

White Paper



Taming Virtual Server Sprawl

the darker side of server consolidation

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A Short History of Server Virtualization

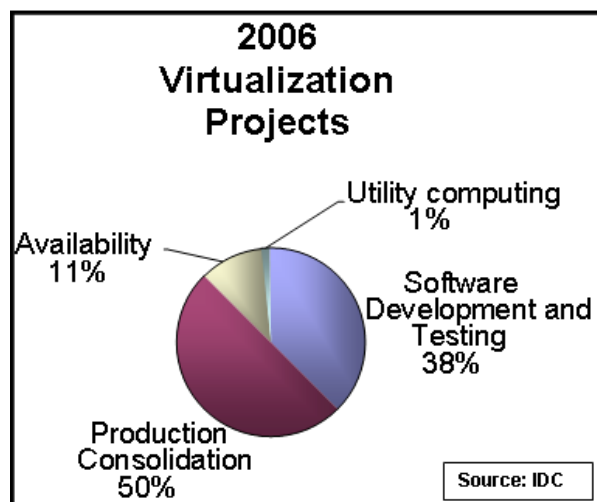
“Server virtualization is now considered a mainstream technology among IT buyers.”

— IDC, 2007

In a few short years, server virtualization has gone from mainframe oddity to mainstream technology. The acceptance of virtualization by IT buyers has largely been driven by the technical innovation and marketing acumen of one company—VMware.

Since 2001, VMware has popularized server virtualization while growing 2006 revenues to \$709 million and achieving a rare liquidity double—a \$625 million acquisition by EMC in 2004, then a planned IPO in 2007.

Like many hot companies, VMware quickly inspired copycats. Foremost among the commercial wannabees is Microsoft, whose Microsoft Virtual Server is regarded as still-inferior to VMware but a formidable challenger nonetheless, especially in the long term. More unconventional has been the rise of open source software for virtualization from the Xen and KVM projects, which have spawned commercial outfits vying as alternatives to VMware. Yet in mid-2007, VMware remains the undisputed champion of virtualization.



Drivers of Virtualization

Server virtualization first gained traction in software development and testing environments, where 70% of implementations were found in 2003. But by the end of 2005, IDC reports that 50% of virtual environments were running production applications on consolidated servers.

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“Companies are running out of space in their data centers,” says James E. Price III, CEO of Florida-based Fairway Consulting Group, an IT reseller and consulting firm. “Even if companies have rack space, often they do not have the additional power or cooling capacity. We frequently encounter situations where a company could not expand a facility because the power company could not bring in any more power.”

Indeed, Gartner Group predicted in 2006 that half of data centers will run out of power and cooling by 2008. In addition, IT departments are finding that demands for new services outstrip their budgets, so server virtualization offers a way to do more with the same hardware. Faster deployment is another key driver.

“We are the only division in our company that for the past four years that has been able to provide a server in hours instead of 6-8 weeks for a project that was not scheduled,” says Daniel Weiss, IT lead analyst for a division of a European multinational that has used VMware for four years.

Looking ahead, disaster recovery/business resiliency and utility computing will be the new growth engines for server virtualization, IDC predicts. In 2006, those two areas accounted for 22% of virtualization spending. By 2010, IDC expects them to hit 64%.

QUALCOMM agrees. “We’re looking to enhance the backup and restore of virtual machines,” says Paul Poppleton, senior staff engineer with the giant wireless technology provider. “Also doing online snapshots for people to roll back to and enhance Disaster Recovery around VMs.”

Virtualization Becomes Virtual Sprawl

“Managing sprawl is a constant thing we’re dealing with.”

— Paul Poppleton, senior staff engineer, QUALCOMM

IDC estimates that 2.3 million virtual servers were deployed in 2006. This rapid proliferation has created virtual sprawl, a new problem exacerbated by immature management tools for VMs. For QUALCOMM, server sprawl is global—the San Diego-based firm has 1,500 VMs deployed and employs more than 9,300 in 51 locations.

“Manual management was a nightmare with thousands of VMs. Resource balancing had become a daily occurrence,” Poppleton says. “We were reacting to people complaining about performance problems, Band-Aiding it.”

QUALCOMM is hardly atypical. IDC reports that 62% of IT professionals currently implementing server virtualization are looking for a unified management tool. Without one, managing virtual sprawl is a major headache.

The Many Pains of Virtualization Management

“Doing shares manually is like a black art.”

— Roger McIlmoyle, director of technology services, TLCvision

Enterprises face multiple challenges in managing VMs. Often they don’t know which VMs are running on which physical host. How applications are performing on VMs

remains a mystery. Tweaking VMs and applications for greater system performance challenges IT managers.

Enterprise systems management software from the Big 4 (IBM, HP, CA and BMC) offers scant data about performance of virtual machines. Even VMware’s management tools come up short.

IDC’s 10 prerequisites for Virtualization 3.0

Must Haves

- Image portability
- Virtual image management (CMDB)
- Virtualized storage
- Local area balancing
- Security model that migrates with VMs

Optional

- Policy-based provisioning
- Wide area load balancing
- Ability to automatically reconfigure network on the fly.
- Usage metering

“We couldn’t find the best way to balance performance of the hosts. We couldn’t get in and manipulate the shares quickly,” says Roger McIlmoyle, director of technology services at vision care provider TLCvision in Ontario, Canada. “We tried to do it manually, but it didn’t work.”

McIlmoyle says even the latest version of VMware’s virtualization software, VMware Infrastructure 3, falls short of constant, dynamic management of VMs and hosts.

Reseller Ty Schwab of Blackhawk Technology Consulting, a virtualization consultant based in Eugene, Ore., concurs. “Manual management is time-consuming—you’ve got to dig deep with your VMware-certified engineers and then you get only rudimentary data. VMware’s reporting tools are still basic, and you can’t customize them.”

Price of Fairway Consulting differs—to a point. VMware’s ESX server does a decent job of optimization as long as the user keeps the default settings for workload management, he says. “But inevitably things change—an environment grows unexpectedly or in an ad hoc manner that significantly impacts resource demands.”

IT Requirements for Virtualization Management

“The long-term value of virtualization depends on integrated management.”

— Yankee Group, 2006

Foremost among enterprise requirements on virtualization management is the optimization of shares on physical machines that are dedicated to specific virtual machines. VMware sells an add-on tool called DRS (Distributed Resource Scheduler) that balances workloads, but users seek more sophisticated, dynamic optimization.

“For VMware particularly, and Microsoft, Virtual Iron and Xen to an extent, one core weakness is their inability to schedule effectively under a load,” said Fairway Consulting’s Price.

Users articulate this requirement as the ability to balance resources automatically and dynamically because manual processes are cumbersome and costly.

Cost considerations are another issue, exacerbated by VMware’s aggressive pricing. If users can cram one or two more VMs onto a host, they save on both hardware and software licenses.

IDC’s Server Virtualization Survey 2006 asked users their top three areas of savings. 83% cited server hardware, 53% real estate, and 40% power and cooling. Only 35% cited savings in “simplified management,” an area IDC included in “Abstract benefits and future areas of focus.”

Other enterprise requirements include:

- Better tools to generate more detailed, customized reports more easily. The goal: More data for informed decisions.
- Disaster recovery enhancements for back-up and restore.
- VM security management.
- Interoperability across VM platforms.

No unanimity has emerged on the desirability of a single management environment to manage both physical servers and VMs from a single console.

Market Landscape of Virtualization Management Providers

A look at virtualization management market today reveals three groups of vendors.

First, the traditional systems management vendors—IBM Tivoli, CA Unicenter, BMC and HP OpenView—have shown tepid enthusiasm in adding virtualization management features.

“Products from the old vendors do very cursory justice to integrating the virtual with the physical,” said Price of Fairway Consulting. “So their consoles show virtual elements but limited to up/down status. And they don’t integrate network and storage.” He builds integrated physical-virtual consoles for his clients.

VMware and other VM vendors, the second segment, haven’t yet delivered the full range of management features that enterprises require, even in VMware’s latest Virtual Infrastructure 3 offering. Analyst firm Saugatuck, in a June 2007 note, puts VM-makers delivery on management capabilities in the future: “[They] are developing virtualized system and infrastructure

management offerings that can enable enterprise-wide, holistic, policy-based management.”

The third segment consists of young, third-party start-ups that are plowing into virtualization management, fueled by impressive sums of venture capital. The start-up crowd sounds much the same in marketing message but delivery remains uneven.

Interestingly, no open source VM management software has gained traction, in part because the business model around open source Xen virtual machines is for companies to make money on commercial management software.

Finally, among both start-ups and incumbents, there exists a subtle but critical distinction between managing virtualized environments and monitoring them. Virtualization management software identifies the problem, solves it and informs a human IT manager. Monitoring software identifies problems, alerts the relevant person and calls it quits. Some virtualization monitoring vendors let customers write scripts to handle common situations. Virtualization management software is an enterprise application, not the tools or point products of monitoring vendors.

By far the majority of data center virtualization software falls into the monitoring tools category, not management applications.

Virtugo virtualSuite: A Management Platform for Virtualization

In that market, neither VMware’s built-in management nor manual optimization nor system management software from the usual suspects fits the bill for the IT manager tasked with optimizing a VMware environment.

One offering to emerge from the third-party virtualization management segment is virtualSuite from Virtugo (www.virtugo.com). It offers a solution that optimizes hosts and

VMs, measures performance, and produces reports. Its key components:

- Optimize provides real-time allocation of CPU, memory and disk shares.
- Perform displays real-time and historical performance metrics.
- Connect links VMware to Microsoft Operations Manager (MOM).
- Capacity enables capacity planning, usage and performance modeling.
- Meter tracks usage for allocation and chargeback.

Optimize manages VMs dynamically and instantly to squeeze the most out of a virtualized environment. Optimize allocates processor, memory and disk shares for each VM, and it complements VMware’s DRS software by automatically retuning shares when peak loads subside.

“The Virtugo product allows companies to avoid hitting the glass ceiling at 60% utilization,” says Fairway’s Price. “With Virtugo, the ceiling is at 98 or 99%, resulting in better virtual machine performance and system scalability.”

In addition, Optimize allows IT managers to prioritize VM service levels to support business priorities. The result: IT services are tied closely to business processes.

The Perform product provides systems visibility and asset management of both hosts and VMs, helping to reduce virtual sprawl. It also simplifies management reporting and monitors how well business applications are performing.

How Customers View virtualSuite

“Real-world physical configurations often do not make sense in the virtual world.”

—James E. Price III, CEO,
Fairway Consulting Group

“By incorporating virtualSuite into our VMware environment, we saw an immediate ROI and increased performance on each

server,” says early adopter Weiss of the European multinational. “This allowed us to increase the workload on each physical box to new levels without reducing the performance of the entire infrastructure.”

With virtualSuite, QUALCOMM squeezes more VMs onto a physical host, cutting costs. Blackhawk’s Schwab calls virtualSuite a “one-of-a-kind product,” adding:

“Virtugo offers me the products that can drill down deep to find out CPU usage

information and can easily create reports to make informed decisions. You don’t have to be a systems administrator to get a report. When I get an IT manager who wants to generate reports on the fly, virtualSuite is the only option.”

Fairway’s Price agrees: “Many products will identify the problem, provide metrics, but few actually fix the problems dynamically. With Virtugo, install now and feel better immediately.”

About Virtugo

Virtugo Software (www.virtugo.com), based in Beaverton, Oregon, is the leading provider of software technologies for the virtual computing platform. The company’s products enable on demand or utility style computing utilizing server virtualization technology, while increasing hardware utilization to better enable decision making, performance measurement, capacity planning, resource optimization and usage metering.

About FactPoint

The FactPoint Group (www.factpoint.com) is a Silicon Valley-based market research and consulting firm specializing in the early adoption of new technologies. The FactPoint Group has been producing world class research, analysis and consulting since 1993. FactPoint’s virtualization research began in June 2005 with an early reports on Utility Computing. Among its on virtualization research clients are Hitachi, NTT DATA, Availigent and Levanta.