'Hyperversity' Rages On
KVM grows; VMware, Hyper-V, Xen stable

'Hyperversity' (a mash up of 'hypervisor' and 'diversity') is the term we've coined to describe data centers with multiple hypervisors in their infrastructures. In our latest x86 Data Center Survey, we find that two-thirds of our enterprise respondents are using at least two virtualization mechanisms, and those selections are based upon technical and/or cost considerations. Relative share between the major hypervisors remained stable except in the case of KVM, which saw a modest increase in both overall use and the number of users who have standardized on the KVM hypervisor.

Conventional wisdom, not to mention self-serving advice from virtually every vendor, says that data centers should strive toward standardization as much as possible. They should use the same systems, software, and tools throughout their infrastructures in order to minimize costs and make it easier for data center workers to become highly skilled admin ninjas.

While vendors and pundits continue to preach the standardization religion, customers mostly don't care. The mindset out in the real world is that they'll buy the right tool for the job in question, meaning the one that comes closest to solving their problem in a reasonable amount of time and at acceptable cost. They won't standardize on anything unless it's squarely in their best interest to do so.

Using our semi-annual data center surveys as a tool, we've tracked a trend for the past several years: customers aren't moving to standardize on a single brand or type of server, operating system, or even x86 hypervisor.

In our fifth annual x86 Data Center Survey (2011-'12 edition) we asked a lot of questions about customers' IT infrastructures in general, honing in on their x86 platforms. (We've included survey details and demographics on the last page of this report.) We devoted an entire section of the survey to x86 virtualization usage and benefits, virtualization vendors, and virtualization management.

Our survey approach is a bit unique. Rather than seek out CIOs and upper management, we reach out to folks who work in enterprise data centers. We've found that these people have a much better feel for how their organizations are actually dealing with the myriad of challenges facing them on a daily basis. They know what's receiving the most attention, what's slipping between the cracks, who's in, and who's out – and they're not shy about sharing their opinions with us.

While we've always asked detailed questions about x86 virtualization adoption levels and the benefits customers are realizing (or not realizing) from virtualization, we only began asking about usage of specific virtualization mechanisms in the 2009-'10 edition of our x86 Data Center Survey.
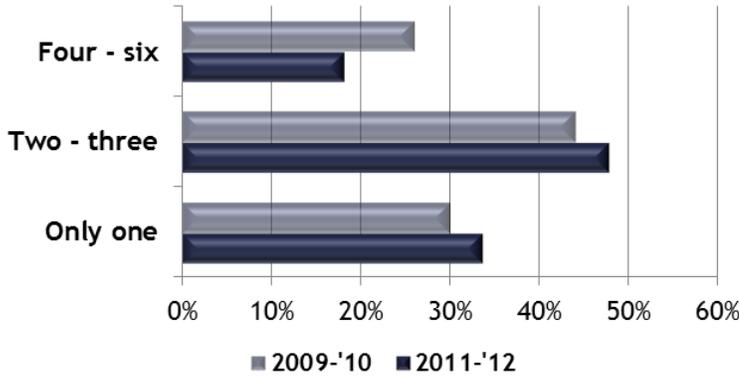
We were somewhat surprised to find that customers were using a wide range of different hypervisors to a greater extent than we anticipated.

Number of x86 Hypervisors Currently Used

We asked customers who are using x86 virtualization whether they're using any of the major branded x86 hypervisors, and to what extent.

Given that VMware is far and away the dominant x86 hypervisor and is almost synonymous with x86 virtualization, we figured we'd see just a smattering of usage for the other candidates.

Back in 2009-'10, we didn't expect to find that two-thirds of our survey respondents were using two or more hypervisor packages. But further investigation in our latest survey, along with discussions with clients, reveals that customers have good reasons to use multiple hypervisors. Most of them cited technical and cost issues as the major factors, also saying that they don't anticipate moving to a single hypervisor any time soon.

Comparing the data from both surveys (above), there appears to be a gradual consolidation trend, with the number of users standardizing on a single hypervisor rising and the number of those using multiple mechanisms falling commensurately. However, this probably isn't the case.

Examining demographic data from both surveys shows that customers who are using a single hypervisor tend to…

- Be smaller organizations. 52% had fewer than 1,000 employees, and 72% had less than 4,000 employees. In the survey overall, only 40% of respondent organizations had less than 1,000 employees, and 59% employed fewer than 4,000.

- Have smaller IT infrastructures. 57% of respondents using only one hypervisor had less than 250 physical x86 systems, and 80% had fewer than 1,000. In the survey as a whole, 43% of respondents had fewer than 250 systems, and 62% had less than 1,000 physical x86 servers.

- Have less diversity in their IT infrastructures. They tend to be Windows-centric, with less Linux and commercial Unix than other respondents. 67% of single-hypervisor customers said that Windows Server is 'heavily prevalent' in their data centers.

Larger firms with more extensive and varied IT operations tend to use more hypervisor packages in their infrastructures. These facts held true in both of the survey periods. What's changed is the demographic mix between the two survey respondent bases.

In our 2011-'12 survey, we captured a larger percentage (59% vs. 55%) of smaller organizations (4,000 employees or smaller). Physical server counts per organization were also slightly lower in our latest edition of this survey compared to our 2010 version. We believe that what looks like a trend toward hypervisor standardization is really just the difference between the survey respondent bases.

As part of the 2012 survey, we asked a set of questions probing customers' reasons for using multiple hypervisors. Are they merely kicking the tires on various packages before settling on a standard, or are they using multiple packages for technical or cost reasons? We'll be discussing these results in future reports, but briefly, most of our respondents are using multiple hypervisors for technical and business reasons and don't see their organizations standardizing on one any time soon.

Hypervisor Vendor Prevalence

A large majority of enterprise data centers we surveyed have virtualized to some extent, and as we expected, the vast majority of those are using VMware.

As can be seen on the chart below, just over 80% of the IT shops in our survey are using VMware on at least some systems in their infrastructures. They held roughly the same percentage of usage in both the 2009-'10 and 2011-'12 editions of this survey.


Hypervisor Usage Over Time
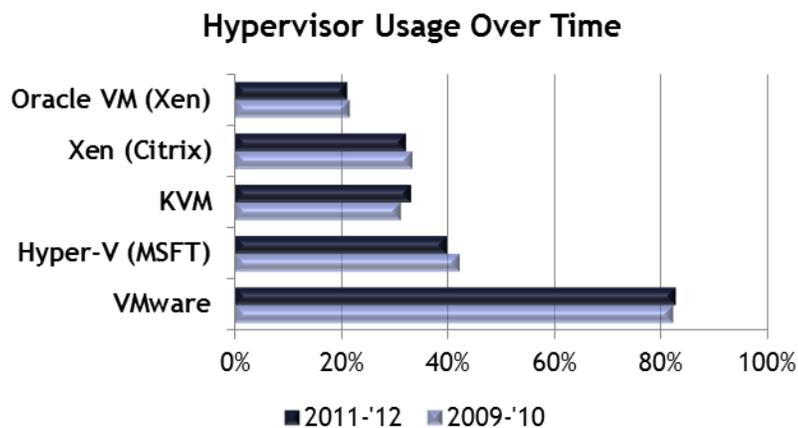
While VMware is the most prevalent, they don't have a lock on the enterprise hypervisor market; other mechanisms are getting plenty of use as well.

Microsoft's Hyper-V product is the second most widely used hypervisor – around 40% of our enterprise data center respondents use it on at least some systems. This percentage has held roughly steady over both survey periods.

The major Xen variants from Citrix and Oracle are used by 32% and 21% of our survey respondents respectively. These percentages are virtually the same in both our 2009-'10 survey and in our latest 2011-'12 edition.

Hypervisor Preference: Standard Solution
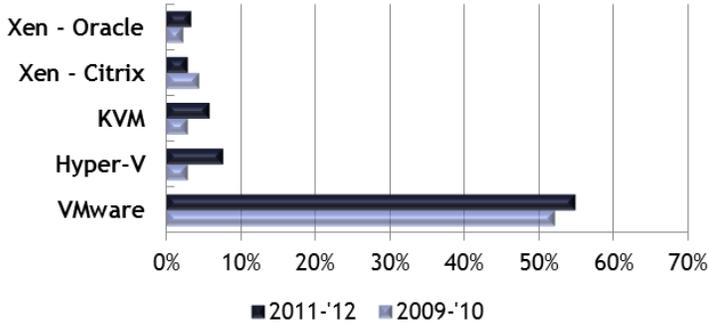
The only virtualization mechanism showing growth overall is KVM, which moved from 31% to 33% prevalence in our two surveys. This clearly isn't a huge jump, but it's more than we've seen for other solutions.

We also see some incremental change when it comes to hypervisor standardization. As can be seen on the chart at left, VMware has become slightly stronger in terms of being the standard virtualization solution for our enterprise data respondents, moving from 55% to 57%.

But the magnitude of VMware's sizeable lead obscures the moves in the back of the pack. Looking at the same data, but with VMware removed, more clearly highlights the changes in standardization rate among the other hypervisor competitors.

Customers standardizing on Oracle's version of Xen moved from 2% to 3% during the

Hypervisor Preference: Standard Solution
### (not including VMware)

two survey periods. For Citrix Xen, we see a small drop from 4% to 3%. Both of these changes are probably due to differences in the survey respondent bases.
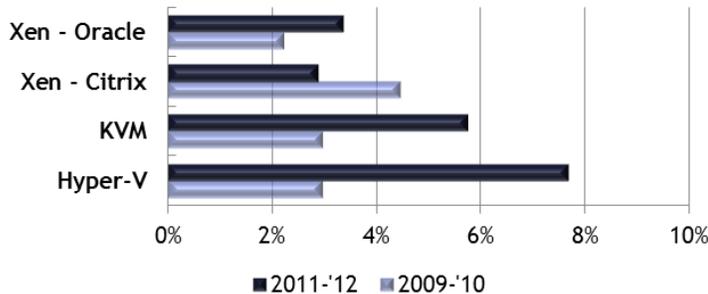
But when it comes to KVM and Microsoft's Hyper-V, we do think that we're seeing real growth. The number of customers who use Hyper-V as their standard solution more than doubled, moving from 3% to almost 8%. KVM also saw its customer standardization rates double from 3% to 6%.
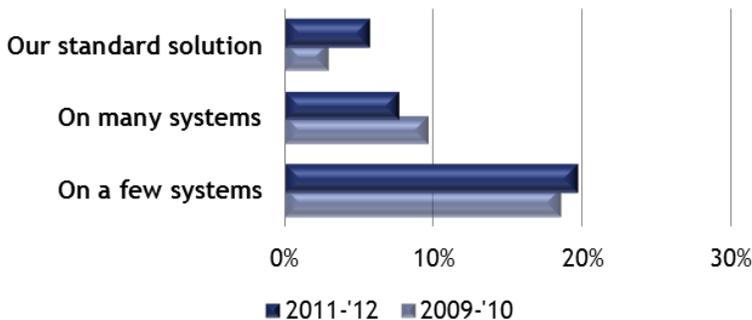
In fact, KVM is the only hypervisor in our last two surveys to notch gains in both the number of overall users **and** in the number of users adopting it as their standard go-to hypervisor.

Virtualization Suite: KVM

These are modest gains to be sure, with overall usage increasing by 2% and standardizers growing from 3% to 6%.

While this isn't what we'd call "house on fire" growth, it's certainly a positive

development for KVM and, given other KVM-related activities, might signal the beginning of a growth spurt.

Will Open Virtualization Alliance Spur KVM?

KVM, the brainchild of software start-up Qumranet, started life in 2005 and rapidly gained acceptance as a solid Linux virtualization option with inclusion in the 2.6.20 Linux kernel in 2007. While Qumranet was purchased by Red Hat in 2008, KVM remains an open source project.

Its capabilities have come a long way in the past several years, with support for a wide range of Linux, Windows, and even Unix guest operating systems. KVM also provides some of the most popular features of VMware and Xen, like live migration and the ability to host large (up to 16 CPU) SMP guest instances.

KVM is different from the others in a couple of crucial ways. It's the only hypervisor that's actually part of Linux and uses the Linux scheduler and memory manager. Both VMware and Xen are external hypervisors and therefore need to have control mechanisms for the entire system, making them larger and more complex.

Last year, industry heavyweights including Intel, HP, IBM, and Red Hat – along with a host of other players – joined together to create the Open Virtualization Alliance (OVA), an organization geared to encourage open source hypervisor adoption and development.

Virtualization is becoming universal, and it's leading the way toward widespread public and private cloud computing. The OVA is seeking to ensure that a dominant hypervisor player like VMware doesn't control the development of these new usage models or hinder their adoption.

The alliance believes that its active support of open source hypervisors like KVM will show the industry that these are viable alternatives that are here to stay. This, in turn, should accelerate technical development and ecosystem growth. And their efforts might be paying off – the announcement of the OVA put KVM in the news last year and, at least in our survey, we've seen KVM usage rates increase significantly.

Summary

Despite VMware's big lead, competition in the hypervisor space is vigorous these days. Microsoft is using their heft to drive Hyper-V into their sizeable installed base. Commercial and open source Xen and KVM variants give customers alternatives that are technically sophisticated and also available as fully supported packages.

Rather than selecting a single hypervisor and virtualization suite provider, customers are picking and choosing what they feel are the best tools for their unique needs. This is, of course, exactly the right approach.

As competition continues, we can expect continual improvement from all of the major hypervisors. Single-vendor markets tend to stagnate over time, and customers end up paying more than they really should for what often turn out to be mediocre products. Fortunately, there's enough competition in virtualization today to keep this situation from developing.

The members of the OVA, with their push behind KVM and open source virtualization, have shown that they're highly interested in making sure that the hypervisor market remains competitive and customers continue to have viable alternatives. While they're not doing this out of purely altruistic motives – they obviously want to blunt VMware's market power – the interests of the OVA dovetail well with the best interests of the market. The more competition we have in this or any other market, the better the resulting products.

GCG 2011-2012 x86 Data Center Survey Demographics

Our surveys are aimed at actual data center workers. We believe that they have the best handle on how their organizations use technology in general as well as specific hardware, software, and services. They have multi-product and multi-vendor experience, and they understand what their businesses and IT operations are planning for the future.
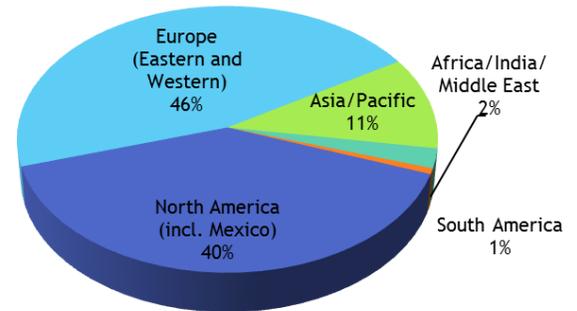
Organization Size - Total Employees

- 10,000 + 30%
- 4,000 - 10,000 10%
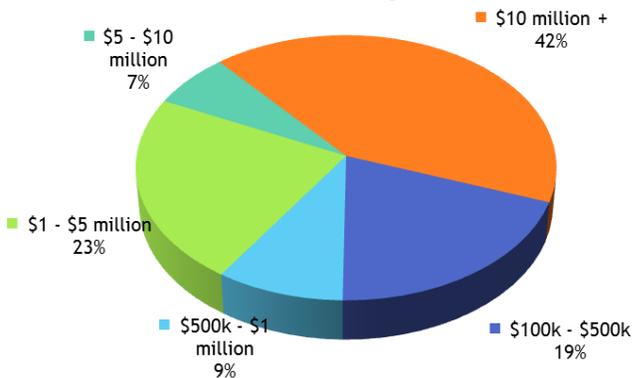- 1,000 - 4,000 12%
- Under 1,000 39%
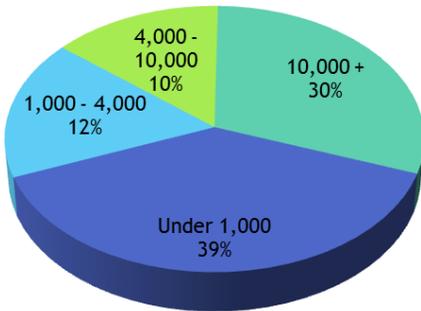
This survey was in the field from the last half of 4Q2011 into the second quarter of 2012. Respondents came from GCG's survey data base of previous participants and from targeted advertising. The total number of respondents to this survey was 345, with 40% of respondents in mid-size and large organizations of 4,000 employees and above.

This was a global survey; 46% of respondents hailed from Europe, 40% from North America, and 11% from Asia/Pacific.

Geographic Location

- Europe (Eastern and Western) 46%
- Asia/Pacific 11%
- Africa/India/ Middle East 2%
- South America 1%
- North America (incl. Mexico) 40%

Annual IT Budget

- $10 million + 42%
- $5 - $10 million 7%
- $1 - $5 million 23%
- $500k - $1 million 9%
- $100k - $500k 19%

As part of our demographics, we asked respondents for their organizational annual IT spending. This included hardware, software, and services provided by third parties. 42% reported spending of more than $10 million, and more than half spend at least $5 million per year on IT products/services.

We also asked each respondent to describe their personal knowledge of their organization's IT infrastructure. As can be seen on the chart, our respondents are key players in their data centers and bring high levels of knowledge and experience to the survey.

Respondent Responsibilities
(multiple selections allowed)

- Detailed knowledge - IT security
- Decision maker: Apps
- Decision maker: Platforms
- Key recommender: app SW
- Key recommender: HW, O/S, MW
- Resp. for core business SLAs
- IT planning
- In the loop on IT budgets
- Detailed knowledge org IT

0% 20% 40% 60% 80% 100%