Magic Quadrant for x86 Server Virtualization Infrastructure

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At least 70% of x86 server workloads are virtualized, the market is mature and competitive, and enterprises have viable choices. An increasing number of enterprises are evaluating both the cost benefits of competitive migrations and the benefits of deploying multiple virtualization technologies.

Market Definition/Description

The x86 server virtualization infrastructure market is defined by organizations that are looking for solutions to virtualize applications from their x86 server hardware or OSs, reducing underutilized server hardware and associated hardware costs, and increasing flexibility in delivering the server capacity that applications need. The x86 server virtualization infrastructure market includes all x86-based workloads (that is, application, Web and database servers; hosted virtual desktops [HVDs]; and file, print and security servers) deployed on standard x86-based physical servers.

Solutions for this market leverage:

- Hypervisors to create virtual machines (VMs)

- Shared OS virtualization technologies (also called "containers" or "zones")

- Server virtualization administrative management (base frameworks)

- Server virtualization embedded management (live migration and basic automation of administrative management functions)

Not included in the x86 server virtualization infrastructure market are higher-level management functions, such as operational automation tools that deal with virtual resources, application performance tools that leverage and monitor virtualization, disaster recovery tools that leverage virtualization, desktop provisioning and brokering software, and so forth.

Magic Quadrant

Figure 1. Magic Quadrant for x86 Server Virtualization Infrastructure

Source: Gartner (July 2014)

Vendor Strengths and Cautions

Citrix

Citrix has executed a number of fundamental changes in the last year that focus and reposition XenServer as a platform for cloud infrastructures and desktop virtualization. First and foremost was

releasing XenServer 6.2 in June 2013 as a free and fully open-source solution, along with a commercially supported distribution of the same software. With the release of XenServer 6.2, a number of features that could be described as "enterprise-server-focused" also were retired and deprecated. (Note: Customer response has motivated Citrix to change its feature retirement plans, potentially in its 6.5 release.) Retired features (for now) include automated live migration (Workload Balancing [WLB]), physical-to-virtual conversion (XenConvert), and VM backup and recovery (VM Protection and Recovery [VMPR]). Deprecated features include the plug-in for Microsoft's System Center Virtual Machine Manager (VMM), Integrated StorageLink and Distributed Virtual Switch. Retired features either were not heavily used or can be replaced by third-party offerings. Essentially, Citrix is no longer investing strictly to keep up with market leaders VMware and Microsoft for traditional server virtualization. Instead, Citrix is focusing its energies on making XenServer an attractive hypervisor for two markets: cloud infrastructure (optimizing integration with its own CloudPlatform offering); and desktop virtualization (supporting its market-leading XenDesktop and XenApp offerings, particularly in the area of graphics processing unit [GPU] virtualization).

For cloud infrastructures, Xen is the most widely used architecture for public infrastructure as a service (IaaS) cloud providers, including Amazon Web Services. The goal for Citrix is to leverage that commodity base to grow its business with Citrix CloudPlatform (which is the commercially supported version of the open-source Apache CloudStack). The open-source cloud infrastructure market is still nascent, but Citrix's strongest competitor in terms of technology and market perception is OpenStack, which is deployed heavily on a KVM. Citrix moving XenServer to full open source was a required step to not only become competitive in this market, but also to potentially rejuvenate open-source community investment in XenServer. However, while CloudPlatform has several hundred customers (about half being service providers, in which monetization is challenging), Citrix has marketing hurdles to overcome, which are the community support and vendor marketing muscle being put behind OpenStack. Unless Citrix can increase its own community, or gain alliances with major vendors, it will struggle.

In desktop virtualization, XenApp and XenDesktop are widely used, but VMware vSphere continues to be a broadly used hypervisor in XenDesktop and XenApp deployments. Citrix has an opportunity to reduce VMware's influence with a free back end, and potentially make Citrix-only desktop and server virtualization attractive (especially with smaller customers). While this is a good defensive strategy for Citrix, monetizing this strategy for growth will be a challenge. Furthermore, the growth of Hyper-V as a back end adds another challenge.

Citrix and Microsoft have an intriguing relationship. While Citrix supports Hyper-V and has a long-term partnership with Microsoft, winning at the desktop layer is important if Citrix wants to expand its management, automation and cloud business further. As a result, Citrix's go-to-market strategy regarding how it competes with and complements Microsoft remains confusing for many customers and channel partners. Regardless, it is apparent that Citrix is willing to sacrifice the server platform to Microsoft and Hyper-V to grow its desktop virtualization business.

Citrix recently introduced Citrix Workspace Services, which is a cloud-based platform that allows customers to subscribe to desktop as a service (DaaS), applications and mobile applications that reside on a public, private or self-hosted infrastructure. A key partner/platform (among several) that enables Workspace Services is Microsoft Azure, serving as the back-end infrastructure necessary

for desktop services. And while Microsoft is a key partner for desktop and application virtualization, it does pose some confusion for customers contemplating the CloudStack-based cloud infrastructure as an alternative to Azure. Citrix also made recent announcements for Citrix Workspace Suite, which provides for a secure delivery and management of apps, data and services across any device or network. The deployment options for Workspace Suite can be fulfilled by XenServer, CloudPlatform and Azure, as well as by other partners in the application delivery ecosystem.

For server virtualization alone, Citrix's reduction in XenServer functionality (at the same time that Microsoft and VMware are expanding) and clear strategic positioning will make XenServer an unlikely competitor. Gartner inquiries on XenServer for server workload virtualization have declined dramatically in the last year, with the exception of inquiries asking about migration to other solutions. It appears that customer demand has caused Citrix to rethink its plans to retire and deprecate functionality for the upcoming release of XenServer later in 2014. Time will tell if that signals a strategic change that rejuvenates market interest in XenServer for enterprise server virtualization.

The success of CloudPlatform or XenDesktop/XenApp is less reliant on the success of XenServer; however, as a core underlying virtualization technology for these products, XenServer can potentially help accelerate Citrix's success in both areas, and enterprises can rely on Citrix to maintain investments in XenServer that specifically help their CloudPlatform or XenDesktop businesses.

Strengths

- XenServer is a good product offering at zero cost (except for paid support).

- Citrix has a large opportunity in the telecom and cloud service provider markets that rely heavily on open-source Xen today.

- Citrix has a very large and loyal channel.

Cautions

- Marketing execution and reach are limited for XenServer.

- Citrix faces open-source software (OSS) competition from KVM and OpenStack, and it lacks associated community and vendor support.

- Citrix has reduced the focus and feature set of XenServer in the area of enterprise server virtualization.

- XenServer does not have a strong business model for monetization to cover future investments.

Huawei

Huawei started its enterprise business in 2011, creating a challenge for the company to transform from its service-provider focus into a balanced provider, catering to both enterprise and consumer markets across all geographies and verticals.

Huawei's FusionCloud suite — FusionSphere, FusionCube and FusionAccess — offers a good mix of physical, virtual and private cloud hardware and software combinations, with strength in its integrated capabilities. The FusionCloud suite of products encompasses management and a FusionSphere Xen-based hypervisor, as well as extended input/output, availability and recovery products and capabilities. Furthermore, Huawei is developing a KVM product suite. FusionCube is an integrated infrastructure system that ties the FusionCloud/FusionCube to integrated hardware.

Huawei's FusionSphere, an x86 hypervisor solution, is part of FusionCloud, and thus, Huawei is a new entrant in the 2014 x86 Server Virtualization Infrastructure Magic Quadrant. An up-and-coming product in emerging markets, the Huawei FusionSphere has hundreds of references in the BRIC countries (Brazil, Russia, India and China). However, Huawei has more customer references from China than from those in emerging markets and mature markets. While we recognize Huawei's presence with FusionCloud, at this point it is unclear how many of Huawei's FusionSphere customers are using Huawei's own hypervisor in production. FusionSphere is predominantly appropriate for Huawei hardware users. Users of other x86 servers should validate the level of certification and local support.

During the past three years, Huawei has shown great ambition to expand into mature markets. However, because of concerns over national security from some governments, it has encountered major obstacles, predominantly in North America's national infrastructure projects. Emerging markets, Asia/Pacific and Western Europe — which are evaluating FusionCloud and FusionSphere in test/development and pilots for cloud infrastructure — will continue to be the strategic focus for Huawei's data center business, in which Huawei leverages its success in telecom companies for network infrastructure.

Strengths

- Huawei provides an increasing breadth of product set tied to FusionSphere and FusionCloud.

- Huawei has a complete stack in terms of server hardware and virtualization software.

- Huawei is a disruptive alternative vendor with good momentum in the BRIC regions.

Cautions

- Huawei is challenged in mature markets, especially in markets that are sensitive to political issues.

- Huawei has inconsistent execution across various geographies and vertical-industry markets.

- Huawei has limited partnerships with third-party vendors.

Microsoft

Microsoft has been in the market with Hyper-V and System Center VMM for six years. Windows Server 2008 with Hyper-V was delivered in 2008, with incremental enhancements delivered in late 2009 and early 2011. Windows Server 2012 was delivered in September 2012 and is a major

virtualization release, enhanced in October 2013 with R2. Enhancements include shared virtual hard disk extended (VHDX) files (especially for guest-based failover clustering); storage quality of service; write-back cache; no-downtime live migrations from Windows Server 2012 to R2; improved live migration performance; enhanced Hyper-V Replica; improved support for Linux VMs; dynamically growing or shrinking VHDX files; and deduplication of VHDXs (especially for HVDs).

Microsoft has effectively closed most of the functionality gap with VMware in terms of the x86 server virtualization infrastructure. Additional gaps remain in management and automation features — notably, VMware's Site Recovery Manager (SRM) is more automated and better-suited for large-scale disaster recovery requirements. Importantly, Microsoft made Hyper-V Recovery Manager (HRM) available in January 2014 — an Azure-hosted service that orchestrates Hyper-V Replica for disaster recovery purposes. Microsoft plans to expand that offering by including Azure-based replication and recovery, and renaming the offering Microsoft Azure Site Recovery (currently in preview mode). It is too early to judge the competitiveness of these offerings, but they will be critical to Microsoft's success against VMware.

System Center VMM 2012 and Windows Azure Pack (delivered October 2013) dramatically improve the ability to create private cloud solutions based on Hyper-V, which also enables service providers to use Microsoft as the basis for cloud offerings. While Microsoft does not have the service provider ecosystem that VMware has, Microsoft's Azure service is becoming a growing attraction for enterprises that want to develop Microsoft-based applications on-premises and in the cloud using common development and management tools.

While the management functionality is strong, ease of use (for example, clients report that Hyper-V HA is relatively difficult to set up and manage) and lack of fully centralized management remain issues. While most management tasks can be handled through VMM, some require Hyper-V Manager or Windows PowerShell. Microsoft has made improvements in recent versions of Hyper-V and System Center.

Microsoft can now meet the needs of most enterprises with respect to server virtualization. Its challenge is neither feature nor functions, but competing in a market with an entrenched competitor, VMware. Microsoft is now winning a good percentage of enterprises that are not heavily virtualized yet — especially those that are mostly Windows-based (while Linux support is improved, especially in Windows Server 2012 R2, there are very few customers using Hyper-V for Linux). However, few enterprises that are heavily virtualized with an alternative technology are choosing to go through the effort to switch. A growing number of large enterprises are finding niches in which to place Microsoft — for example, in stores, branch offices or separate data centers. This strategy of "second sourcing" will enable these enterprises to evaluate Hyper-V for further deployments and perhaps leverage the competition in deals with VMware. While Microsoft's technology is capable, winning the larger and more mission-critical deployments will be an uphill battle and will require more proof points.

Microsoft's challenge is less about products but much more about sales and marketing, as well as overcoming an entrenched competitor with high-quality products and happy customers. The most important factor in Microsoft's favor is price. Unlike VMware, Microsoft does not rely uniquely on a business model based on virtualization software. At the same time, the market — including service providers — is becoming more concerned about vendor lock-in. In a market moving to cloud

infrastructures based on virtualization software, and with growing interest in potentially heterogeneous and open-source solutions such as OpenStack, Microsoft must be careful to not position itself as just another proprietary solution. Furthermore, it must find ways to differentiate itself from VMware based on its service provider and Azure offerings — for example, using Azure for disaster recovery and developing new applications Azure — but managed centrally together with on-premises assets. In the end, Azure interoperability may become the more important factor compared with price.

Strengths

- Microsoft has an administrative environment that is familiar to Windows administrators.

- Microsoft has a large installed base of Windows servers, and there are a large number of Windows-only enterprises.

- Microsoft's virtualization products are offered at a low price.

- Hyper-V and System Center have a growing interoperability and integration with Azure.

Cautions

- Microsoft will face difficulty in converting an entrenched VMware installed base, especially in large enterprises.

- Microsoft is challenged to compete with VMware for channel and service provider influence.

- While improving, Microsoft's management tools aren't completely centralized and have some ease-of-use weaknesses.

- Microsoft faces growing competition with open-source-based solutions, especially in the service provider market.

Oracle

With Oracle VM for x86, Oracle has success predominantly with an application-driven virtualization strategy that goes beyond the hypervisor to provide full integration across the Oracle software portfolio. Being a broad vendor of enterprise applications and infrastructure software, Oracle is positioned to test and tune the hypervisor. Oracle develops new Oracle VM enhancements that simplify management of its applications across multiple environments (virtual, cloud and physical). The Oracle virtualization product portfolio is focused on achieving faster application time to market, business efficiency and agility with better service levels. Being tied to Oracle applications, DBMS software and Oracle Linux has resulted in Oracle growing in consolidation and agility/live migration scenarios. More complex HA/disaster recovery functions and mission-critical workloads are addressed by leveraging Oracle VM, along with native capabilities of the Oracle stack, such as Real Application Clusters (RAC) and Active Data Guard — which are predominantly physical and not virtualized.

Oracle VM is Oracle's implementation of the Xen hypervisor, which leverages intellectual property tied to Oracle Linux and was also put together based on intellectual property acquired from Sun Microsystems and Virtual Iron, which also had Xen-based offerings. Oracle has further integrated these technologies into a more coherent and packaged solution with the Oracle VM 3.2 release in 2013 (and an update release is imminent). Oracle VM is managed by Enterprise Manager 12c, Oracle's system management product. Enterprise Manager can monitor and manage the entire stack — from applications to infrastructure — allowing application and platform administrators to get contextual insight into their virtualization environment. Enterprise Manager 12c also acts as the service delivery platform for cloud services, such as IaaS, leveraging the infrastructure and virtualization resources provided by Oracle's VM product portfolio. This portfolio includes Oracle VM (an x86 architecture product, based on Xen); Oracle VM Server for SPARC (based on Sun Logical Domain [LDOM] technology); Oracle Solaris Zones (Oracle has changed the Solaris Containers' product name to Oracle Solaris Zones); Oracle Linux Containers; and potential software appliances using Oracle VM, storage and other related virtualized infrastructures. This management unification is an important foundation for Oracle virtualization and other products, because it builds an integrated approach to selling virtualized DBMSs (including Oracle RAC), Oracle WebLogic Server and other Oracle software solutions, as well as attached storage with Oracle-based management solutions.

Oracle has chosen to certify its software on Oracle VM. Most customer references that Gartner talked to stated that certification and licensing were their primary reasons for choosing Oracle VM. Oracle has now certified its software on Hyper-V; to date this certification has gained a few Gartner client inquiries and limited related momentum. However, Hyper-V certification does mean that Type C conservative clients now have a choice — other than Oracle VM and as an alternative to VMware — potentially limiting Oracle VM exclusivity and attraction. Oracle still favors Oracle VM for software licensing and pricing — for example, with processor pinning (allowing the specification of a limited number of processors being used by a VM, which can reduce software costs when live migration is not required). This approach and flexibility do not extend to the Hyper-V certification.

Oracle's corporate strategy is "integrated but open," which encompasses the company's infrastructure stack. While Oracle solutions are optimized to work with one another, they still work with supported third-party vendors. Oracle VM is a solid and mature solution for Oracle-centric Red Stack architecture, and it is becoming a valuable component of an integrated Oracle-managed architecture and Oracle Engineered Systems. Additional management features will also improve the success of Oracle Database Appliance and Oracle Virtual Compute Appliance. Gartner continues to receive a growing number of inquiries from clients considering VMware alternatives (such as Oracle VM) because of Oracle certification, license and support issues. Clients continue to report that previous difficulties around live migration and storage recovery have generally been resolved — tied to improvements in both Oracle VM and Oracle Linux as they are integrated within Engineered Systems.

Oracle Solaris Zones offer shared OS virtualization capabilities for tactical x86 deployments (the same capabilities as provided on the SPARC platform, although that is out of scope for this market evaluation). All zones and container technologies provide differentiated benefits for x86 Oracle users — higher virtualization density and reduced operational costs due to fewer OS instances, something that hypervisor-based solutions cannot do. In this case, Oracle Solaris Zones alongside Oracle VM

can be a complementary solution, targeted at different application requirements. Solaris Zones also contain a new Solaris optimized virtualization layer that allows for the flexibility of a Type 2 hypervisor that is optimized to run Solaris as a guest. There has also been a substantiated effort of open-source containers, with joint efforts from Parallels, SUSE and Oracle to bolster container-based solutions and increase Linux densities and separation of workloads.

Strengths

- Oracle provides preferential licensing and certification of Oracle software using Oracle VM.

- Oracle has a large overall software installed base and financial strength, allowing Oracle to test and tune the hypervisor for optimal application performance.

- Oracle offers stack management and IaaS using Oracle Enterprise Manager 12c, including many ready-to-use VM templates for Oracle Linux, Oracle DBMS, Oracle RAC and Oracle Applications.

- Oracle Solaris and OSS OpenVZ containers complement Oracle VM as a lightweight alternative to a hypervisor.

Cautions

- Oracle tends to focus on an "Oracle only" virtualization market and user requirements. This focus limits its full growth potential.

- Market perception regarding Oracle VM often means customers dismiss Oracle prematurely.

- Third-party ecosystem and partnering for Oracle VM is still embryonic, limiting Oracle VM's chances to become general-purpose and broadly adopted (although Oracle has started making more investments).

Parallels

Parallels now offers a virtualization suite consisting of three virtualization packages: Parallels Containers (for Windows and Linux); Parallels Cloud Server (which includes Parallels Containers, Parallels Hypervisor and Parallels Cloud Storage); and Parallels Automation for Cloud Infrastructure (including Parallels Cloud Server and service provider tools). These products are targeted at service providers that serve small- or midsize-business customers — a loyal, viable and expanding community for Parallels. Additionally, Parallels is a major driving force behind OpenVZ, which is essentially the foundation of Parallels Containers and an important source of potential migrations to Parallels Containers.

The Parallels Containers product allows applications to run in lightweight, separate containers, offering processor affinity and memory protection and isolation. Compared with hypervisor-based solutions, the Parallels Containers offering enables much-higher server densities and can reduce OS software and administration costs. The Parallels Containers product also offers portability and live workload migration. The whole architecture of containers enables a workload and container to

spin up faster with less performance overhead than VM solutions. For those customers who prefer to manage their own OS, Parallels Cloud Server also includes Parallels Server Bare Metal, enabling service providers to offer traditional VMs on the same physical node as containers. Parallels Cloud Server combines Parallels Containers and Parallels Hypervisor with Parallels Cloud Storage to enable a complete high-availability solution on commodity hardware by creating a cloud storage pool from existing server hard drives.

As cloud computing evolves, Parallels is positioned well with service providers (and, through them, midmarket enterprise customers), but it has yet to become a major player with more than a few large enterprises. Parallels' service provider focus and lack of focus on on-premises enterprise virtualization may make growth into large enterprises more difficult. As the shift to cloud computing continues, Parallels is seeing interest and adoption beyond its traditional base of hosted service providers that use containers to support hosted applications.

For now, Parallels offers the best solution for service providers building high-density and isolated solutions around common workloads, such as Web services. Parallels has a challenge and an opportunity with OpenVZ — expanding the use of containers, especially by service providers, but adding enough value to monetize that through Parallels Containers (and other Parallels cloud service delivery software). Parallels' success with containers and common management and automation tools creates an opportunity for further expansion with Parallels Cloud Server into the service provider market. Parallels has extended the capabilities of its virtualization solutions with automation and management tools in offerings such as Parallels Automation for Cloud Infrastructure, with associated storage virtualization.

Strengths

- Parallels offers unique and innovative container-based solutions, including live migration and some isolation.

- Parallels has flexible products and pricing, attaining success with service providers.

- Parallels offers reduced administrative and OS software costs, as well as higher density compared with hypervisor-based solutions.

- The strong mix of containers, a hypervisor, storage virtualization and cloud management leads providers to a low-cost, high-performance alternative.

Cautions

- Parallels has a small enterprise customer base, which reduces its opportunity for hybrid cloud computing.

- Parallels must be able to monetize open-source OpenVZ container growth as OpenVZ gains momentum.

- Containers have a relatively large single point of failure due to dependence on a single host OS.

- Parallels lacks a third-party management ecosystem, which will continue to limit Parallels' applicability in the enterprise.

Red Hat

Red Hat has made further progress in this year's Magic Quadrant, primarily due to a relatively strong tie between KVM adoption and OpenStack (roughly half of all OpenStack projects use KVM), and an increase in OpenStack adoption. Red Hat is working hard to integrate the two together. In Red Hat Enterprise Virtualization (RHEV) 3.3 (January 2014), Red Hat added both the OpenStack Glance project (for disk and server image management) to its distribution and a technology preview of OpenStack's Neutron networking project (with plans for Neutron to be fully supported by RHEV 3.4). But OpenStack is not necessarily a sure thing for Red Hat — the most popular OS of choice appears to be Ubuntu, and RHEV appears to be the hypervisor of choice about 5% of the time. As Gartner has pointed out in the past, RHEV's primary competitor still appears to be open-source KVM. With a relatively undervirtualized Red Hat Enterprise Linux (RHEL) market, and a growth in OpenStack, Red Hat has potential opportunity.

RHEV 3.3 also added support for the RHEV Manager to be deployed as a VM on the same host (mainly good for demonstrations and small deployments), and it added a backup/restore API set for third parties to use. Red Hat is rolling out a new point release every six months or so — however, new functionality is relatively limited in each release.

Red Hat's strategy is to become the No. 3 virtualization vendor behind VMware and Microsoft, especially in the RHEL installed base and where there is concern over VMware lock-in; align tightly with growing interest in OpenStack, especially for private clouds; build a rich set of layered software capabilities, including JBoss Middleware, CloudForms and OpenShift. Red Hat's vision makes sense — the key will be execution, at the same time that VMware and Microsoft are investing heavily in their own solutions that extend from virtualization to cloud infrastructures to IaaS and platform as a service (PaaS).

Similar to Microsoft, Red Hat's success cannot require displacing VMware or only penetrating customers that have yet to virtualize. Instead, Red Hat needs to successfully promote the idea of the right virtualization stack for the right applications, promote RHEV (especially for Linux-based development and new applications), and allow VMware to maintain a position for existing enterprise applications. RHEL customers remain a prime target. Microsoft is promoting the same idea with its Hyper-V, but it is almost exclusively gaining share in Microsoft-only environments — leaving Linux an opportunity for Red Hat. For private clouds, while VMware will take a strong position, Red Hat can promote an alternative — OpenStack-based private cloud architecture for new, cloud-aware applications and new development/test. Red Hat's biggest competitor will be open-source-based solutions, but as interest in OpenStack grows, interest in vendor support and more turnkey solutions will also grow. Improved investments in marketing will be critical for Red Hat to overcome significant marketing by VMware and Microsoft. Through its RHEL base alone, Red Hat should aspire to be in the Challengers quadrant. But to get there, it will need to execute better in marketing and RHEV adoption.

Enterprises interested in OpenStack but looking for faster time to value should consider Red Hat as an option — but also should require a rapid return on investment (two to three years), with the potential of changing technologies at the end of that time frame.

Strengths

- Red Hat has a strong and loyal RHEL customer base opportunity (much of which is nonvirtualized).

- Red Hat provides an integrated Linux kernel hypervisor (for example, the hypervisor leverages mature OS scheduling capability).

- Red Hat has a solid offering for enterprises interested in OpenStack.

- Red Hat's rich software stack extends to middleware and PaaS.

- Red Hat leads the core KVM OSS development community.

Cautions

- Red Hat has limited sales and marketing execution to date, while competitors are investing heavily.

- The majority of Red Hat's virtualized RHEL instances run on VMware, and VMware is difficult to displace.

- Red Hat has a limited RHEV ecosystem of independent software vendor (ISV) tools and limited OEM support.

VMware

VMware has maintained its functionality lead, introducing vSphere 5.5 in September 2013, including scalability improvements (for example, broader reach for the vCenter Server Appliance), an expanded vSphere Web Client for management, Virtual SAN, server-side caching (vFlash), 62TB Virtual Machine Disks (VMDKs). Furthermore, the vCenter Site Recovery Manager (SRM) now works with Storage DRS and Storage vMotion.

VMware continues to have dominant market share, and customers remain very satisfied with product capabilities and vendor support. However, concern over price and vendor lock-in remains. Since Microsoft released Windows Server 2012 (and the recent R2 update), client inquiries comparing the two have increased significantly. On the other hand, very few large enterprises are switching, but some smaller enterprises that are not far along in their virtualization deployment are switching, and some larger customers are deploying alternatives to VMware in separate data centers or in branch/store locations. A poll taken at Gartner's Data Center Conference in December 2013 showed that more than 90% of attendees considered vSphere their primary hypervisor, but 48% indicated that Hyper-V was their secondary hypervisor.

VMware is still enjoying good growth, but growth is harder, due to both increasing market saturation and competitive pricing pressure. An emerging concern is the rapid growth of IaaS cloud providers, especially Amazon Web Services (based on Xen), used mainly for new workloads that are designed for cloud computing. While VMware has a dominant share for existing enterprise workloads, its share of the newer, cloud workloads is much smaller.

VMware's overall vision is synchronized with the market interest (especially large-enterprise interest) in private cloud computing and hybrid cloud computing. However, its Software-Defined Data Center (SDDC) push into infrastructure virtualization (storage and networking) is confronting established organizational structures and skills that are resistant to change — making growth harder. Service providers are very interested in creating easy onramps for VMware-based customers, but slow expansion of the VMware-based business, and provider concern with both potential commoditization and lock-in with VMware, have pushed many toward their own architectures, sometimes based on OpenStack. Notably, while VMware has a strong service provider ecosystem, in August 2013, VMware launched its own IaaS offering, vCloud Hybrid Services (vCHS).

Perhaps the business unit that VMware has had the most increased focus during the past year has been end-user computing. New management, a heightened emphasis on the market opportunity and a renewed sales channel have placed end-user computing momentum in VMware's favor. The Horizon Suite bundles complementary products (View for HVDs, Mirage for offline use and Workspace for device-agnostic delivery) that have broad appeal. Other worthwhile end-user computing changes include the ability to deliver published applications (that is, similar to XenApp or Remote Desktop Services), and the acquisitions of Desktone and AirWatch. Desktone should help VMware build out DaaS as a competitive offering in this nascent market. AirWatch firmly plants VMware in the mobile device management (MDM)/enterprise mobile management (EMM) space, which helps complete the portfolio necessary for end-user computing. The success of its end-user computing strategy is extremely relevant to VMware, as these implementations create vSphere stickiness and create difficulty in switching hypervisors.

With respect to the growing midmarket business, in which high-end management and automation features are less critical, VMware has retained a strong market share. (Gartner surveys consistently show that about half of midmarket companies, those with 100 to 1,000 employees, tend to use VMware.) However, as Microsoft gains marketing momentum, VMware will need to continue to offer low-price packages (such as vSphere Essentials Plus) to remain competitive in this market. As VMware promotes virtualization for more mission-critical workloads, it continues to face an Oracle VM solution, whereby concern over platform certification will drive a small number of VMware users to Oracle VM. While Windows-based workloads have become heavily virtualized, there is still quite a bit of opportunity for Linux-based workloads. (Gartner estimates that Windows is 70% to 75% virtualized, while Linux is about 45% virtualized.) Microsoft, Oracle, Red Hat and open source could make VMware's expansion difficult.

VMware's primary market issues are price, concern with lock-in and the interest in heterogeneity. VMware depends on vSphere revenue as it expands into higher-level management and automation software, but it may need to make adjustments if customer migration moves from investigation to action. In terms of heterogeneity, while heterogeneous management is nearly nonexistent, the interest is there, and users are asking about cloud infrastructure solutions, such as OpenStack, which could open the door to alternative virtualization architectures.

Strengths

- VMware's virtualization strategy encompasses the data center and expansion to private and hybrid cloud computing.

- VMware continues to lead in technology leadership, investments and innovation.

- VMware receives high customer satisfaction.

- VMware has a large installed base (especially among large enterprises) and service provider ecosystem.

Cautions

- VMware's business model and growth investments depend heavily on vSphere revenue.

- VMware must maintain high revenue growth in a more product- and price-competitive market that is already heavily penetrated.

- VMware has experienced slow penetration in the growing cloud provider market, especially for newer, "cloud-native" applications.

Vendors Added and Dropped

We review and adjust our inclusion criteria for Magic Quadrants and MarketScopes as markets change. As a result of these adjustments, the mix of vendors in any Magic Quadrant or MarketScope may change over time. A vendor's appearance in a Magic Quadrant or MarketScope one year and not the next does not necessarily indicate that we have changed our opinion of that vendor. It may be a reflection of a change in the market and, therefore, changed evaluation criteria, or of a change of focus by that vendor.

Added

Huawei was added to this year's Magic Quadrant.

Dropped

No vendors were dropped.

Inclusion and Exclusion Criteria

Vendors that were eligible for inclusion in this Magic Quadrant met the following criteria:

- They must provide x86 server-based solutions to virtualize applications from OSs, or OSs from x86 server hardware, using:

  - Hypervisors

  - Container technology

- They must provide basic administrative tools for those solutions:

  - Administrative management frameworks/suites for hypervisors/containers

- Embedded virtualization management technology (such as live migration)

- They must have at least 100 organizations using their generally available products as of 1 March 2014.

Open-Source Communities (Such as Xen and KVM Hypervisors) Versus Vendor-Embedded OSS Business Models

The x86 server virtualization infrastructure Magic Quadrant includes only commercial vendor-based offerings, and it does not include individual positions and evaluations for OSS projects, such as Xen, KVM or OpenVZ. The omission of these projects as OSS projects follows the same decision used in previous Magic Quadrants (see "Magic Quadrant for x86 Server Virtualization Infrastructure"). We heavily weight vendor efforts, such as marketing and sales, in Magic Quadrants. Open-source projects would be penalized in the Magic Quadrant as a consequence of being a community-sponsored development, compared with the specific financial and marketing goals of vendors using the same underlying technology. Nevertheless, they are represented within commercial vendor offerings, such as Citrix (Xen), Oracle VM (Xen), Red Hat (KVM) and Parallels (OpenVZ).

External service providers, startups and entrepreneurs who have the necessary in-house skills can use open source to develop, test, configure, build and maintain their own environments. Cloud service providers (such as Amazon and Google) are more likely to have the technical skills and shave margins in their services and product offerings to keep costs low, and they will likely develop and deploy their automation tools on a license-free OSS version of the hypervisor. We also see OpenStack efforts in enterprises often using open-source technologies rather than vendor distributions.

Users have the choice of selecting either vendor-specific implementations of virtualization or OSS-community-supported projects, including the types of virtualization (OS-hosted versus hypervisors) inclusive of monitoring and management tools, or a build-your-own approach, with self-maintenance or support of service providers. The self-maintenance and integration approach avoids subscription support licenses and vendor dependencies, but it will add to internal support costs if skills are minimal or infrastructures are poorly implemented, resulting in more-frequent outages and downtime.

Evaluation Criteria

Ability to Execute

We evaluated technology providers on the quality and efficacy of the processes, systems, methods and procedures that enable IT provider performance to be competitive, efficient and effective, and to positively affect revenue, retention and reputation. Ultimately, technology providers are judged on their ability and success in capitalizing on their vision.

Ability to Execute in server virtualization is not simply about product features, but also about maintaining a constantly changing business model in a dynamic trend. Good products could fail, and poor products could be successful, based on effective vendor execution.

Product or Service: This criterion includes the core goods and services offered by the technology providers that compete in/serve the defined market. This criterion also includes current product/service capabilities, quality, feature sets and skills, whether offered natively or through OEM agreements/partnerships. Key factors that are evaluated include the range of OSs and applications supported; scalability and efficiency; elasticity; maturity; embedded resource management; management features to reduce administrative burden; ability to administer the holistic, virtualized ecosystem; administrative scalability; and integration with third-party enterprise management providers. Feature/function checklists are not sufficient — real customer use matters, as does ease of use.

Overall Viability: Viability includes an assessment of the overall organization's financial health, the financial and practical success of the business unit, and the likelihood of the individual business unit to continue to invest in the product, continue offering the product and advance the state of the art within the organization's portfolio of products.

Sales Execution/Pricing: This criterion covers the technology provider's capabilities in all presales activities, and the structure that supports them. This includes deal management, pricing and negotiation, presales support, and the overall effectiveness of the sales channel. Customers included are enterprises and service providers. In a market that continues to grow significantly every year, share growth is more important than volume growth.

Market Responsiveness/Record: This criterion examines the provider's ability to respond, change direction, be flexible and achieve competitive success as opportunities develop, competitors act, customer needs evolve and market dynamics change. This criterion also considers the provider's history of responsiveness.

Marketing Execution: This criterion evaluates the clarity, quality, creativity and efficacy of programs designed to deliver the organization's message to influence the market, promote the brand and business, increase awareness of the products, and establish a positive identification of the product/brand and organization in the minds of buyers. This mind share can be driven by a combination of publicity, promotions, thought leadership, word of mouth and sales activities.

Customer Experience: This criterion considers the relationships, products and services/programs that enable clients to be successful with the products evaluated. Specifically, this criterion includes the ways customers receive technical or account support. It can also include ancillary tools, customer support programs (and the quality thereof), the availability of user groups and SLAs.

Operations: This criterion evaluates the ability of the organization to meet its goals and commitments. Factors include the quality of the organizational structure, such as skills, experiences, programs, systems and other vehicles that enable the organization to operate effectively and efficiently on an ongoing basis.

Table 1. Ability to Execute Evaluation Criteria

Evaluation Criteria	Weighting
Product or Service	High
Overall Viability	High
Sales Execution/Pricing	High
Market Responsiveness/Record	Low
Marketing Execution	High
Customer Experience	Medium
Operations	Low

Source: Gartner (July 2014)

Completeness of Vision

We evaluated technology providers on their ability to convincingly articulate logical statements about current and future market direction, innovation, customer needs and competitive forces, and how well they map to the Gartner position.

In the server virtualization market, vendor understanding and articulation of the strategic path for virtualization (expanding into the foundation for the future infrastructure architecture and operations, extending toward cloud computing, and enabling interoperability with third-party providers) are particularly important and differentiating.

Market Understanding: This criterion evaluates the technology provider's ability to understand buyers' needs and to translate those needs into products and services. Vendors that show the highest degree of vision listen to and understand buyers' wants and needs, and they can shape or enhance those wants with their added vision. The market includes enterprises with their own strategies to build private cloud solutions, hybrid cloud solutions and cloud computing providers.

Marketing Strategy: This criterion includes a clear, differentiated set of messages consistently communicated throughout the organization and externalized through the website, advertising, customer programs and positioning statements.

Sales Strategy: This criterion considers the strategy for selling products that uses the appropriate network of direct and indirect sales, marketing, service, and communications affiliates to extend the scope and depth of market reach, skills, expertise, technologies, services and the customer base.

Offering (Product) Strategy: This criterion includes a technology provider's approach to product development and delivery that emphasizes differentiation, functionality, methodology and feature

set, as they map to current and future requirements. Interoperability between enterprises and service providers (and between providers) is also growing in importance.

Business Model: This criterion includes the soundness and logic of a technology provider's underlying strategic business proposition. With virtualization, the business model might be for the virtualization technology itself, or virtualization might be an enabler for a related business.

Vertical/Industry Strategy: This criterion considers the technology provider's strategy to direct resources, skills and offerings to meet the specific needs of individual market segments, including verticals (enterprises and service providers).

Innovation: This criterion evaluates the direct, related, complementary and synergistic layouts of resources, expertise or capital for investment, consolidation, or defensive or pre-emptive purposes.

Geographic Strategy: This criterion refers to the technology provider's strategy to direct resources, skills and offerings to meet the specific needs of geographies outside the native geography, either directly or through partners, channels and subsidiaries, as appropriate for the geography and market.

Table 2. Completeness of Vision Evaluation Criteria

Evaluation Criteria	Weighting
Market Understanding	High
Marketing Strategy	High
Sales Strategy	Medium
Offering (Product) Strategy	Medium
Business Model	Medium
Vertical/Industry Strategy	Medium
Innovation	Medium
Geographic Strategy	Low

Source: Gartner (July 2014)

Quadrant Descriptions

Leaders

Leaders in this market have a clear strategy and road map for their offerings, understand virtualization's role in infrastructure and operations transformation, and have a clear vision with respect to private cloud, hybrid cloud, and public cloud computing (in terms of the role of

virtualization). Most importantly, they have a strategy to communicate their vision to their market and are executing well from a sales and market share perspective. Microsoft and VMware remain in the Leaders quadrant in 2014. Microsoft delivered an important update to Hyper-V (Windows Server 2012 R2), and VMware delivered vSphere 5.5. VMware remains the overall leader, with a dominant market share, but the gap is slowly decreasing as competitive offerings mature.

Challengers

Challengers in this market have a strong Ability to Execute but have a more focused marketing or product vision. Oracle entered the Challengers quadrant in 2012 and has tremendous potential to grow, given the large Oracle software customer base, but traction in the last year has not accelerated faster than the overall market growth.

Visionaries

Visionaries in the x86 server virtualization infrastructure market have a differentiated approach or product, but they aren't meeting their potential from an execution standpoint. At this point in the x86 server virtualization infrastructure market, there are no Visionaries that are not also executing well.

Niche Players

Server virtualization is a broad market, and Niche Players in this market either have not capitalized on their opportunity yet or are focused on specific niches where they can be successful versus competitors that have a more general approach. Parallels and Red Hat remain Niche Players in this market. Parallels continues to be a strong and improving choice for service providers focused on high-density deployments of specific applications, especially targeting small or midsize businesses, and it has reasonable plans to expand its base over time. Red Hat remains a general contender in the x86 server virtualization infrastructure market, with a significant amount of Linux in the market that has yet to be virtualized, and Red Hat has some momentum due to interest in OpenStack. Huawei, a Niche Player, is new to the Magic Quadrant this year, and it is gaining acceptance in specific geographies and for specific use cases. Citrix has moved from the Visionaries quadrant to the Niche Players quadrant, due to limited but focused investment aimed at specific markets for server virtualization.

Context

As of mid-2014, more than 70% of x86 architecture workloads have been virtualized on servers. The cloud provider market has also been growing, with 6% of all VMs delivered by IaaS cloud providers. In the enterprise segment, saturation is beginning to have an effect and slowing the market somewhat. There will continue to be growth opportunities in midmarket enterprises, the Linux-based market (which is less virtualized than the Windows-based market) and especially cloud providers, as well as expansion into more mission-critical workloads. Most large enterprises are in the early stages of private cloud computing, which is causing them to evaluate their virtualization

foundation, consider multiple services based on different technologies, and analyze the cost versus the benefits of managing multiple hypervisors. Cloud management platforms are also having an effect on virtualization infrastructures, with a small but growing interest in OpenStack-based solutions (which often promotes use of open source or open-source-based virtualization). Pricing remains a concern, with huge disparities across the offerings, and licensing and entitlements continue to change. Service providers are also adding more support for interoperability with virtualized enterprises, enabling easier VM migration and the potential for hybrid cloud computing. All these trends are affecting the x86 server virtualization infrastructure market.

Market Overview

The x86 server virtualization infrastructure market is the foundation for two extremely important market trends that relate and overlap: infrastructure modernization and cloud computing. For infrastructure modernization, virtualization is used to improve resource utilization, reduce costs, improve energy efficiency, improve the speed of resource delivery and encapsulate workload images in a way that enables automation. Virtualization is a horizontal trend in this sense, with the vast majority of enterprises and workloads eventually becoming virtualized. Cloud computing is a more specific style of computing that will be applicable to specific workloads — especially those that require agility of provisioning and/or scaling.

Virtualization is a fundamental enabler to IaaS, and it will be used to establish private cloud services, public cloud services and interoperable hybrid cloud services. Effectively, all IaaS offerings will rely on VMs or container technology. In the last year, the installed base of server virtual containers and VMs continued to grow significantly; however, the enterprise market is beginning to see a slowdown in growth due to increasing market saturation, while the IaaS market is expanding rapidly (tripling since 2011 to account for 6% of all VMs). Virtualization enables faster provisioning and deprovisioning, increasing the growth of workload deployments and offsetting saturation somewhat. At the same time, the flexibility and low barrier to entry that virtualization and IaaS create are decreasing the average life span of workloads.

About half of all server VMs are now HVD VMs (although they tend to be consolidated at a much higher density, resulting in fewer server licenses). Most organizations are focusing virtualization efforts on the more complex, Tier 1 workloads. Based on polls, nearly half of large enterprises have already deployed a private cloud service at least as a pilot project, and more than half have aspirations for hybrid cloud interoperability. In the last year, questions evaluating alternative choices for x86 server virtualization infrastructure have been increasing, as the market becomes more competitive — however, two clear mainstream vendors stand out even more this year: VMware and Microsoft. Choices made at the server virtualization layer matter to future plans for cloud infrastructures and hybrid cloud interoperability.

VMware remains the market share leader, but the market continues to grow, and competitors have a growing share of the market. The majority of large enterprises are heavily virtualized, and very few are considering changing their existing virtualization technologies. However, a growing percentage of them have or are planning to have multiple virtualization technology silos, each managed with its own administrative solutions and skills (which may reduce software expense, but which also

increases overall operational cost and complexity). A poll at the December 2013 Gartner Data Center Conference revealed that nearly half of large enterprises attending the conference had multiple hypervisors deployed. Many smaller enterprises and those in emerging economies are still early in their virtualization effort. These enterprises have several viable alternatives from which to choose.

In addition, as the cloud computing paradigm continues to evolve, cloud service providers offering IaaS want to make interoperability with their service offerings easy. A key trend among service providers is a shift to support better interoperability with existing enterprise virtualization infrastructures — in many cases, expanding their support for the same VM technologies that enterprises are using. However, open-source-based frameworks, such as OpenStack, promise heterogeneous hypervisor interoperability — a promise that is long from mature at this point.

Gartner Recommended Reading

Some documents may not be available as part of your current Gartner subscription.

"How Gartner Evaluates Vendors and Markets in Magic Quadrants and MarketScopes"

Evaluation Criteria Definitions

Ability to Execute

Product/Service: Core goods and services offered by the vendor for the defined market. This includes current product/service capabilities, quality, feature sets, skills and so on, whether offered natively or through OEM agreements/partnerships as defined in the market definition and detailed in the subcriteria.

Overall Viability: Viability includes an assessment of the overall organization's financial health, the financial and practical success of the business unit, and the likelihood that the individual business unit will continue investing in the product, will continue offering the product and will advance the state of the art within the organization's portfolio of products.

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business, increase awareness of the products, and establish a positive identification with the product/brand and organization in the minds of buyers. This "mind share" can be driven by a combination of publicity, promotional initiatives, thought leadership, word of mouth and sales activities.

Customer Experience: Relationships, products and services/programs that enable clients to be successful with the products evaluated. Specifically, this includes the ways customers receive technical support or account support. This can also include ancillary tools, customer support programs (and the quality thereof), availability of user groups, service-level agreements and so on.

Operations: The ability of the organization to meet its goals and commitments. Factors include the quality of the organizational structure, including skills, experiences, programs, systems and other vehicles that enable the organization to operate effectively and efficiently on an ongoing basis.

Completeness of Vision

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Business Model: The soundness and logic of the vendor's underlying business proposition.

Vertical/Industry Strategy: The vendor's strategy to direct resources, skills and offerings to meet the specific needs of individual market segments, including vertical markets.

Innovation: Direct, related, complementary and synergistic layouts of resources, expertise or capital for investment, consolidation, defensive or pre-emptive purposes.

Geographic Strategy: The vendor's strategy to direct resources, skills and offerings to meet the specific needs of geographies outside the "home" or native geography, either

directly or through partners, channels and subsidiaries as appropriate for that geography and market.

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