Magic Quadrant for Cloud Infrastructure as a Service, Worldwide

18 May 2015 ID:G00265139

Analyst(s): Lydia Leong, Douglas Toombs, Bob Gill

VIEW SUMMARY

The market for cloud IaaS is in a state of upheaval, as many service providers are shifting their strategies after failing to gain enough market traction. Customers must exercise caution when choosing providers.

Market Definition/Description

Cloud computing is a style of computing in which scalable and elastic IT-enabled capabilities are delivered as a service using Internet technologies. Cloud infrastructure as a service (IaaS) is a type of cloud computing service; it parallels the infrastructure and data center initiatives of IT. Cloud compute IaaS constitutes the largest segment of this market (the broader IaaS market also includes cloud storage and cloud printing). Only cloud compute IaaS is evaluated in this Magic Quadrant; it does not cover cloud storage providers, platform as a service (PaaS) providers, software as a service (SaaS) providers, cloud service brokerages (CSBs) or any other type of cloud service provider, nor does it cover the hardware and software vendors that may be used to build cloud infrastructure. Furthermore, this Magic Quadrant is not an evaluation of the broad, generalized cloud computing strategies of the companies profiled.

In the context of this Magic Quadrant, cloud compute IaaS (hereafter referred to simply as "cloud IaaS" or "IaaS") is defined as a standardized, highly automated offering, where compute resources, complemented by storage and networking capabilities, are owned by a service provider and offered to the customer on demand. The resources are scalable and elastic in near real time, and metered by use. Self-service interfaces are exposed directly to the customer, including a Web-based UI and an API. The resources may be single-tenant or multitenant, and hosted by the service provider or on-premises in the customer's data center. (For more details, see "Technology Overview for Cloud Infrastructure as a Service").

Cloud IaaS includes not just the resources themselves, but also the automated management of those resources, management tools delivered as services, and cloud software infrastructure services. The last category includes middleware and databases as a service, up to and including PaaS capabilities. However, it does not include full stand-alone PaaS capabilities, such as application PaaS (aPaaS) and integration PaaS (iPaaS).

We draw a distinction between cloud infrastructure *as a service*, and cloud infrastructure *as a technology platform*; we call the latter cloud-enabled system infrastructure (CESI). In cloud IaaS, the capabilities of a CESI are directly exposed to the customer through self-service. However, other services, including noncloud services, may be delivered on top of a CESI; these cloud-enabled services may include forms of managed hosting, data center outsourcing and other IT outsourcing services. In this Magic Quadrant, we evaluate only cloud IaaS offerings; we do not evaluate cloud-enabled services. (For more on this distinction, see "Technology Overview for Cloud-Enabled System Infrastructure" *[Note: This document has been archived; some of its content may not reflect current conditions]*, "Technology Overview for Cloud-Enabled Managed Hosting" and "Don't Be Fooled by Offerings Falsely Masquerading as Cloud Infrastructure as a Service" *[Note: This document has been archived; some of its content may not reflect current conditions]*.)

This Magic Quadrant covers all the common use cases for cloud IaaS, including development and testing, production environments (including those supporting mission-critical workloads) for both internal and customer-facing applications, batch computing (including high-performance computing [HPC]) and disaster recovery. It encompasses both single-application workloads and "virtual data centers" (VDCs) hosting many diverse workloads. It includes suitability for a wide range of application design patterns, including both "cloud-native" application architectures and enterprise application architectures.

Customers typically exhibit a bimodal IT sourcing pattern for cloud IaaS (see "Bimodal IT: How to Be Digitally Agile Without Making a Mess" and "Best Practices for Planning a Cloud Infrastructure-as-a-Service Strategy — Bimodal IT, Not Hybrid Infrastructure"). Most cloud IaaS is bought for Mode 2 agile IT, emphasizing developer productivity and business agility, but an increasing amount of cloud IaaS is being bought for Mode 1 traditional IT, with an emphasis on cost reduction, safety and security. This Magic Quadrant considers both sourcing patterns and their associated customer behaviors and requirements.

This Magic Quadrant primarily evaluates cloud IaaS providers in the context of the fastest-growing need among Gartner clients: the desire to have a "data center in the cloud," where the customer retains most of the IT operations responsibility (even if the customer subsequently chooses to outsource that responsibility via third-party managed services). Gartner's clients are mainly enterprises, midmarket businesses and technology companies of all sizes, and the evaluation focuses on typical client requirements.

This Magic Quadrant strongly emphasizes self-service and automation in a standardized environment. It focuses on the needs of customers whose primary need is self-service cloud IaaS, although this may be supplemented by a small amount of colocation or dedicated servers. Organizations that need significant customization or managed services for a single application, or that are seeking cloud IaaS as a supplement to a traditional hosting solution ("hybrid hosting"), should consult the Magic Quadrants for

ADDITIONAL PERSPECTIVES

Industry: Government (Federal)

EVIDENCE

Gartner client inquiries in 2014 and 2015 (currently more than 1,000 cloud IaaS-related inquiries per quarter)
Service provider interviews and product demonstrations in 2014 and 2015
Surveys of more than 75 cloud IaaS providers in 2014 and 2015
Customer references from the service providers in 2014 and 2015
Hands-on trials of service offerings in 2014 and 2015
Public information from sources such as U.S. Securities and Exchange Commission filings, press releases, vendor websites and community support forums

NOTE 1
SSAE 16

Statement on Standards for Attestation Engagements (SSAE) 16 — that is, Service Organization Control (SOC) 1. See "SOC Attestation Might Be Assurance of Security … or It Might Not."

NOTE 2
ISO 27001

International Organization for Standardization (ISO)/International Electrotechnical Commission (IEC) 27001. See "Security Research Roundup for ISO 27001 Compliance."

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.

Sales Execution/Pricing: The vendor'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.

Market Responsiveness/Record: 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 vendor's history of responsiveness.

Marketing Execution: 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 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

Managed Hosting instead ("Magic Quadrant for Cloud-Enabled Managed Hosting, North America," "Magic Quadrant for Cloud-Enabled Managed Hosting, Europe" and "Magic Quadrant for Cloud-Enabled Managed Hosting, Asia/Pacific"). Organizations that want a fully custom-built solution, or managed services with an underlying CESI, should consult the Magic Quadrants for data center outsourcing and infrastructure utility services ("Magic Quadrant for Data Center Outsourcing and Infrastructure Utility Services, North America," "Magic Quadrant for Data Center Outsourcing and Infrastructure Utility Services, Europe" and "Magic Quadrant for Data Center Outsourcing and Infrastructure Utility Services, Asia/Pacific").

This Magic Quadrant evaluates all industrialized cloud IaaS solutions, whether public cloud (multitenant or mixed-tenancy), community cloud (multitenant but limited to a particular customer community), or private cloud (fully single-tenant, hosted by the provider or on-premises). It is not merely a Magic Quadrant for public cloud IaaS. To be considered industrialized, a service must be standardized across the customer base. Although most of the providers in this Magic Quadrant do offer custom private cloud IaaS, we have not considered these nonindustrialized offerings in our evaluations. Organizations that are looking for custom-built, custom-managed private clouds should use our Magic Quadrants for data center outsourcing and infrastructure utility services instead (see above).

Understanding the Vendor Profiles, Strengths and Cautions

Cloud IaaS providers that target enterprise and midmarket customers generally offer a high-quality service, with excellent availability, good performance, high security and good customer support. Exceptions will be noted in this Magic Quadrant's evaluations of individual providers. Note that when we say "all providers," we specifically mean "all the evaluated providers included in this Magic Quadrant," not all cloud IaaS providers in general. Keep the following in mind when reading the vendor profiles:

All the providers have a public cloud IaaS offering. Many also have an industrialized private cloud offering, where every customer is on standardized infrastructure and cloud management tools, although this may or may not resemble the provider's public cloud service in either architecture or quality. A single architecture and feature set and cross-cloud management, for both public and private cloud IaaS, make it easier for customers to combine and migrate across service models as their needs dictate, and enable the provider to use its engineering investments more effectively. Most of the providers also offer custom private clouds.

Most of the providers have offerings that can serve the needs of midmarket businesses and enterprises, as well as other companies that use technology at scale. A few of the providers primarily target individual developers, small businesses and startups, and lack the features needed by larger organizations, although that does not mean that their customer base is exclusively small businesses.

Most of the providers are oriented toward the needs of Mode 1 traditional IT, especially IT operations organizations, with an emphasis on control, governance and security; many such providers have a "rented virtualization" orientation, and are capable of running both new and legacy applications, but are unlikely to provide transformational benefits. A much smaller number of providers are oriented toward the needs of Mode 2 agile IT; these providers typically emphasize capabilities for new applications and a DevOps orientation, but are also capable of running legacy applications and being managed in a traditional fashion.

All the providers offer basic cloud IaaS — compute, storage and networking resources as a service. A few of the providers offer additional value-added capabilities as well, notably cloud software infrastructure services — typically middleware and databases as a service — up to and including PaaS capabilities. These services, along with IT operations management capabilities as a service (especially DevOps-related services) are a vital differentiator in the market, especially for Mode 2 agile IT buyers.

We consider an offering to be public cloud IaaS if the storage and network elements are shared; the compute can be multitenant, single-tenant or both. Private cloud IaaS uses single-tenant compute and storage, but unless the solution is on the customer's premises, the network is usually still shared.

In general, monthly compute availability SLAs of 99.95% and higher are the norm, and they are typically higher than availability SLAs for managed hosting. Service credits for outages in a given month are typically capped at 100% of the monthly bill. This availability percentage is typically non-negotiable, as it is based on an engineering estimate of the underlying infrastructure reliability. Maintenance windows are normally excluded from the SLA.

Some providers have a compute availability SLA that requires the customer to use compute capabilities in at least two fault domains (sometimes known as availability zones or availability sets); an SLA violation requires both fault domains to fail. Providers with an SLA of this type are explicitly noted as having a multi-fault-domain SLA.

Very few of the providers have an SLA for compute or storage performance. However, most of the providers do not oversubscribe compute or RAM resources; providers that do not guarantee resource allocations are noted explicitly.

Many providers have additional SLAs, covering network availability and performance, customer service responsiveness and other service aspects.

Infrastructure resources are not normally automatically replicated into multiple data centers, unless otherwise noted; customers are responsible for their own business continuity. Some providers offer optional disaster recovery solutions.

All providers offer, at minimum, per-hour metering of virtual machines (VMs), and some can offer shorter metering increments, which can be more cost-effective for short-term batch jobs. Providers charge on a per-VM basis, unless otherwise noted. Some providers offer either a shared resource pool (SRP) pricing model or are flexible about how they price the service. In the SRP model, customers contract for a certain amount of capacity (in terms of CPU and RAM), but can allocate that capacity to VMs in an arbitrary way, including being able to oversubscribe that capacity voluntarily; additional capacity can usually be purchased on demand by the hour.

Some of the providers are able to offer "bare metal" physical servers on a dynamic basis. Due to the longer provisioning times involved for physical equipment (two hours is common), the minimum billing increment for such servers is usually daily, rather than hourly. Providers with a bare-metal option are noted as such.

All the providers offer an option for colocation, unless otherwise noted. Many customers have needs that require a small amount of supplemental colocation in conjunction with their cloud — most frequently for a large-scale database, but sometimes for specialized network equipment, software that cannot be licensed on virtualized servers, or legacy equipment. Colocation is specifically

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

Market Understanding: Ability of the vendor to understand buyers' wants and needs and to translate those into products and services. Vendors that show the highest degree of vision listen to and understand buyers' wants and needs, and can shape or enhance those with their added vision.

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

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

Offering (Product) Strategy: The vendor's approach to product development and delivery that emphasizes differentiation, functionality, methodology and feature sets as they map to current and future requirements.

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.

mentioned only when a service provider actively sells colocation as a stand-alone service; a significant number of midmarket customers plan to move into colocation and then gradually migrate into that provider's IaaS offering. If a provider does not offer colocation itself but can meet such needs via a partner exchange, this is explicitly noted.

All the providers claim to have high security standards. The extent of the security controls provided to customers varies significantly, though. All the providers evaluated can offer solutions that will meet common regulatory compliance needs, unless otherwise noted. All the providers have SSAE 16 audits for their data centers (see Note 1). Some may have security-specific third-party assessments such as ISO 27001 or SOC2 for their cloud IaaS offerings (see Note 2), both of which provide a relatively high level of assurance that the providers are adhering to generally accepted practice for the security of their systems, but do not address the extent of controls offered to customers. Security is a shared responsibility; customers need to correctly configure controls and may need to supply additional controls beyond what their provider offers.

Some providers offer a software marketplace where software vendors specially license and package their software to run on that provider's cloud IaaS offering. Marketplace software can be automatically installed with a click, and can be billed through the provider. Some marketplaces also contain other third-party solutions and services.

All providers offer enterprise-class support with 24/7 customer service, via phone, email and chat, along with an account manager. Most providers include this with their offering. Some offer a lower level of support by default, but allow customers to pay extra for enterprise-class support.

All the providers will sign contracts with customers, can invoice, and can consolidate bills from multiple accounts. While some may also offer online sign-up and credit card billing, they recognize that enterprise buyers prefer contracts and invoices. Some will sign "zero dollar" contracts that do not commit a customer to a certain volume.

All the providers evaluated are believed to be financially stable, with business plans that are adequately funded. However, many of the providers are undergoing significant re-evaluation of their cloud IaaS businesses. Existing and prospective customers should be aware that such providers may make significant changes to the strategy and direction of their cloud IaaS business, including replacing their current offering with a new platform, or exiting this business entirely in favor of partnering with a more successful provider.

Many of the providers have white-label or reseller programs, and some may be willing to license their software. We mention software licensing only when it is a significant portion of the provider's business; other service providers, not enterprises, are usually the licensees. We do not mention channel programs; potential partners should simply assume that all these companies are open to discussing a relationship.

Most of the providers offer optional managed services on IaaS. However, not all offer the same type of managed services on IaaS as they do in their broader managed hosting or data center outsourcing services. Some may have managed services provider (MSP) or system integrator (SI) partners that provide managed and professional services.

All the evaluated providers offer a portal, documentation, technical support, customer support and contracts in English. Some can provide one or more of these in languages other than English. Most providers can conduct business in local languages, even if all aspects of service are English-only. Customers who need multilingual support will find it very challenging to source an offering.

In previous years, this Magic Quadrant has provided significant technical detail on the offerings. These detailed evaluations are now published in "Critical Capabilities for Public Cloud Infrastructure as a Service, Worldwide" instead.

Format of the Vendor Descriptions

When describing each provider, we first summarize the nature of the company and then provide information about its industrialized cloud IaaS offerings in the following format:

Offerings: A list of the industrialized cloud IaaS offerings (both public and private) that are directly offered by the provider. Also included is commentary on the ways in which these offerings deviate from the standard capabilities detailed in "Understanding the Vendor Profiles, Strengths and Cautions," above. We also list related capabilities of interest, such as object storage, content delivery network (CDN) and managed services, but this is not a comprehensive listing of the provider's offerings.

Locations: Cloud IaaS data center locations by country, languages that the company does business in, and languages that technical support can be conducted in.

Recommended mode: We note whether the vendor's offerings are likely to appeal to Mode 1 traditional IT, Mode 2 agile IT, or both, and whether the offerings are likely to be useful for organizations seeking IT transformation. This recommendation reflects the way that a provider goes to market, provides service and support, and designs its offerings. All such statements are specific to the provider's cloud IaaS offering, not the provider as a whole.

Recommended uses: These are the circumstances under which we recommend the provider. These are not the only circumstances in which it may be a useful provider, but these are the use cases it is best used for. For a more detailed explanation of the use cases, see "Recommended Uses" below.

In the list of offerings, we state the basis of each provider's virtualization technology and, if relevant, its cloud management platform (CMP). We also state what APIs it supports — the Amazon Web Services (AWS), OpenStack and vCloud APIs are the three that have broad adoption, but many providers also have their own unique API. Note that supporting one of the three common APIs does not provide assurance that a provider's service is compatible with a specific tool that purports to support that API; the completeness and accuracy of API implementations vary considerably. Furthermore, the use of the same underlying CMP or API compatibility does not indicate that two services are interoperable. Specifically, OpenStack-based clouds differ significantly from one another, limiting portability; the marketing hype of "no vendor lock-in" is, practically speaking, untrue.

For many customers, the underlying hypervisor will matter, particularly for those that intend to run commercial software on IaaS. Many independent software vendors support only VMware virtualization, and those vendors that support Xen may support only Citrix XenServer, not open-source Xen (which is often customized by IaaS providers and is likely to be different from the current open-source version).

For a detailed technical description of public cloud IaaS offerings, along with a use-case-focused technical

evaluation, see "Critical Capabilities for Public Cloud Infrastructure as a Service, Worldwide."

We also provide a detailed list of evaluation criteria in "Evaluation Criteria for Cloud Infrastructure as a Service." We have used those criteria to perform in-depth assessments of several providers: see "Amazon Web Services: In-Depth Assessment," "In-Depth Assessment of Google Cloud Platform," "In-Depth Assessment of SoftLayer, an IBM Company" and "Microsoft Azure: In-Depth Assessment."

We summarize all the provider descriptions, and compare their capabilities against our baseline expectation of capabilities, in tabular format in "Toolkit: Comparison Matrix for Cloud Infrastructure-as-a-Service Providers, 2015."

Recommended Uses

For each vendor, we provide recommendations for use. The most typical recommended uses are:

Cloud-native applications. These are applications specifically architected to run in a cloud IaaS environment, using cloud transaction processing (TP) principles.

E-business hosting. These are e-marketing sites, e-commerce sites, SaaS applications, and similar modern websites and Web-based applications. They are usually Internet-facing. They are designed to scale out and are resilient to infrastructure failure, but they might not use cloud TP principles.

General business applications. These are the kinds of general-purpose workloads typically found in the internal data centers of most traditional businesses; the application users are usually located within the business. Many such workloads are small, and they are often not designed to scale out. They are usually architected with the assumption that the underlying infrastructure is reliable, but they are not necessarily mission-critical. Examples include intranet sites, collaboration applications such as Microsoft SharePoint, and many business process applications.

Enterprise applications. These are general-purpose workloads that are mission-critical, and they may be complex, performance-sensitive or contain highly sensitive data; they are typical of a modest percentage of the workloads found in the internal data centers of most traditional businesses. They are usually not designed to scale out, and the workloads may demand large VM sizes. They are architected with the assumption that the underlying infrastructure is reliable and capable of high performance.

Development environments. These workloads are related to the development and testing of applications. They are assumed not to require high availability or high performance. However, they are likely to require governance for teams of users.

Batch computing. These workloads include high-performance computing (HPC), "big data" analytics and other workloads that require large amounts of capacity on demand. They do not require high availability, but may require high performance.

For all the vendors, the recommended uses are specific to self-managed cloud IaaS. However, many of the providers also have managed services, as well as other cloud and noncloud services that may be used in conjunction with cloud IaaS. These include hybrid hosting (customers sometimes blend solutions, such as an entirely self-managed front-end Web tier on public cloud IaaS, with managed hosting for the application servers and database), as well as hybrid IaaS-PaaS solutions. Even though we do not evaluate managed services, PaaS and the like in this Magic Quadrant, they are part of a vendor's overall value proposition and we mention them in the context of providing more comprehensive solution recommendations.

Magic Quadrant

Figure 1. Magic Quadrant for Cloud Infrastructure as a Service, Worldwide

Source: Gartner (May 2015)

Vendor Strengths and Cautions

Amazon Web Services

Amazon Web Services (AWS), a subsidiary of Amazon.com, is a cloud-focused service provider with a very pure vision of highly automated, cost-effective IT capabilities, delivered in a flexible, on-demand manner.

Offerings: AWS offers Xen-virtualized multitenant and single-tenant compute, with multitenant storage, along with extensive additional IaaS and PaaS capabilities, including object storage with an integrated CDN (Amazon S3 and CloudFront) and a Docker container service (EC2 Container Service). It is willing to negotiate large-scale single-tenant and on-premises deals (such as the U.S. intelligence community cloud deal). The AWS Marketplace has an extensive selection of third-party software and services. Enterprise-grade support is extra. It has a multi-fault-domain SLA. Colocation needs are met via AWS Direct Connect. See the In-Depth Assessment for a detailed technical evaluation.

Locations: AWS groups its data centers into "regions," each of which contains at least two availability zones. It has regions on the East and West Coasts of the U.S., and in Germany, Ireland, Japan, Singapore, Australia, Brazil, and (in preview) China. It also has one region dedicated to the U.S. federal government. It has a global sales presence. The portal, documentation and support are provided in English, Dutch, French, German, Japanese, Korean, Mandarin, Portuguese, and Spanish, although documentation is comprehensively localized only in English, Japanese and Mandarin.

Recommended mode: AWS primarily appeals to Mode 2 buyers, but is now commonly chosen for Mode 1 needs as well. Transformation efforts are best undertaken in conjunction with an SI.

Recommended uses: All use cases that run well in a virtualized environment, although highly secure applications, strictly compliant or complex enterprise applications (such as SAP business applications) require special attention to architecture.

Strengths

AWS has a diverse customer base and the broadest range of use cases, including enterprise and mission-critical applications. It is the overwhelming market share leader, with over 10 times more cloud IaaS compute capacity in use than the aggregate total of the other 14 providers in this Magic Quadrant. This has enabled it to attract a very large technology partner ecosystem that includes software vendors that have licensed and packaged their software to run on AWS, as well as many vendors that have integrated their software with AWS capabilities. It also has an extensive network of partners that provide application development expertise, managed services, and professional services such as data center migration.

AWS is a thought leader; it is extraordinarily innovative, exceptionally agile, and very responsive to the market. It has the richest array of IaaS features and PaaS-like capabilities. It continues to rapidly expand its service offerings and offer higher-level solutions. Although it is beginning to face more competition from Microsoft and Google, it retains a multiyear competitive advantage. Although it will not be the ideal fit for every need, it has become the "safe choice" in this market, appealing to customers who desire the broadest range of capabilities and long-term market leadership. It is the provider most commonly chosen for strategic adoption.

Cautions

AWS can be a complex vendor to manage. Customers must ensure that they receive the level of sales and solution architecture engagement they need to be successful. AWS is a price leader, but it

charges separately for optional items that are sometimes bundled with competing offerings; use of third-party cost management tools, such as RightScale Cloud Analytics and Cloudability, is highly recommended. AWS's support offerings are tiered based on the level of support that a customer purchases, rather than on a "relationship" or size-of-spend basis; customers need Business-tier support in order to ensure excellent support.

AWS is spreading its efforts very broadly. Although many new services are highly successful, services that turn out to be of less interest to customers will not get the same depth of continued investment as more popular services. As AWS expands, it increasingly encroaches on the territory of traditional IT vendors, heightening competitive pressure and the need to invest deeply in engineering efforts. Furthermore, new capabilities often compete with products and services from AWS partners; though this is normally positive for customers, it creates ecosystem conflicts that AWS must continue to manage carefully.

CenturyLink

CenturyLink, a U.S.-based global communications service provider, acquired Savvis, a Web hoster with a long track record of leadership in the hosting market, in 2011. It acquired Tier 3, a pure-play cloud IaaS provider, in November 2013, and merged it into Savvis to create the CenturyLink Technology Solutions business unit.

Offerings: CenturyLink Cloud (CLC) is VMware-virtualized; it can be either multitenant or fully single-tenant. CenturyLink continues to sell legacy Savvis offerings, such as Cloud Data Center 2 and Cloud Servers, when those solutions are appropriate. The Marketplace Program provides third-party software. Enterprise-grade support is extra. Managed services are optional. CenturyLink offers an aPaaS (AppFog), but it is not an integrated solution.

Locations: CLC is available in multiple data centers across the U.S., along with Canada, the U.K., Germany and Singapore. The legacy Savvis cloud offerings are available in a broad range of data centers globally. CenturyLink has global sales, and business is conducted in local languages, but the service is offered only in English.

Recommended mode: CenturyLink primarily appeals to Mode 1 buyers, but may meet Mode 2 requirements that are limited to basic cloud IaaS.

Recommended uses: Self-service cloud IaaS in conjunction with managed services, for all applications that run well in a virtualized environment, excluding batch computing.

Strengths

CenturyLink has a compelling and distinctive vision of application-fluent infrastructure that spans network, compute and storage capabilities. Its "Platform CenturyLink" vision is rooted in the ability to deliver the breadth of CenturyLink's capabilities in an API-accessible and composable fashion. It is building a broad range of cloud-enabled services, including automation-augmented managed services.

While CenturyLink is increasingly focused on using the cloud as a means to enter the data center outsourcing market, it nevertheless has a competitive feature set for self-service, and successfully blends the self-service and managed services models across a hybrid solution portfolio. CenturyLink has a track record of successfully delivering enterprise-class solutions, including managed security services. The existing CenturyLink base of managed hosting, colocation and network customers provides it with cross-selling opportunities.

Cautions

While CenturyLink has an ambitious vision and is investing significantly in this market, it is competing against many other providers who are also investing deeply, including market leaders with much more extensive engineering resources. CenturyLink has a solidly capable and well-implemented basic offering, and it is executing successfully on its roadmap, but that roadmap may not be sufficiently aggressive for the pace of the market.

CenturyLink has had a difficult time learning to deliver solutions on the CLC offering, which created challenges for sales, solution engineering, installation and delivery. Customers who are not simply using self-service on the CLC offering should take extra care to understand how CenturyLink intends to architect and deliver their solution. Furthermore, the quality of customer service has been uneven over the past year, although this represents an improvement over the prior two years.

CSC

CSC is a large, traditional IT outsourcer with a broad range of data center outsourcing capabilities.

Offerings: CSC's offering is VMware-virtualized and supports the vCloud API. It is offered in several tenancy models — CSC-hosted and fully-multitenant (CloudCompute), CSC-hosted single-tenant compute with a multitenant back-end (BizCloud VPE), and fully single-tenant on the customer's premises (BizCloud). While customers can access vCloud Director if they prefer, CSC has built its own, more user-friendly portal. Customers can also choose to use the Agility Platform CMP (formerly ServiceMesh). Managed services are optional. Via its acquisition of Infochimps, CSC also has big-data-related services.

Locations: CSC has multiple cloud data centers in the U.S., as well as in Canada, Brazil, Germany, Luxembourg, the Netherlands, the U.K., Australia, Malaysia and Singapore. It has a global sales presence. Customer support is provided in English, French, German, Italian, Spanish, and Mandarin; technical support is provided in the local language of each data center region. The portal and documentation are available only in English.

Recommended mode: CSC primarily appeals to Mode 1 buyers, but may meet Mode 2 requirements via a hybrid solution that combines the Agility Platform and its own cloud with third-party cloud IaaS offerings.

Recommended uses: Cloud-enabled data center transformation for customers that want a VMware-based service or a private cloud.

Strengths

CSC has pivoted toward being a CSB capable of managing multiple clouds, including third-party

clouds such as AWS and Microsoft Azure. It is using the Agility Platform that it acquired from the purchase of ServiceMesh in order to facilitate the management of multiple platforms in a consistent way.

CSC has fully embraced the highly standardized, highly automated cloud model, successfully blending the benefits of a true cloud service into an enterprise-ready offering. It has a solid platform that is attractive to Mode 1 IT operations organizations that still want to retain control, but need to offer greater agility to the business and are willing to embrace data center transformation.

Cautions

CSC now leads sales with a transformation discussion and emphasizes the Agility Platform's capabilities, and then helps the customer choose the appropriate cloud IaaS offering, which, increasingly, is not CSC's own. In the past year, CSC's investments in its own platform have focused on integrating it with the Agility Platform, rather than advancing the core capabilities of the offerings.

CSC is not building the rich portfolio of value-added cloud software infrastructure services that leading competitors are offering. Instead, it is encouraging customers who need these capabilities to use third-party clouds, and providing a hybrid offering that is managed via the Agility Platform.

Dimension Data

Dimension Data, an NTT Group company, is a large SI and value-added reseller. It entered the cloud IaaS market by acquiring OpSource in 2011.

Offerings: Dimension Data's Compute-as-a-Service (CaaS) offering is available in Public (multitenant VMware-virtualized) and Private (single-tenant VMware or Hyper-V-virtualized) flavors. Managed services are optional.

Locations: Dimension Data has data centers on the East and West Coasts of the U.S., plus Canada, the U.K., Netherlands, Australia, Hong Kong, Japan, Brazil and South Africa. Local-language sales and support is provided in 51 countries, with cloud-specialized support provided from its regional service centers. The portal is available only in English. Documentation is available in English and Japanese.

Recommended mode: Dimension Data appeals primarily to Mode 1 buyers, including conservative SaaS vendors. It may meet Mode 2 requirements that are limited to basic cloud IaaS.

Recommended uses: E-business hosting, cloud-native applications and general business applications for customers that have very diverse geographic needs, or need a private cloud.

Strengths

Dimension Data's Managed Cloud Platform (MCP) is a single unified architecture that is used for both its own offerings and those of partners. It is pursuing a federated model, whereby service provider partners offer MCP-based services via resale or white label, but Dimension Data provides one consistent, unified service globally. It also provides sales and marketing enablement to its OneCloud Alliance members. It has one of the broadest geographic footprints, including presence in locations where there are few other cloud providers.

OpSource had a long history as a SaaS hoster, and Dimension Data has retained these capabilities. Its rich suite of offerings for that market includes not only infrastructure, but also an on-demand billing platform, custom application management and help desk support. It has notably excellent SLAs.

Cautions

MCP uses Dimension Data's own technology and has been actively developed and maintained. However, compared with competitors, Dimension Data has significantly underinvested in cloud IaaS engineering since the OpSource acquisition. Although MCP is a capable basic cloud IaaS platform, it lacks value-added capabilities. Dimension Data began the rollout of MCP 2.0 in March 2015. This version of its platform uses a new API, and there are changes in the portal UI, as well as different functionality and data center locations. Although MCP 1.0 will continue to be supported, this change is potentially disruptive for customers.

Dimension Data intends to become a CSB that will manage its own infrastructure as well as third-party cloud offerings; to do this, it is splitting out its Cloud Control CMP from the MCP offering. Other NTT Group companies own and operate several other cloud IaaS platforms. We believe NTT Group's split of investment across multiple offerings is probably detrimental to Dimension Data's ability to achieve maximum success in this market.

Fujitsu

Fujitsu is a large diversified technology company.

Offerings: Fujitsu Cloud IaaS Trusted Public S5 is Xen-virtualized and comes in two flavors — a fully multitenant service, and a Dedicated service with single-tenant compute and a multitenant back-end. Fujitsu also has regional offerings that use different technology platforms, and carry the Fujitsu Cloud IaaS Private Hosted brand in conjunction with a region name or the "Global" designation. Managed services are optional.

Locations: S5 is available in data centers in the U.S. (West Coast), Germany, the U.K., Australia, Japan and Singapore. Fujitsu has global sales, and provides support in 34 languages; the S5 portal and documentation are available in English, German and Japanese. The regional offerings have their own capabilities and locations, which are different from those of S5.

Recommended mode: Fujitsu appeals primarily to Mode 1 customers.

Recommended uses: General business applications for customers who need managed services in conjunction with cloud IaaS. Development environments for customers who only need basic cloud IaaS.

Strengths

Fujitsu has a long history in IT services and data center outsourcing. It has a large global sales force, is the leader in IT outsourcing in Asia/Pacific and has a strong European presence. This gives it a

large existing base of captive customers into which it can sell cloud services, and it has been successful at extending existing Fujitsu relationships into cloud deals. It has very responsive support and good account management.

Fujitsu is developing a portfolio of cloud IaaS, PaaS and SaaS services. It has launched the Fujitsu Cloud Integration Platform, a CMP that unifies management across its infrastructure portfolio, including its own cloud IaaS offerings, third-party cloud IaaS offerings and noncloud infrastructure.

Cautions

Fujitsu is developing its "Next Gen Cloud," a common platform onto which it intends to consolidate all its internal systems, including its system integration business. This offering is projected to enter beta in 2015. Over time, this OpenStack-based platform will be used for both IaaS and PaaS solutions. Fujitsu has ambitious plans for this new set of offerings, and customers considering the existing offerings should factor the new roadmap into their decisions.

Fujitsu's cloud IaaS capabilities lag significantly behind those of the market leaders, and the gap is increasing, not narrowing. Although it is possible that the "Next Gen Cloud" will help close the gap, Fujitsu will need to commit extraordinary resources to deliver a truly competitive offering. Although Fujitsu can sell its IaaS platform on a stand-alone basis, and it can be purchased without the need for a long-term contract, it is most often combined with managed services or a broader outsourcing relationship.

Google

Google is an Internet-centric provider of technology and services.

Offerings: Google Cloud Platform combines an IaaS offering (Compute Engine), an aPaaS offering (App Engine) and a range of complementary services, including object storage and a Docker container service (Container Engine). Compute Engine VMs are KVM-virtualized and metered by the minute. Enterprise-grade support is extra. It has a multi-fault-domain SLA. Colocation needs are met via Google Cloud Interconnect. See the In-Depth Assessment for a detailed technical evaluation.

Locations: Google groups its IaaS data centers into "regions," each of which contains at least two availability zones. There is a central U.S. region, a European region (located in Belgium), and an Asian region (located in Taiwan). Google has a global sales presence. Support is available in English and Japanese. The portal is available in English, French, German, Spanish, Portuguese, Korean, Japanese and Mandarin. Documentation is available only in English.

Recommended mode: Google appeals to Mode 2 buyers.

Recommended uses: Cloud-native applications and batch computing, as well as projects leveraging Google Cloud Platform as a whole.

Strengths

Google's strategy for Google Cloud Platform centers on the concept of allowing other organizations to "run like Google" by taking Google's highly innovative internal technology capabilities and exposing them as services that other companies can purchase. Consequently, although Google is a late entrant to the IaaS market, it is primarily productizing existing capabilities, rather than having to engineer those capabilities from scratch.

Google has a comprehensive vision for, and extensive experience with, how cloud-native applications are developed and managed through the life cycle. It has a fluid notion of the boundaries between IaaS and PaaS, along with the spectrum of deployment options from VMs to containers, that will, over time, enable customers to choose their trade-offs between control and automated management. Although many customers currently choose Google for its excellent price/performance value and exceptionally fast VM provisioning, over time, Google will differentiate itself with platform and manageability features, not prices.

Cautions

Although Google has significant appeal to technology-centric businesses, it is still in the rudimentary stages of learning to engage with enterprise and midmarket customers, and needs to expand its sales, solutions engineering and support capabilities. Prospective customers report difficulties in gaining the attention of Google's sales staff and being directed toward appropriate solutions. Furthermore, Google needs to earn the trust of businesses. Google also lacks many capabilities important to businesses that want to migrate legacy workloads to the cloud. Its hybrid cloud strategy is open-source and partner-centric, focused on the ecosystem surrounding Kubernetes, its container cluster management software Google needs to build an ecosystem around Google Cloud Platform; its partner program is nascent.

Google's cloud IaaS adoption has been driven primarily by cloud-native use cases, including batch computing. Google's short-term focus is on better enabling new cloud-native applications, with less attention being paid to capabilities needed for other workloads. While the offering has been improving steadily, Google's feature release velocity has not been as fast as expected. Google's deep engineering investment could potentially advance its offering much more rapidly in the future. Google is not yet taking full advantage of its potential opportunity with Google Cloud Platform.

IBM (SoftLayer)

IBM is a large diversified technology company with a range of cloud-related products and services. In July 2013, it acquired SoftLayer, an independent Web hoster with a focus on small and midsize businesses (SMBs), and in January 2014, it shut down its own SmartCloud Enterprise cloud IaaS offering, after migrating its existing customers to SoftLayer.

Offerings: SoftLayer, an IBM company, offers both multitenant and single-tenant Citrix-Xen-virtualized compute (Virtual Servers). It also offers, as part of its cloud, paid-by-the-hour nonvirtualized dedicated servers (Bare Metal Servers). It has OpenStack-based object storage with an integrated CDN (via a partnership with EdgeCast). SoftLayer's primary business is noncloud offerings, such as paid-by-the-month dedicated servers (a broader range of configurations than is available per hour) and hosted appliances, but it does not make a clear distinction between these offerings and its cloud IaaS capabilities. Managed services are available through IBM. There is no support for colocation. IBM's aPaaS (BlueMix) is hosted in SoftLayer data centers but the offerings are not integrated. See the In-Depth Assessment for a detailed technical evaluation.

Locations: SoftLayer has multiple data centers in the U.S., along with data centers in Canada, Mexico, France, Germany, the U.K., Netherlands, Australia, Hong Kong, Japan and Singapore. It has a global sales presence. It offers support in English, Dutch, French, German, Italian, Spanish and Japanese. The portal and documentation are available in English only.

Recommended mode: Before the IBM acquisition, SoftLayer typically sold to Mode 2 customers (specifically startups and gaming companies with a strong interest in bare-metal dedicated hosting). Since the acquisition, IBM has increasingly focused on acquiring Mode 1 customers, but SoftLayer better meets the needs of Mode 2 customers (as long as they only require basic cloud IaaS and specifically want bare metal).

Recommended uses: E-business hosting, general business applications and batch computing, in circumstances that require both API control over scalable infrastructure and bare-metal servers in order to meet requirements for performance, regulatory compliance or software licensing. Alternatively, IBM outsourcing deals that use SoftLayer bare-metal servers as the hosting platform, where the customer has a need for supplemental basic cloud IaaS.

Strengths

IBM's cloud vision encompasses public and private clouds at both the system and application infrastructure levels. IBM's portfolio of products and services has IaaS, PaaS and SaaS elements, along with IT operations management (ITOM) software, middleware and database software, and comprehensive consulting and outsourcing capabilities. IBM believes the shift to cloud will radically transform its business over time, including altering its go-to-market strategy, with an increasing focus on online sign-up and self-service. SoftLayer is one of its first forays into self-service and serving SMB customers. SoftLayer will be the common hosting platform for IBM's services in the future.

IBM has a strong brand and existing customer relationships across the globe, and its base of strategic outsourcing customers will help drive a cloud-enabled data center outsourcing business on top of SoftLayer. IBM intends to make local presence one of its competitive differentiators; since the acquisition, it has taken advantage of SoftLayer's relatively small-scale "pod" architecture to expand the service from three countries to 11. However, in the near future, IBM will continue to be a hosting-scale provider, which may make it difficult for it to match the cost economics of the hyperscale market leaders.

Cautions

SoftLayer has limited differentiation beyond the hybrid blending of virtualized and bare-metal capabilities, and a broader geographic presence. SoftLayer's feature set did not improve significantly in 2014, and IBM's efforts to enrich the capabilities of its BlueMix aPaaS have limited benefits for SoftLayer customers because the offerings are not integrated into SoftLayer. Furthermore, SoftLayer uses its own technology and API, which has limited third-party tool support. IBM has a beta of OpenStack-based VMs in BlueMix, but a transition toward OpenStack could be disruptive for existing SoftLayer customers. We believe that SoftLayer is primarily becoming an enabling data center platform for the rest of IBM's business, and customers who pursue strategic adoption of IBM cloud services will do so via IBM's enterprise sales force for the managed services and other higher-level IBM capabilities, not the core SoftLayer capabilities. However, existing and prospective customers report that integration with IBM managed services is still nascent.

SoftLayer has historically been strongly focused on self-service dedicated hosting for SMB customers, and it is missing many cloud IaaS capabilities desired by midmarket and enterprise customers. Customers report that SoftLayer services still feel like a small-business experience, particularly with regard to the portal, sales and support. SoftLayer's portal does not distinguish between cloud services and the noncloud, by-the-month hosted hardware and appliances. Provisioning for all services can be initiated via API, but customers need to understand the technical and business implications of choosing the noncloud services, such as less financial flexibility, longer provisioning times and greater operational burdens placed on the customer. SoftLayer is not a market share leader in cloud IaaS (based on Gartner estimates) and does not have the scale of the market leaders; customers anticipating large-scale deployments must ensure that IBM has the necessary capacity in those specific data centers, and that they can obtain that capacity in a cloud model.

Interoute

Interoute is a U.K.-based Pan-European communications service provider.

Offerings: Interoute Virtual Data Centre (VDC) is a CloudStack-based offering that can be delivered in the customer's choice of tenancy models and of VMware, Citrix Xen or KVM virtualization. A wide variety of payment models are supported. Interoute's CloudStore provides a marketplace for third-party software and solutions. Managed services are optional.

Locations: Interoute VDC is located in data centers on the East and West Coasts of the U.S., plus the U.K., France, Germany, Italy, Netherlands, Spain, Switzerland, and Hong Kong. It has global sales. Centralized support is available in English, Dutch, French, German, Italian, and Spanish, and Interoute's local technical support can cover most languages spoken in Western and Central Europe. The portal is available in English and Spanish. Documentation is available only in English.

Recommended mode: Interoute is likely to appeal primarily to Mode 1 customers, but may be a good fit for the needs of Mode 2 customers who value Interoute's unique intersection of networking and cloud IaaS capabilities.

Recommended uses: E-business hosting, general business applications, and development environments for customers who need a broad Pan-European geographic footprint or for whom tight integration with the WAN is important.

Strengths

Interoute has tightly integrated its cloud services with its global network, which has broad coverage of the major European markets, including especially strong coverage of Central and Eastern Europe. Its "network-attached cloud computing" concept allows customers to easily integrate VDC LAN topologies with Interoute's WAN services, including the ability to use the API to configure networks that span multiple sites. This is useful for customers that have complex distributed applications.

Interoute's flexible range of choices for tenancy models, hypervisors, pricing models, and support and service models, provides customers with a variety of interoperable options. Interoute's VDC is a capable enterprise-class basic cloud IaaS offering, and it is one of the few such offerings available from a Europe-based, Pan-European provider; customers with European data sovereignty requirements may find Interoute to be more attractive than a U.S.-based provider.

Cautions

Interoute's VDC service is a capable basic cloud IaaS offering; Interoute has not ventured into higher-level cloud services, other than communications applications. Instead, Interoute is depending on partners to build and offer higher-level services on the VDC platform. Interoute has begun to build an ecosystem of software partners in its CloudStore, but also needs solution partners. Awareness of its brand is limited outside Europe.

Interoute is feeling the impact of the industrywide decline in fixed data revenue on its wholesale business, for which its significantly growing IT service revenue may not be able to compensate. Cloud IaaS is a very expensive market in which to compete, and Interoute will find it challenging to muster the resources necessary to accelerate its success in the market.

Joyent

Joyent is a small, independent service provider that focuses solely on cloud services and software.

Offerings: Joyent Compute Service is a fully multitenant cloud IaaS offering, although Joyent can also offer it as a hosted private cloud. Joyent's architecture is container-native; compute resources run in Triton Zones (Joyent's SmartOS virtualization technology, similar to Solaris Zones). Customers can run Linux guests in Triton Zones (on bare metal), or Windows guests on KVM-based VMs. There is a Docker container service (Triton). Joyent offers a free open-source version of its software as SmartDataCenter, and sells a commercial version as Triton Elastic Container Infrastructure; Joyent can also offer this as a Joyent-operated service on the customer's premises. Joyent's object storage service (Manta) has a unique architecture designed for batch jobs that require high-performance access to large amounts of storage, with an in-place batch compute service separate from Joyent's main compute service. Enterprise-grade support is extra.

Locations: Joyent has data centers in the eastern and western U.S., along with a data center in the Netherlands. It has local sales presence in the U.S. and U.K. Support, the portal and documentation are in English only.

Recommended mode: Joyent will appeal primarily to Mode 2 organizations, but may appeal to Mode 1 organizations that are seeking a secure hybrid solution for Docker containers.

Recommended uses: Cloud-native or microservice architecture applications deployed into OS containers; cloud-native applications and e-commerce sites where visibility into application performance is crucial; batch computing on large datasets.

Strengths

Joyent has long been an advocate of OS containers, and the growing popularity of container technologies, especially Docker, has been beneficial both for its service and software businesses. Joyent's architecture is well-suited to running containers securely within a multitenant environment, and it is one of the first providers to launch a Docker-based container service. Because Joyent maintains a single codebase across its own service offerings and the cloud infrastructure framework software that it sells, customers can more easily consume Joyent technology in a hybrid fashion.

Joyent has a pure focus on new, cloud-native applications, including mobile applications, as well as, in the context of its Manta service, big data applications and massively parallel data analytics. Joyent is the sponsor of Node.js. It offers commercial support for Node.js, as well as proprietary tools focused on Node.js operations within its platform. Joyent places strong emphasis on application performance and takes a holistic approach to its delivery, including particularly deep portal-based performance analytics.

Cautions

Joyent focuses on developing its own technology, and has a track record of releasing innovative capabilities. However, it faces a long-term challenge to compete against providers with greater development resources. Joyent has a capable basic cloud IaaS offering, but its feature set is strongly oriented toward cloud-native use cases, and it is highly developer-centric.

Joyent needs an ecosystem of third-party tools that support its platform, along with a software marketplace, and managed and professional service partners. Although Joyent can take advantage of the growing Docker ecosystem, it must find ways to bring that ecosystem to its platform, and that ecosystem will not by itself be sufficient to support customer needs.

Microsoft

Microsoft is a large and diversified technology vendor that is increasingly focused on delivering its software capabilities via cloud services. Its Azure business was previously strictly PaaS, but Microsoft launched Azure Infrastructure Services (which include Azure Virtual Machines and Azure Virtual Network) into general availability in April 2013, thus entering the cloud IaaS market.

Offerings: Microsoft Azure offers Hyper-V-virtualized multitenant compute (Virtual Machines), with multitenant storage, along with many additional IaaS and PaaS capabilities, including object storage (Blob Storage) and a CDN. The Azure Marketplace offers third-party software and services. Enterprise-grade support is extra. It has a multi-fault-domain SLA. Colocation needs are met via Azure ExpressRoute. See the In-Depth Assessment for a detailed technical evaluation.

Locations: Microsoft calls Azure data center locations "regions." There are multiple Azure regions in the U.S., as well as regions in Ireland, the Netherlands, Australia, Hong Kong, Japan, Singapore and Brazil. There are also two regions for the U.S. federal government. (Azure China is a separate service operated by 21Vianet.) Microsoft has global sales. Azure support is provided in English, French, German, Italian, Spanish, Japanese, Korean, Mandarin and Portuguese. The portal and documentation are available in those languages, as well as Russian.

Recommended mode: Microsoft Azure appeals to both Mode 1 and Mode 2 customers, but for different reasons; Mode 1 customers tend to value the ability to use Azure to extend their infrastructure-oriented Microsoft relationship and investment in Microsoft technologies, while Mode 2 customers tend to value Azure's ability to integrate with Microsoft's application development tools and technologies.

Recommended uses: General business applications and development environments for Microsoft-centric organizations; cloud-native applications; batch computing.

Strengths

Microsoft Azure encompasses integrated IaaS and PaaS components that operate and feel like a unified whole. Microsoft has been rapidly rolling out new features and services, including differentiated capabilities. It has a vision of infrastructure and platform services that are not only leading stand-alone offerings, but also seamlessly extend and interoperate with on-premises Microsoft infrastructure (rooted in Hyper-V, Windows Server, Active Directory and System Center), development tools (including Visual Studio and Team Foundation Server), and applications, as well as Microsoft's SaaS offerings.

Microsoft's brand, existing customer relationships, history of running global-class consumer Internet properties, deep investments in engineering, and aggressive roadmap have enabled it rapidly to attain the status of strategic cloud IaaS provider. Microsoft Azure is growing rapidly, and is in second place for market share, with more than twice as much cloud IaaS compute capacity in use as the aggregate total of the remaining providers in this Magic Quadrant (excluding market share leader AWS). Microsoft has pledged to maintain AWS-comparable pricing for the general public, and, on a practical level, customers with Microsoft Enterprise License Agreement discounts obtain a price/performance ratio that is comparable to AWS.

Cautions

Microsoft has previously reliably met its promised time frames for introducing critical features that help Azure fulfill enterprise needs for security, availability, performance, networking flexibility and user management, but it has not finished introducing all such functionality. Customers who intend to adopt Azure strategically and migrate applications over a period of one year or more (finishing in 2016 or later) can begin to deploy some workloads now, but those with a broad range of immediate enterprise needs may encounter challenges. Furthermore, customers express concern about the global impact of many past Azure outages, which may necessitate ensuring that critical applications on Azure have a non-Azure disaster recovery solution.

Microsoft's partner ecosystem is still relatively nascent. It recently launched a software marketplace and has begun aggressively recruiting managed service and professional services partners. However, many of these partners lack extensive experience with the Azure platform, which could compromise the quality of the solutions they deliver to customers. Furthermore, the Azure ecosystem is very dependent on existing Microsoft relationships. Although customers do run heterogeneous environments in Azure, this lessens the appeal of Azure to non-Microsoft-centric organizations.

NTT Communications

NTT Communications (hereafter "NTT Com"), an NTT Group company, is a Japan-based global communications service provider.

Offerings: NTT Com has two cloud IaaS offerings. Cloud^{n} is a fully multitenant, CloudStack-based, KVM-virtualized offering. Cloud^{n} has an associated object storage offering, CDN, MySQL-based database as a service, and Cloud Foundry-based aPaaS. Enterprise Cloud is a VMware-virtualized, vCloud API-enabled offering with an SRP pricing model, and it can be either fully multitenant or single-tenant; almost all customers use managed services, but they are optional.

Locations: Cloud^{n} is available in multiple data centers in Japan, as well as a U.S. East Coast data center. NTT Enterprise Cloud is available in data centers on the East and West Coasts of the U.S., plus the U.K., Germany, Australia, Hong Kong, Japan, Malaysia, Singapore and Thailand. NTT Com has a global sales presence. Cloud^{n} support is available in English and Japanese. NTT Enterprise Cloud support is available in English, French, German, Spanish, Cantonese, Hindi, Japanese, Mandarin, Malay and Thai. The portal and documentation for both offerings are available in English and Japanese.

Recommended mode: Cloud^{n} will appeal primarily to Mode 2 customers. NTT Enterprise Cloud will appeal primarily to Mode 1 customers.

Recommended uses for Cloud^{n}: Development environments and cloud-native applications where Japan-based hosting is desirable.

Recommended uses for NTT Enterprise Cloud: Development environments and general business applications for customers who need a Pan-Asian footprint and want a VMware-virtualized environment in conjunction with managed services.

Strengths

NTT Com has a significant base of existing customers, especially in the Asia/Pacific region, to whom it can potentially sell cloud services. Other NTT Group companies, such as NTT Data, may also bring NTT Com cloud opportunities, as could NTT Com's partner network. NTT Com also has a long track record in managed hosting and managed security services, and can deliver these solutions in conjunction with Enterprise Cloud.

NTT Com is using its global network to reduce both the total cost of its cloud solutions and friction in its customer implementations. There are no data transfer charges with Cloud^{n}. NTT Com cloud customers receive a free connection between the offering and NTT's Arcstar Universal One network. For NTT Enterprise Cloud, NTT Com has implemented software-defined networking in its data centers and in the interfaces between the offering and the WAN.

Cautions

NTT Enterprise Cloud is a basic cloud IaaS offering with little differentiation. While Cloud^{n} has more features that may be of interest to developers, Cloud^{n} is missing capabilities that would make it attractive to enterprise IT operations organizations. There is no integration between the offerings.

This makes it difficult for NTT Com to serve customers who need a unified offering, or who have cloud-native use cases that require enterprise-class capabilities.

In mid-2015, NTT Com will begin rolling out its "Next Generation Cloud Platform," an OpenStack-based offering that is intended to serve as the unified cloud IaaS platform for its cloud efforts. It will replace the bifurcated approach currently represented by Cloud^{n} and Enterprise Cloud. It will also allow NTT Com to introduce new hosted private cloud services and bare-metal cloud options. NTT Com intends to provide a CSB portal that includes not only its own offerings but third-party clouds as well. While this represents a positive direction for NTT Com, it is a change that existing customers will have to navigate.

Rackspace

Rackspace is an independent Web hoster with a long track record of leadership in the managed hosting market. It has numerous related businesses; some, such as SaaS email, are part of Rackspace itself, while others, such as Jungle Disk, are subsidiaries.

Offerings: Rackspace Public Cloud is a fully multitenant, OpenStack-based, Citrix Xen-virtualized offering; the offering also has OpenStack Ironic-based bare-metal servers (OnMetal) that are provisioned in approximately 5 minutes, and paid for per minute. Rackspace also offers three flavors of hosted private cloud: vCloud Director-based and VMware-virtualized, Microsoft Cloud OS-based and Hyper-V virtualized, and OpenStack-based and KVM-virtualized. It also offers a Rackspace-operated OpenStack private cloud on the customer's premises. Private clouds are priced on the basis of dedicated capacity. Rackspace has object storage with an integrated CDN (Cloud Files). Customers must choose either a paid support plan or managed services.

Locations: Rackspace Public Cloud and the hosted private cloud services are offered in data centers in the central and eastern U.S., the U.K., Australia and Hong Kong. However, accounts are region-specific; Europe is a separate region from the rest of the world. Rackspace has sales presence in the countries where it has data centers, along with the Netherlands, Switzerland and Mexico. Support is provided in English only. The portal and documentation are available only in English.

Recommended mode: Rackspace appeals to both Mode 1 and Mode 2 customers who value highly responsive customer service.

Recommended uses for Rackspace Public Cloud: Cloud-native applications requiring a basic cloud IaaS offering that includes bare-metal servers; cloud IaaS as part of a hybrid hosting solution with DevOps-oriented managed services; hybrid hosting where cloud IaaS is supplementary to a primarily dedicated infrastructure; development environments where simplicity and ease of use are crucial.

Recommended uses for Rackspace Private Cloud: Private OpenStack environments for development or cloud-native applications; VMware or Hyper-V-based "rented virtualization" for general business applications or development environments; private "Azure-like" (Windows Azure Pack) environments for development; hybrid environments with Microsoft Azure.

Strengths

Over the course of 2014, Rackspace successfully pivoted from its "Open Cloud Company," OpenStack-oriented strategy, and returned to its roots as "a company of experts," emphasizing its managed service expertise and superior support experience. Rackspace has a coherent vision of cloud-enabled managed services that utilize automation and a DevOps philosophy. Rackspace is no longer targeting customers that want to self-manage exclusively, except in the context of its private cloud services.

Rackspace's industrialized private cloud offerings are thoughtfully constructed, more automated than most competing offerings, and operated in a fashion that allows Rackspace to deliver reliable, well-supported services at economical prices. During 2014, Rackspace embraced technology partnerships with VMware and Microsoft in order to expand its range of private cloud offerings, and began to provide managed services for third-party offerings, starting with VMware's vCloud Air. While Rackspace continues to participate in the OpenStack community, and has invested significantly in its OpenStack-based private cloud services, it is increasingly technology-neutral. It is now focused on the ways in which it can add value beyond providing basic infrastructure, such as offering solution templates within its OpenStack-based private cloud.

Cautions

Rackspace Public Cloud is a developer-centric offering, and has appealed primarily to small businesses seeking a replacement for low-cost mass-market hosting. Although Rackspace now delivers a solid set of basic features, it has not been able to keep up with the pace of innovation of the market leaders. Rackspace has refocused its business upon customers that need expert managed services for mission-critical needs, rather than try to compete directly for self-managed cloud IaaS against hyperscale providers that can rapidly deliver innovative capabilities at very low cost, or against established IT vendors that have much greater resources and global sales reach. It is a stronger competitor in private cloud IaaS, which does not require the same breadth of capabilities.

Rackspace has made many cloud-related acquisitions to enhance its cloud capabilities and rapidly expand the number of developers it employs. However, it has not integrated these acquisitions into a cohesive whole. Many of the acquisitions actually can manage or operate with multiple cloud IaaS providers. While this potentially positions Rackspace for future multicloud management, and enables it to take advantage of the growth of competitors, Rackspace will need to create a compelling value proposition for using its own cloud IaaS offerings.

Verizon

Verizon is a U.S.-based global communications service provider. Verizon acquired Terremark, a managed hosting and cloud IaaS provider, in 2011. During 2014, Verizon phased out the Terremark brand.

Offerings: During 2014, Verizon consolidated most of its cloud IaaS offerings under the "Verizon Cloud" umbrella brand and portal. The "Verizon Cloud" brand was previously used for a new cloud IaaS offering that Verizon introduced into beta in October 2013. This offering is now in general availability, with three deployment models: Virtual Private Cloud (VPC) Reserved Performance (fully multitenant), Public Cloud (fully multitenant, with a simplified subset of features) and Private Cloud (single-tenant). It is based on

AMD SeaMicro servers, is fully multitenant and can be either Xen-virtualized or VMware-virtualized; it also encompasses Verizon's object storage offering. Verizon's other offerings are fully multitenant and VMware-virtualized. The former Terremark Enterprise Cloud (eCloud) is now offered as Verizon Cloud's VPC Elastic Resource, although it remains a distinct deployment model with its own distinctive environment, capabilities, UI and API; it uses an SRP pricing model. The Federal Edition of eCloud remains a separate offering outside Verizon Cloud. The vCloud Express offering and Verizon's Enterprise Cloud Managed Edition (ECME) are being retired. Optional managed services are available for all offerings other than Public Cloud and eCloud Federal Edition. Enterprise-grade support is extra.

Locations: Verizon Cloud is available in multiple U.S. data centers, plus the U.K., Netherlands, Hong Kong and Brazil, but not all offerings are available in all locations. Verizon has a global sales presence. Support for all of Verizon Cloud is provided in English, Spanish and Portuguese; other offerings are supported only in English. The portal and documentation for all offerings are only in English.

Recommended mode: Verizon primarily appeals to Mode 1 customers.

Recommended uses: Development environments and general business applications.

Strengths

Verizon, via the offering formerly known as Terremark Enterprise Cloud, has the longest track record in the market for VMware-virtualized enterprise-class public cloud IaaS. However, its competitive differentiators have eroded over time as competitors have caught up and, in some cases, surpassed it in feature development. The new Verizon Cloud offering was an effort to build a consolidated, hypervisor-neutral, next-generation platform; although it has not fulfilled Verizon's hopes, it remains the market's most ambitious and innovative attempt at a truly software-defined, mixed-tenancy cloud IaaS offering delivered on commodity infrastructure.

Verizon has a solid, workload-centric vision of what it would like its future service portfolio to be. Currently, Verizon can serve a relatively broad range of use cases for basic cloud IaaS via its range of different offerings. It is gradually consolidating all its cloud IaaS offerings under the Verizon Cloud portal, which will eventually result in a more consistent user experience across the portfolio. It has begun to build an ecosystem around Verizon Cloud and started a marketplace program.

Cautions

Verizon has capable basic cloud IaaS offerings, but lacks value-added capabilities. It will need to invest very deeply in engineering, product development and its partner ecosystem, which means competing for scarce talent and the attention of partners (which normally prefer to work with the providers that have the most market share). Verizon's maintenance of multiple distinct cloud IaaS platforms has forced it to split its engineering efforts, at a time when all competitors in this market face a challenge to advance a single platform.

Verizon's sales organization does not often have a relationship with the decision makers and influencers who select cloud IaaS providers, since they are different from the people who control network procurement. For Verizon's cloud business to achieve its potential, Verizon needs to become relevant to business managers and application development leaders.

Virtustream

Virtustream is a small, independent service provider focused solely on cloud services and software.

Offerings: Virtustream's service, xStream, is hypervisor-neutral but typically supports VMware and KVM. It is offered in both single-tenant and multitenant variants; furthermore, it can support single-tenant compute with a multitenant back-end, as well as bare metal. VMs are available by the hour, bare metal is available by the month, and both paid-by-the-VM and SRP models are available. The offering embeds a tool for governance, risk management and compliance (GRC), including capabilities from Virtustream's 2014 acquisition of ViewTrust Technology. There are variants of xStream targeted specifically at customers who need PCI compliance, and U.S. federal government customers. Managed services are optional. Virtustream also offers xStream as software, and has licensed some of its technology to other service providers, such as IBM.

Locations: Virtustream has multiple data centers in the eastern and western U.S., and in the U.K. and Netherlands. It has sales presence in the U.S., along with London, Walldorf (the German home of SAP), and Dubai sales offices. The service is provided in English only.

Recommended mode: Virtustream's focus on complex traditional enterprise applications means that it appeals primarily to Mode 1 customers, especially those seeking improved agility.

Recommended uses: Complex workloads, particularly those related to ERP or other enterprise software suites, including applications that may not have been designed to run in virtualized environments.

Strengths

Virtustream's founders have backgrounds in VMware and SAP consultancies, as well as system integration, and the company has a strongly consultative approach, as well as particular expertise in SAP; in 2013, Virtustream received a direct investment from SAP America. Its cloud is targeted primarily at production applications, especially mission-critical complex enterprise applications, such as ERP suites from SAP, Oracle and Microsoft. Its ability to template and automate the deployment and management of highly complex legacy applications enables customers to achieve agile application development life cycles and reduce the risk of application changes for complex workloads such as those associated with SAP. Virtustream has been successful at winning large-scale enterprise deals, particularly those focused on SAP and that require managed service capabilities.

Virtustream has developed its own cloud platform technology, and can offer fully consistent hybrid cloud solutions. Its micro-VM technology enables it to charge for resources consumed, rather than resources allocated, and to offer policy-based service-level management and application performance SLAs. It has focused on meeting enterprise security and compliance needs, and has some unique capabilities, such as support for Intel's Trusted Execution Technology (TXT) and trust framework. Virtustream typically works closely with customers to determine how best to migrate on-premises applications to its cloud, and it has its own data collection tools that customers run on their on-premises servers to determine what resources they will need on xStream.

Cautions

Although Virtustream supports a solid set of self-service features, it primarily targets complex, mission-critical applications where it is likely that the customer will purchase professional service assistance for implementation, and managed services on an ongoing basis. It does not have the resources to compete for all workloads against providers whose greater resources allow development of much broader product portfolios. Rather, it provides deep and differentiated capabilities in its focus areas. As a relatively small but innovative provider with unique intellectual property, it may be a target for acquisition.

Virtustream is a compelling and unique provider for particular enterprise application use cases, but it is better suited to implementations where an environment will be carefully and consultatively tuned for the needs of particular applications, rather than general-purpose environments where workloads are deployed without oversight.

VMware

VMware has historically been a software vendor focused on virtualization technologies. It entered the cloud IaaS market when it launched the VMware vCloud Hybrid Service (vCHS), now renamed vCloud Air, into general availability in September 2013. It is a subsidiary of EMC.

Offerings: vCloud Air is a VMware-virtualized, vCloud-API-enabled offering that comes in three variants: On-Demand (fully multitenant), Virtual Private Cloud (fully multitenant and SRP-priced) and Dedicated Cloud (single-tenant compute with multitenant back-end, and SRP-priced with customer-controlled oversubscription). There is also a disaster recovery service. All vCloud Air services share a common portal and are delivered as resource pools out of the same shared hardware.

Locations: vCloud Air is available in multiple data centers in the U.S., as well as in the U.K., Germany, Australia and Japan. VMware has a global sales presence. Support is available in English, French, German, Portuguese, Spanish, Hindi, Japanese and Mandarin. The portal is available in English only; documentation is available in English and Japanese.

Recommended mode: vCloud Air primarily appeals to Mode 1 customers with existing investments in VMware technology.

Recommended uses: Development environments, general business applications, supplementing existing VMware-virtualized environments, Pivotal Cloud Foundry hosting, and disaster recovery for customers seeking a VMware-based solution.

Strengths

VMware is the market share leader and thought leader in virtualization. It has a strong brand, global sales reach, and a broad base of existing customers that are deeply committed to its technologies. Its strategy for vCloud Air is to offer hybrid cloud options to existing VMware customers, reinforcing its position in internal data centers, and expanding its total addressable market. It wants to offer customers a consistent experience across VMware-based infrastructure, whether delivered as an on-premises virtualized environment or delivered as a cloud service.

vCloud Air is a vCloud Director-based service (although VMware offers an easier-to-use portal as the primary UI), and takes advantage of VMware's NSX software-defined networking technology; the result is a capable basic cloud IaaS offering. The notion of "single pane of glass" manageability appeals to many IT administrators, although vCloud Air does not yet deliver on this promise. However, the vCloud Air Disaster Recovery service may be attractive to customers with on-premises VMware. VMware also possesses a suite of ITOM tools that could, in the future, be used to enhance vCloud Air manageability.

Cautions

vCloud Air has limited appeal to the business managers and application development leaders who are typically the key decision makers for cloud IaaS sourcing. VMware administrators in IT operations are the most likely champions of vCloud Air within a business, but they often prefer to build internal solutions, and they are also often the people that the business is trying to bypass by going to cloud IaaS. VMware must continue to create hybrid solutions that can pull customers toward the cloud. It is trying to develop compelling value propositions for developers by partnering with PaaS providers, with a particular emphasis on mobile solutions. Although EMC also owns Pivotal, the Pivotal Web Services PaaS runs on AWS, and VMware is in the process of independently building developer-oriented capabilities.

VMware needs to build an ecosystem around vCloud Air. It has introduced a vCloud Air Marketplace within its VMware Solution Exchange, but the catalog currently only includes operating systems and Microsoft SQL Server. VMware does have a strong channel in its broader business, but SIs, MSPs and value-added resellers need to learn to sell vCloud Air effectively and deliver value on top. VMware has previously used service providers as its channel to market, but none of those providers attained true scale and they were not able to maintain the level of innovation necessary in this market. Some of these partners are now reselling vCloud Air, which reduces channel conflict, but VMware faces the same technical challenges, and many of the same business challenges, as other VMware-based service providers.

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

Interoute

NTT Communications

Dropped

GoGrid. GoGrid was acquired by Datapipe in January 2015. Due to the timing of the acquisition, and integration-related uncertainty, we could not assess either vendor for this Magic Quadrant.

HP. While HP continues to operate its cloud IaaS offering (HP Public Cloud), it now only actively seeks to market and sell this offering as part of a hybrid solution. It no longer has sufficient market share to qualify for inclusion in this Magic Quadrant.

Inclusion and Exclusion Criteria

To be included in this 2015 Magic Quadrant, vendors had to demonstrate the following, as of January 2015:

Market participation. They must sell public cloud IaaS as a stand-alone service, without the requirement to use any managed services (including guest OS management), or to bundle it with managed hosting, application development, application maintenance, or other forms of outsourcing. They may, optionally, also sell a private version of this offering that uses the same architecture but is single-tenant.

Market traction and momentum. They must be among the top 15 providers for the relevant segments (public and industrialized private cloud IaaS, excluding small deployments of one or two VMs), based on Gartner-estimated market share and mind share.

Business capabilities relevant to Gartner clients. They must offer the public cloud IaaS service globally, be able to invoice, offer consolidated billing, and be willing to negotiate customized contracts. They must have 24/7 customer support (including phone support).

Technical capabilities relevant to Gartner clients. The public cloud IaaS service must be suitable for supporting production workloads, whether enterprise or cloud-native. Specific service features must include:

- Data centers in at least two metropolitan areas, separated by a minimum of 250 miles, on separate power grids, with SSAE 16, ISO 27001 or equivalent audits
- Real-time provisioning (small Linux VM in 10 minutes)
- The ability to scale an application beyond the capacity of a single physical server
- An allowable VM size of at least eight vCPUs and 32GB of RAM
- An SLA for compute, with a minimum of 99.5% availability
- The ability to securely extend the customer's data center network into the cloud environment
- The ability to support multiple users or API keys, with role-based access control
- Access to a Web services API

Vendors Considered but Not Included

This Magic Quadrant is global in scope, but most of the providers are based in the U.S. This is a reflection of the way the market is evolving. The market has matured more quickly in the U.S. and the bulk of revenue comes from U.S.-based customers and flows to U.S.-based companies — U.S.-based IaaS providers typically derive 20% or more of their revenue from customers outside the U.S. However, all the providers in this Magic Quadrant offer their services on a global basis, and most have at least one data center in North America, Western Europe and Asia/Pacific.

Significant Europe-based providers not in this Magic Quadrant include arsys, CloudSigma, Colt, Gigas, Orange Business Services, OVH and Skyscape. Providers with significant presence in the Asia/Pacific region that are not in this Magic Quadrant include Datapipe and Tata Communications.

In the evaluations for this Magic Quadrant, we considered a variety of interesting cloud IaaS providers that did not meet the criteria for inclusion. The more distinctive ones, by use case, include:

Development: Skytap, which has deep self-service "lab management" capabilities and features that support collaboration between developers, using either its own infrastructure or AWS.

Disaster Recovery: Hosting and iland, which offer disaster recovery as a service on their cloud IaaS platforms.

Enterprise applications: NaviSite, a Time Warner Cable Company, whose cloud IaaS platform is suitable for hosting Oracle E-Business Suite and other complex applications.

HPC: CloudSigma, Internap, Peer 1 Hosting and ProfitBricks, which offer configurations and pricing models that are attractive for HPC.

Private clouds: Blue Box and Metacloud (now Cisco OpenStack Private Cloud), which offer remotely managed OpenStack-based private clouds as a service.

There are also many cloud IaaS providers that specialize in serving small businesses that typically use just one or two VMs; examples are DigitalOcean, ElasticHosts and Linode. These low-cost providers are often used as an alternative to mass-market virtual private server (VPS) hosting. Gartner clients typically have needs beyond what such "cloud VPS" providers can fulfill.

Even though some businesses may use PaaS in a very IaaS-like manner, we have excluded PaaS providers from this Magic Quadrant, with the exception of those PaaS providers that also have a qualifying IaaS offering. PaaS offerings do not allow customers to obtain raw VMs that can be loaded with arbitrary operating systems, middleware and applications, which is a requirement for being considered as IaaS. For PaaS providers, see "Magic Quadrant for Enterprise Application Platform as a Service" and "Magic Quadrant for Enterprise Integration Platform as a Service, Worldwide."

Evaluation Criteria

Ability to Execute

Gartner analysts evaluate technology vendors on the quality and efficacy of the processes, systems, methods or procedures that enable IT providers' performance to be competitive, efficient and effective, and to positively affect revenue, retention and reputation. Ultimately, technology providers are judged on their ability to capitalize on their vision, and on their success in doing so.

We evaluated vendors' Ability to Execute in this market by using the following criteria:

Product/Service: Service providers were evaluated on the capabilities of their cloud IaaS offering to support all use cases being evaluated. We evaluated the breadth and depth of the feature set, self-

service capabilities, automated system management and suitability to run a broad range of workload types. This criterion is important to buyers who want to purchase the most capable, feature-rich service.

Overall Viability (Business Unit, Financial, Strategy, Organization): Providers were evaluated on the success of their cloud IaaS business, as demonstrated by current revenue and revenue growth since the launch of their service; their financial wherewithal to continue investing in the business and to execute successfully on their roadmaps; commitment to their current offerings, with no plans to execute disruptive platform transitions or migrations in the next two years; and their organizational commitment to this business, and its importance to the company's overall strategy. This criterion is important to buyers who prefer to purchase services from large vendors with ample financial resources, or from vendors that have a position of market leadership and are continuing to invest aggressively in the business. It is also important to buyers who are concerned about their long-term strategic investment in a particular vendor, or who want to avoid potentially disruptive service changes.

Sales Execution/Pricing: Providers were evaluated on their ability to address the range of buyers for IaaS, including the different audiences in each mode of bimodal IT; adapt to "frictionless selling" with online sales, immediate trials and proofs of concept; provide consultative sales and solutions engineering; be highly responsive to prospective customers; and offer value for money. This criterion is important to buyers who value a smooth sales experience, the right solution proposals and competitive prices.

Market Responsiveness and Track Record: This market is evolving extremely quickly and the rate of technological innovation is very high. Providers were evaluated on how well they have historically been able to respond to changing buyer needs and technology developments, rapidly iterate their service offerings, and deliver promised enhancements and services by the expected time. This criterion is important to buyers who value rapid delivery of cutting-edge capabilities.

Marketing Execution: Providers were evaluated on their mind share and brand awareness in the market; their ability to convey marketing messages based on their ability to deliver real business value, not empty hype or misleading "cloudwashing" (the practice of rebranding or remarketing an existing offering under a cloud label without offering all the attributes of a cloud service); and the clarity and accuracy of their marketing messages, compared with their actual service offering. This criterion is important to buyers who prefer to buy from well-known vendors.

Customer Experience: Providers were evaluated on the quality and responsiveness of their account management and technical support; the ease of use of their self-service functionality; the capabilities of their customer portal (additional functionality such as monitoring, reporting and trouble ticketing); the usefulness of their documentation and customer communications; the quality of their SLAs; the ease of doing business with them; and overall customer satisfaction. This criterion is important to buyers who value the aspects of the vendor relationship and capabilities beyond the IaaS platform itself.

Operations: Providers were evaluated on their ability to meet their goals and commitments, including their track record of service delivery; the quality of their response to outages; their approach to emergency and scheduled maintenance; and their ability to meet timelines that are communicated to customers and to the market. This criterion is important to buyers who want a reliable, predictable service experience.

Our evaluation of a service provider's Ability to Execute remains similar to that of the 2014 Magic Quadrant. We have continued to raise our expectations of a provider's feature set, and we have further increased the weighting of Overall Viability, reflecting our belief that even though some providers can accomplish great things with relatively few resources, long-term success in this market will require substantial investment, as well as the ability to attract an ecosystem.

Table 1. Ability to Execute Evaluation Criteria

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

Source: Gartner (May 2015)

Completeness of Vision

Gartner analysts evaluate technology vendors on their ability to articulate logical statements convincingly about current and future market direction, innovation, customer needs and competitive forces, as well as how they map to Gartner's position. Ultimately, technology providers are assessed on their understanding of the ways in which market forces can be exploited to create opportunities.

We assessed vendors' Completeness of Vision in this market by using the following criteria:

Market Understanding: Providers were evaluated on their understanding of the wants and needs of three different buying constituencies in this market — enterprises, midmarket businesses and digital businesses (whether technology companies or digital business units embedded in nontechnology businesses) — both currently and in the longer term as the use of IaaS matures. This criterion is important to buyers who value a provider's understanding of the market's evolution and broader business trends, which impact a provider's ability to plan a successful long-term strategy.

Marketing Strategy: Providers were evaluated on their ability to articulate their position in the market and their competitive differentiation, and to communicate these messages clearly and consistently, both internally and externally. This criterion is important to buyers who believe that

providers should have a clear focus and direction.

Sales Strategy: Providers were evaluated on their understanding of the buying centers for the market, and the way that these different buying centers want to engage with sales, as well as their strategy for adapting their sales force, online channel and partner channels to the IaaS market. This criterion is important to buyers who value a provider's ability to grow its business over the long term.

Offering (Product) Strategy: Providers were evaluated on the breadth, depth, quality and differentiation of their service roadmaps, as relevant to the use cases under evaluation, with an emphasis on self-service, automated ITOM and overall feature set. This criterion is important to buyers who want a provider who will lead the market in service capabilities.

Business Model: Providers were evaluated on their overall value proposition and their strategy for providing solutions for the use cases under consideration, not just raw infrastructure elements. This included evaluating how IaaS fits into their broader product portfolio and product strategy. This criterion is important to buyers who view IaaS as part of an integrated set of solutions from a particular provider.

Vertical/Industry Strategy: Providers were evaluated on their ability to offer targeted services for particular vertical markets, such as government, biotechnology, media and entertainment, and retail. This includes sales and marketing to such verticals, their ability to meet specialized compliance needs, and vertical-specific solutions. This criterion is not directly important to most buyers, except to the extent that a provider has a vertical-specific offering that is relevant to them.

Innovation: Providers were evaluated on the level of investment in the future of their business, and the quality of those investments, whether financial or human capital; this includes aspects such as the deployment of engineering resources, investments in new technology, mergers and acquisitions, and partnerships and alliances. This criterion is important to buyers who care about leading-edge capabilities, and the strength of a provider's ecosystem.

Geographic Strategy: Providers were evaluated on their ability to expand their offering beyond their home region, serving the needs of multinational businesses, as well as adapting their offerings to other geographies. In particular, this included their strategy for international sales and support, as well as their data center footprints and internationalization efforts. This criterion is important to buyers who want to use a global vendor.

Our evaluation of Completeness of Vision remains similar to that of the 2014 Magic Quadrant. However, we have continued to increase our expectations for the breadth and depth of a provider's vision. We believe that a comprehensive vision must encompass the ambition to run any workload, at anytime, anywhere in the world, with the appropriate availability, performance, security and isolation — including the ability to self-service all the necessary compute, storage, network and management capabilities — in cooperation with an ecosystem of supporting partners.

Table 2. Completeness of Vision Evaluation Criteria

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

Source: Gartner (May 2015)

Quadrant Descriptions

Leaders

Leaders distinguish themselves by offering a service suitable for strategic adoption and having an ambitious roadmap. They can serve a broad range of use cases, although they do not excel in all areas, may not necessarily be the best providers for a specific need, and may not serve some use cases at all. They have a track record of successful delivery, significant market share and many referenceable customers.

Challengers

Challengers are well-positioned to serve some current market needs. They deliver a good service that is targeted at a particular set of use cases, and they have a track record of successful delivery. However, they are not adapting to market challenges sufficiently quickly, or do not have a broad scope of ambition.

Visionaries

Visionaries have an ambitious vision of the future, and are making significant investments in the development of unique technologies. Visionaries may be new market entrants, or they may be existing providers who are reinventing their business. Their services are still emerging, and they have many capabilities in development that are not yet generally available. While they may have many customers, they might not yet serve a broad range of use cases well.

Niche Players

Niche Players may be excellent providers for the use cases in which they specialize, but may not serve a broad range of use cases well, or have a broadly ambitious roadmap. They may be relatively new entrants to this market, or may not yet have gained significant market share. Some may have solid leadership positions in markets adjacent to this market, but are still in the relatively early stages of developing capabilities in cloud IaaS. Providers that specialize in managed services on top of a "good enough" IaaS

platform may be in this category. The more highly targeted your needs, the more likely it is that there will be a Niche Player ideal for your needs.

Context

When people think about "cloud computing," cloud IaaS is often one of the first things that comes to mind. It's the "computing" in cloud computing — on-demand compute, storage and network resources, delivered on-demand, in near real time, as a service. There has been tremendous hype about these services, but there are also a number of use cases for which cloud IaaS delivers excellent business value. Although the market is immature, it is evolving rapidly; it has begun its journey up the Slope of Enlightenment on Gartner's "Hype Cycle for Cloud Computing, 2014." Unfortunately, many customers do not clearly understand their requirements, and many providers are in a state of turmoil and articulate their offerings poorly. Therefore, care should be taken when sourcing these services.

In 2014, the absolute growth of public cloud IaaS workloads surpassed the growth of on-premises workloads (of any type) for the first time. Market share has continued to grow more heavily concentrated, even while the market has dramatically expanded. 2014 has been a year of reckoning for many cloud IaaS providers, and many cloud IaaS providers believe that their current strategy is failing them. Some of these providers intend to launch an entirely new cloud IaaS platform, or are in the process of making substantial changes to their current platform. Others are considering or in the process of executing a pivot to providing managed services on leading cloud IaaS providers. Many providers have indicated that they intend to discontinue or significantly reduce their investment in their cloud IaaS offerings, and others intend to eliminate or replace their current offerings. We urge buyers to be extremely cautious when selecting providers; ask specific and detailed questions about the provider's roadmap for the service, and seek contractual commitments that do not permit the provider to modify substantially or to discontinue the offering without at least 12 months' notice.

Cloud IaaS is now used for virtually all use cases that can be reasonably hosted on virtualized x86-based servers. The most common use cases for cloud IaaS are development and testing environments; HPC and batch processing; Internet-facing websites and Web-based applications (which may or may not have architectures specifically designed for the cloud); and non-mission-critical internal business applications. An increasing number of organizations now run mission-critical business applications on cloud IaaS (Gartner's cloud computing survey indicates 28% in 2014), and a significant number of organizations are in the midst of migrating most or all of their infrastructure to cloud IaaS. Migrations are most frequently done to avoid major capital expenditure, such as a hardware refresh or the construction of a data center.

Initially, most businesses adopt cloud IaaS for Mode 2, agile IT projects; such projects may be peripheral to the organization's IT needs, but may have a high business impact. Over time, as a business becomes more comfortable with the use of cloud IaaS, it will be used in Mode 1, traditional IT projects as well, usually mirroring the past decade's adoption pattern of virtualization in the data center. Many businesses, especially in the midmarket, will eventually migrate away from running their own data centers in favor of relying primarily on infrastructure in the cloud. Gartner's 2015 CIO survey indicates that 83% of CIOs consider cloud IaaS as an infrastructure option, and 10% are already cloud-first with cloud IaaS as their default infrastructure choice. (See "Flipping to Digital Leadership: The 2015 CIO Agenda.")

Although some organizations still source cloud IaaS in a tactical, per-project fashion, most organizations are now looking for long-term strategic partners. This 2015 Magic Quadrant focuses on evaluating providers through the lens of their suitability for strategic adoption. We believe that while the market is still relatively immature, customers may reasonably begin making strategic choices, based on their own speed of adoption. Customers who will not have the majority of their workloads on cloud IaaS until 2017 or later may choose strategic providers whose offerings are still substantively incomplete, if they are confident that those providers will have the necessary capabilities by the time they need them. We recommend that prospective customers with immediate needs focus on finding the cloud provider that matches their anticipated use cases for the next year. In some cases, businesses may have to use multiple cloud IaaS providers to meet the needs of diverse use cases.

Market Overview

Cloud IaaS provides on-demand, near-real-time, self-service access to abstracted, programmatically accessible and highly automated infrastructure resources (at minimum, compute resources, along with associated storage and network resources), on-demand and in near real time. In IaaS, the provider manages the data center facilities, hardware and virtualization, but everything above the hypervisor layer — the operating system, middleware and application — is managed by the customer, or is an add-on managed service from the provider or another third party. This market is wholly separate and distinct from cloud PaaS and SaaS.

Cloud IaaS is owned, built and operated by a service provider, but it may be delivered on-premises within a customer's data center or hosted in the provider's data center. It may be "public" (multitenant) or "private" (single-tenant), although, in practice, there is no consistency in the application of these labels to varying degrees of resource isolation, and most hosted offerings use some degree of shared resources in services labeled "private."

Cloud IaaS is not a commoditized service, and even providers with very similar offerings and underlying technologies often have sufficiently different implementations that there is a material difference in availability, performance, security and service features.

What Types of Workload Are Being Placed on Cloud IaaS?

There are four broad categories of customer need in cloud IaaS:

- Digital business enablement
- Mode 2, agile IT projects
- Mode 1, traditional IT data center substitution
- Batch computing

Digital business needs account for the majority of workloads in cloud IaaS. Digital business, however, is not limited to technology companies. Almost every business is being impacted by digital disruption and an increasing number of businesses have "internal startups" or digital business units. (See "CEOs and CIOs Must Assume That Every Industry Will Be Digitally Remastered.") Digital business use cases are very

broad, and include digital marketing, e-commerce, e-CRM, SaaS and data services. These are generally production applications, although cloud IaaS is typically used for the whole application life cycle. Many of these customers have mission-critical needs.

In addition to digital business projects, many organizations have a wide variety of IT projects that they are executing in an agile fashion. Rapid application development, prototyping, experiments and other IT projects that require agility, flexibility and the ability to meet urgent infrastructure needs are frequently executed on cloud IaaS. Although most such Mode 2, agile IT projects are not core to the organization's overall IT portfolio, they may have high visibility and high business impact.

In many organizations, cloud IaaS is gradually replacing or supplementing traditional data center infrastructure. It is typically used very similarly to the organization's internal virtualization environment. Organizations typically begin with development environments or less-mission-critical production applications, but gradually expand to also host mission-critical applications on cloud IaaS. Mode 1, traditional IT organizations typically look to cloud IaaS to deliver cost reductions, but may also be interested in long-term IT transformation.

The least common need, but one that nevertheless generates significant revenue for the small number of providers that serve this portion of the market, is batch computing. For these customers, IaaS serves as a substitute for traditional HPC or grid computing. Customer needs include rendering, video encoding, genetic sequencing, modeling and simulation, numerical analysis and data analytics. These customers need to access large amounts of commodity compute at the lowest possible price, with little concern for infrastructure reliability. Some HPC use cases benefit from specialized hardware such as graphics processing units (GPUs) and high-speed interconnects.

Cloud IaaS can now be used to run most workloads, although not every provider can run every type of workload well. Service providers are moving toward infrastructure platforms that can offer physical (nonvirtualized) and virtual resources, priced according to the level of availability, performance, security and isolation that the customer selects. This allows customers to run "cloud native" applications that have been architected with cloud transaction processing principles in mind (see "From OLTP to Cloud TP: The Third Era of Transaction Processing Aims to the Cloud"; *Note: This document has been archived; some of its content may not reflect current conditions*), as well as to migrate existing business applications from their own virtualized servers in internal data centers into the cloud, without changes. Cloud IaaS is best used to enable new IT capabilities, but it has become a reasonable alternative to an internal data center.

What Key Market Aspects Should Buyers Be Aware Of?

Cloud IaaS is not a commodity. Providers vary significantly in their features, performance, cost and business terms. Although in theory, cloud IaaS has very little lock-in — a VM is just a VM, in the end — in truth, cloud IaaS is not merely a matter of hardware rental, but an entire data center ecosystem as a service. This encompasses the entirety of the ITOM stack, including traditional IT service management capabilities, DevOps-oriented capabilities, and new forms of automation, analytics and insight, including "smart" infrastructure capabilities that take advantage of the unique perspective offered by the delivery of integrated compute, storage and networking resources. The more you use those capabilities, the more value you will receive from the offering, but the more you will be tied to that particular service offering. The dynamics of this market resemble a software market, not a traditional IT services market. Providers are in a race to deliver features, and the "winners" are likely to be those that are highly innovative and that have the most resources to invest in the breadth and depth of capabilities development.

IaaS and PaaS capabilities are overlapping. Cloud IaaS providers are increasingly offering middleware capabilities as a service, and are likely to add capabilities such as the provisioning and orchestration of application containers (particularly Docker containers). Many leading providers will offer both IaaS and PaaS, and in many cases will blend IaaS and PaaS capabilities into cloud integrated infrastructure services (CIIS). The spectrum of services allows customers to decide on a trade-off between control and convenience. Customers want to develop, deploy and manage applications efficiently, and will choose the combination of capabilities that best suits their needs. To make it easy for applications to span the spectrum of capabilities, a provider's CIIS needs a single self-service portal and catalog, common identity and access management, an integrated low-latency network context, and an integrated security context.

Providers' size and scale matter. While scale does impact operational efficiency to some degree, more importantly, it impacts engineering efficiency — the ability to leverage an investment in developers as well as partner capabilities across as large a customer base as possible. Software requires a large upfront investment, but each incremental customer adds comparatively little cost, and software markets tend to become "winner takes all" arenas, where a small number of vendors command dominant market shares. Scale also matters because the ability to deliver a broad range of integrated capabilities will become increasingly crucial. A provider's size, its existing customer relationships, and the strength of its brand have an enormous impact on its ability to gain market share and traction, especially on a global basis. Furthermore, the solution ecosystem is rapidly consolidating around a small number of market leaders.

The market is in a state of upheaval. The sky is not falling — customers are getting great value out of cloud IaaS — but the earth is moving as the competitive landscape shifts. Few providers have the financial resources to invest in being broadly competitive in the cloud IaaS market. While there is room in the market for highly specialized providers, most providers are trying to compete for a broad range of use cases. Many providers are struggling to grow their businesses, despite rapid overall market growth. Some less successful providers may try to build new platforms, become specialists in particular niches, acquire another provider in order to use their platform instead, pivot to become third-party managed service providers on other clouds, or exit the market entirely. This may be very disruptive for customers who choose such providers. However, customers who have chosen market leaders should be well-insulated from these troubling market conditions.

Bimodal IT impacts cloud IaaS sourcing decisions. Mode 2, agile IT organizations typically value cloud IaaS providers that invest deeply in engineering in order to provide a rich suite of features and extensive automation for self-service enablement. Mode 2 adoption is often business-led — driven by business managers who hold the budget, need greater agility and have shorter time frames than IT operations are able to accommodate, and who therefore turn to application developers and enterprise architects for a solution. IT operations organizations typically have a Mode 1 mindset and may initially look for providers that provide a basic set of IaaS features within a familiar environment that is similar to their existing virtualized infrastructure, but they are likely to rethink this approach if their ultimate goal is IT transformation. Cloud IaaS providers vary in their ability to target these different buying centers.

Furthermore, most providers focus on either a Mode 1 or Mode 2 audience, and their feature set and style of service are oriented accordingly, although leading providers offer capabilities attractive to both audiences.

Automation will increasingly transform operations in the cloud. To deliver greater value to customers, cloud IaaS providers must improve the quality and efficiency with which customers can manage their infrastructure. They must find ways to reduce the burden of operational chores such as patch management and backups. While manual managed services are frequently used to substitute for automated offerings, efficiency demands automation instead of operators, and successful IaaS providers will push "up the stack" to deliver highly automated solutions.

Customers are separating cloud IaaS platform decisions from managed services decisions. Some customers want to use an industrialized cloud IaaS offering, but would like to outsource the management of that infrastructure. These customers increasingly choose to adopt a best-in-class IaaS offering, and then seek a MSP to manage it, rather than adopt a "managed cloud" offering from a MSP that can offer only basic IaaS capabilities on its own platform. Customers may also extend existing outsourcing relationships to include management of a third-party cloud IaaS offering. While some Mode 1, traditional IT customers consider it acceptable for an MSP's platform to offer only a basic set of IaaS features, it is generally unacceptable to Mode 2, agile IT customers. Furthermore, such deficiencies have a long-term impact on the quality and cost of the customer's IT operations, which may be strategically unacceptable to Mode 1 customers. Some MSPs specialize in cloud-native operations, usually with significant use of DevOps, and can help customers through the transformation process, which may be attractive to both Mode 1 and 2 customers, as well as digital businesses.

Public and private cloud IaaS are converging. Service providers are increasingly using dynamic physical and logical isolation mechanisms to create "private" infrastructure within a shared, multitenant capacity pool. This allows for economies of scale, while enabling customers to meet a broader range of security and compliance requirements. For details of this convergence and how to choose the level of isolation you need, see "Best Practice: Evaluate Isolation Mechanisms in Public and Private Cloud IaaS" *(Note: This document has been archived; some of its content may not reflect current conditions)*. We believe that, over time, the leading providers will offer a single, highly flexible platform across both their own data centers and customers' data centers. As a result, this Magic Quadrant covers not only public cloud IaaS, but industrialized private cloud IaaS as well.

Most organizations are multicloud at the point of provisioning. While many customers use multiple cloud IaaS providers, each individual project (or component of a composite application) is typically hosted on a single provider. While it is relatively straightforward to move VM images from one cloud to another, truly hybrid multicloud scenarios are rare. The tools to enable true "single pane of glass" management and seamless movement across infrastructure platforms are not mature, and there are significant differences in cloud IaaS implementations, even between providers using the same underlying CMP. Note that the claim that an ecosystem is "open" has nothing to do with actual portability. Due to the high degree of differentiation between providers, the organizations that use cloud IaaS most effectively will embrace cloud-native management, rather than allow the legacy enterprise environment to dictate their choices.

The software-defined data center is the center of a partner ecosystem. Programmatic (API) access to infrastructure is crucial, as it enables customers, as well as third parties, to build management tools for their platforms, and to enable applications to take maximum advantage of the infrastructure environment. Providers need to foster rich ecosystems of capabilities. While the leading providers are likely to build a substantial number of capabilities themselves, partners will extend the range of their capabilities, provide overlays for complex heterogeneous multivendor environments, and add "stickiness" to these platforms by offering tight integrations between applications, middleware and infrastructure.

Local sourcing matters to some customers. Customers normally prefer to keep data in-region for reasons of network latency. However, regulatory concerns that require keeping data in-country, as well as revelations about foreign intelligence agencies obtaining access to private data, have heightened the desire of non-U.S.-based customers to purchase cloud IaaS from local providers. (See "The Snowden Effect: Data Location Matters.") Unfortunately, local providers typically lack the scale and capabilities of the global providers, and may focus primarily on small businesses, not enterprises. Furthermore, keeping data local is no guarantee of freedom from either domestic or foreign surveillance. It is nevertheless possible that the cloud IaaS markets in Europe and Asia will become highly fragmented, which may result in only basic, commodity capabilities being available to customers that cannot use a foreign provider (even when that provider has local presence).

Public cloud IaaS provides adequate security for most workloads. Although many security controls are the responsibility of the customer, not the provider, most major cloud IaaS providers offer a high degree of security on the underlying platform. Transparent encryption of LAN, WAN and storage will become increasingly commonplace as a bundled element of cloud IaaS offerings, as providers react to defend themselves against intrusion from government entities.

Customers do not always save money by using cloud IaaS. Although many customers first investigate using IaaS to achieve cost savings, most customers buy IaaS to achieve greater business agility or to access infrastructure capabilities that they do not have within their own data center. IaaS can drive significant cost savings when customers have short-term, seasonal, disaster recovery or batch-computing needs. It can also be a boon to companies with limited access to capital and to small companies, especially startups, that cannot afford to invest in infrastructure (see "Cloud Computing Can Be the Singular Solution for at Least Five Use Cases"; *Note: This document has been archived; some of its content may not reflect current conditions)*. For larger businesses with existing internal data centers, well-managed virtualized infrastructure, efficient IT operations teams and a high degree of automation, IaaS for steady-state workloads is often no less expensive, and may be more expensive, than an internal private cloud. The less efficient your organization, the more likely you are to save money by using a cloud provider, especially if you take advantage of this opportunity to streamline and automate your operations. The largest-scale providers are continually lowering their prices, and automated managed services will substantially drive down the cost of infrastructure management over time, so cost advantages will continue to accrue to the providers.

Government (Federal) Context

19 May 2015

Analyst(s): Lydia Leong

Some cloud IaaS providers offer solutions specifically designed for U.S. federal government customers.

Market Differentiators

A cloud infrastructure as a service (IaaS) solution designed for U.S. federal government customers ("federal IaaS") is expected to be Federal Risk and Authorization Management Program (FedRAMP)-compliant. U.S. federal government entities are supposed to use FedRAMP-compliant solutions, but in practice, they do not always do so.

Because the FedRAMP certification process is lengthy, providers may be in the process of certification. Cloud IaaS providers exist in all three forms of FedRAMP compliance — Joint Accreditation Board Provisional Authority to Operate (JAB P-ATO), agency ATO, and security assessment package ("CSP Supplied Package") assessed by a FedRAMP-accredited Third Party Assessment Organization (3PAO) — and all forms of compliance are considered valid for federal IaaS. Some other providers may not want to undertake the effort and expense of an ATO, but may have solutions that meet the FedRAMP requirements; note, however, that these solutions are not considered FedRAMP-compliant. Because FedRAMP is the expected standard in this market, but acquiring an ATO is a difficult, expensive and lengthy process, the number of federal IaaS providers is limited.

Note that some cloud IaaS providers have a very broad solution, which may include platform as a service (PaaS) capabilities. A 3PAO may not have assessed everything in their portfolios, but providers will normally be specific about which parts of their solution have been reviewed by a 3PAO.

Federal IaaS solutions normally adhere to International Traffic in Arms Regulations (ITAR) restrictions. Some providers are also Federal Information Security Management Act (FISMA) Moderate accredited. Some have also received authorization under the Department of Defense (DoD) Cloud Security Model (CSM). Federal IaaS is often, but not always, delivered from data centers that are specifically for government customers. When such solutions are hosted in the same data centers as are used for commercial customers, the federal IaaS solutions are usually physically and logically segregated from the commercial solutions. These federal solutions are normally operated by U.S.-based personnel.

Use of federal IaaS solutions is normally restricted to U.S. federal government customers, but in most cases, contractors and other third parties performing work on behalf of government agencies can also use them. Notably, SaaS providers with government customers are often allowed to use these solutions.

State and local government entities are usually not permitted to use federal IaaS solutions, although this varies by provider — it is the provider that decides which customers are permitted in the community cloud. Such entities may need to find commercial cloud IaaS solutions instead. In most cases, customers use Criminal Justice Information Services Division (CJIS) compliance as a proxy for determining whether a cloud IaaS offering can adequately meet government security requirements.

Considerations for Technology and Service Selection

Government organizations contemplating the use of cloud IaaS should pay careful attention to bimodal IT requirements. Government IT personnel frequently have a cautious mindset and a tendency to operate only Mode 1 reliable IT, but they increasingly face agile demands that are better served with Mode 2 IT. Government IT organizations often attempt to source cloud IaaS in a Mode 1 fashion, even if the primary need is agility; such an approach is unlikely to fully satisfy users. Conversely, government IT organizations that are trying to drive Mode 1-oriented cost reductions need to source differently than those whose primary need is agility and transformation. When selecting an offering, it is vital to keep bimodal requirements in mind.

Government customers should be careful to distinguish between cloud IaaS and more traditional forms of outsourcing. Many so-called "cloud" solutions that are marketed to government entities are simply "cloudwashed" outsourcing; they often come with long-term contracts, with relatively inflexible capacity constraints, and lack the automation and industrialization of true cloud IaaS offerings (for more details, see "Don't Be Fooled By Offerings Falsely Masquerading as Cloud Infrastructure as a Service").

Some government customers find it difficult to contract directly with cloud IaaS providers, due to government acquisition rules. There are third-party cloud service brokerages — usually managed service providers (MSPs) and system integrators (SIs), such as Accenture, Datapipe, Smartronix and Unisys — that resell major cloud IaaS providers' solutions, and that typically add significant value as well; these are probably the best choice for government entities that need a brokered solution. There are other brokers that may add little or no value, but are willing to resell a major cloud IaaS provider's solution while offering much more attractive contract terms, usually with far higher liability caps. Government customers should beware of such resellers as they frequently lack the financial solvency to fulfill their obligations. Government customers may also want to buy through an 8(a) company in order to fulfill procurement obligations; again, they should be careful, as such resellers often mark up the price without adding value.

Notable Vendors

Vendors included in this Magic Quadrant Perspective have customers that are successfully using their products and services. Selections are based on analyst opinion and references that validate IT provider claims; however, this is not an exhaustive list or analysis of vendors in this market. Use this perspective as a resource for evaluations, but explore the market further to gauge the ability of each vendor to address your unique business problems and technical concerns. Consider this research as part of your due diligence and in conjunction with discussions with Gartner analysts and other resources.

Amazon Web Services

AWS's GovCloud is an AWS region located in Oregon. It is a community cloud dedicated to the U.S. federal government, including contractors, third parties and SaaS providers providing services to federal customers. It has a FedRAMP agency ATO from the Department of Health and Human Services, as well as a DoD CSM Level 3-5 Provisional Authorization. It adheres to ITAR regulations. It can be used for workloads that must adhere to CJIS requirements. Most AWS services are available in GovCloud, though only the core services have been assessed by a 3PAO.

AWS has the largest market share in cloud IaaS for government customers. It serves federal customers

both in GovCloud and its commercial regions. It also serves a significant customer base of state and local customers from its commercial regions. AWS has a rich ecosystem of partners, and many government customers adopt AWS through an MSP or SI.

Carpathia

VMware vCloud Government Service (vCGS) provided by Carpathia is a partnership between VMware and Carpathia to provide a government community cloud. There are two vCGS data centers, one in Northern Virginia and one in Arizona. vCGS has a FedRAMP JAB P-ATO, and can be used for workloads that must adhere to CJIS requirements. Note that this service uses the same architecture as VMware's own vCloud Air and must meet the same quality metrics, but it is still a distinct service operated by a VMware partner, not VMware itself. Carpathia has a long history as a managed hosting provider for government customers.

Microsoft

Microsoft Azure Government Cloud is a community cloud for U.S. federal, state and local government customers, as well as qualified partners serving those entities. There are two regions, one in Northern Virginia and one in Iowa. Completion of a FedRAMP JAB P-ATO is expected in May 2015. It can be used for workloads that must adhere to CJIS requirements. Many Azure services are available in the Azure Government Cloud, although the newer, higher-performing compute instance types are not yet available in these regions. The main Microsoft Azure service also has a FedRAMP JAB P-ATO, although only a subset of Azure services has been assessed by a 3PAO.

Microsoft has been aggressively pursuing government customers, especially state customers. There are many ways in which government customers can purchase Azure services, which eases what is sometimes a complex procurement process.

Verizon

Verizon's Enterprise Cloud: Federal Edition is a community cloud for U.S. federal government customers. It is based on the Terremark Enterprise Cloud; it is not part of Verizon Cloud. It is deployed in Northern Virginia, and has an agency ATO from the Department of Health and Human Services.

Virtustream

Virtustream's Federal Managed Cloud Services (FMCS) is a community cloud for U.S. federal government customers. It is similar to Virtustream's Enterprise Cloud, with Northern Virginia and San Francisco-based isolated deployments of Virtustream's xStream platform. Virtustream expects to receive a FedRAMP JAB P-ATO in May 2015. FMCS can be used for workloads that must adhere to CJIS requirements. In addition, Virtustream's ViewTrust solution can be used for continuous monitoring and on-demand compliance reporting.