



Market Analysis

Six Reasons Why Microsoft's Hyper-V Will Overtake VMware to Become the Major Player in the x86 Server Virtualization Marketplace

Executive Summary

EMC's VMware subsidiary has *become* the information technology (IT) industry's darling when it comes to providing software that virtualizes (pools) x86-based server hardware resources. VMware has experienced a meteoric and virtually unchallenged ride to the top of the x86 virtualization market, largely due to its strategic vision (VMware saw the vast growth potential for virtualization software when other competitors did not), its innovation, and its solid marketing/sales execution.

But *Clabby Analytics* (that's me) believes that VMware's free ride is about to come to an end. With the introduction of Hyper-V by Microsoft, VMware is about to experience some very serious competition from a vendor with deep pockets, with a massive worldwide marketing and sales organization, with major market penetration across Fortune 500 and small and medium business markets, and with extensive and complementary infrastructure and management product depth.

In this *Market Analysis* report, *Clabby Analytics* explains why I believe that Hyper-V will overtake VMware in just a few years to become the x86 server virtualization market's leader.

Background

This section explores what virtualization is, what benefits virtualization delivers, and the role of EMC's VMware in helping to form the x86 virtual server marketplace. It also describes how the virtualization market has evolved from the delivery of hypervisor technology (explained later) to the delivery of virtualization stacks complete with infrastructure and management components.

What Is Virtualization — and What Benefits Does It Deliver?

Virtualization is all about the pooling physical and logical systems resources. These resource pools can then be used for a variety of purposes including:

- *Improving system utilization* — by finding and pooling unused resources, IT managers and administrators can greatly improve overall system utilization. For example, servers running at 10% utilization can typically operate 60-80% utilization range when virtualized. Accordingly, enterprises see better return-on-investment (ROI) by virtualizing their x86-based servers — and additionally, they

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are able to forestall the need to acquire additional servers until existing servers are better utilized.

- *Production test beds* — applications under development, or new application updates, can be deployed in their own virtual partitions and tested on the actual production hardware on which it will eventually be deployed — without endangering real world production workloads. And,
- *High-availability failover* — instead of buying completely redundant servers for failover, IT managers can set-up failover partitions using virtualization software. This practice can help enterprises save their companies thousands, hundreds of thousands, or even millions of dollars in additional systems costs.

These represent the top three reasons why server virtualization has become extremely popular. Other reasons include software licensing consolidation savings, power consumption and data center cooling cost savings, and more...

The Role of VMware in Helping to Found the x86-based Server Virtualization Market

The practice of virtualizing systems resources has been around for over thirty years, originating on IBM mainframes in the 1970s. But few IT managers saw or understood the benefits of virtualization on x86 servers until VMware arrived on the scene. In 1998, VMware released a software abstraction layer between various operating environments (initially Windows, then Linux, and Mac OS X) that allowed multiple versions of the same operating system (OS), and/or multiple guest operating environments to share the same underlying hardware (this is how virtualization actually works). This abstraction layer is known as a “hypervisor”.

How the Virtualization Market Is Evolving

In the early days of the x86 virtualization marketplace, hypervisors were extremely important — not only for the functionality that they provided but also because of their lock-in characteristics. So, winning the hypervisor battle at a given company had the potential to ensure that a given vendor's hypervisor would proliferate throughout the company — and, as a result, it would pave the way to sell add-on infrastructure and management software. This is exactly what has happened to today's virtualization market.

IT buyers need to understand the importance of this situation. Hypervisors represent only a small chunk of revenue to virtualization software vendors. The big money is in the “add-on” business that consists of infrastructure and management software as well as related services!

Why EMC's VMware Will Lose Market Share to Microsoft's Hyper-V

Until now, much of the revenue in the virtualization marketplace has been reaped from the sale of hypervisors. But going forward, *Clabby Analytics* believes that the majority of virtualization revenue will be derived from the sale of add-on infrastructure and management software as well as services. And this does not bode well for EMC's VMware in the long run. Here's why:

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To play in the x86 infrastructure and management markets, VMware needs to directly compete with some very large and well established vendors including Microsoft, Symantec, IBM, Hewlett-Packard, Sun, BEA and others. Many of these vendors already have very deep infrastructure and management offerings. And several of them (particularly the systems hardware vendors) have one very huge, distinct advantage over VMware — they can do a far better job of managing PHYSICAL as well as virtual resources. As these vendors become more aggressive in the virtualization marketplace, VMware will see not only increased market pressure but also significant margin pressure. VMware will not go away in the near term, but IT buyers will soon find that other, more comprehensive offerings are available at less cost as alternative options to VMware.

The Six Reasons Why Microsoft's Hyper-V Will Overtake VMware

With a massive installed base, with a huge network of direct sales and indirect business partners, and with inexpensive product alternatives to VMware's hypervisor and related infrastructure/management software products, Microsoft is now prepared to compete head-on with VMware for market leadership in x86 systems virtualization. In fact, *Clabby Analytics* believes that Microsoft has six distinct advantages over VMware in the area of:

1. Price;
2. Packaging;
3. Depth;
4. Reach;
5. Control/integration; and,
6. Installed base.

The remainder of this section examines each of these differentiators in greater depth.

Price

Trying to do an apples-to-apples price comparison between Microsoft's Hyper-V and EMC's VMware is a little tricky because both environments are not exactly identical (VMware has several sophisticated virtualization features that Microsoft's Hyper-V does not have; Microsoft has better Windows integration and far stronger physical system control, etc...). Still, it is possible to compare and contrast these products by examining virtual machine infrastructure, management, and license costs.

Chart 1 shows that Microsoft's Hyper-V environment (that includes a 1 processor Windows environment, Server Management Suite Enterprise (SMSE), Operations Manager Server, Configuration Manager Server, and Data Protection Manager Server) ***costs about one-third as much*** as an almost equivalent VMware environment (that includes a Windows license, Virtual Center, and the enterprise edition of VMware's Infrastructure). Sources for this data included Microsoft, StorageMojo.com, and VMware's website at:

http://store.vmware.com/servlet/ControllerServlet?Action=DisplayPage&Env=BASE&Locale=en_US&SiteID=vmware&id=ProductDetailsPage&productID=83583000.

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Chart 1 — Hyper-V Environment vs. VMware Environment

Microsoft Environment

# Servers	1	5	10	20	50	100
1 proc DC Windows	2400	12000	24000	48000	120000	240000
SMSE	860	4300	8600	17200	43000	86000
2 yr SA	430	2150	4300	8600	8600	8600
Ops Mg Server (one time)	573	573	573	573	573	573
Config Mg Server (one time)	573	573	573	573	573	573
DPM Server (one time)	573	573	573	573	573	573
TOTAL COST:	\$5,409	\$20,169	\$38,619	\$75,519	\$173,319	\$336,319
	1 server	5 servers	10 servers	20 servers	50 servers	100 servers

VMware Environment

	1	5	10	20	50	100
1 proc DC Windows	2400	12000	24000	48000	120000	240000
VirtualCenter + 2 yr SA (one time)	7318	7318	7318	7318	7318	7318
Infrastructure Ent + 2 yr SA	8425	42125	84250	168500	421250	842500
	\$18,143	\$61,443	\$115,568	\$223,818	\$548,568	\$1,089,818
	1 server	5 servers	10 servers	20 servers	50 servers	100 servers

Over time, expect Microsoft's pricing advantage to create significant margin pressure on VMware. Microsoft is a volume product software manufacturer with a massive installed base. It will leverage this installed base, and price its products to out-function/undercut VMware's pricing.

The computing industry saw this same situation arise when Citrix built a leadership base for its terminal server products — only to have Microsoft enter the market and claim significant marketshare after Citrix pioneered the terminal server market (note that Citrix and Microsoft now partner and compete — and that Microsoft and Citrix are now working together to integrate Citrix XenServer under the Microsoft virtualization management

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umbrella. Almost the exact same situation is about to happen again — this time between VMware and Microsoft.

Packaging

Hypervisor packaging is a major advantage for Microsoft. The fact that Microsoft can deliver its hypervisor (Hyper-V) with every version of 64-bit Windows Server 2008 is a major distribution advantage in Microsoft's favor. (Note: a SKU is available for IT buyers to opt-out of Hyper-V [not have it packaged with the OS]. *Clabby Analytics* expects .0001 of the buyers to choose this option...). Further, installing Hyper-V is a breeze. A box simply needs to be checked during installation and Hyper-V becomes active.

By not requiring IT buyers to find/acquire/download additional virtualization software, the job of deploying and testing virtualization within a Windows Server 2008 is greatly simplified. VMware cannot counter this packaging advantage.

Depth

Product depth is the single biggest differentiator when comparing VMware and Microsoft x86 virtualization. It can be argued that VMware has several distinct advantages when it comes to managing virtual machines — most notably in the area of virtual machine mobility (the ability to move live virtual machines with active sessions underway — also known as “live migration”). Further, it can be argued that VMware has done a good job in packaging — allowing it to sell its add-on management and infrastructure software as integrated software suites. Examples include VMware Converter (which helps manage other virtual hypervisors — but currently doesn't manage Hyper-V); VMware Capacity Planner; and VMware ACE (used for desktop virtualization).

However, when it comes to the actual management of physical and virtual servers combined, *Clabby Analytics* argues that Microsoft is far deeper from a management and infrastructure perspective than VMware. Microsoft's widely-deployed and fast-growing Systems Center product portfolio currently provides a broad array of systems management tools including:

- Configuration Manager;
- Operations Manager;
- Data Protection Manager;
- Virtual Machine Manager;
- System Center Essentials;
- Capacity Planner;
- Mobile Device Manager;
- Service Manager;
- Online Services;
- Microsoft Application Virtualization; and,
- Desktop Optimization Pack.

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VMware is owned by storage company EMC. EMC does not have the comparable breadth and depth of systems management products that Microsoft has primarily because EMC is not in the systems management business. EMC's VMware can improve this situation by acquiring and integrating various systems management software packages available on the open market; by trying to build a portfolio of open software solutions; or by structuring deep partnerships with ISVs that offer systems management packages. But none of these options ensure that EMC's VMware will provide the level of integration that Microsoft — the maker of Windows — can provide as part of its combined System Center/Virtual Machine Manager portfolio.

The bottom line: EMC is not in the systems business. It does not have the charter or portfolio to manage systems to the degree that Microsoft has. Accordingly, VMware is not positioned to compete with Microsoft when it comes to combined virtualization/physical systems management.

Reach

Microsoft is a \$51 billion dollar software company with 79,000 employees. EMC is a \$13 billion dollar company with 37,700 employees. But, more importantly, EMC's VMware's revenue is just over \$1 billion (most of EMC's revenue is still derived from storage sales). In short, Microsoft is significantly larger than VMware.

Given its deep pockets, large installed base, and strong strategic commitment to server virtualization, Microsoft is aggressively positioning to capture market share from VMware. The company's approach involves:

- *Air cover* — Microsoft's Windows Server 2008 "Heroes Happen Here" program is already underway, and is paving the way for customer base/field awareness for Microsoft's virtualization infrastructure and management products;
- *Microsoft field training* — over 5000 field engineers have been trained in Hyper-V and related management products today, with several more to follow in the forthcoming months.
- *Compete group competitive analysis* — Microsoft's compete group (competitive analysis team) will specifically and continually analyze VMware market position, pricing policies, and functionality after Hyper-V release in order to provide Microsoft's field and business partners with the latest/greatest advice for competing with VMware;
- *Partners/ecosystem* — Microsoft will leverage its business partners and ecosystem in order to piggyback Microsoft virtualization solutions onto third party software solutions.
- *Services* — Microsoft's services organization will continue to build and package Hyper-V based virtualization services (including specialized turnkey solutions known as "solutions accelerators") to enable Microsoft customers to rapidly and inexpensively deploy Microsoft virtualization solutions.

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- *Best practices* — Microsoft has already started to build a best practices library around Hyper-V and System Center implementation, deployment, and utilization. This library will be greatly expanded.

Microsoft is a well-oiled machine, primed and ready to compete head on with VMware. Given the company's size, commitment, and resources — Microsoft can easily outreach VMware in all phases of product development and market deployment.

Control/Integration

Microsoft builds Windows, hence Microsoft controls Windows. Hyper-V is built in conjunction with Windows and can influence Windows OS developmental directions. VMware is a Windows add-on, does not have any direct influence over Windows' strategic development, and must wait for Microsoft to release its code in order to build on Windows. All of these circumstances give Hyper-V a position in the driver's seat and a competitive advantage over VMware when it comes to time-to-market with new functionality.

In addition, Microsoft has a vast library of systems management products that can be integrated with Hyper-V. VMware's library of systems management products is comparatively miniscule.

Installed Base

As mentioned earlier, Microsoft has a massive installed base, expected to cross 1 billion users by the end of 2008. By contrast, VM ware claims to have 100,000 customers (source: VMware's investor relations page). Clearly, Microsoft has a huge edge here...

Microsoft's plans to leverage this installed base by:

1. Making virtualization available to everybody as a very low cost, integrated option. Microsoft's plan is to offer many more virtualization products and much more virtualization integration at a lower price than VMware.
2. Enticing its customers to buy System Center because of the value it brings (simplified management, open Hyper-V APIs that enable 3rd-party system management vendors to easily add value, ...). And,
3. Using physical and remote management as the primary differentiator between VMware and Microsoft.

Hyper-V: Some Shortcomings

Hyper-V is not the be-all end-all for every virtualization need in the enterprise. As described earlier, Hyper-V does have some shortcomings when compared to VMware — specifically in the areas of live migration and in virtualization packaging and management. The live migration advantage will be addressed in the next revision of Hyper-V; and the VMware advantages in the areas of virtualization packaging and management (previously described on Page 4) will be addressed over time.

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Some research analysts also see the fact that Hyper-V is tied to releases of Microsoft's Windows server OSs as a potential disadvantage. Give that OS releases generally come out every two years, it can take quite a while to exploit upgrades and new functionality associated with Hyper-V. On the other hand, IT managers generally update their systems environment in cycles that are consistent with new OS releases (generally waiting a while to install new updates until a given OS is field proven). So waiting for new Hyper-V software releases that are tied to OS revisions may not be that big a deal after all. And for those who need the latest/greatest Hyper-V and Virtualization Machine Manager updates, Microsoft frequently makes improvements available to their customers for pre-release beta testing.

Summary Observation

Reporter swoon and information technology research analysts glow when describing the VMware's rapid revenue growth, its market share dominance, and its leading-edge virtualization-on-x86 technology advances. And much of this credit being given to VMware is well deserved. VMware jumpstarted and defined virtualization on x86 hardware — and accordingly paved the way for enterprises large and small to reap the benefits that server virtualization can provide (better total-cost-of-ownership through increased systems utilization; more cost effective application development, testing, and deployment; simplified high-availability and resource management; and so on).

Reporters and other research analyst firms also criticize Microsoft for being late to market with Hyper-V. *Clabby Analytics* will readily grant that Microsoft is late to market with Hyper-V and accompanying infrastructure/systems management products. But there were several good reasons for this tardiness:

- Connectix was not the right product (a bolt-on as opposed to a piece of Windows architecture). BUT Microsoft obtained excellent expertise from this acquisition....
- The initial performance of this product needed improvement. The first time Windows Hyper-V was run it took 1.5 hours to boot Windows. Now Hyper-V, at 640KB in total size — is lightening fast...
- Tuning was needed to optimize Hyper-V on x86 hardware.
- Stability was a primary focus (especially in the area of I/O handling).
- There were thousands of testing scenarios that had to be examined before Microsoft could release its code (Microsoft needed to know what was really supported in application, validate the OS interactions, etc.). And,
- All of this was going on while Windows Server 2008 was evolving (changes at the core OS level and technology development going back and forth).

Frankly, most IT managers would rather have a fully tested and optimized product when delivered, rather than a half-baked, half-tested virtualization solution. So waiting for Microsoft to test and certify Hyper-V may outweigh concerns about its tardiness.

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The big question that is now on the table is whether VMware can maintain its current market leadership position. And *Clabby Analytics* has concluded that VMware may not be capable of handling the increased competition that Microsoft is about to apply. This *Market Analysis* report showed six key areas (price; packaging; depth; reach; control/integration; and, installed base leverage) in which VMware will face head-on competition with Microsoft in the long term.

Some reporters, research analysts, and IT managers will challenge the findings in this report — and take exception to some of the conclusions that I have drawn. As the criticism rains in, consider this: this report was not meant to bash VMware. It is meant to describe a scenario that *Clabby Analytics* believes is highly likely to evolve. *Clabby Analytics* is firmly convinced that Microsoft, with Hyper-V and System Center, will overtake VMware in market share at some point over the next three to five years.

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