Increase Utilization, Decrease Energy Costs With Data Center Virtualization

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Presenter: Ron Priester

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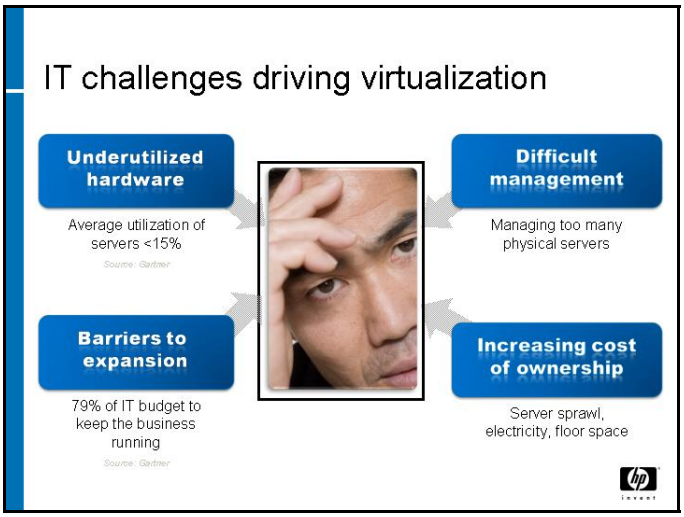
This document is based on an HP/TechTarget webcast entitled “Increase Utilization, Decrease Energy Costs With Data Center Virtualization.”

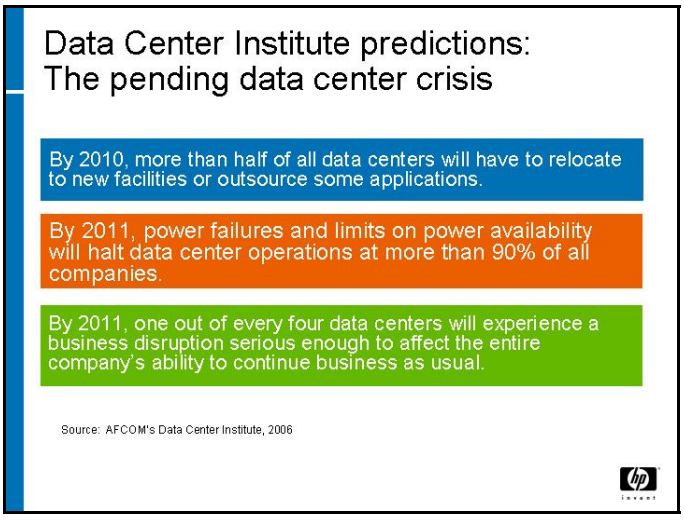
Max McDonough: Hello and welcome to “Increase Utilization, Decrease Energy Costs With Data Center Virtualization.” My name is Max McDonough and I am the moderator. Joining me is Ron Priester, Americas Virtualization Business Development Manager at HP. I am now going to turn things over to Ron Priester. Ron, take it away.

Ron Priester: As it was mentioned a little bit earlier, my name is Ron Priester. I am at HP, and I look after virtualization business development in the Americas. I say that because I get to talk to a lot of customers on a day-to-day basis about virtualization. I am excited about the opportunity to share some of the things that we think about and solutions we build at HP around virtualization that address energy costs and data center virtualization. Another thing that you will hear me mention throughout this document is data center transformation.

Just to get started, I want to step through a bit of an agenda that we put together. First, we will talk about some IT challenges that are driving virtualization and data center transformation. We see these challenges pretty consistently across all of our customer segments. Whether we are talking to the largest enterprises or small businesses, we see some IT challenges that virtualization addresses. So we will talk about that. We also felt it would be important to talk about how virtualization supports the whole transformation of data centers. With regard to the business case for virtualization, there are some specific return-on-investment ideas that I think you will find compelling. We will share a little bit about the building blocks—the solutions—that come from HP around virtualization (specifically with VMware) and some other solutions and some best practices. We also have highlighted some key resources and we will share some links.

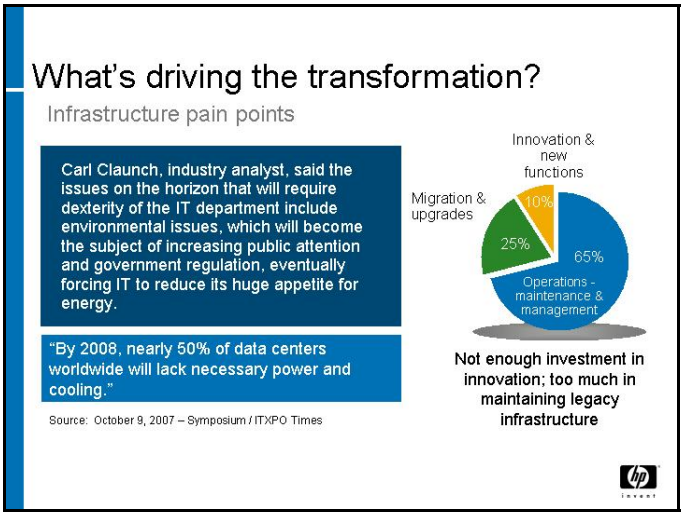


What you see here are some of the IT challenges around virtualization and data center transformation that we see on a constant basis. Most people will probably agree with these and can look at them from the standpoint of their own organization. First of all, we see underutilized hardware. In fact, when you look at servers, whether we are talking about 10 servers or 100 servers, average utilization generally fits around 15%. That is not giving the return that most people are looking for with regard to their hardware, specifically around servers and storage. The other thing that we notice and we think you will agree with is management. How do you manage your environment? With servers tending to sprawl, physical servers become harder to manage, and that increases cost. We will come back to that. Another big point that we come across pretty consistently when we talk to customers is how much of my IT budget is spent on just maintaining the environment—I would like to spend more on innovating and responding to business. Right now, the numbers tend to show that about 79% on average of IT budgets are spent just on maintaining the environment. I already mentioned server sprawl, and that is the result of applications being deployed on a silo basis. For example, the organization decides to use an application, you buy a server, you deploy that application, you buy another server, you deploy an application, and so on. It tends to drive sprawl. And in this environment where costs—specifically, power costs and floor space—are becoming a bigger factor, increasing those costs is not acceptable. These are the kind of challenges that virtualization addresses. We will come back to a couple of those as we move forward. But think about this: couple those challenges with some of the transformation challenges that we see on a day-to-day basis, like the ones you see on the screen here.

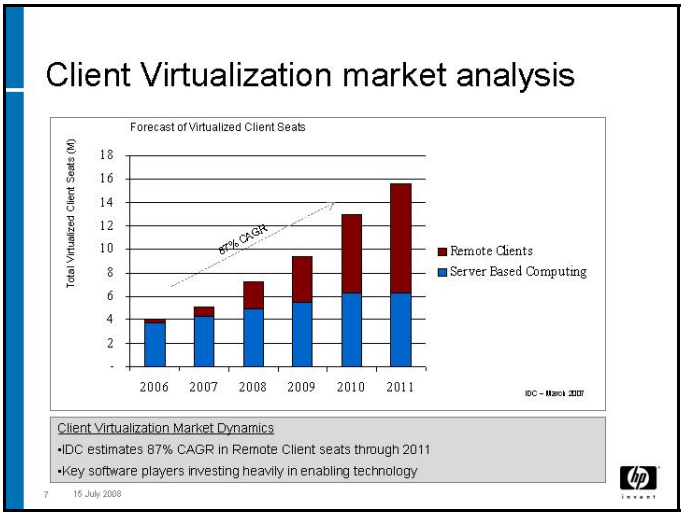


Data centers are experiencing what you see here. By 2011, power failures and limits on power will halt the data center operations at more than 90% of all companies. That is a big challenge. We see, on a day-

to-day basis, customers who are looking at transforming existing environments and moving to new data centers. And with IT becoming a much bigger part of business, that is a huge challenge. There are some others here on the screen that you will probably recognize, as well. In addition to what you saw earlier, these challenges make it tough.

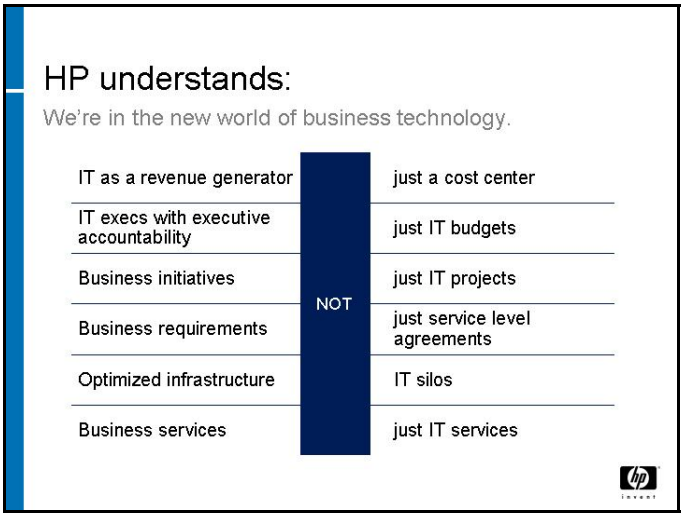


I thought I would point out another transformation issue that I think is a huge pain point, and that is how do you leverage more of your IT budget to things other than just maintaining an environment? What we hear customers tell us on a day-to-day basis—and you see it, of course, here—is, "I want to spend more of my IT dollars on innovation and responding to business." This is a huge challenge. And as I mentioned before, virtualization is going to address most of these challenges.

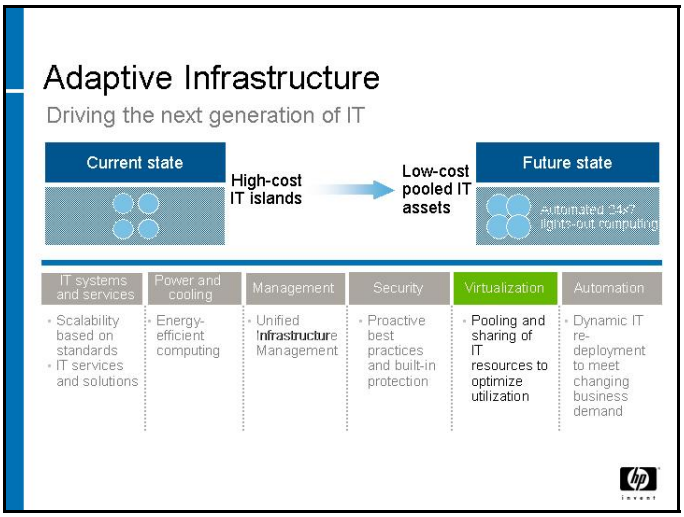


So far, what we've talked about centers around server virtualization. But there is another emerging trend in the market and that is client virtualization, which has some of the same drivers. But there is a huge opportunity for a lot of our customers to reduce costs when it comes to their IT budget. That opportunity centers on client virtualization. Another big driver is security. This means building a secure environment that does not allow for the entry of malicious code. What you are looking at here is a trend that we believe is going to take hold in the market. That trend is client virtualization.

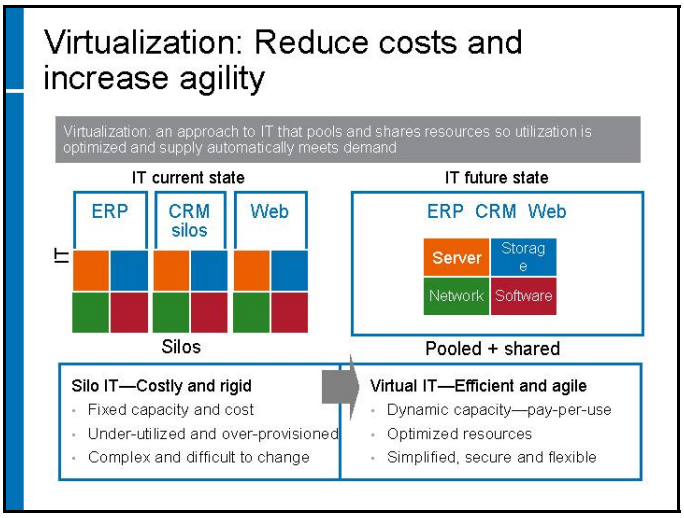
HP understands that as IT becomes much more integral in business, IT is changing.



IT is no longer just a cost center. IT is considered to be a significant revenue generator in many companies. It is not just considered as a department that manages IT projects. Instead, IT has become integral in business initiatives. IT is no longer just a silo. IT is now charged with optimizing the infrastructure to respond to business much more quickly.

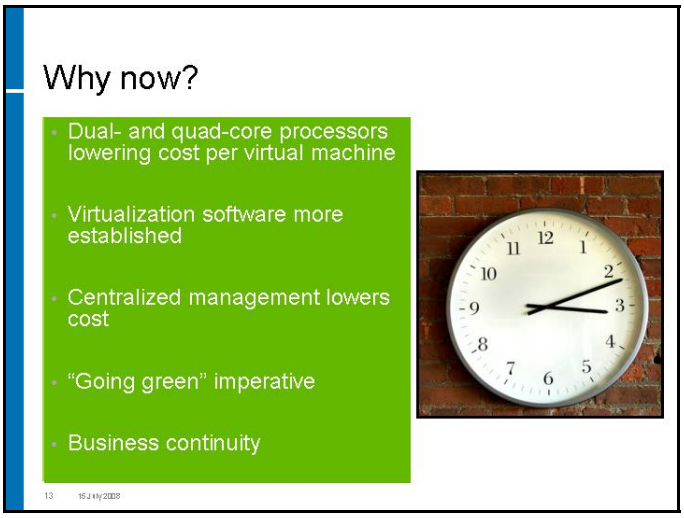


With those kinds of changes in IT, how does virtualization address this issue? Well, it starts with thinking about the current state where applications live in silos. And thinking about virtualization and IT resources being pulled, so that applications can share storage environments, server environments, and so on.

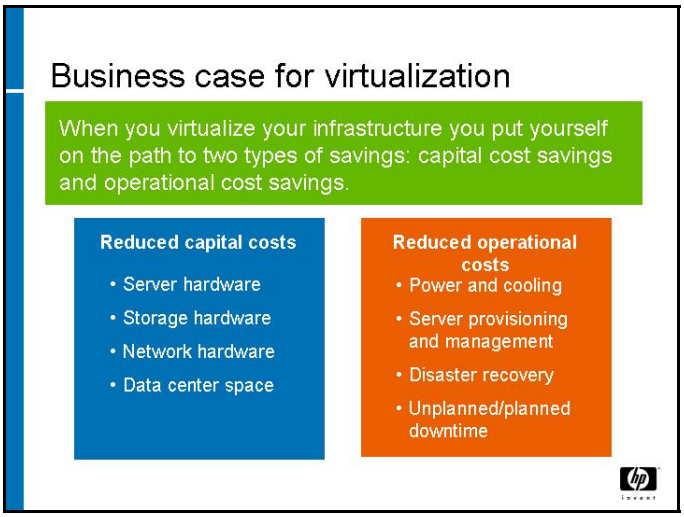


Here is a picture of the desired state where we see virtualization supporting IT. In the past, IT pretty much looked like what you see on the left-hand side: ERP applications, CRM or other applications, Web applications—all living on servers. Those servers run at very low utilization rates.

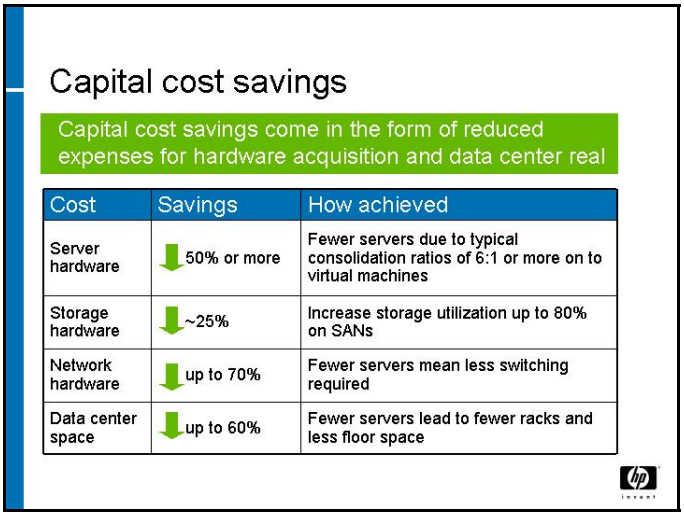
In the future, with virtualization, IT will share resources. Whether we are talking about ERP applications or CRM applications or Web applications, they will share the same resources. Utilization rates go up. Return on investment will go up significantly for our customers. So, let's explore that a little bit more.



Virtualization and transformation: why now? There are a number of reasons. Hardware platforms and virtualization software are now much more mature. And then there are initiatives such as going green, the desire to drive down costs, and business continuity. A high availability is also a big driver. So, let's look at a couple of different categories.



At HP, when we talk about virtualization, there is a business case for virtualization. It usually falls into two big categories: reducing capital costs and reducing operational costs. On the capital costs side, you see server hardware, storage hardware, network hardware, and data center space. All of those are in the capital category. On the operational side, costs associated with power and cooling, provisioning, disaster recovery, and planned and unplanned downtime—all of those are significant to the business. Let's explore a couple of those in detail.



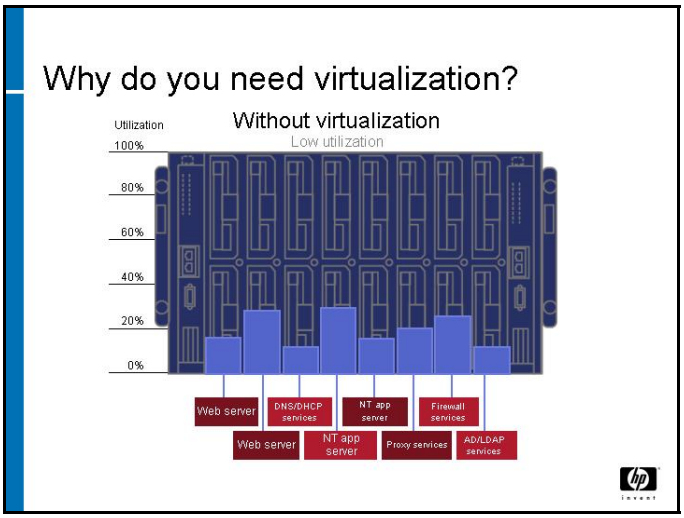
On the capital costs side, for example, with virtualization, think about this: for a very conservative consolidation ratio of 6:1 (meaning, consolidating six servers down to one with virtualization), hardware costs can be reduced by 50%. The same is true for storage. Utilization rates are generally low on storage, probably around 15% to 20% on average in a SAN environment. Increasing utilization—getting it up to about 80%—reduces that by 25%. If you think about servers, they require more switching. And reduced network hardware can save costs to the tune of about 70% at a 6:1 ratio, and that is a very conservative rate of consolidating servers. Data center and floor space are becoming bigger issues. Therefore, with fewer servers, those costs can be driven down by 60%.

Operational cost savings

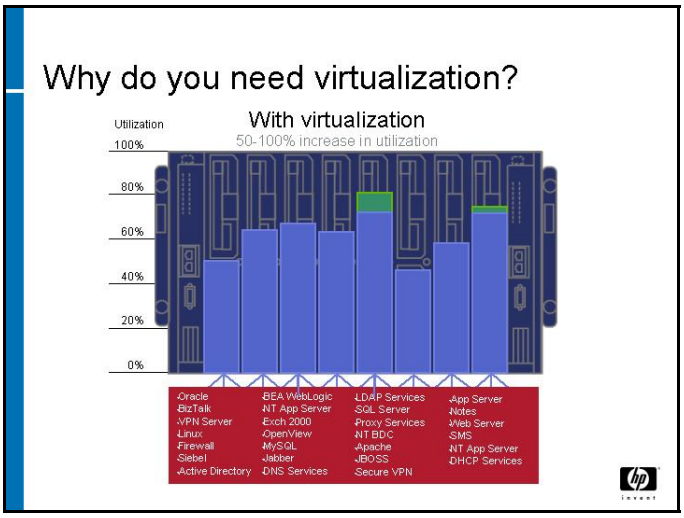
In a virtualized environment, operational cost savings stem from reductions in power and cooling costs, management costs, and costs associated with server downtime.

Cost	Savings	How achieved
Power and cooling	↓ $800+ per server virtualized	Fewer servers due to consolidation ratios of 6:1 or more on to virtual machines
Server provisioning costs and time	↓ 10x in time	Fewer servers to provision, use of template-based VMs
Disaster recovery	↓ up to 75%	Fewer servers to restore, faster restore of virtual machines
Unplanned downtime	↓ up to 75%	Ability to move VMs between physical machines while performing maintenance

If you couple significant capital costs with operational costs—here are some of the typical operational costs. Again, using very conservative numbers like the 6:1 consolidation ratio around servers, you drive down power and cooling costs. When we created this slide, we were experiencing $800 per saver, but those numbers are going up dramatically. The provisioning costs tend to be very high. Disaster recovery becomes a solution that a lot of customers can use with virtualization. Planned and unplanned downtime is significant. Capital and operational costs can be addressed by server consolidation, IT consolidation, and virtualization.

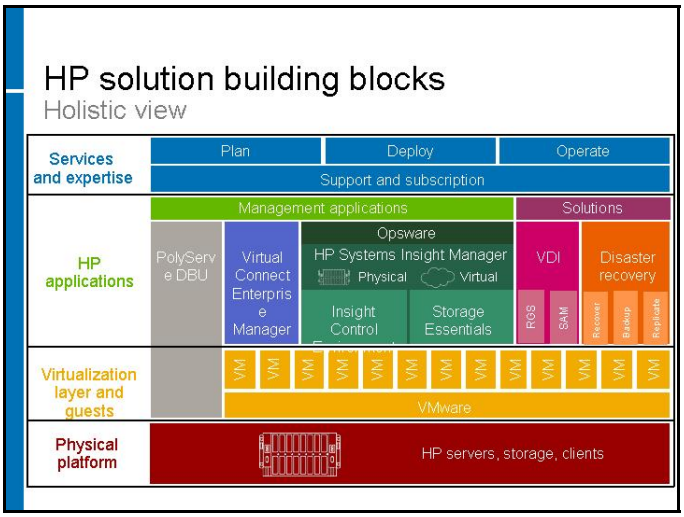


Let's look a little bit further. I would suspect that a significant number of people are probably looking at blade servers, which are very powerful platforms. At HP, we have a strong line of blade servers: c-Class blade servers. But let's look at a typical environment. Even with powerful blade servers, if they are siloed and separated by applications, as you see in this diagram, you are going to see low utilization rates.

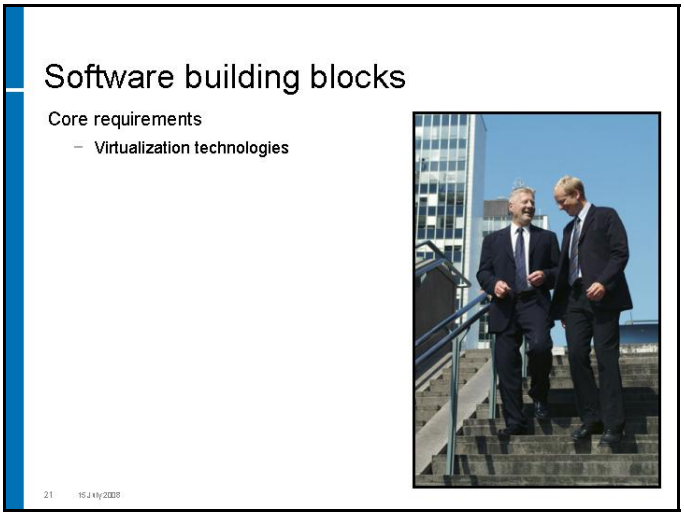


We are encouraging our customers to take those blade servers, consolidate applications, and share resources. You can see in this diagram that you can drive up those utilization rates as high as 80%, which is very significant.

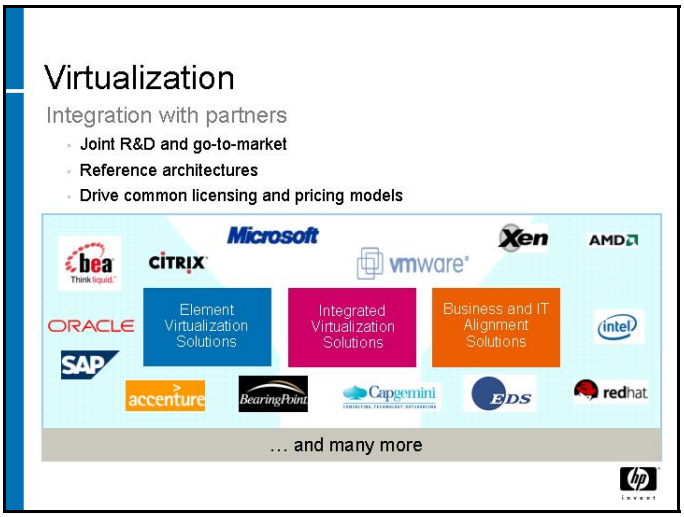
Blade servers are hot, and they are one solution in the category. When you think about them from a traditional standpoint but more from a consolidation standpoint—getting those applications, sharing resources across blade servers—they become a powerful tool. So let's explore this a little bit more.



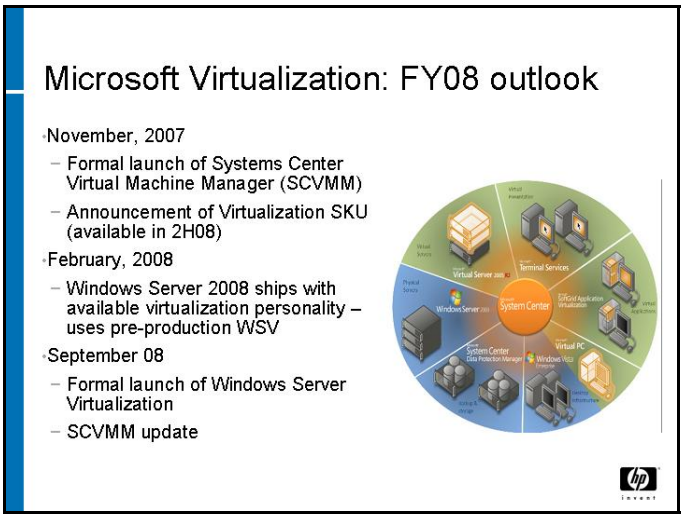
What you can see here is HP's view of a complete virtualization solution. This is a holistic view of the complete solution. Let's look at this moving from the bottom up to the top. When we look at delivering a virtualization solution, it starts with HP Servers, whether they are rack mounted servers or blade storage. This solution also begins with clients. When you look at the virtualization or hypervisor layer, HP does a lot of engineering work with partners like VMware to engineer the hypervisor layer into the platform. We will come back and talk more about, specifically, some new integration features around building the hypervisor layer into the server platforms. But one of the critical components in a holistic solution is the application layer. You can achieve a huge return on investment with a comprehensive set of management tools. At HP, they center on our HP Systems Insight Manager suite, but those tools allow you to manage both the physical as well as the virtual environment. They are very important, and we will talk about that a little bit more. At the top of the solution is a complete portfolio of support and services around virtualization that supports both the platforms as well as the software. That includes the virtualization layer as well as the management software. At HP, we look at this entire solution stack as a certified stack and a holistic solution. We will talk about it a little bit more.



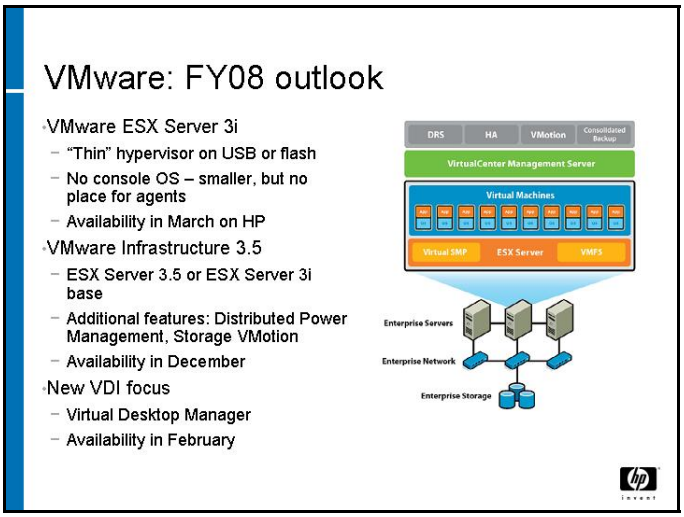
So, let's look at the virtualization technologies.



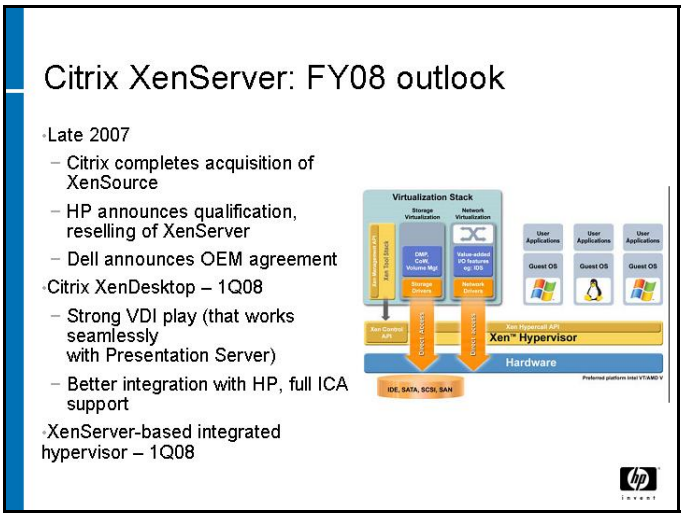
I will point out here that HP first of all works with a significant number of partners (that you will recognize on this slide) that support virtualization. Some of the key partners you will notice at the top of the screen include VMware, Citrix, and Microsoft—all providing virtualization solutions that are integrated into HP platforms.



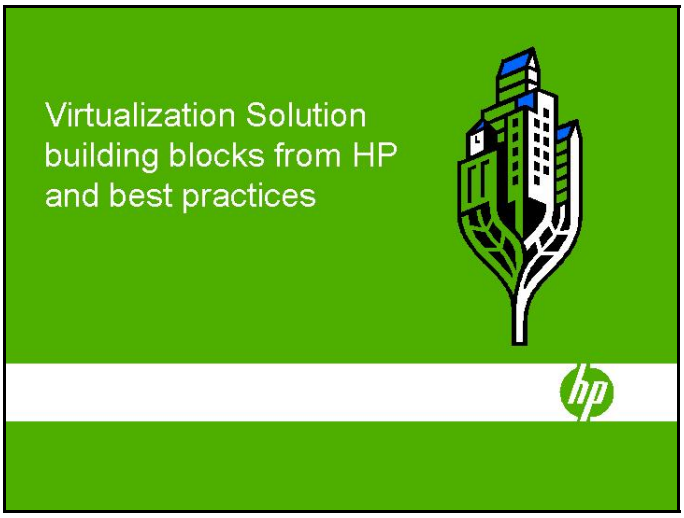
Let's look at some of them individually, specifically around virtualization. We are working with Microsoft, for example, and you see some of the key dates around the Microsoft virtualization solutions. One of the ones that I would point out is the September 2008 timeframe. Microsoft is set to release Hyper-V, their solution in addition to Windows Server 2008. HP customers can rest assured that those solutions will be integrated on HP platforms.



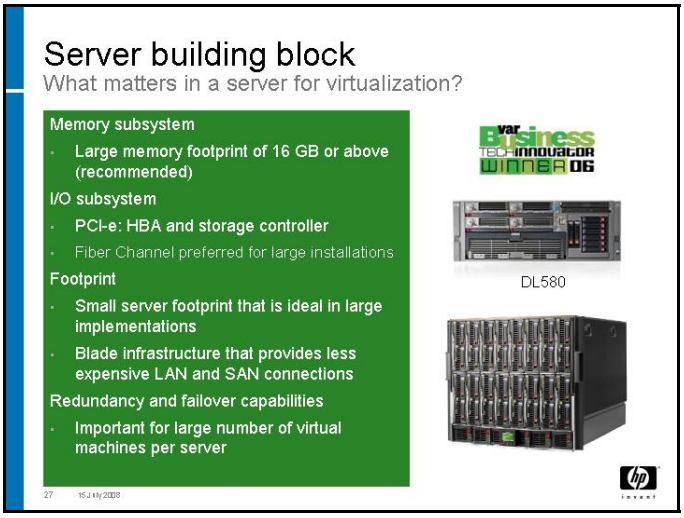
From the standpoint of VMware, some interesting things are happening in that software stack, for example, VMware ESX Server 3i. That is a very thin hypervisor that is integrated into HP platforms, and I will come back and talk about that as a solution as well. We started shipping 3i on April 1 at HP. Today, you can get a server fully integrated with the ESX Server 3i on a flash USB drive. It is completely integrated on the server platform and reduces the time to deployment tremendously.



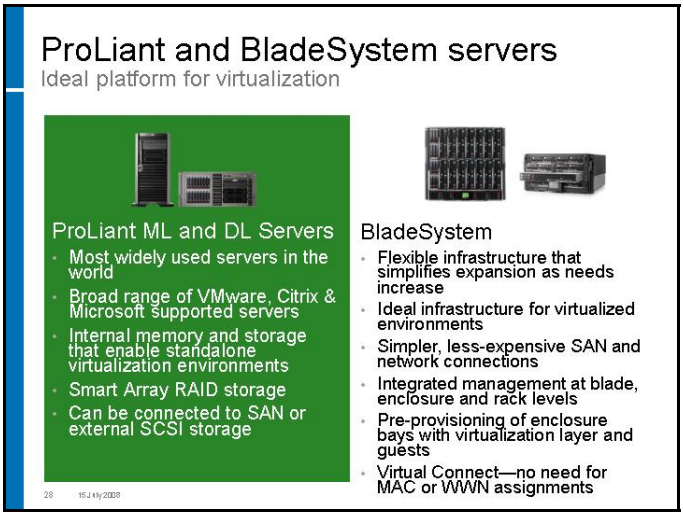
For those customers who look at solutions like Citrix XenServer, we also have a XenServer on HP platforms. And the integrated solution I described for VMware—there is a similar solution available for XenServer on HP platforms. This solution is integrated on an internal USB flash drive and uses HP's Virtual Console to launch the installation of the hypervisor layer on the platform. These are some significant developments, and I will come back and talk about a few of those a little bit later.



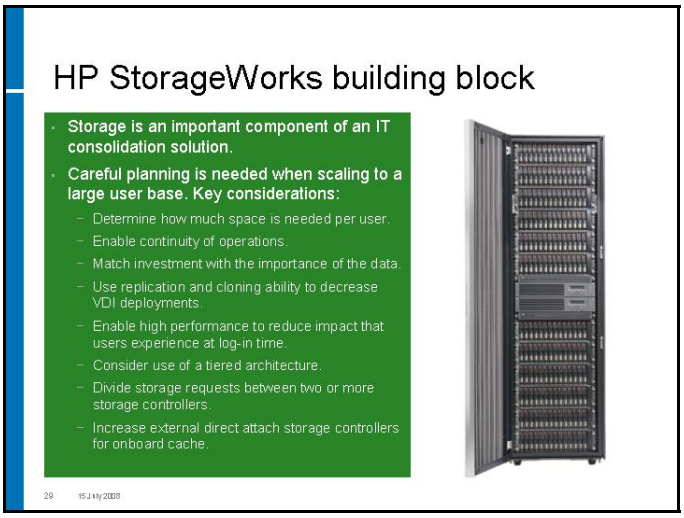
Let's talk more about the building blocks individually.



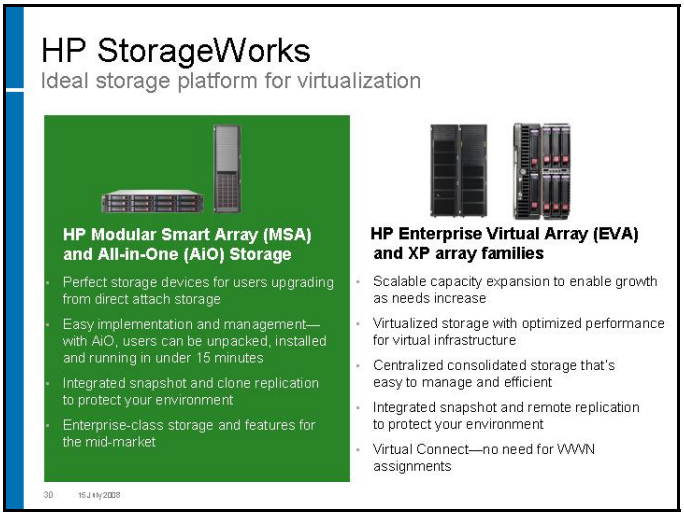
We will talk next about the server platforms. What matters in a server platform when you are looking at virtualization?



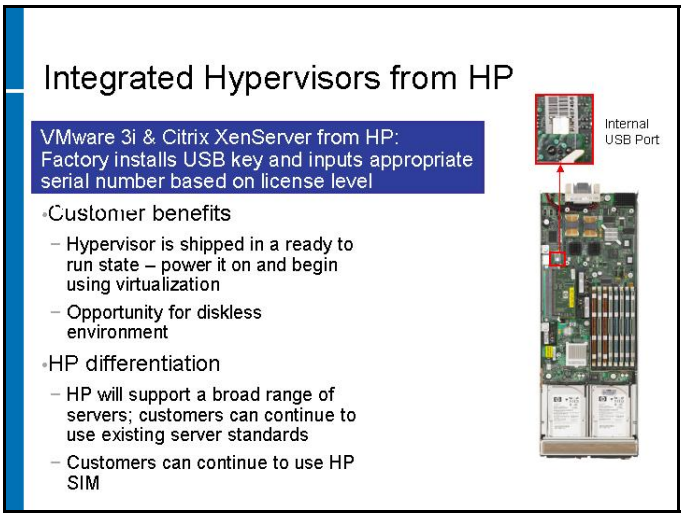
Well, first of all, if you have looked at the ProLiant DL580 or ProLiant blade systems, you will notice that they are designed for virtualization. Large amounts of memory are available on those platforms. The I/O subsystems and host bus adapters and controllers are designed around virtualization and consolidating applications, high-performance Fiber Channel solutions. If you look at the footprints of these servers, they have small server footprints that are ideal for large implementation. And in the case of blades, HP c-Class blade systems require as low as 40% less power than a traditional blade environment or rack mounted servers. That is a huge, huge cost saving. There are a lot of redundancy and failover capabilities built into these platforms. In a platform like the DL580, large amounts of memory support the idea of consolidating and sharing resources in a single platform.



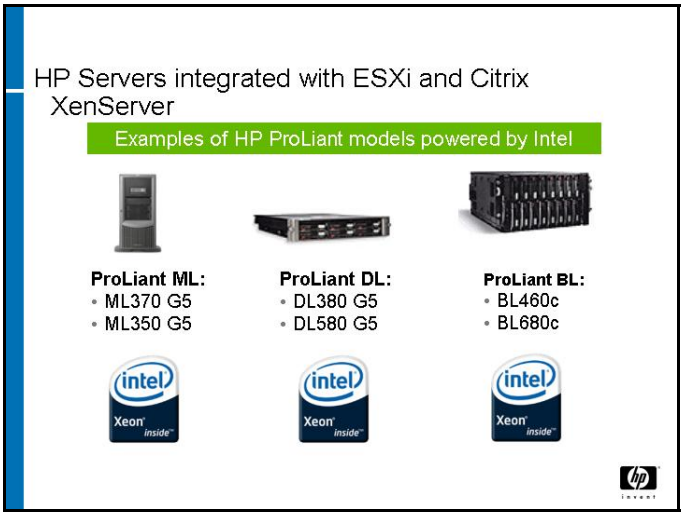
There is a wide array of HP ProLiant Servers, including our ML and DL line. These are widely used servers. Lots of customers are familiar with them. Lots of customers use HP System Insight Manager.



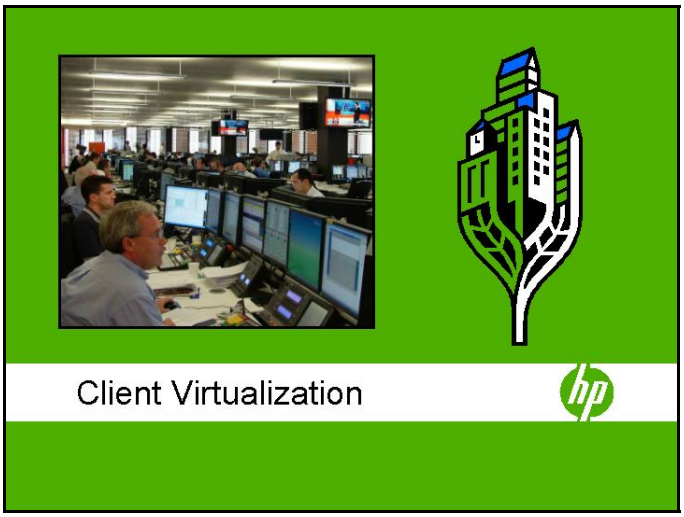
And in addition to blades, these platforms support VMware, Citrix, and Microsoft servers. They have lots of internal memory. A simple, less expensive SAN connectivity is available on these platforms. There is a feature called Virtual Connect, where you no longer need MAC or WWN assignments for users or servers. In addition, HP has some specific platforms in the storage category: the EVAs. We just introduced the EVA4400, which is an entry-level mid-market targeted platform that comes with software designed to manage a virtual environment. So there is a wide range of platforms and services available.



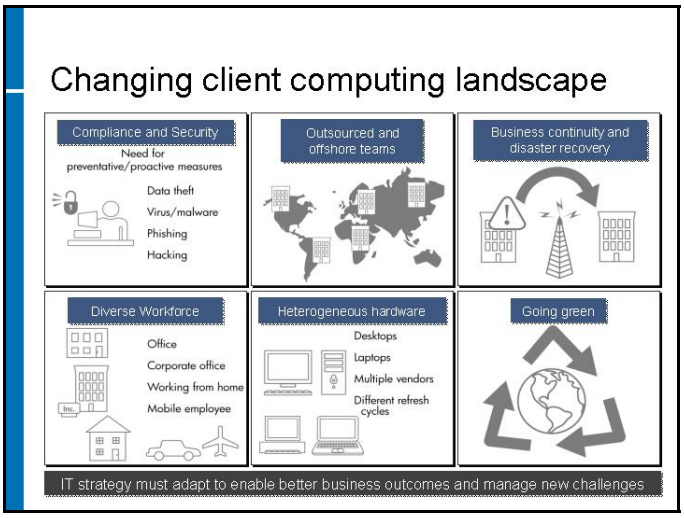
I will move on to one additional point I want to make about the integration of hypervisors on HP platforms. I reference this with VMware 3i and Citrix XenServer. Take a look at this screen. What you actually see here is a representation of an internal USB port on an HP Server that has the VMware or Citrix XenServer bits or code preloaded on this internal flash drive. This means a customer can order under a single SKU from HP—not only the platform but also the virtualization software for Citrix XenServer or VMware on this internal USB port. Why does that matter? If you are deploying a server, you simply fire up that server, and you will use the System Insight Manager solution to start up that server. You can have that server up in about 15 minutes, including the hypervisor layer. That is an example of integration.



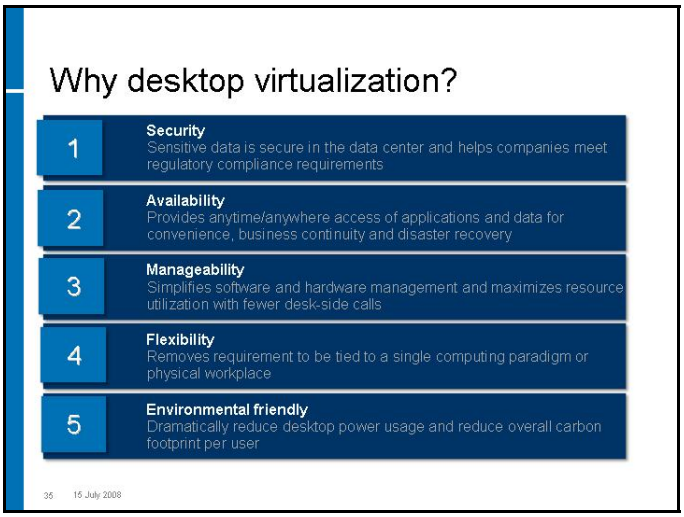
Here, you can see some of the typical ProLiant Servers in the ML, DL and the blade platform for end-users that we are shipping today with those integrated hypervisors available.



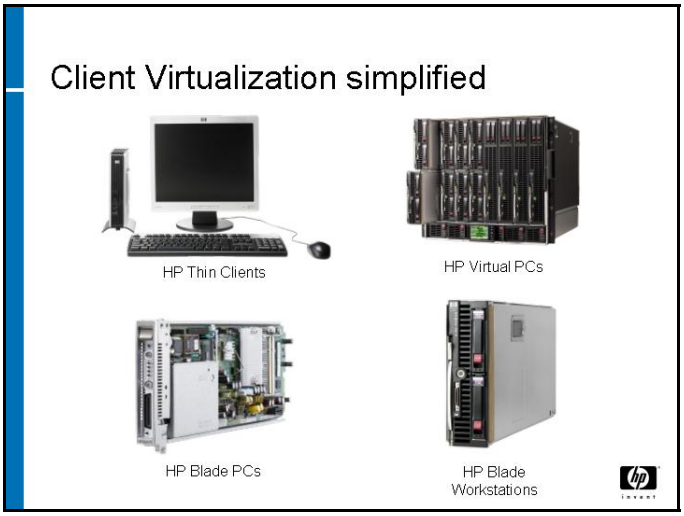
So far, we have talked a lot about server virtualization and some of the best practices around virtualization with servers and with storage. But as I mentioned upfront, one of the developing trends in virtualization is client virtualization. So let's talk about that. The business drivers around server virtualization and storage virtualization are pretty clear. We talked about the capital costs and operating costs, but when we look at clients in virtualizing desktops, some of those drivers are similar.



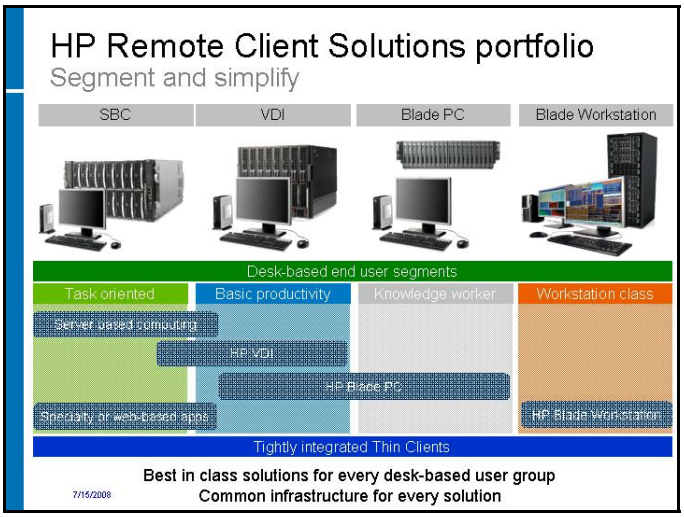
But when I talk to customers who are in the implementation process around client virtualization, one thing is prevalent in all those conversations. That is security. As many customers transform their data center environment, they are concerned about security. It is a huge driver (along with the business drivers I mentioned around server virtualization) as a big imperative around moving to client virtualization. I also mentioned that IDC projects this as a huge growth opportunity for IT companies and IT customers alike.



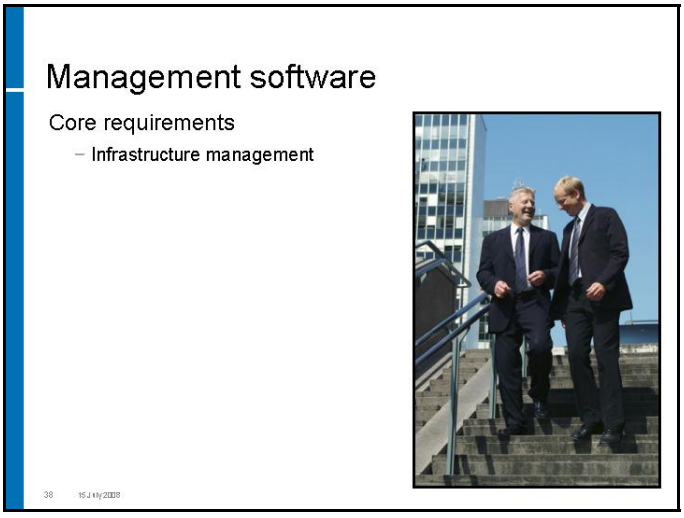
Here are some of the desktop virtualization drivers: security, availability, manageability, flexibility, and environmental friendly. All of these are almost self-explanatory. But with regard to security, for example, having sensitive data in a data center is much more secured than it would be on a desktop. There are also regulatory and compliance issues that drive customers to look at a much more secure environment for the desktop. From the standpoint of managing desktops in a server data center environment versus a desktop, the management costs can be significantly lower.



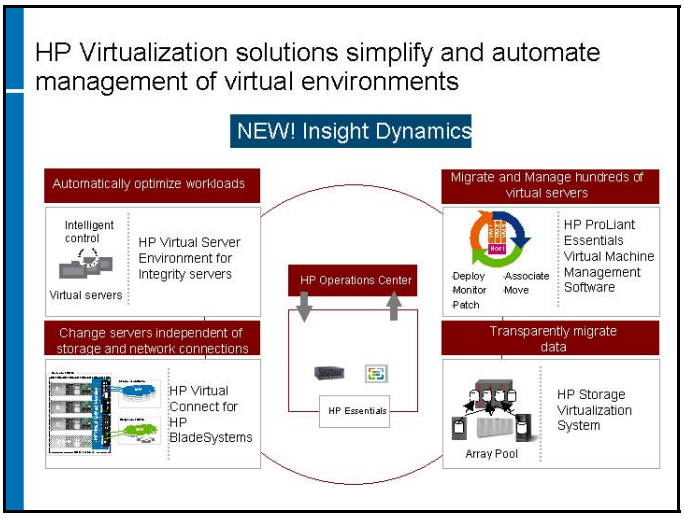
At HP, these are typical platforms that support client virtualization today: a combination of thin clients, blade PCs (if you think about blade PCs running in a data center as opposed to a PC on a desktop or a laptop), virtual PCs in a virtualized environment (running in the data center on servers), and blade workstations for high performance workstation environments. All of these solutions can be virtualized in the data center (as opposed to the desktops) and achieve all of the goals that we saw a little bit earlier.



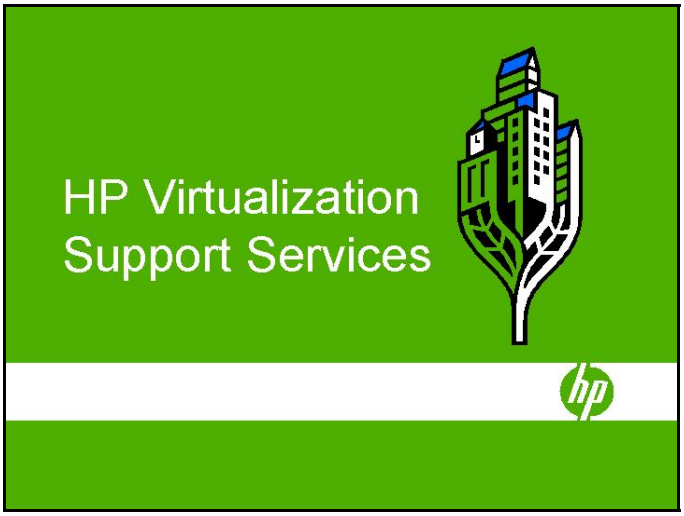
If you look at today's current choices and consider which ones fit your particular environment, I do not think there is a one solution. What we tend to do is look at the users in segments. For example, if they are task-oriented workers, a thin client might be the solution. If they are technical workers or engineers, a powerful workstation or a blade workstation might be a solution. If they are knowledge workers, they might require a blade PC. At HP, we have developed a solution that fits all of those segments and the right choice is not consistent from one customer to another. It depends on their environment.



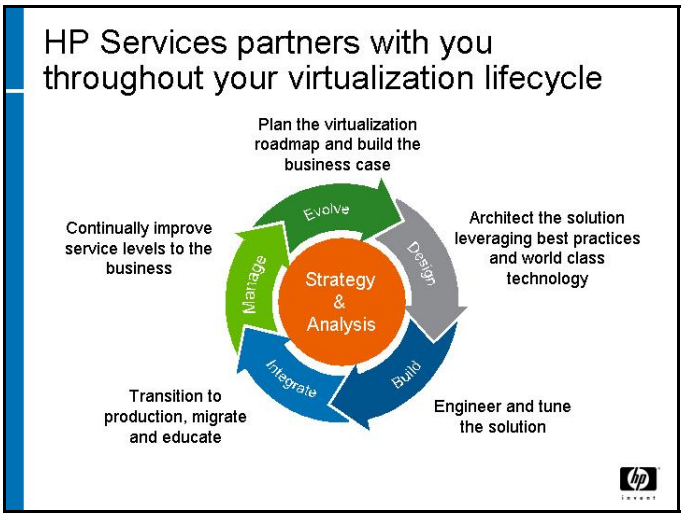
Let's look a little bit further at management software. There is a lot of choice around management software for the physical and virtual environment that is supplied by VMware or Microsoft or Citrix.



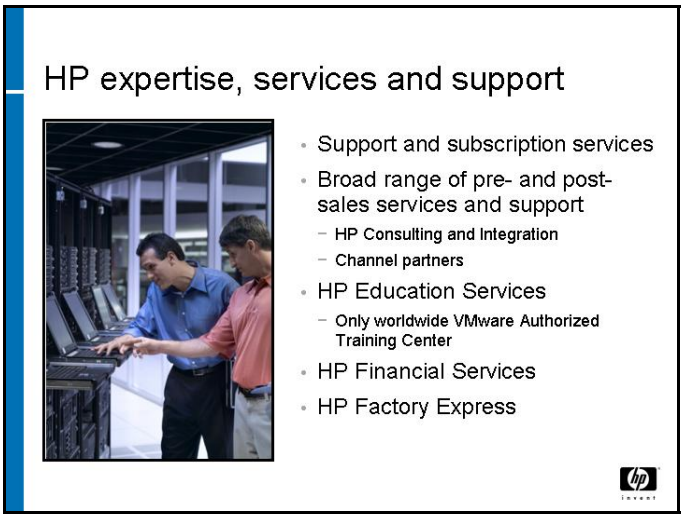
At HP, we built a complete suite of management tools that are based on System Insight Manager. Our concept is a single-pane-of-glass view where you can manage a physical and virtual environment. It might be a UNIX-based environment. It might be a storage environment. It might be a typical virtual environment with virtual machines or complete data centers. Our philosophy is to provide a complete set of tools that are designed to manage a physical and virtual environment. If you are a ProLiant customer, you know that System Insight Manager ships with ProLiant Servers. And you can add on additional modules (such as ProLiant Essentials and Virtual Machine Management) that are required for your business. These all contribute to that single view of both a physical and a virtual environment.



Let's talk a little bit about some of the virtualization support services that HP provides to ensure you are successful along this virtualization journey.

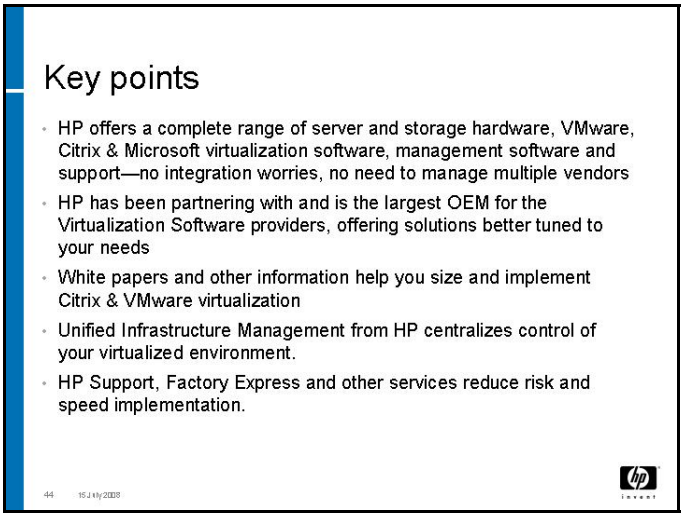


At HP, we offer planning, design, implementation, and services. Those services are offered directly from HP or through some of HP's partners. If you work with HP partners and resellers, they have the capability of providing services—including virtualization services—throughout the entire services lifecycle. If you are planning or designing, call HP or HP partners. As a side note, HP has a core group of virtualization partners that focus on delivering virtualization services. Feel free to call us at any time, both HP and HP partners. We focus on not only planning and designing but also managing the complete lifecycle around services. Let's look at that a little bit further.



You can call on HP for services and support for licensing. If you are using VMware licensing, Citrix licenses, or Microsoft licenses, HP can provide complete subscription services. We also have Consulting and Integration Services. Notice about halfway down the screen, you see HP Education Services. If you are in need of certifying your resources (such as your team members around VMware), HP Education Services offers classes that support that. We also have Financial Services. We also have factory-integrated platforms called HP Factory Express that allows you to configure in the factory and ship ready-to-go platforms, including virtualization platforms.

Let's get to a couple of the key points.



At the end of the day, HP offers a complete range of servers, storage, hardware, and software from our partners, as well as HP software for managing a physical and virtual environment. We are a single point of contact for support services. We have been partnering with OEMs like VMware and Citrix for many, many years.

We have a lot of resources available, such as white papers and sizing guides. We look at virtualization as a unified infrastructure with all of the tools necessary to support it. We also have support services (like HP Support and Factory Express) that minimize the risk associated with implementing VMware, Citrix, and Microsoft platforms running virtualization.

Virtualization resources

- Americas contacts
  - BCS/Unix Virtualization: paul.mantey@hp.com
  - ProLiant/ISS Software: jim.odasz@hp.com
  - Virtualization Business Development: ron.priester@hp.com
- HP Virtualization site
  http://www.hp.com/go/virtualization

Here is a list of some of those resources, including people. You will notice that we have outlined here both ProLiant and Integrity virtualization resources. All of these people are available if you have questions. We also have a key site at HP (www.hp.com/go/virtualization) where you can find a lot of the assets that I mentioned a little bit earlier. When it comes to the platforms (for example, blade servers), you can always go to www.hp.com/go/blades/storage and find a wealth of information around virtualization.

VDI - Where to go for more info

- Remote client solutions
  www.hp.com/go/rcs
- VDI
  www.hp.com/go/vdi

If you are interested in client virtualization, we have a specific resource page around VDI (virtual desktop infrastructure). Again, sizing guides, white papers that address desktop virtualization.