



Microsoft Private Cloud

A Comparative Look at Functionality, Benefits,
and Economics

November 2012



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Executive Summary

In this whitepaper, we compare private cloud solutions from Microsoft and VMware. We do this by defining private cloud using industry standard concepts, explain the Microsoft products needed to create a Microsoft private cloud solution and then define the technology benefits a Microsoft private cloud solution provides. We also examine how the licensing and pricing models differ between Microsoft and VMware and, in particular, how those differences will impact the ROI of investments you are making today and long into the future.

Our analysis shows that a VMware private cloud solution can cost ~5-6 times more than a comparable Microsoft private cloud solution over a period of one to three years.

Economics has always been a powerful force in driving industry transformations and as more and more customers evaluate cloud computing investments that will significantly affect ROI, now is the time to provide the information they need to make informed decisions, for today and tomorrow.

Private Cloud

Private cloud is a computing model that uses resources which are dedicated to your organization. A private cloud shares many of the characteristics of public cloud computing including resource pooling, self-service, elasticity and pay-by-use delivered in a standardized manner with the additional control and customization available from dedicated resources.

Fig. 1: Private Cloud Attributes



While virtualization is an important technological component of private cloud, the key differentiator is the continued abstraction of computing resources from infrastructure and the machines (virtual or otherwise) used to deliver those resources. Only by delivering this abstraction can customers achieve the benefits of private cloud – including improved agility and responsiveness, reduced TCO, and increased business alignment and focus. Most importantly, a private cloud promises to exceed the cost effectiveness of a virtualized infrastructure through higher workload density and greater resource utilization.

Microsoft Private Cloud – No Virtualization, Memory, or Density Tax

Microsoft private cloud solutions are built using Windows Server with Hyper-V and System Center – the combination of which provides enterprise class virtualization, end-to-end service management and deep insight into applications so you can focus more attention on delivering business value. Both Windows Server 2012 and System Center 2012 are available in two editions, Standard for lightly virtualized environments and Datacenter for highly virtualized environments. They both have the same licensing model of a processor license that covers up to two physical processors on a server and both editions of the products have the same capabilities across the editions. The differentiator between the editions is the virtualization rights. Standard edition provides 2 virtual instances with each license and Datacenter continues to offer unlimited virtualization with each license.

As always, the best way to purchase Microsoft private cloud is through the Enrollment for Core Infrastructure (ECI)¹. ECI provides customers with an easy and cost efficient way to purchase the Microsoft private cloud.

ECI Datacenter edition includes Windows Server 2012 Datacenter, which supports unlimited virtualization rights. This means that customers license on a per processor basis, with ability to have unlimited Windows Server 2012 based virtual machines on a particular physical processor. Additionally, ECI Datacenter also includes System Center 2012 Datacenter edition, which provides rights to manage an unlimited number of physical or virtual operating system environments. Microsoft private cloud licensing options are shown below.

Fig. 2: Microsoft Private Cloud Licensing Options

Editions Offered in two simple editions (Standard, Datacenter) differentiated only by virtualization rights	License type Each license covers up to 2 physical processors	Capabilities Provide all features to enable any private cloud workload	Virtual rights 2 OSEs	Virtual rights Unlimited
Standard Low Density or No Virtualization Windows Server 2012 Standard System Center 2012 Standard ECI Standard	✓	✓	✓	
Datacenter High Density Virtualization Windows Server 2012 Datacenter System Center 2012 Datacenter ECI Datacenter	✓	✓		✓

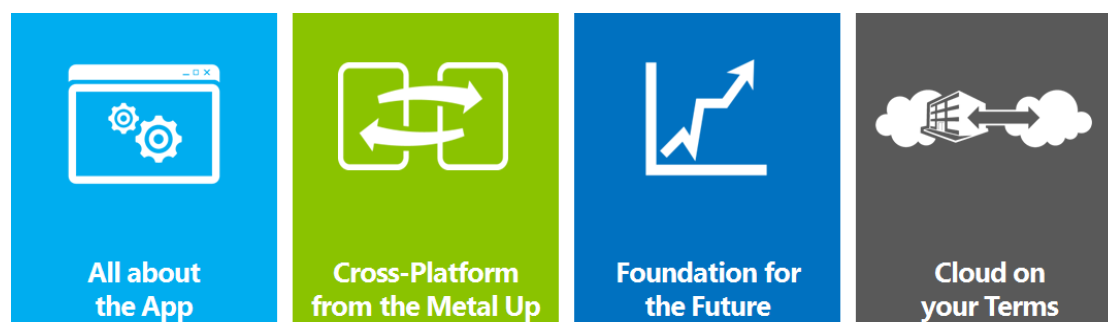
¹ Microsoft ECI licensing program details [here](#). More details in Appendix A.

Our approach is focused on delivering the benefits of scale to you – through unlimited virtualization rights and significantly simplified licensing for Windows Server 2012 and System Center 2012. A deeper cost analysis is provided in the Private Cloud Economics section of this whitepaper.

Microsoft Private Cloud – Business Benefits

The Microsoft private cloud is a unique and comprehensive offering, built on four key “pillars”.

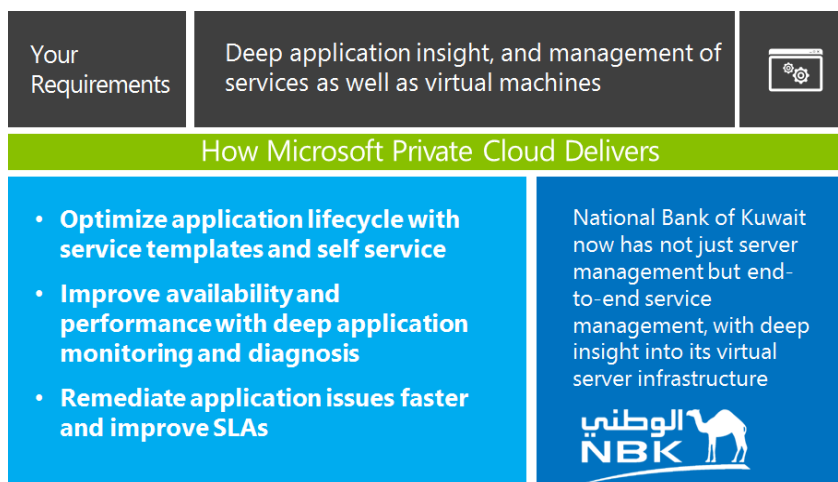
- **All about the App:** Application centric cloud platform that helps you focus on business value.
- **Cross-Platform from the Metal Up:** Cross-platform support for multi-hypervisor environments, operating systems, and application frameworks.
- **Foundation for the Future:** Microsoft private cloud lets you go beyond virtualization to a true cloud platform.
- **Cloud on your Terms:** Ability to consume cloud on your terms, providing you the choice and flexibility of a hybrid cloud model through common management, virtualization, identity and developer tools.



Microsoft offers a private cloud that delivers real value today AND positions a business to take advantage of greater public cloud benefits in the future. Let's look at each of these pillars in depth.

All about the App

Applications are the lifeblood of your business. The ability to deploy new applications faster and keep them up and running more reliably is the central mission of IT as a competitive differentiator. To gain a real edge, you need to go beyond just managing infrastructure.



National Bank of Kuwait Case Study

With the Microsoft private cloud, you can:

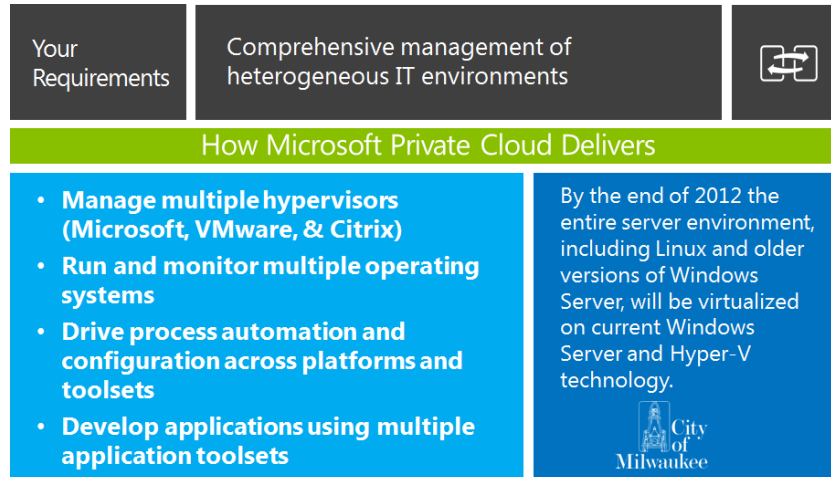
- Optimize the application lifecycle with service templates and self service
- Improve availability and performance with deep application monitoring and diagnosis
- Remediate application issues faster and improve SLAs

The Microsoft private cloud lets you deliver applications as a service. You can deploy both new and legacy applications on a self-service basis, and manage them across private cloud and public cloud environments. You can even virtualize server applications to simplify deployment and upgrading. And with a new way to see what's happening inside the performance of your applications, you can remediate issues faster – before they become show-stoppers. The result is better SLA's, better customer satisfaction, and a new level of agility across the board.

Microsoft private cloud provides you deep application insight, and management of services as well as virtual machines.

Cross-Platform from the Metal Up

No datacenter is an island. Odds are, you run and manage an IT environment today that is deeply heterogeneous, with a wide range of OS, hypervisor, and development tools in the mix. You want to gain the advantages of private cloud computing, but not if it means walking away from your existing IT investments or adding new layers of complexity. Microsoft takes an open and comprehensive approach that puts customers' needs ahead of any particular technology.



City of Milwaukee Case Study

With the Microsoft private cloud, you can:

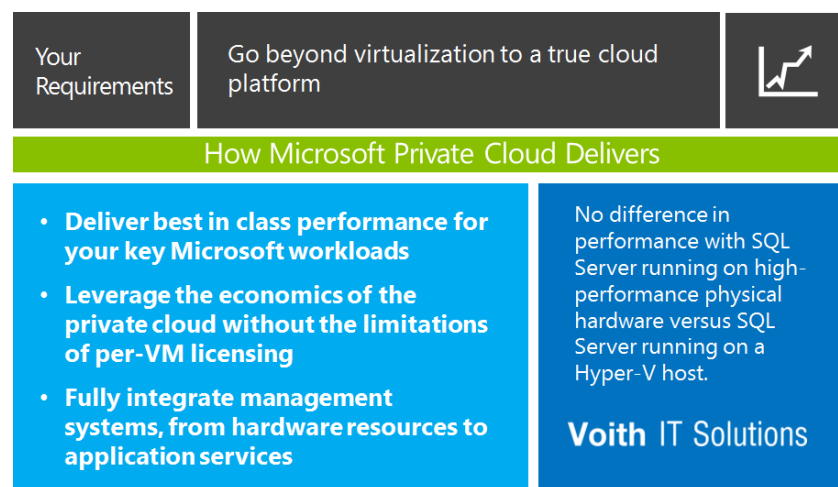
- Manage multiple hypervisors (Microsoft, VMware, and Citrix) and run and monitor multiple operating systems
- Drive process automation and configuration across platforms and toolsets
- Develop applications using multiple application toolsets

The Microsoft private cloud lets you keep what you've got and make the move now to a new kind of agility. That's because it's architected from the raw metal up to enable process automation and configuration across platforms and environments. Because the Microsoft private cloud provides comprehensive management of heterogeneous IT environments, you can put your business's needs ahead of the needs of any particular technology or vendor.

Microsoft private cloud gives you comprehensive management of heterogeneous IT environments.

Foundation for the Future

A private cloud delivers fundamentally new capabilities that represent a fundamental shift in computing. The bet you make today will have long-term implications for the future of your business.



[Voith IT Solutions Case Study](#)

With the Microsoft private cloud, you can:

- Deliver best-in-class performance for your key Microsoft workloads
- Leverage the economics of the private cloud without the limitations of per-VM licensing
- Fully integrate management systems, from hardware resources to application services

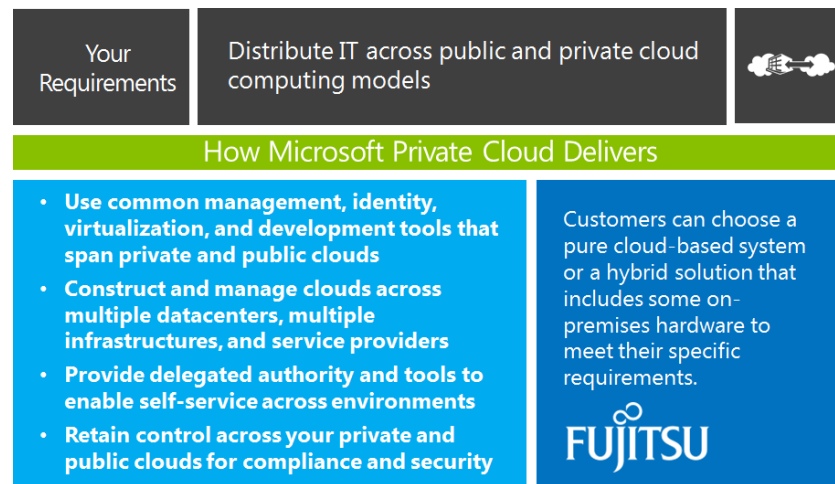
For more than 15 years, Microsoft has operated some of the world's biggest and most advanced datacenters, and we've driven the evolution of major Internet services such as Windows Live, Hotmail, and Bing. Our experience is unmatched in the industry, and we've taken all that we've learned and put it into the DNA of our products.

Microsoft workloads (including SharePoint, Exchange, and SQL Server) work best on the Microsoft private cloud. But the story is much bigger than that. We've architected our platform and our management approach to be comprehensive and deeply integrated, spanning private and public cloud scenarios. Our goal is to take our customers beyond virtualization – and unnecessary per-VM licensing – and proceed with confidence in building a secure and manageable private cloud that delivers great performance and compelling economics.

Microsoft private cloud lets you go beyond virtualization to a true cloud platform.

Cloud on your Terms

The move to cloud computing involves more than just building a private cloud. The undeniable benefits of public cloud computing – on-demand scalability, flexibility, and economics, as we’ve discussed – also promise significant competitive advantages. The challenge is to leverage your existing investments, infrastructure, and skill sets to build the right mix of private and public cloud solutions for your business – one that will work for you today and in the future.



Fujitsu Case Study

With the Microsoft private cloud, you can:

- Use common management, identity, virtualization, and development tools that span private and public clouds
- Construct and manage clouds across multiple datacenters, multiple infrastructures, and service providers
- Provide delegated authority and tools to enable self-service across environments
- Retain control across your private and public clouds for compliance and security

With Microsoft, you have the freedom to choose. Because Microsoft solutions share a common set of management, identity, virtualization, and development technologies, you can distribute IT across physical, virtual, and cloud computing models. Our solutions are built to give you the power to construct and manage clouds across multiple datacenters, infrastructures, and service providers – on terms that you control. That means you can keep a handle on compliance, security, and costs. And you can let your business needs drive your IT strategy, instead of having IT limit your options.

Microsoft private cloud lets you distribute IT across public and private cloud computing models.

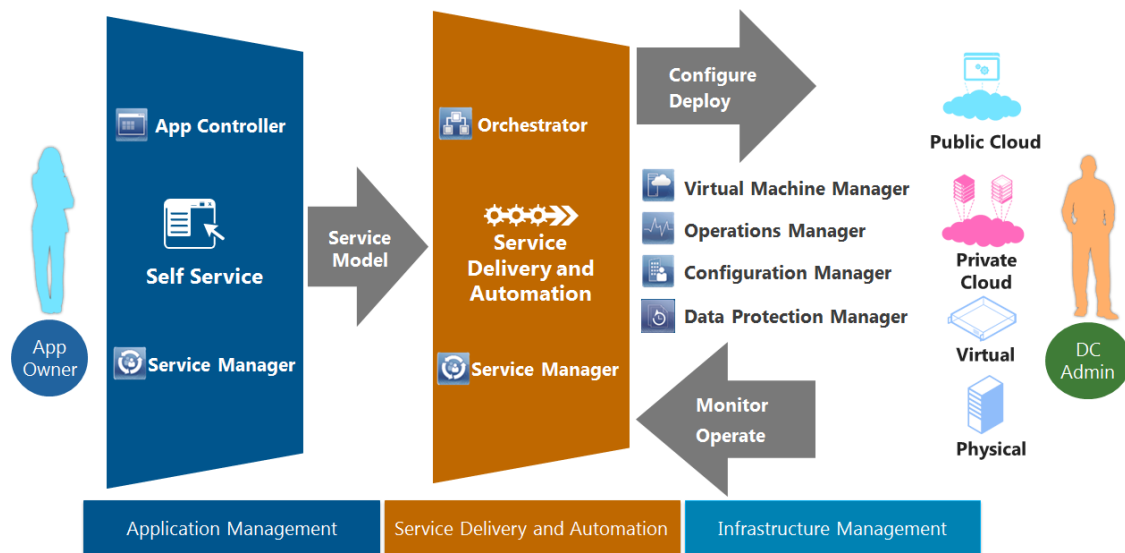
Private Cloud Features Comparison

In this section we look at the features comparison between Microsoft and VMware private cloud products. As seen earlier, Microsoft private cloud solutions are built using Windows Server with Hyper-V and System Center. To build a comparable private cloud using VMware, you'd need components from its vCloud Suite.

Let's discuss the capabilities required to deliver IT as a service using a private cloud computing model.

- First, you need a "simple" self-service experience to enable your application owners to specify their requirements.
- Next, you need a way to understand the topology and architecture of the application service in question. An application deployed in on an abstracted, or cloud computing model is called a "service". This would necessitate a "service model" that accurately binds the application's architecture to the underlying resources where it will be hosted.
- You will need a set of process automation capabilities to break down this application provisioning request into the enterprise change requests that need to be implemented. This could include setting up the underlying infrastructure and then a set of app configuration/release requests that need to be tracked.
- Next, you need a set of provisioning tools that actually configure and deploy the infrastructure and application layers.
- Once the underlying infrastructure and application service are deployed, they would immediately need to be "discovered" and monitored for reporting and health tracking.

Fig. 3: System Center 2012 SP1 & Windows Server 2012 Capabilities Enabling you to Deliver IT as a Service



You can use **Windows Server 2012** and **System Center 2012 SP1** to build a Microsoft based private cloud solution. System Center 2012 provides a single SKU for an integrated private cloud management solution by integrating eight separate component products into one unified solution with following components - App Controller, Configuration Manager, Data Protection Manager, Endpoint Protection, Operations Manager, Orchestrator, Service Manager, and Virtual Machine Manager.

To build a comparable VMware based private cloud solution, you will require multiple VMware and non-VMware products, including

- VMware vCloud Suite products: a bundling of various disparate products, including vSphere, vCenter, vCloud Director, vCenter Site Recovery Manager (SRM), vShield, vCenter Operations Management Suite (vCOPS) and vFabric Application Director
- Various other VMware products like VMware Service Manager and vFabric Application Performance Manager
- An OS like Windows Server 2012 for virtualizing apps.

Fig. 4: Microsoft and VMware Private Cloud Products Comparison

Private Cloud Tiers	Private Cloud Capability	Microsoft	VMware
Application Management	Application Self-Service	System Center 2012 SP1 Windows Server 2012	vCloud Suite 5.1
	Application Performance Management		vFabric Application Performance Mgr.
	Application Management across clouds		vCloud Suite 5.1
Service Delivery & Automation	IT Service Management & Service Catalog		VMware Service Manager
	Process Automation & Orchestration		vCloud Suite 5.1
	Capacity Management		
Infrastructure Management	Private Clouds Provisioning and Delegation		
	Data Protection & Disaster Recovery		
	Monitoring		
	Configuration & Compliance		
	Security		
	Integration with existing heterogeneous mgmt. tools		
	Heterogeneous Infra Support - physical & virtual		
	Multi-hypervisor Management Support		
	Identity Management		X
	Hypervisor Platform		vCloud Suite 5.1

Windows Server 2012 Hyper-V Advantages over vSphere 5.1

Whether you're looking to get better scale, performance and density, put a flexible infrastructure in place, or implement a highly available solution, you don't have to look beyond Windows Server 2012 Hyper-V. Windows Server 2012 Hyper-V provides the most complete virtualization platform in the market with breakthrough advances in server, storage, and network virtualization. Using Windows Server 2012 Hyper-V, organizations can deliver fully isolated, multi-tenant clouds, enable high scale and low cost data centers and provide the most manageable, extensible and interoperable platform for cloud.

Fig. 5: Windows Server 2012 Hyper-V Advantages over vSphere 5.1 Enterprise Plus

Capability	Resource	Windows Server 2012 Hyper-V	VMware vSphere 5.1 Ent Plus
Scalability, Performance, Density	Active Virtual Machines Per Host	1,024	512
	Memory Per Virtual Machine	1 TB	1 TB
	Virtual Processors Per Virtual Machine	64	64
	Maximum Nodes Per Hyper-V Cluster	64	32
	Maximum Virtual Machines per Hyper-V Cluster	8,000	3,000
	SR-IOV with Live Migration Support	Yes	No
Storage	Native 4KB Disk Support	Yes	No
	Maximum Virtual Disk Size	64 TB	2 TB
	Encrypted Cluster Storage	Yes	No
Secure Multitenancy	Open Extensible Switch	Yes	Closed
	Resource Metering	Yes	Chargeback Req.
Flexible Infrastructure	1GB Simultaneous Live Migrations	Unlimited	4
	10GB Simultaneous Live Migrations	Unlimited	8
	Live Storage Migration	Yes	Yes
	Shared Nothing Live Migration	Yes	Yes
	Network Virtualization	Yes	VXLAN Req.
High Availability	Virtual Machine Replication	Yes	Yes
	Guest OS Application Monitoring	Yes	API Only
	Guest Clustering with Live Mig & Dyn Memory	Yes	No

Software Defined Networking, Enabled in Windows Server 2012 and System Center 2012 SP1

Windows Server 2012 and the Virtual Machine Manager (VMM) component of System Center 2012 SP1 enable everyone to take advantage of the power of Software Defined Networking (SDN) in your datacenters. Our integrated solution provides unparalleled automation, flexibility, and control. The solution supports scalability for even the most mission-critical deployments. At the same time, we provide a standards-based and open platform that is supported by a rich partner ecosystem. Best of all, everything you need to deploy SDN is built right into these products, so you do not need to acquire separate management tools or product licenses.

Fig. 6: Hyper-V Network Virtualization Advantages over VMware Network Virtualization

Microsoft Network Virtualization	VMware Network Virtualization
<ul style="list-style-type: none"> • In-the-box feature, no separate add-on • Uses Network Virtualization General Routing Encapsulation (NVGRE), a Standards based tunneling technology built on IETF standard GRE protocol • Managed using System Center Virtual Machine Manager 2012 SP1 • Strong partner eco-system with silicon partners, switch extension partners, switch and load balancer partners and gateway partners • Partners committed to Windows Server 2012 Network Virtualization include Arista, Dell, HP, Emulex, Intel, Broadcom, IVO networks, Brocade, NEC, F5 Networks and others 	<ul style="list-style-type: none"> • Existing solution, VXLAN is a separate product add-on available from Cisco • With \$1.3B purchase of Nicira, roadmap of VMware network virtualization is unclear • Current supported solution, VXLAN and future solution, Nicira, use 2 different competing standards. Nicira uses a different standard than VXLAN called Stateless Transport Tunneling (STT). STT is not approved in IETF as yet¹. • If VMware standardizes on STT, they would have to build the same partner ecosystem that we have already built with our solution

¹ Nicira blog, 29th Feb 2012, Opening up the tunnels, [link](#)

Microsoft Enables Disaster Recovery in-the-box

Hyper-V Replica is an asynchronous virtual machine replication technology that is included in Windows Server 2012. It works with any server, network, or storage vendor and does not require any shared storage. Hyper-V Replica is tightly integrated with Hyper-V and Failover Clustering. With vSphere 5.1, VMware made replication available in-the-box similar to Hyper-V Replica, but it has severe restrictions as shown below.

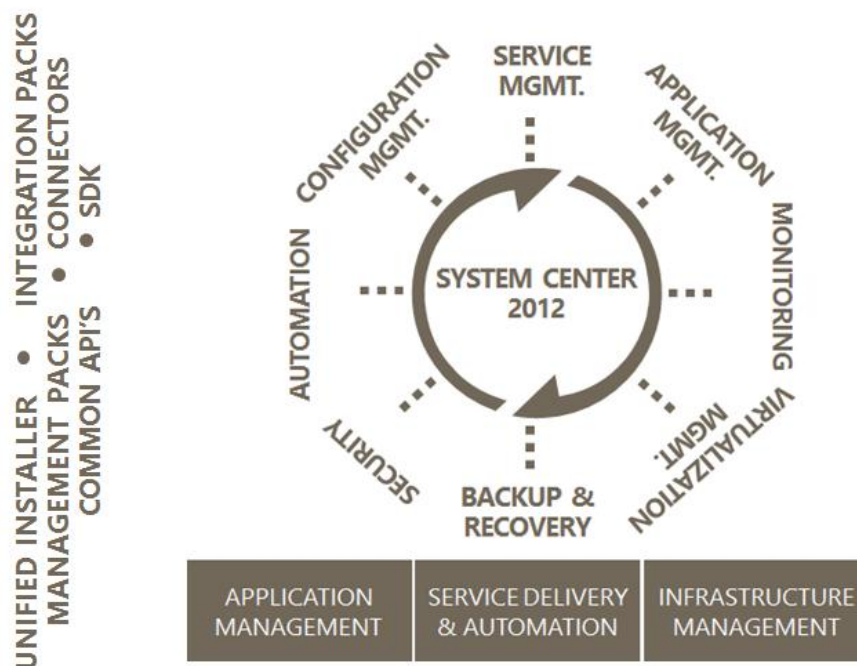
Fig. 7: Windows Server 2012 Hyper-V Replica Advantages over VMware vSphere 5.1 Replication

Capability	Microsoft Hyper-V Replica	VMware vSphere Replication
Availability	All editions	All editions
Architecture	In-the-box with hypervisor	Separate Virtual Appliance
Replication Methodology	Asynchronous	Asynchronous
RTO	5 minutes	15 minutes
Planned Failover	Yes	No
Unplanned Failover	Yes	Yes
Test Failover	Yes	No
Simple Failback Process	Yes	No
Automatic Re-IP Process	Yes	No
Point in Time Recovery	Yes, 15 recovery points	No
Orchestration	Yes, System Center Orchestrator	No

Comprehensive Physical, Virtual, Private Cloud, and Public Cloud Management Capabilities with System Center 2012

System Center 2012 enables physical, virtual, private cloud, and public cloud management using a single pane of glass. System Center 2012 captures and aggregates knowledge about systems, policies, processes, and best practices so that you can optimize your infrastructure to reduce costs, improve application availability, and enhance service delivery. Microsoft has a well differentiated position across all aspects of the management capabilities with System Center 2012, including support for multi-hypervisor management, third party integration and process automation, ability to manage applications via a single view across private clouds and Windows Azure, deep application diagnostics, insights, and remediation, and technologies like Server Application Virtualization, which enable you to abstract your applications from the underlying private cloud infrastructure. And most importantly, System Center 2012 simplifies complexity by providing deep cross-component integration through management packs, integration packs, connectors, API's, and SDK. To further simplify complexity, System Center 2012 provides a unified installer to install individual components and common UI and shared services.

Fig. 8: System Center 2012: Simplifying Complexity through Deep Component Integration



On the other hand, VMware vCloud Suite 5.1 is a license bundle with disparate products bundled together without deep cross-product integration as shown below.

[illegible]

- **No unified installer for the suite**
- **Loosely coupled** - every product integrates with vCenter, but not with each other
- **Closed architecture** - vCenter becomes the single point of failure
- **No common API style** - different API's for different products
- **Patchwork UI** - separate UI for each product

In this section, we first compare the private cloud licensing differences between Microsoft and VMware. Next, we illustrate the cost differences through a simple example of a private cloud with 300 VMs.

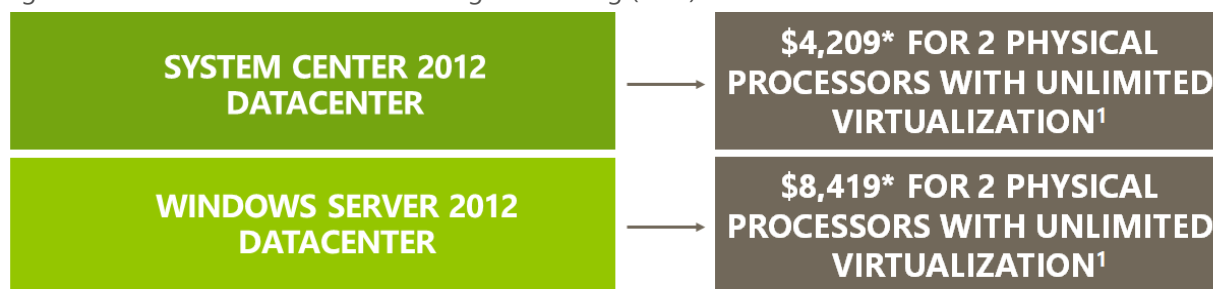
As mentioned earlier, you can use Windows Server and System Center to build Microsoft based private cloud solutions. To build a comparable private cloud solution on VMware technologies, you'll require the components from VMware vCloud Suite.

Microsoft Private Cloud || 15

prices for both VMware and Microsoft. We include Microsoft Software Assurance² (SA) for Microsoft Windows Server 2012, System Center 2012, and ECI Datacenter³ and VMware Production Support and Subscription⁴ (SnS) for all VMware products. Appendix A provides details on Microsoft and VMware U.S. suggested list prices.

There are two options to license Microsoft private cloud. You can license Windows Server 2012 and System Center 2012 individually like shown below. The datacenter editions of both these products offer unlimited virtualization.

Fig. 10: Microsoft Private Cloud Licensing and Pricing (USD)

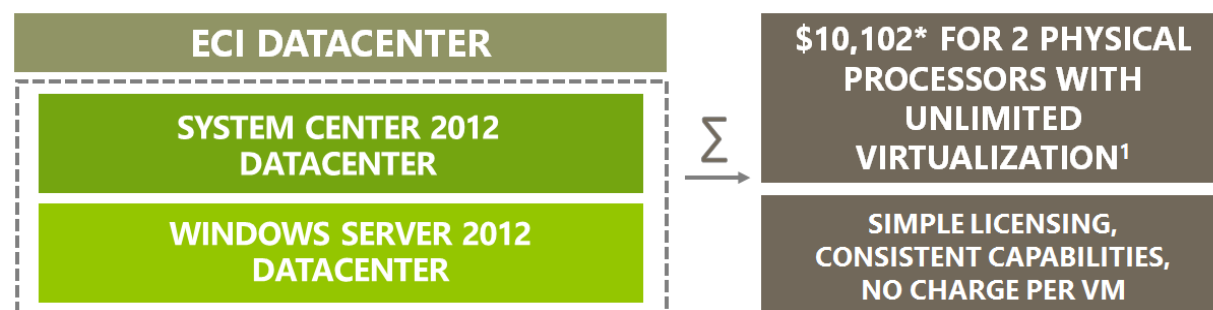


¹EACH LICENSE OF WINDOWS SERVER 2012 AND SYSTEM CENTER 2012 COVERS UP TO 2 PHYSICAL PROCESSORS. WINDOWS SERVER 2012 DATACENTER AND SYSTEM CENTER 2012 DATACENTER ALLOW UNLIMITED VIRTUALIZATION RIGHTS.

*PRICE SHOWN HERE INCLUDES 3 YEAR LICENSE AND SOFTWARE ASSURANCE COSTS UNDER MICROSOFT OPEN LICENSE PROGRAM, NO LEVEL PRICING USED, U.S. SUGGESTED LIST PRICES AS OF SEPTEMBER 2012, RESELLER PRICING MAY VARY.

As always, the best way to purchase Microsoft private cloud is through the Enrollment for Core Infrastructure (ECI). ECI provides customers with an easy and cost efficient way to purchase the Microsoft private cloud. ECI helps reduce licensing costs with a 20 percent savings as compared to purchasing Windows Server and System Center licenses individually. The licensing and pricing of Microsoft private cloud with ECI Datacenter is shown below.

Fig. 11: Microsoft Private Cloud Licensing and Pricing with ECI (USD)



¹EACH LICENSE OF ECI DATACENTER COVERS UP TO 2 PHYSICAL PROCESSORS AND PROVIDE UNLIMITED VIRTUALIZATION RIGHTS. ECI REQUIRES A 25 LICENSE MINIMUM INITIAL PURCHASE

*PRICE SHOWN HERE INCLUDES 3 YEAR LICENSE AND SOFTWARE ASSURANCE COSTS UNDER MICROSOFT OPEN LICENSE PROGRAM, NO LEVEL PRICING USED, U.S. SUGGESTED LIST PRICES AS OF SEPTEMBER 2012, RESELLER PRICING MAY VARY.

ECI OFFERS THE MOST COST EFFECTIVE MECHANISM TO LICENSE MICROSOFT PRIVATE CLOUD

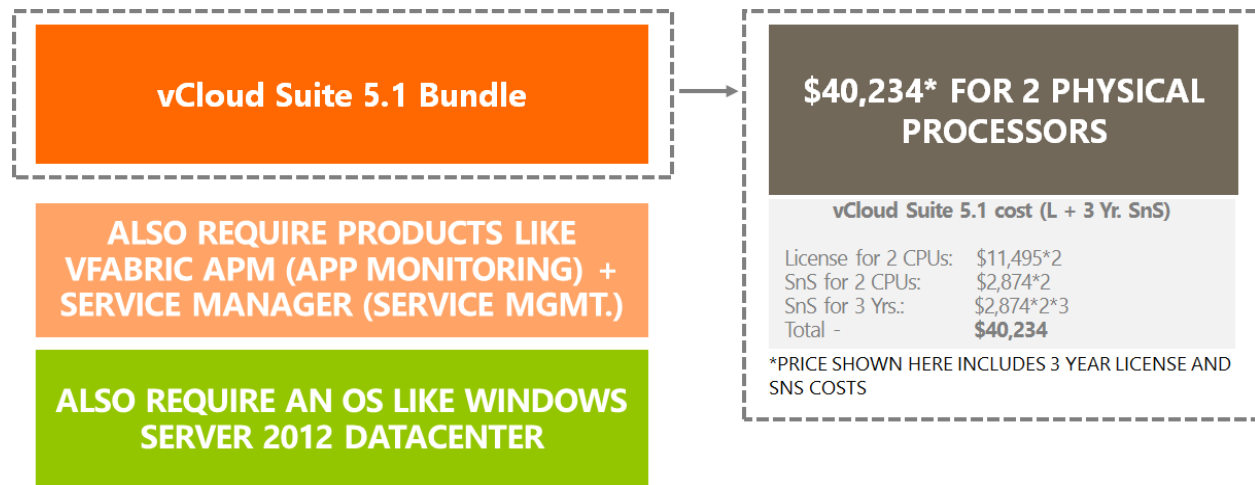
² Microsoft Software Assurance information [here](#)

³ Pricing for ECI Datacenter available in Appendix A, Windows Server 2012 and System Center 2012 pricing available [here](#)

⁴ Most of VMware products require at least 1 year of SnS. Production SnS is 25% of the then-current list price.

VMware private cloud is licensed through vCloud Suite 5.1, some other missing components in vCloud Suite 5.1 like Service Manager and vFabric Application Performance Manager (APM) and an OS like Windows Server 2012 for running guest VMs. Also note that you can **also choose to purchase individual VMware products on an a la carte basis, in which case most of VMware private cloud products are licensed on a per VM basis.**

Fig. 12: VMware Private Cloud Licensing and Pricing (USD)

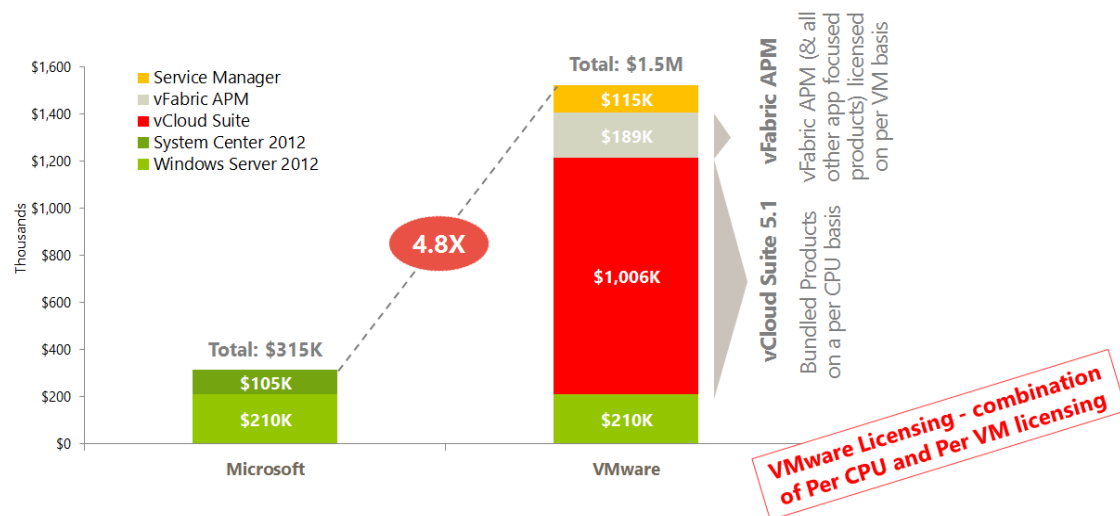


Private Cloud Cost Comparisons

In our analysis of private cloud costs between Microsoft and VMware, we only consider the software acquisition and support costs, including software licenses for virtualization, private cloud, management, and guest operating systems. We are not providing a complete datacenter or private cloud TCO (Total Cost of Ownership) analysis, as calculating operational costs, capital costs, and other datacenter related costs require complex calculations and are beyond the scope of this whitepaper. Additionally, complete datacenter TCO cost comparisons can get misleading because of different assumptions around operational and capital costs.

Let's say you want to set up a new private cloud with a fixed number of VMs. In our example, we consider an initial private cloud set up with 300 VMs. The costs below don't include hardware, storage, or operational costs. As shown below, with a fairly conservative consolidation ratio of 6 VMs per physical processor, **a VMware private cloud solution can cost around five times more than a comparable Microsoft private cloud solution over a period of one to three years.** In this example, we use Windows Server 2012 and System Center 2012 licenses for a Microsoft private cloud solution.

Fig. 13: Private Cloud Cost Comparison – Microsoft and VMware for 300 VMs

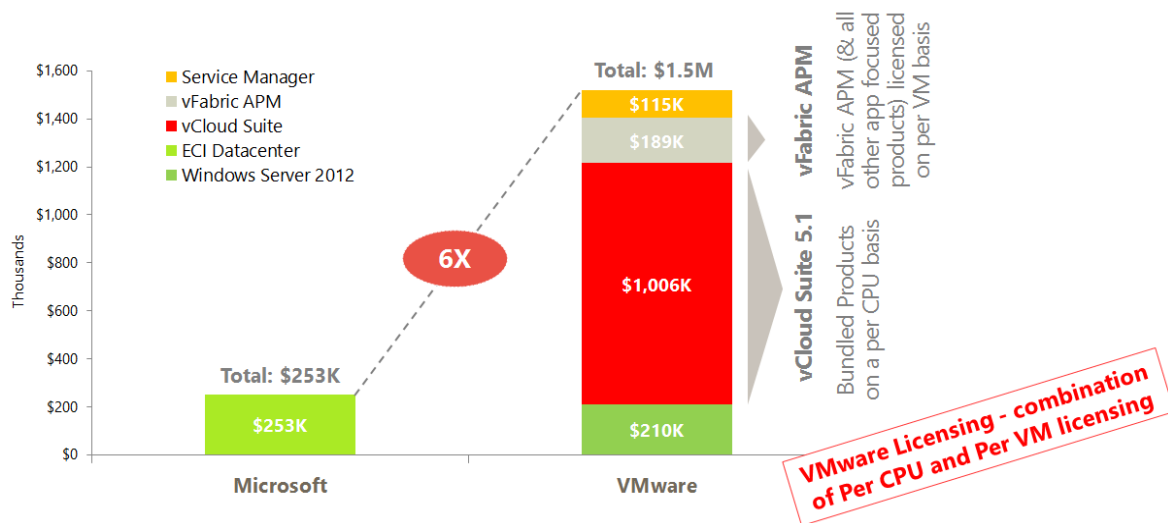


Assumptions

- Assumes 25 physical hosts with 2 CPU & six cores each, 300 VMs at 6:1 consolidation ratio
- Costs shown for 3 years for license & support, no discount applied on either sides, cost doesn't include hardware, storage or labor costs
- VMware cost includes Windows Server 2012 Datacenter edition for running guests
- Calculation uses licensing and support prices based on published U.S. suggested list prices for VMware and Microsoft as of November 2012

If you require buying more than 25 licenses of Windows Server 2012 Datacenter and System Center 2012 Datacenter, the best way to purchase these products is through ECI Datacenter. ECI helps reduce licensing costs with a 20 percent savings as compared to purchasing Windows Server and System Center licenses individually. In the example above, if you use ECI Datacenter on the Microsoft side, **a VMware private cloud solution can cost six times more than a comparable Microsoft private cloud solution over a period of one to three years.**

Fig. 14: Private Cloud Cost Comparison – Microsoft and VMware for 300 VMs with Microsoft ECI Datacenter



Assumptions

- Assumes 25 physical hosts with 2 CPU & six cores each, 300 VMs at 6:1 consolidation ratio
- Costs shown for 3 years for license & support, no discount applied on either sides, cost doesn't include hardware, storage or labor costs
- VMware cost includes Windows Server 2012 Datacenter edition for running guests
- Calculation uses licensing and support prices based on published U.S. suggested list prices for VMware and Microsoft as of November 2012

Conclusion

Cloud computing, both private and public, is fundamentally shifting the IT industry and a primary driver of that trend is economics. Customers that implement Microsoft private cloud solutions are well poised to realize many benefits. They will be able to leverage a hybrid cloud model and choose either a private or public cloud model depending on what best suits their requirements. For any private cloud model (on-premise or hosted) that they choose, they will have access to Windows Server 2012 Hyper-V groundbreaking capabilities and System Center 2012 SP1 complete, integrated management capabilities and will get a single pane of glass to manage physical, virtual, private, and public cloud environments. This will enable them to manage their infrastructure more effectively than with VMware's private cloud solutions. Finally our history, and ongoing, commitment to helping customers benefit from technology – at scale – will continue.

Our approach is focused on you – your apps, your heterogeneous environments, your need for a solution that scales with a public cloud that's real today. Our approach to cloud – is on your terms – and it will grow with you – not against you.

Visit this site – <http://www.microsoft.com/privatecloud/> – to learn more about our private cloud offerings.

Appendix A: Microsoft and VMware U.S. Suggested Price List

Microsoft Private Cloud Products Price List (Microsoft Open License Estimated Retail Price List ⁵ in USD, reseller pricing may vary)						
Product	Components	License Type	Base License Price (2 physical processors)	SA for 2 Years (2 physical processors)	SA for 3 Years (2 physical processors)	Total Cost (License + 3 year SA) (2 physical processors)
System Center 2012	Operations Manager Configuration Manager Orchestrator Data Protection Manager App Controller Virtual Machine Manager Service Manager Endpoint Protection	Per 2 physical Processors	\$2,404	\$1,203	\$1,805	\$4,209
Windows Server 2012	Windows Server 2012 Datacenter	Per 2 Physical Processors	\$4,810	\$2,406	\$3,609	\$8,419
ECI Datacenter	System Center 2012 Datacenter Windows Server 2012 Datacenter	Per 2 Physical Processors				\$10,102

Each Windows Server 2012, System Center 2012, and ECI license covers up to 2 physical processors. ECI requires a 25 license minimum initial purchase.

ECI helps reduce licensing costs with a 20 percent savings as compared to purchasing Windows Server and System Center licenses individually.

ECI Datacenter = (Windows Server 2012 Datacenter + System Center 2012 Datacenter) *.80

ECI Datacenter = (\$8,419 + \$4,209) *.80 = \$10,102

⁵ [Microsoft License Advisor](#), November 2012

System Center 2012 introduces the following licensing improvements:

- Standalone 'products' become components of integrated product Management Licenses.
- Software Assurance is included with all licenses.
- Server Management Licenses align to 'processor-based' model, each license covers 2 processors.
- The right to run Management Server software and supporting SQL Runtime are now included with every Management License. Management Server Licenses are discontinued.

VMware Private Cloud Products Price List (U.S. Suggested List Prices)					
Product	License Type	Base License Price	Production SnS for 1 Year*	Production SnS for 3 Years	Total Cost (License + 3 year SnS)
vCloud Suite 5.1	Per 2 Physical Processors	\$22,990 ⁶	\$5,748	\$17,244	\$40,234
vFabric Application Performance Manager (APM)	Per-VM	\$360 ⁷ per VM	\$90	\$270	\$630
Service Manager	Per-Instance	\$66,000	\$16,500	\$49,500	\$115,500

*Production SnS fee is 25% of base license price per year

⁶ vCloud Suite 5.1 U.S. suggested list price list price from VMware website as of November, 2012

⁷ vFabric APM U.S. suggested list price list price from VMware website as of November, 2012

Appendix B: Private Cloud Cost Comparison – Microsoft & VMware for 300 VMs

Private Cloud Environment	
Number of Physical Hosts	25
Number of Physical Processors (2 per host)	$(25 \times 2) = 50$
Number of VMs per Physical Processor	6
Total Number of VMs (VMs per Physical Processor* Number of Physical Processors)	300

Product	Components	License Type	Total Cost (License + 3 year SnS)	Calculation	Final Cost
vCloud Suite 5.1	vCloud Suite 5.1	Per 2 Physical Processors	\$40,234	$= \$40,234 \times 25$	\$1,005,850
vFabric APM	vFabric Application Performance Manager	Per-VM	\$630	$= \$630 \times 300$	\$ 189,000
Service Manager	Service Manager	Per-Instance	\$115,500	$= \$115,500 \times 1$	\$115,500
Windows Server 2012	Windows Server 2012 Datacenter	Per 2 Physical Processors	\$8,419	$= \$8,419 \times 25$	\$210,475
Total VMware Private Cloud Cost for 300 VMs					\$1,520,825

Microsoft Private Cloud Costs without using ECI Datacenter

Product	Components	License Type	Total Cost (License + 3 year SA)	Calculation	Final Cost
Not using ECI Datacenter	Windows Server 2012 Datacenter	Per 2 Physical Processors	\$8,419	$= \$8,419 \times 25$	\$210,475
	System Center 2012 Datacenter	Per 2 Physical Processors	\$4,209	$= \$4,209 \times 25$	\$105,225
Total Microsoft Private Cloud Cost for 300 VMs					\$315,700

Microsoft Private Cloud Costs using ECI Datacenter

Product	Components	License Type	Total Cost (License + 3 year SA)	Calculation	Final Cost
ECI Datacenter	System Center 2012 Datacenter Windows Server 2012 Datacenter	Per 2 Physical Processors	\$10,102	=\$10,102*25	\$252,550
Total Microsoft Private Cloud Cost for 300 VMs					\$252,550

A VMware private cloud with 300 VMs is 4.8X more expensive than a Microsoft private cloud without using Microsoft ECI Datacenter licensing.

A VMware private cloud with 300 VMs is 6X more expensive than a Microsoft private cloud when using Microsoft ECI Datacenter licensing.