you want to host your VDI service in your own data center, using a proven architecture and build process will get you to results in record time and at very low risk.

Anytime, Anywhere, "Anydevice" Access

Virtual desktops should be accessible from almost any connected device securely over the Internet from any connected location (this isn't true of every single technology, but it is rapidly getting there). Supported devices include PCs, MacBooks, netbooks, thin clients, iPads and other tablets, iPhones and Android devices. The service requires a connection, but will operate well over 3G or Wi-Fi and uses less bandwidth than a locally installed application. Your local machine is operating as a remote control for a distant PC and data is not downloaded over your connection, improving speed and security.

Rapid, Low-Risk, Software Updates

Because the virtual PC is hosted in a data center rather than on a local device, it is always connected and is device independent. Therefore, even major upgrades can be done overnight without impact to the local hardware (e.g. thin client or BYO PC). If you are considering a Windows 7 upgrade, for example, you can provide your staff with a virtual desktop running the new operating system and they can initially access it from their existing hardware. You can then swap-out the hardware at your convenience or when it fails. In the meantime, they have a fallback mechanism because their old PC remains active on their desk.

Support BYO PCs Securely

The concept of bring your own (BYO) computing has been around for a while. There is always a challenge around securely supporting the corporate applications and networks on an unknown or wide variety of devices. A virtual desktop is ideal for this model, because the end-point-device does not need to be on a trusted network, it can access the virtual desktop securely over the Internet. Essentially, it is operating as a remote control for a PC in a secure data center, rather than having direct access. This makes it relatively easy to lock down the connection and keep viruses out and data in.

Capex/Opex Flexibility (buy or rent)

Look for a flexible financial model allowing you to either buy the hardware and licenses required to build a service, so that the asset belongs to you and you can write it off over a period (this is typically the model used for deployments in a client's own data center). Under this model, your DaaS provider should still be able to run

the service for you and sign up to an SLA. They might also offer a model in which you effectively rent capacity within their data centers (look for full network segregation and retaining control over security through your AD and firewall rules).

Flexibly Hosting in Your DC - or Theirs
Look for a flexible hosting model allowing the virtual desktop infrastructure to be hosted in your provider's data centers or your own. Clients choosing to host in their own DCs typically do so for the performance and connectivity advantages of having the virtual desktops running physically close to the applications that they are accessing (this typically provides an improvement on where they are today as physical PCs are rarely located in the data center). Clients choosing to host in a service provider's locations do so for the freedom to flex both volume and processing power up and down to suit their business needs (as the service provider can re-use extra capacity for other clients). Some clients even choose a mix such as 80% in their own DC and 20% in the provider's DC as a swing capacity that they may call on if they need it. Some also offer a disaster recovery capacity in their data centers, so that if our clients experience a data center level failure, they have the peace of mind of knowing that they can still get their virtual machines up and running quickly.

Flex Up or Down to Suit Your Business
Look for tremendous vendor flexibility (particularly when hosting in a DaaS provider's data centers) because they can re-use unwanted capacity for other clients. In a virtual world, compute power flexibility can present itself as either "a number of desktops" or as "the processing power, memory and storage associated with each desktop". Both are flexible, so you can increase or decrease your number of staff safe in the knowledge that your desktop capability and costs will scale smoothly. In addition, your DaaS provider might even monitor the actual usage of your various staff-groups to determine whether the individuals need more power and performance or whether there is over-capacity in the system, thus giving you the ability to dynamically control their performance experience (e.g. business is slow, save some money; sales team struggling to cope with demand, improve response times and thus their throughput).

Open or Close Offices Quickly
With a virtual desktop solution, the office networking and local devices are as simple and generic as possible; almost anything that is there will do. If you are starting from scratch, the technically simplest Internet connection (although perhaps two of them for resilience) and thin-client solution will do. It is cheap, fast and non-specialist. Regional offices and come and go quickly and cheaply without drama or excessive cost and delay.

Virtual Desktop Infrastructure Benefits

So far, we've broken down the process of eating the VDI elephant into several steps:

- We have defined several virtual desktop technologies and briefly outlined their benefits and
- We have addressed the high-level considerations of these technologies

In this section, we'll explore the benefits of VDI technology and provide detailed considerations in four key benefit areas.

Desktop as a Service (DaaS) based on Virtual Desktop Infrastructure (VDI) technology can, when implemented correctly and wrapped in the right commercial and service model, provide a different and better approach to traditional corporate desktops. The benefits to DaaS and VDI include:

- Data and network security
- Cost-effectiveness
- Environmentally green

While VDI might only be the right answer for a portion of your staff, but where it is a fit, it can add a great deal of value to the enterprise. Fore example, where an organization has a project starting up with multiple external parties, the challenge of granting these "external" teams access to specific parts of your corporate network can be a daunting one. In this specific example, providing external workers with a virtual desktop can be done much more quickly and cost-effectively than buying them all a laptop, configuring the devices, and protecting against external threats.

This same scenario can be extended to similar circumstances such as when an organization acquires another business and needs to provide the new staff access to corporate IT infrastructure as fast as possible -- even if access is from their existing network or remote location. With this last scenario in mind, a good DaaS provider can establish short-term arrangements, either hosted or in your data center, quickly and securely, with minimum hassle and cost to you.

VDI Benefits – Security

Critical to any enterprise, is the security of their network and data infrastructure. With a plethora of mobile computing devices requesting access to the corporate infrastructure – data and network security remain a key consideration to every organization.

In this section of our VDI discussion, we will address security issues that customers should consider with their VDI solution provider.

Data Security from Laptop Theft or Loss

Data remains securely inside your corporate network in the data center, inside your firewall rules and is not sent down to the "end-point device" which the end-user is touching (e.g. laptop, iPad or other tablet, MacBook etc). The only communication with the data center is keystrokes and mouse data in one direction and screen updates in the other and even these can be simply encrypted. So if someone loses a laptop while traveling, they may lose their personal information, if it is their personal machine, but they will not place your corporate data at risk.

Data Security from "Thumb Drive" Theft

It is relatively straightforward to lock-down a VDI service such that it simply does not map to any local drives and therefore when someone inserts a "thumb drive" or "memory stick" into the end-point device (e.g. PC or thin client), then only thing they have access to is the local machine which has no corporate data on it. The "PC" is now a virtual machine in the data center where it is safe from thumb-drives and the like.

IP Security in Third Party or Offshore Teams

With data and applications residing safely in the data center and third parties accessing locked-down desktops remotely, your IP can be managed much more securely than in a traditional PC environment. Add tools for "sniffing" data removal and key logging so that any suspected incidents can be easily followed up and you can have confidence in your IP security. Even an overseas third party can work on data while it remains locally in your data center and never leaves your national boundaries.

E-mail and Internet Lock Out

Typically, third parties will use their own hardware and possibly even their own network connections to access the service (if they are accessing from their offices, for example), so it is sometimes possible to take the concept of desktop lockdown a stage further than usual. Not only can you remove administrator access to a third party desktop (so they can no longer install their own applications) but you can also remove a web browser from the build and even email (these being on their own physical PC through their direct employer) leaving only the bare essential applications required to do the job. Without a local drive, administrator access, internet access or email, a third party handling sensitive data is restricted to using only the applications that you have provided for them. They can do their job, but that is all.

Secure Access from Insecure Networks

The remote protocol associated with a virtual desktop (RDP for example, although there are more sophisticated examples) takes keyboard and mouse inputs from the end-point device (e.g. PC, Mac, Thin client or Tablet) and returns screen updates. The end-point device (which could be the users own PC, iPad or MacBook) does not need to directly access the corporate network in order to connect to a virtual desktop on that network. The remote protocol provides a secure link or isolation layer between the two and prevents the infection of the corporate network by virus or other attack from the network local to the end-point. This has implications for travelers, home-workers, third parties working from their own offices, business continuity and even new corporate offices because it means that end-points no longer require either a corporate LAN or a Secure VPN and can therefore save costs, improve usability and increase security at the same time.

Support BYO Devices Securely

In the same way as virtual desktops keep the "PC" safely locked away in a data center with the remote protocol acting as a isolation layer so the end-point device can be on an insecure network (see above), so the device itself can be untrusted. This is a complicated way of saying that you can access your corporate desktop securely from any machine that happens to be handy. Want to bring you MacBook to work and be able to work on it? Want to allow third parties to work on their own machines? Want to allow the senior executives to use iPads (or Android devices or frankly anything else comes along)? You are in luck. As long as it has an Internet connection and a remote protocol (and they pretty much all do), it can be used to access your virtual desktop (this not true of all virtual desktop products all of the time, so be careful; for example, it took 18 months for Citrix to announce its support for the iPad).

Support for Two Factor Authentication

Many organizations already use two-factor authentication to require a user to remember their password and be in possession of a physical token (for example) before they gain access to the system. This capability becomes increasingly important when users can gain access from unknown devices and locations because someone could be watching them type their password either physically (by standing behind them) or electronically (using a key-logger, for example).

Support for Key Logging and Data Loss "Sniffing"

There are a range of technologies available targeted at protecting an organization's sensitive data and IP. Think about what sort of protection you need and whether it is compatible with the desktop virtualization or VDI technology you are considering. Most will work with a full VDI solution where each user has a dedicated VM, because most types of software will be agnostic under those circumstances as to whether it is running in a virtual environment or a physical PC. A couple of examples that we have seen are key logging and data loss "sniffing". Key logging simply records every key-stroke and button-press made by each user and enables an extremely accurate post-event evaluation of events and, if necessary, legal investigation. While it is not actively preventative, staff and third parties who know that they are being key-logged may be more inclined to behave. Data loss "sniffing" is software that is able to be "taught" what sort of data you consider sensitive (and easy example might be customer account numbers, because they are a very specific format) and it looks for such data leaving the network, raising alerts or logs as instructed.

PC Remains Inside the Corporate Network

A first sight, this seems a bit obvious given that the desktops are inside the data center, but it is worth drawing this out and thinking it through to see if there are any associated simplifications or security improvements that can be driven out from this configuration. A laptop is designed to connect to insecure networks, defend itself as best it can and then return to the host network, bringing virus risk with it. Virtual desktops never get exposed to an external network (or a thumb-drive etc as discussed above). This is an inherent benefit of the virtual desktop solution, as it will be more secure than a laptop as a result, but it could also lead to a rethink of virus protection for example (could you run virus scans at the server level rather than on each desktop?) or firewall protection (does each desktop require its own firewall?).

Secure from endpoint viruses

As discussed above under "Secure access from insecure networks" and "Support BYO devices securely" the remote protocol acts as an isolation layer so that anything undesirable on the access device, such as a virus, remains there and unable to travel back to the desktop. In a world where Stuxnet has been defined as the world's first weapon's grade virus and computer viruses are allegedly being created by governments as well as their enemies, this is an extremely key capability of a virtual desktop.

VDI Benefits – Cost Effectiveness

In this section we will identify what customers of a good VDI or DaaS service should expect in terms of cost effectiveness and how it can save you money.

Reduced "At Elbow" Support

With a virtual desktop, the end-user is typically either using a thin-client or their own machine, either under an employee Bring Your Own (BYO) scheme or because they are from a third-party using a third-party machine. The fact that a portion of your end-users that previously required a corporate PC are now using their own machines is a bit of a "no-brainer" when considering reduced at-elbow support (you will need to consider the HR and contractual implications of this change; these are typically simplified if it is optional). In addition, thin-clients are simpler devices than PCs; they lack spinning hard-discs and fans, which are among the most common components to fail in a PC. They are also un-personalized, so a user can sit down in front of any thin-client device it doesn't need to be the one they used the day before. Therefore, thin-clients tend to go wrong less often than PCs and when they do, a user can take another from the stationary cupboard and continue to work almost immediately. While this may have a modest impact in a single big office, the savings across multiple smaller regional locations can be substantial.

Reduced OS and Software Issues

PC hardware varies and hardware manufacturers like to differentiate their products with useful extra features. The problem is that these differences and features often reduce the stability of the platform. How many times have you closed the lid on a laptop to find that it is set-up to hibernate when you do so? How often does it cleanly recover from hibernation? In my experience, it is all too common for a laptop to fail to recover properly from sleep or hibernation and both the OS and the applications are left in a tangle. With a virtual desktop, the hardware is running in a controlled data-center environment and the OS and applications are isolated from the hardware by the hypervisor layer. The result is that the user experiences increased stability and reduced glitches, reboots and software issues.

Resilient Hardware

It has been standard practice for many years to build key data-center systems with resilient hardware so that even if there is an individual component failure, the system remains available. This allows for the replacement of the failed component while the system is still available, so that the resilience is maintained. This sort of architecture is not used for PCs, which typically have any number of components that would cause a system-down if they failed. You should expect virtual desktop infrastructure, whether being provided as a service or in-house, to be fully resilient giving three nines (99.9%) availability, which is substantially more than is achievable with a PC estate (I have seen claims of four nines; this can be done, but it is expensive and only necessary for specific cases). Although virtual desktops still require an endpoint device, thin clients are more reliable than PCs (see Reduced "at elbow" support).

Easier Routine Patches and Upgrades

Most corporate PCs have a standard start-up routine that includes checking that they are connected to the network and then immediately checking for emergency and other patches and scanning for viruses. If they are not connected, they will have to scan without the latest security patches and run without them until they are able to connect. Therefore, at any one time, a traditional PC estate will be in various states of patch, which can make emergency patching very challenging to manage. Virtual desktops need never be disconnected from the network or powered-down, so patches can be implemented and rolled-out consistently across the estate quickly at any time, day or night, and need not disrupt the users. In addition, depending on your technology choices, virtual desktops may offer tools for managing pools of desktops with standard "gold pattern" images that can save substantial time and effort.

Extend Life of Existing Desktop Hardware

The refresh of desktop hardware is rarely associated with it ceasing to function and much more commonly aligned with some sort of operating system upgrade (e.g. Windows 7 roll-out) or application upgrade as the old hardware struggles to cope with the demands of the new software. With a virtual desktop, the demands on the local hardware are greatly reduced and there is no need for it to be running the latest operating system; there are even tools available to effectively reduce an old PC to a thin-client, at least from a software perspective. Therefore, a new or upgraded virtual desktop solution can be rolled-out on existing hardware, extending its life. You should expect to be able to access your virtual desktops from very basic old machines and experience improved performance (especially if they are struggling today). One potential watch-point here is peripherals; the desktop hardware must be able to support the required peripherals (e.g. Video camera, microphone).

Reduced Power Consumption

A typical thin-client uses about 10% of the power of a PC as it lacks a spinning hard-disk or a fan as well as typically running less-powerful processors. This dramatically reduces power consumption in the office and will also reduce the need for air-conditioning as PCs produce a lot of heat as they consume all that power. Even when we take a rounded view and draw-in the data center power to the comparison, you should expect to see 70% savings. This is a little more contentious as it is dramatically affected by the density of desktops to servers and the level of storage de-duplication you are able to achieve, but assuming you have these well optimized, 70% is achievable.

Optimize Office Space (hot-desks and home working)

Office space optimization is a tough nut to crack and no single technical solution is going to make it "go away", as there are team-working dynamics, HR considerations and a whole raft of other people-related issues to consider. However, having a desktop solution that gives a seamless and personalized experience wherever you access it from is a very strong start. This gives the business the maximum flexibility to support hot-desking and home-working without having to worry about the technical infrastructure implications. Thin clients remain impersonalized, as the user's virtual desktop looks the same to them wherever they access it from, without them having to physically move a PC around. Because the virtual desktop remains permanently inside the corporate network, securely accessible via a remote protocol, the end-user can use an insecure network to access it, like home or a coffee shop. This remains secure as no data passes between the machines other than screen shots and key-strokes.

Simplified Office Networking

Many corporate office networks are relatively expensive to set up, particularly for smaller regional offices. It is cheaper, faster and easier to set up smaller, regional offices (or shops) with simple Internet connections. The components are more widely available and much cheaper as you can effectively use domestic equipment. The challenge is typically that sensitive customer data cannot be sent over the Internet and a traditional PC desktop model typically sends the data down to the PC either in a "client/server" application or simply via email. With a virtual desktop, sensitive customer data is retained centrally, the local devices are relatively dumb and the communication between the two can be easily locked-down and encrypted. The watch-point here is printing as, even with a virtual desktop, if you want to print locally, a spool file will still need to be sent to the local printer so you will need some mechanism for handling that securely.

PC Purchase Avoidance

PCs for third parties is one of the most obvious business-cases for VDI and is often the first (and sometimes the only) area to be implemented. Many corporations currently buy laptops for their third-parties as a mechanism for giving them secure and controlled access to the network and applications they need to do their job. The problem is that this is expensive and puts both the asset and your data/IP in the hands of individuals outside of your organization and possibly even outside of your geography. Sending them a link for a virtual desktop will be cheaper than buying them a laptop and both the asset and the data/IP remain securely inside your data center.

Lower Cost and Lower Risk Upgrades

Major operating system (OS) upgrades are often associated with hardware refresh because older portions of the desktop hardware estate are too slow and have too little memory to run the new OS and associated applications. This adds complexity and risk to the upgrade implementation project because it means a visit to every desk in every office at the moment of software upgrade. This, in turn, means long implementations with long periods of parallel running and substantially increased risk. A virtual desktop solution allows the new software to become accessible from the old hardware, so that the implementation can become as simple as receiving an email with your new log-in details. This also means that the old hardware and software remains in place as a fallback if there is a problem with the new solution or if there a small number of rarely used applications that have yet to be tested on the new platform. Once the estate is virtual, Future upgrades, are greatly simplified and remain distinct from hardware refresh cycles.

VDI Benefits – Environmentally Green

In this last section we'll explore details of an benefit area often overlooked – environmental friendliness. While this area may seem trial at first, it is important to recognize that the impact technologies have on our planet is already a prime consideration in some countries and in many US states. The environmental impact of any technology should be strongly considered and fortunately VDI also scores well in this area. Here a few environmental considerations that may positively influence your selection of VDI technologies in your enterprise.

Supports One Machine for Home and Work

Many people who use a PC regularly at work, also have one at home (in some cases more than one). This is hugely environmentally inefficient as the impact of making new equipment is substantial. The idea that an individual could use a single machine, keep their personal data and applications on it locally and use it as an access device when at work is a neat response to this device proliferation and is supported by virtual desktop technology. For example, an organization could run a "BYO" scheme in which employees bring their Macs or other personal laptops to work, connect them to a guest network and use them to access their virtual desktop for business. The device need not even be particularly powerful, even an iPad (depending on the type of users, they may want a Bluetooth keyboard) or Android device can fulfill this role. The net result is fewer end-point devices and potentially thinner end-point devices.

Enables Efficient (de-duplicated) Storage

In a typical corporate office packed with PCs, their hard-discs are storing 80% duplicated data. Think about that for a minute, the same data is being stored over and over again on hundreds of hard-drives, just so that it is locally available to each processor on request. This is hugely inefficient and results in much more storage, in aggregate, than is actually necessary. Much of this duplication is down to the Windows image and the local applications, but some also comes from file store as we email the same presentation out to twenty people or reply to an email chain twenty emails long (each one with another copy of the previous nineteen). With a virtual desktop configuration, all of that duplicated data is pulled together centrally and can be de-duplicated. Not only does this require a great deal less storage (which is therefore efficient) but it can be made to be very efficient by keeping information that is requested regularly in memory cache or solid state storage rather than spinning disc.

Enables Efficient Server-Level Virus Protection

Talking to a potential client recently, they were bemoaning their virtual desktop infrastructure because it is "unable to cope" with the daily virus scan. This problem is avoidable on two fronts; first, randomize the timing of the scan so that each desktop scans at a different time of the day, rather than all kicking off at once; second (and in many ways better approach) stop scanning at the desktop level and scan at the server level. This again is much more efficient as it is effectively scanning many desktops at once "in bulk". It uses less processing power and therefore less power, particularly when combined with the above point about reduplicated storage (because the storage only needs scanning once).

Enables Efficient Pooled Computing

The average PC isn't working very hard most of time, it is inherently inefficient because its processor and memory are dedicated to an individual, whose demands are very "peaky". When I log-in in the morning and open various applications, I want all the processing power I can get, because I am naturally impatient and I want to get going. But when I am writing a blog or making a phone-call, I am using little or no processing power and my machine is largely sitting idle (meanwhile, the person across the office from me is recalculating a large spreadsheet and needs all the processing power they can get). A compromise is made at the point of specifying the machine between cost and performance. This is a compromise that can be much more balanced in a virtual environment where compute resource is naturally pooled. When I am not using my resources, they are available to the person across the room. This means that it is possible to get better performance from less hardware, which in turn is both more efficient from the point of view of buying and powering the kit.

Avoids Third Parties PCs Purchase

In all my conversations with potential clients about virtual desktops, this one keeps coming up as a hot-button; "I want to stop buying laptops for my third parties. It just feels wrong". Well it is wrong, from an environmental point of view, because they already have PCs and it is a waste to be giving them new ones just so they can access your network securely. With a virtual desktop approach, third parties can access their virtual desktops from their own hardware. You will be happy avoiding the extra cost, they will be happy avoiding the need to carry two laptops and the planet will avoid the environmental cost of all that laptop manufacture.

Thin Clients Last Longer than PCs

One of the biggest environmental impacts of an electronic device is when it needs to be replaced with a new one. We are talking raw materials, manufacturing, packaging, distribution, and recycling of the old device. Thin-client devices are simpler than PCs and lacking moving parts, like fans and hard-drives, so physically last longer. Also, because the OS and applications are running in the data center, in. virtual desktop model, the local device remains independent of even the most major upgrade, a time when many fully functioning PCs are replaced.

Extends the Life of Existing PCs

As noted above, one of the biggest environmental impacts of an electronic device is when it needs to be replaced. With a virtual desktop, the hardware is abstracted from the system and application software, so that major software upgrades can be managed independently of the hardware. What this means in practice is that when you come to do your next major Windows upgrade, for example, you can keep all your old desktops (or thin clients) and access the new service virtually. The same logic applies in the data-center, as even the virtual desktop is running on a hypervisor layer that isolates it from the servers it is running on and it is therefore reasonable to run the servers to failure as well. As long as you maintain an "n+1" configuration for redundancy and high availability, this approach need not affect the availability of your service.

Reduced Desktop Power Consumption

A typical thin-client uses about 10% of the power of a PC as it lacks a spinning hard disk or a fan as well as typically running less-powerful processors. This dramatically reduces power consumption in the office and will also reduce the need for air-conditioning in most offices as PCs produce a lot of heat as they consume all that power.

More Power-efficient Overall (including DC)

We note above that thin clients are more power efficient than PCs, but what about the extra power being used in the data center to run the virtual service? Even when we take a rounded view and draw-in the data center power to the comparison, you should expect to see 70% savings. This is more variable than the thin-client numbers and it is dramatically affected by the ratio of desktops to servers and the level of storage de-duplication you wish to achieve. Assuming you have these well optimized, 70% is achievable.

Reduced N-Cooling

As noted above, thin-client devices use about 10% of the power of PCs because of their lack of moving parts (e.g. fan and hard-disk) and because of their more parsimonious processors. Much of the power consumption of a PC ends up ultimately dissipating as heat, indeed a room full of PCs has a substantial impact on the calculations for a the air-conditioning unit for that new office. Even in an existing office, the air-conditioning will have less work to do if you replace all of the PCs with thin-clients.

Summary

Cloud computing solutions are growing rapidly and they can have a profound impact on the viability of your business and its operational costs. For some, entry into cloud computing discussions can be a daunting task but by looking at these technologies in quantum bites (or quantum "bytes" - if you prefer the technical method), it is possible to determine if VDI technologies may be appropriate in your enterprise.

Regardless of your business type, consideration of new cloud-based desktop computing solutions is a worthy investment of your time and effort. Don't let the task of eating the cloud-based VDI elephant deter you.

About Total Cloud Connections:

Total Cloud Connections assists organizations in their migration to cloud technologies. We work with C-Level and with IT staff to assist and develop an overall IT blueprint. Through our process of Strategic IT Mapping (SIM) we outline your company's IT needs and determine if a cloud solution is a match for you; culturally, financially, and strategically.

Once we have developed the cloud migration blue print for the organization, we engage with 2-3 providers that best suit your organization's needs in order to provide a complete Total Cost of Ownership model that is non-biased and includes a side by side comparison with your current IT spend.

For further information about hoe cloud solutions can improve your business, contact Total Cloud Connections:

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