

Turning data centers into virtual, flexible data utilities



Avanade Information Technology Services makes the case for data center virtualization.

In 2009, Avanade embarked on a large-scale infrastructure refresh of its Enterprise Data Center, located near Seattle. This enterprise data center, which houses the company's core business applications, services and data, delivers round-the-clock IT services to over 10,000 professionals in 25 countries worldwide. After several years of rapid growth across Avanade, the data center was laboring under a spectrum of operational inefficiencies, including too many servers, too much unused capacity, and energy costs that exceeded the center's rated profile by as much as 30%. The time had clearly come for a major overhaul of the central compute-and-storage engine supporting Avanade's business.

Taking advantage of advances in computing power and computing technologies, Avanade launched Compute Utility, an initiative by Avanade Information Technology Services (ITS) that will transform its primary physical enterprise data center into a highly virtualized data center. To accomplish this, the Avanade ITS team used a pre-release version of Microsoft Windows Server® 2008 R2 to design the destination architecture to run the enterprise on Microsoft Hyper-V™ virtualization. Even though the Hyper-V software was still in beta testing, Avanade's ITS experts easily mastered its intricacies and were able to capitalize on the new power and flexibility of Hyper-V, including its server, application, desktop and other hypervisor-based solutions.

Leveraging the new Live Migration features of Hyper-V, the team then proceeded to implement the virtualization program at the data center while still providing optimal uptime for running services. Using in-place migrations and progressively

consolidating available computer power and space, Avanade transformed the center and drafted a new virtual engineering model that will be implemented at all of its other data centers. Eventually, each of Avanade's five data centers worldwide will serve as a pure computing "utility," providing computing and storage resources with the same elasticity as a traditional utility providing metered electricity.

Multiplying by dividing

The Compute Utility virtualization initiative, enabled by Microsoft Hyper-V technology, creates layers between the hardware, operating systems and applications, thereby allowing multiple instantiations on the same physical machine.

In its prior configuration, the Avanade data center ran web applications on dedicated servers, housed individual business applications on separate servers, and placed database applications on still more servers. The primary enterprise data center had several hundred servers in total, and this already vast server farm was steadily expanding. Even with all this computing capacity, most of the center's computing power was going to waste. Server utilization rates in corporate data centers typically average only 20-40% of capacity, and Avanade's own server utilization was averaging 18%.

To visualize the inefficiency of this arrangement, imagine hundreds of buses, each carrying a single passenger. So many buses naturally take up a great deal of space, and each bus surely has room for more than just one passenger. What's more, so many buses are much more expensive and

Business Situation

Beginning in 2005, Avanade entered a period of rapid corporate growth. As its data center operations expanded, this technology leader encountered performance challenges, including server sprawl, under-utilized capacity and rising energy costs.

Solution Summary

The Avanade Information Technology Services (ITS) Compute Utility initiative is providing Avanade with global IT computer services that strike the best balance of resiliency, flexibility and efficiency. The Avanade ITS team worked with a pre-release version of Microsoft Windows Server 2008 R2, designing the destination architecture to run the enterprise on Hyper-V virtualization. The team then used in-place migrations to implement the virtualization and consolidate computer power and space, all while providing optimal uptime for Avanade systems.

Results

The Avanade ITS Compute Utility initiative achieved exceptional efficiencies upon its completion in September 2010, including:

- Physical server inventory reduced by 70%
- Data center floor space reduced by 42%
- Power consumption cut by 47%
- Carbon footprint reduced by an estimated 66%
- Reductions in infrastructure management costs of \$1.3 million over five years
- Savings of over \$100,000 per year in warranty costs
- Response time for new server set-up cut from weeks to one hour

operationally difficult to maintain, besides being inherently inefficient and environmentally unfriendly. Yet the Avanade data center operated in a very similar state of inefficiency.

The real-world obstacle to greater efficiency is that in conventional IT environments, multiple applications and services cannot coexist on a common hardware device without triggering system problems. Virtualization technology changes everything, dividing each physical server into so many “virtual machines.” The Hyper-V feature built into and licensed with the Windows Server 2008 R2 operating system uses “hypervisor” technology in which a small layer of software runs directly on the hardware. The hypervisor layer works in conjunction with Windows Server 2008 R2 to allow multiple instances of operating systems to run simultaneously on the same physical server. Using layers of software operating above the physical hardware, each single physical server can then function as many more virtual servers, accurately translating physical actions with far greater efficiency.

Server virtualization allows applications and services to coexist safely on the same server hardware, effectively putting many more passengers aboard each bus, and eliminating the need for so many buses. Costs go down across the board, including maintenance fees on hardware and software subscriptions. The refreshed data center also consumes much less energy and boasts a dramatically smaller carbon footprint.

‘Rebuilding the plane in the sky’

Avanade’s ITS organization was one of the very first technology teams outside Microsoft to apply Hyper-V in a production environment. Avanade started working with Hyper-V while it

was still in its beta test version, which gave the ITS team an opportunity to become familiar with the capabilities and requirements of the new technology. Working with a beta version is more demanding technically, but the process gave Avanade the advantage of learning features and functions faster and in greater depth. A close working relationship with the Microsoft release team yielded valuable insights into the virtualization capabilities of Hyper-V.

All this new knowledge and experience turned out to be indispensable when the decision was taken to ‘rebuild the plane in the sky,’ which effectively meant rebuilding the enterprise data center using in-place migrations. The Avanade ITS Compute Utility team had to map out a migration strategy that would implement the virtualization of the data center without interrupting or impeding the operations of the business.

“We have been extremely pleased with our experience with Hyper-V,” says Chris Miller, Avanade’s Chief Information Officer. “The Compute Utility initiative has resulted in a data center that is much more responsive to our internal business customers. We can now respond to requests for new service the same day.” The more flexible infrastructure means that new instances can be created faster across the farm of virtual servers in the data center. Capacity has also increased as more computing workload is handled in the same physical space, and the new virtual environment makes it easier to move virtual machines around the farm.

Hyper-V is functionally comparable to but significantly more cost-efficient than leading competitive virtualization offerings. Best of all, Hyper-V is provided free of licensing fees as an integral part of Microsoft Windows Server 2008 R2.

“Two years ago, it typically would have taken us weeks to bring a new server on line in response to the changing requirements of our business users. Compute Utility has dramatically accelerated our agility in adapting to dynamic demands. When a new need arises today, we can create a new virtual machine in about an hour.”

Chris Miller

Avanade Chief Information Officer

“We were increasing our server capacity by 15%, year over year. On average, each server ran at around 18% capacity. That’s a lot of wasted rack space and a lot of extra electrical costs.”

Dave Muhich

Avanade Operations Architect

“Utilizing Hyper-V we can now run twenty virtual servers in the same space a single physical server used to occupy. Moreover, the power needed to run these virtual servers differs little from the power needed to run this single physical server.”

Will Hutchins

Avanade Compute Utility Architect

Avanade makes the virtual real

Avanade ITS used the same virtualization solutions in its Compute Utility initiative that Avanade provides to its virtualization customers. Avanade provides a world-class portfolio of virtualization solutions to help organizations reduce their costs and increase their revenue, resulting in greater innovation and competitive advantage. Every customer working with Avanade on developing a virtualization strategy benefits from:

- A holistic approach that ensures all dependencies such as business and IT parameters are taken into account.
- A phased deployment that helps deliver cost savings while keeping risk within tolerable parameters.
- Reuse of reliable assets, which supports minimal downtime and minimal impact on users.
- Fast implementations that use proven assets and techniques to reduce development times and speed deployment.

Avanade brings to every project the Avanade Connected Architectures, an array of internally developed proprietary tools and methodologies used for deploying solutions to Avanade clients in a clear, predictable fashion. Once a server virtualization project is underway, Avanade uses the Avanade Connected Methods, a powerful methodology that provides a common set of repeatable methods, processes and tools that guide and accelerate delivery of a variety of

platform migration solutions, including server virtualization.

Gain control of your data center

Server virtualization has become a compelling technology that can help organizations gain better control over their data centers, cut IT costs, and streamline operations. A key benefit of server virtualization is that it helps consolidate server hardware, resulting in a more adaptive, environmentally sustainable data center.

Based on Avanade's experience working with customers worldwide, the Avanade Virtualization Business Case Estimator™ shows dynamic, flexible server provisioning, with these typical returns:

- Physical servers reduced by 60- 90%
- Server hardware capital spend cut by 30-40%
- Total cost of server ownership cut by 20-30%
- Average energy expenses reduced by 50% or more

Avanade's own experience with the Compute Utility initiative shows that server virtualization is 'ready for primetime.' Through the experienced application of people, processes and technology, Avanade can provide server virtualization technologies to help organizations achieve greater efficiencies at lower cost, while building more flexibility into the organization's data centers.

About Avanade Information Technology Services (ITS)

The Avanade ITS organization includes hundreds of technology specialists working to support the information technology needs of the global Avanade workforce of more than 10,000 professionals worldwide. Avanade ITS supports five data centers and regularly confers with Avanade customers on our information technology experiences and insights.



About Avanade

Avanade provides business technology services that connect insight, innovation and expertise in Microsoft® technologies to help customers realize results. For more information, visit www.avanade.com.

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