Magic Quadrant for Container Management

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Container management solutions are meeting or exceeding enterprise requirements. I&O leaders must navigate an expansive marketplace to find vendors that support agility, modernization and transformation initiatives.

Strategic Planning Assumptions

- By 2027, more than half of all container management deployments will involve serverless container services, up from less than 25% today.
- By 2027, more than 75% of all AI deployments will use container technology as the underlying compute environment, up from less than 50% today.
- By 2028, 80% of custom software running at the physical edge will be deployed in containers, which is an increase from 10% in 2023.

Market Definition/Description

Gartner defines container management as offerings that enable the deployment and operation of containerized workloads. Delivery methods include stand-alone software or as a service.Delivery methods include cloud, managed service and software for containers running on-premises, in the public cloud and/or at the edge.

Container management automates the provisioning, operation and life cycle management of containerized workloads at scale. Centralized governance and security policies are used to manage container workloads and associated resources. Container management supports the requirements of modern applications (also refactoring legacy applications), including platform engineering, cloud management and continuous integration/continuous deployment (CI/CD) pipelines. Benefits include improved agility, elasticity and access to innovation.

Must-Have Capabilities

The following mandatory capabilities enable the deployment and operation of containers at scale:

- Orchestration and scheduling
- Container runtime

- Service discovery and registration
- Image registry
- Routing and networking
- Service catalog that contains and displays application and infrastructure artifacts.
- Observability that allows reactive, proactive and forensics monitoring.
- Management user interface
- API access to the associated resources.

Standard Capabilities

The standard capabilities for this market include:

- Container infrastructure — Provides enterprise-grade management of containers across on-premises, cloud and edge locations. Container infrastructure also provides tools for integrated fleet management, including life cycles and configurations for large numbers of container clusters potentially sourced from multiple providers.
- Managed provisioning and updates — Automates provisioning and update of container management functions and infrastructure.
- Platform engineering support — Provides functions needed to deliver a self-service container platform using product management practices.
- Application platform capabilities — Provides application development and DevOps capabilities to accelerate the delivery of applications using containers.

Optional Capabilities

The optional capabilities for this market include:

- Policy management and governance capabilities.
- Security functions, including protection of container runtimes and container image supply chain.
- Infrastructure software, including virtual machine hypervisors and host operating systems.
- Storage and data protection services for containerized applications.

Magic Quadrant

Figure 1: Magic Quadrant for Container Management

Vendor Strengths and Cautions

Alibaba Cloud

Alibaba Cloud is a Leader in this Magic Quadrant. Its container service portfolio is focused on providing a wide range of container deployment options, from single to hybrid and multicloud. Its services are available worldwide, including the Middle East, Western Europe and the United States but are mostly focused in Asia. Outside Asia, its clients tend to be organizations doing business in China and Chinese multinationals expanding overseas.

Its primary container management service is Alibaba Cloud Container Service for Kubernetes (ACK), which can run not only in the cloud but also on-premises or at the edge. Alibaba's Elastic Container Instance (ECI) and ACK Serverless are serverless container services. ACK One provides fleet management that can cover external Kubernetes clusters.

Strengths

- **Broad product portfolio:** Alibaba Cloud has the broadest product portfolio of any non-U.S.-based vendor in this Magic Quadrant. In some use cases, it surpasses U.S.-based leaders. In

particular, Alibaba Cloud has a variety of options in hybrid cloud and edge solutions through ACK Distro, ACK Edge, Apsara Stack and cloud-native stack.

- **Alibaba group's extensive use:** Alibaba Cloud's container services are broadly used by Alibaba Group's large e-commerce platform and ecosystem of companies that provide a variety of digital services, which demonstrates the stability, scalability and maturity of Alibaba Cloud's container services, particularly for cloud-native applications.

- **Continued market leadership in China:** Alibaba Cloud has maintained the largest cloud infrastructure as a service (IaaS) market share in Asia, especially in China (where the vast majority of its revenue originates). Alibaba Cloud is growing its presence in the public cloud container service market in China and Southeast Asia by leveraging its large IaaS market share and demonstrating the ability to handle a wide range of use cases.

Cautions

- **Lack of momentum outside Asia:** Alibaba Cloud has a large IaaS market share in Asia but lacks a significant presence in other regions, where its IaaS market share declined in 2023. It has yet to become a viable option outside Asia, except for Chinese multinationals expanding overseas.

- **Uncertainty in organizational strategy:** Alibaba Cloud announced a spinoff plan from the parent company in March 2023, laid off workers as part of the plan in May, then canceled the spinoff in November. The repeated changes in organizational strategy created uncertainty and risk for customers.

- **Unavailability of latest GPU models:** Due to U.S. government graphic processing unit (GPU) export restrictions, the latest GPU models, such as Nvidia A100 and H100, are not available on Alibaba Cloud, limiting support for compute-intensive AI-related container workloads.

Amazon Web Services

Amazon Web Services (AWS) is a Leader in this Magic Quadrant. Its container service portfolio is focused on supporting a wide range of deployment options, from container-based to serverless, with a focus on simplicity. Its operations are geographically diversified, and its clients range from large enterprises to startups. AWS customers tend to combine multiple AWS services to create delivery platforms for their cloud-native applications rather than use containers in isolation.

Both of AWS's primary container services, Amazon Elastic Container Service (Amazon ECS) and Amazon Elastic Kubernetes Service (Amazon EKS), can be used in conjunction with AWS Fargate for serverless container deployment. AWS provides a variety of services to complement them, such as container registry, service mesh, observability and security. AWS has been expanding services available outside its public cloud, such as Amazon EKS Anywhere and Amazon EKS on AWS Outposts.

Strengths

- **Integration with AWS IaaS and PaaS:** AWS's container services can be integrated with other AWS IaaS and PaaS services, allowing users to build a comprehensive cloud-native platform

more simply than most other vendors. This brings significant strengths as a strategic cloud platform to its container management offerings.

- **Diverse partner ecosystems:** AWS has built highly diversified partner ecosystems worldwide, making it easier to find partners that can support container services than other vendors. AWS also has a strong technology partner ecosystem, with over 500 container images and add-ons to choose from in the AWS Marketplace.

- **Serverless portfolio:** AWS pioneered serverless container services, releasing AWS Fargate in November 2017. It has continued to expand serverless container options so users, from complex large enterprise organizations to single app development teams, can choose one that suits their requirements.

Cautions

- **Limited support for multicloud or cross-cloud:** AWS does not proactively add features or solutions for managing containers in multicloud environments. Its main multicloud option is to deploy Amazon EKS Distro on other public clouds, which is supported only by AWS partners.

- **Solution navigation:** AWS has a wide breadth of sometimes-overlapping container management offerings. Customers sometimes struggle to select the right service for a given use case — for example, mapping Amazon EKS and Amazon ECS to the right use cases.

- **Limited Kubernetes cluster fleet management:** AWS provides third-party solutions, automation tools, and best practices for Kubernetes multicluster environments, but lacks native fleet management tools for managing the life cycle and state of distributed Kubernetes clusters at scale.

Broadcom (VMware)

Broadcom is a Leader in this Magic Quadrant. Its Tanzu portfolio provides container management software. Broadcom's operations are geographically diversified, and its customers range from midsize to large enterprises.

At the core of Broadcom's strategy for on-premises infrastructure is delivering hybrid private cloud using VMware Cloud Foundation. This strategy includes distributed hybrid infrastructure, such as compute, storage and networking. Tanzu Platform is Broadcom's offering for building modern applications. It consists of container offerings previously available as stand-alone products or in bundles.

Broadcom acquired VMware in November 2023.

Strengths

- **Customer base:** Broadcom has a large installed base of VMware customers and an extensive ecosystem of partners and alliances. This base reduces the need to develop new operational skills.

- **Integrated operations:** Leveraging its background in virtual infrastructure and operational tooling, Tanzu offers the ability to manage containers with the same control plane used to

manage virtual machines. Tanzu Platform aims to integrate processes and tools required to build code and manage it across clouds.
- **Developer community:** Tanzu is connected to the extensive community of Java developers using the Spring Framework. This relationship provides deep insight into developer needs and an opportunity to expand.

Cautions

- **Acquisition:** Broadcom's acquisition of VMware has become a topic of concern for Gartner clients. Many report that they have experienced cost increases for VMware products, reduction in service quality and the exit of key personnel during client inquiries.

- **Product integration and roadmap:** Tanzu comprises container management capabilities originating from multiple internal R&D projects and acquisitions. In inquiries, Gartner clients continue to express confusion at repeated changes to these offerings, particularly those delivered as a service, and concern about if/how the different offerings are integrated.

- **Competitive friction:** VMware has built partnerships with leading cloud providers, but container management is an area of competitive overlap. To stay broadly competitive in the cloud-native era, Broadcom must successfully add value that differentiates Tanzu from its cloud partner's native container services.

Canonical

Canonical is a Niche Player in this Magic Quadrant. Its container management offerings are available across a diverse range of compute environments, including on-premises, cloud and as a managed service. Canonical's operations are geographically diversified, and its clients tend to be early adopters with a focus on modern, agile development.

As a private company, Canonical does not disclose its revenue or customer count. Canonical's most popular offering, Ubuntu Linux, drives much of its product roadmap and engineering effort. Through 2024, Canonical's roadmap focuses on infrastructure modernization, automation, security and maintaining its position in the open-source ecosystem.

Strengths

- **Frictionless buying:** Pricing is cost-competitive, with all relevant information visible on Canonical's website (including subscriptions, levels of support, training, design and architecture, and remote management costs). This structure provides clarity and simplifies budgeting and expense management.

- **Edge computing:** Canonical continues to invest in container management for edge use cases (including MicroK8s, which is a minimal Kubernetes distribution). This feature makes Canonical suitable for test, development and edge use cases.

- **Flexible deployment:** Canonical's offerings are flexible and particularly suited to multicloud deployment due to Ubuntu's support across many cloud infrastructure providers. Likewise, it is supported by most leading hardware providers and, therefore, equally suited for private and/or hybrid deployment.

Cautions

- **Focus:** Canonical has a wide variety of users within its installed base, mostly centered around Ubuntu. However, historically it has lacked focus and traction with enterprise buyers compared to other container management offerings.
- **Functionality:** Canonical's container management offerings provide base functionality but few differentiating technical features. As the market continues to mature, Canonical risks falling behind unless it invests to remain competitive.
- **Business model:** Canonical's focus on open-source principles has led to enterprise concerns about vendor viability when competing against larger enterprise-centric vendors.

Google

Google is a Leader in this Magic Quadrant. Its container service portfolio is focused on keeping its user experience simple while adding advanced features. Its operations are geographically diversified, and its clients range from large enterprises to startups. Google's clients tend to use its container services for cloud-native apps and modern software development. As the creator of Kubernetes, Google has an influential voice in the community.

Google's flagship container management service is Google Kubernetes Engine (GKE). GKE Enterprise provides a broader platform that provisions and manages distributed clusters and services. GKE can run on-premises, in AWS and Azure as well as in Google Cloud. Google provides serverless container offerings, such as Google Cloud Run and GKE Autopilot.

Strengths

- **Simplicity:** Google tends to address requirements with fewer services, rather than adding new ones, which helps keep its portfolio simple. This principle is also the basis for the simple user experience of Google's serverless container services, such as Google Cloud Run.
- **Advanced fleet management:** GKE Enterprise, an advanced edition of GKE released in August 2023, provides fleet management with enhanced security, networking, backups, observability and service mesh. This brings simplicity to large customers managing complex Kubernetes environments with multiple teams.
- **Purpose-built architecture for AI:** Google has released a new infrastructure architecture for AI, AI Hypercomputer, that brings together GKE with AI-specialized computing instances and network fabrics, simplifying the operation of AI workloads at scale on GKE.

Cautions

- **Edge and on-premises:** Google has less business volume to cover edge and on-premises environments than other leaders in this Magic Quadrant.
- **Traditional enterprise systems:** Google cloud platform (GCP) has a lower presence in containerized traditional enterprise systems, such as data center migrations centered on lift

and shift or the modernization of legacy applications, compared to cloud-native and modern application development use cases.

- **Managed service provider (MSP) ecosystem:** GCP has a smaller MSP ecosystem capable of meeting complex enterprise requirements than others in this Magic Quadrant.

Huawei

Huawei is a Challenger in this Magic Quadrant. Its container service portfolio is focused on covering broad deployments, from on-premises to hybrid cloud and edge environments as well as public cloud. Huawei's operations are mostly focused on China and emerging markets. Its clients tend to be organizations running businesses in those focused markets and Chinese multinationals expanding overseas.

Huawei's primary Kubernetes-managed service is Cloud Container Engine (CCE), which can run not only in the cloud but also on-premises or at the edge. Cloud Container Instance (CCI) and CCE Autopilot are serverless container services. Huawei Cloud Ubiquitous Cloud Native Service (UCS) provides fleet management that can cover external Kubernetes clusters.

Strengths

- **Emerging markets coverage:** Huawei continues to increase its adoption in China's public sector and enterprises but is also expanding its business in emerging markets, such as Southeast Asia, Latin America, the Middle East, and Africa. Huawei leverages its existing business in the telecom industry to forge strategic alliances with key customers and partners.

- **Contribution to open source:** Huawei demonstrates its commitment to open source in this market by contributing to 82 Cloud Native Computing Foundation (CNCF) projects, which is the second highest among the vendors in this Magic Quadrant. Among the open-source projects Huawei participated in and donated to CNCF are KubeEdge, Volcano, Karmada and Kuasar.

- **On-premises and edge:** Huawei has a mature business for on-premises IT infrastructure and networking offerings that can cover edge use cases. Huawei leverages these other services to provide container management that can comprehensively cover on-premises, private and hybrid cloud, and edge requirements.

Cautions

- **International sanctions:** International sanctions have a significant impact on Huawei's overall business activities, and organizations may impose strict conditions on sourcing from Huawei. For this reason, Huawei does not provide services in some regions, such as the United States.

- **Unique ecosystems:** Many of Huawei's major MSP and system integration (SI) partners are based in China. Also, the company's hardware components sometimes deviate from global mainstreams, such as in-house AI processors. The uniqueness of its ecosystems can lead to differentiated services, but it could also decrease flexibility.

- **Transparency:** Compared to Leaders in this Magic Quadrant, little information is available related to Huawei Cloud's international offerings. In addition, information about China-based

and international services is often mixed and difficult to distinguish from one another.

Microsoft

Microsoft is a Leader in this Magic Quadrant. Its container service portfolio is focused on offering a broad and deep integration with its overall services (PaaS and IaaS), including its application development and DevOps platforms. Its operations are geographically diversified, and its clients range from large enterprises to startups.

Microsoft's primary container service is Azure Kubernetes Service (AKS). Microsoft also provides various serverless container options, such as Azure Container Apps (ACA) and AK virtual nodes. Azure Kubernetes Fleet Manager enables large-scale cluster management. Microsoft has been expanding container services that can be used outside its public cloud, such as AKS on Azure Stack HCI and Azure Arc.

Strengths

- **Breadth of functionality:** Microsoft's container services offer wide functionality, as evidenced by strong performance in the technical evaluation of their capabilities.
- **DevOps platform:** GitHub's strong developer community and Microsoft Azure DevOps' large user base give Microsoft's container services, which are tightly integrated with these two DevOps platforms, an advantage over other vendors. Growing interest in the use of GenAI in DevOps workflows via GitHub Copilot reinforces this advantage.
- **Hybrid cloud integrated with HCI:** Microsoft offers container service options that are well-integrated with Azure Stack HCI. This integration supports federating Kubernetes for hybrid cloud environments with AKS on Azure Stack HCI and Azure Arc, which allows users to manage Kubernetes clusters running outside Azure using Azure Resource Manager.

Cautions

- **Heterogeneous environments support:** Microsoft's container services lack some key capabilities in supporting heterogeneous environments, such as full cluster management on other public clouds or VMware vSphere. This makes management or migration of container workloads outside Azure or Azure Stack HCI more complex.
- **User experience in fleet management:** Fleet management tasks are spread across multiple tools, such as provisioning clusters in Azure Arc or Azure CLI, and then managing them in Azure Kubernetes Fleet Manager, making the user experience more complex.
- **Edge support:** While Microsoft has expanded its container management capabilities for the edge by adding AKS Edge Essentials, it lags some others in support for deployment of containers on bare-metal infrastructure without hypervisors, light-weight edge hardware, and air-gapped infrastructure.

Mirantis

Mirantis is a Challenger in this Magic Quadrant. Its operations are geographically diversified, and many of its clients are in telecommunications and the public sector.

Mirantis continues to invest in developer productivity and reducing operational burden. It remains actively involved in OpenStack, including Mirantis OpenStack for Kubernetes. It is a primary contributor to the OpenLens, Lagoon, K0s, and K0smotron open-source projects and is actively involved in the Moby project, which includes containered and runC.

Strengths

- **Enterprise track record:** Mirantis has a track record of supporting enterprise IT infrastructure requirements spanning the last two decades. This record helps assure I&O leaders of support and integration to existing environments (particularly OpenStack).
- **Developer focus:** Mirantis continues to invest in developer-centric tools (Lens, amazee.io and Shipa). This enables I&O teams to deliver capabilities, including an integrated development environment (IDE), DevOps workflow and associated automation.
- **Edge computing:** Mirantis has developed K0s (a certified Kubernetes distribution deployed as a single binary supporting x86 and ARM processors). This serves the needs of telecommunications companies and other edge environments.

Cautions

- **Positioning:** Mirantis has evolved from its OpenStack heritage to Kubernetes through the Docker Enterprise acquisition. I&O leaders must ensure adequate support, focus and investment for its increasingly hybrid container management needs.
- **Core functionality:** Although it has improved during the last year, technical evaluation of Mirantis' solution shows it to have weaknesses in some Gartner-defined use cases for container management. It has limited technical differentiators versus others in this evaluation.
- **Customer traction:** Mirantis has less market traction relative to other vendors in the evaluation. This creates concern about investment relative to its software and cloud-based container management offerings.

Oracle

Oracle is a Challenger in this Magic Quadrant. Its container service portfolio is focused on security and reliability, which aligns with Oracle Cloud Infrastructure (OCI)'s strengths. Its operations are geographically diversified, and its customers tend to be organizations that use OCI as a strategic IaaS provider.

Oracle's primary container service is Oracle Cloud Infrastructure Container Engine for Kubernetes (OKE) (recently rebranded as OCI Kubernetes Engine). It provides a serverless container option on virtual nodes. It enables those services outside its public cloud through OCI Dedicated Region, partner offerings based on Oracle Alloy, and Oracle Private Cloud Appliance (PCA). Oracle also

provides Oracle Cloud Native Environment (OCNE), which is a Kubernetes distribution that can run on-premises or other public clouds.

Strengths

- **Diverse private and sovereign cloud options:** Oracle offers more choice than other cloud providers when it comes to container services on private and sovereign clouds, especially for large organizations in regulated industries. Examples include OKE on Dedicated Region, partner offerings based on Oracle Alloy, and OCNE on PCA.
- **Service-level agreement (SLA):** Oracle provides an SLA of 99.99% for OKE clusters. This is higher than the typical SLA of 99.95% for most Kubernetes-based services in this Magic Quadrant, making it a good fit for use cases where cluster-level availability is critical, such as applications that have traditional architectures and are difficult to design with multicluster.
- **Competitive price and performance:** Oracle competes for large opportunities based on price and performance, winning big SaaS vendors and others. OCI's characteristics, such as nonblocking networking, help achieve better price and performance.

Cautions

- **Developer experience:** Oracle lacks key features for application platforms and developer experience, such as debugging tools, certified container images and application scaffolding. Additional tools and services must be integrated to complement these features.
- **Feature velocity for container management:** Oracle has been adding container-management features at a good pace, but not fast enough to catch up with the Leaders in this Magic Quadrant.
- **Limited cluster fleet management:** Oracle has retired its fleet management software, Verrazzano. It provides third-party solutions but lacks native fleet management tools or platforms for managing the life cycle and state of distributed clusters at scale.

Red Hat

Red Hat is a Leader in this Magic Quadrant. Red Hat OpenShift is broadly focused on container management, with solutions for single and multicloud, on-premises and edge deployments. Its operations are geographically diversified, and its clients span multiple industries (with strengths in financial services and the public sector).

Red Hat partners with cloud providers, including AWS, Microsoft, IBM and Google. It also partners with on-premises infrastructure providers, including HPE and Dell, and extensively with IBM, its parent company.

Strengths

- **Market understanding:** Red Hat has developed the product functionality and external partnerships to span the variety of different container management scenarios. This provides confidence to risk-averse mainstream enterprises looking to adopt container management.

- **Product capabilities:** Red Hat OpenShift is a strong competitor in the majority of enterprise container management use cases. For enterprises seeking a hybrid offering, its pedigree in software-based deployments now extends to distributed cloud and edge computing.

- **Strategic focus:** Red Hat has a decades-long history of supporting modern enterprise IT infrastructure. Adding to this capability, OpenShift is at the core of Red Hat's strategy and business model.

Cautions

- **Pricing:** Gartner clients continue to state in inquiries that they consider Red Hat OpenShift to be relatively expensive (both the container management software subscription and managed cloud offerings). I&O leaders may struggle to justify the cost for deployments that do not require advanced functionality.

- **Product dependencies:** Although Red Hat OpenShift provides a complete stack, some I&O leaders will be concerned about the degree of lock-in. Advanced Cluster Management provides interoperability but is only available as an add-on or as part of the premium offering in OpenShift Platform Plus.

- **Competitive friction:** Red Hat partners with many hyperscale cloud providers but also competes in the container management market. This creates competitive tension and may require organizations to decide whether or not to prioritize their strategic cloud vendor's application platform.

SUSE

SUSE is a Leader in this Magic Quadrant. Its operations are geographically diversified, with a stronghold in Europe. SUSE has a long history of providing Linux for critical workload. Its container management clients are distributed worldwide.

SUSE's vision for cloud-native hyperconverged infrastructure is evident in its Harvester offering. As a result of the 2020 acquisition of Rancher Labs, SUSE is also a pioneer in managing heterogeneous Kubernetes distributions and deploying Kubernetes at the edge (including K3s).

Strengths

- **Heterogeneity:** Rancher has a history of supporting multiple container management distributions in addition to its own. This allows SUSE customers to avoid lock-in for container workloads and support federated requirements (including autonomous business units).

- **Product strategy:** Rancher provides a foundation for its container-management offering that has expanded over the past few years. SUSE retains a strong position in edge container deployments.

- **Cost-competitiveness:** SUSE pricing competes well with the Leaders in this evaluation and is often a reason for its selection.

Cautions

- **Differentiation:** Although SUSE was an early innovator, it often struggles to stand out from the many other vendors that have entered the container management market.
- **Infrastructure centrism:** While SUSE has made investments in developer features, it lacks some of the functionality demanded by enterprise developers.
- **Managed cloud opportunity:** Given enterprise developer demand for cloud-managed deployments, SUSE's nascent relationships with hyperscale cloud providers risks it being alienated from digital initiatives and the associated growth opportunity.

Tencent Cloud

Tencent Cloud is a Challenger in this Magic Quadrant. Its container service portfolio is focused on providing simple, scalable services that empower digital application developers. Tencent Cloud's container services are available worldwide, including Western Europe, Latin America and North America, but it is mostly focused in China. Outside China, its clients tend to be Chinese multinationals expanding overseas or organizations in industries where Tencent Cloud has strengths, such as gaming and consumers.

Tencent Cloud's primary container services are Tencent Kubernetes Engine (TKE) and TKE Serverless. Tencent Kubernetes Engine Distributed Cloud Center (TDCC) provides fleet management that can cover external Kubernetes clusters. TKE has an edge version, TKE Edge, and an open-source version, TKEStack.

Strengths

- **Gaming and consumer industries:** Tencent Cloud has a large number of case studies and solutions focused on the gaming and consumer markets, building the trust of potential customers in those industries.
- **Proven scalability by its digital services:** Tencent Cloud leverages its container and serverless services for many of its hyperscale digital services, with high-performance networking and scale-out architectures. This proven scalability makes Tencent Cloud attractive to customers with high-scale workload requirements.
- **Integration with application platforms for its digital ecosystems:** Tencent Cloud's container and serverless services are well-integrated with application platforms for its digital service ecosystems (e.g., games, social networking and digital e-commerce).

Cautions

- **Limited enterprise momentum outside China:** Tencent Cloud lacks a presence for enterprise customers outside China. It has yet to break out of niche markets for gaming, consumer industries, organizations running businesses in China, and Chinese multinationals expanding overseas.
- **Partner ecosystems for enterprises:** Compared with the Leaders in this Magic Quadrant, Tencent Cloud's partner ecosystems for enterprise businesses outside China is limited, from

consulting to managed service providers.

- **Unavailability of latest GPU models:** Due to U.S. government GPU export restrictions, the latest GPU models, such as Nvidia A100 and H100, are not available on Tencent Cloud, limiting support for compute-intensive AI-related container workloads.

Inclusion and Exclusion Criteria

For Gartner clients Magic Quadrant research identifies and then analyzes the most relevant providers and their products in a market.

The inclusion criteria represent the specific attributes analysts believe are necessary for inclusion in this research.

To qualify for inclusion, providers need to meet the following.

Market Participation

- Provide generally available capabilities as of 1 April 2024. General availability means the product or service is available on a public-facing price sheet or card for purchase directly by clients. Providers must be able to furnish the link to a pricing page for their container management services and offerings.

- Sell the solution directly to paying customers without requiring them to engage professional services help. The vendor must provide at least first-line support for these capabilities, including any bundled open-source software. This includes, but is not limited to, comprehensive product documentation, installation guidance and reference examples.

- Demonstrate an active product roadmap, go-to-market strategy and selling strategy for their solutions.

- Have phone, email and/or web customer support. Providers must offer contracts, consoles/portals, technical documentation and customer support in English (either as the product's default language or as an optional localization).

Capabilities

The container management offerings must offer native support for the standard capabilities described in Gartner's market definition.

The vendor is required to meet the following financial performance criteria (reported in U.S.-dollar constant currency). The default accounting standard is generally accepted accounting principles (GAAP).

- The container management offering must have generated at least $100 million in annual GAAP revenue during the 12 calendar months prior to January 2024. The container management offering must have at least 100 paying production (non-beta-test) customers (excluding sales to managed service providers).

And,

- At least 10 production customers per region in at least three out of seven global regions (North America, Europe, Asia/Pacific [excluding China], Latin America, China, Middle East and Africa).

Or,

- The container management offering must have generated a minimum of $30 million in annual revenue and gained 30 net new customers in calendar year 2023 when compared to calendar year 2022.

And,

- At least three production customers per region in at least three out of seven global regions (North America, Europe, Asia/Pacific [excluding China], Latin America, China, Middle East and Africa).

In addition, the vendor must be listed among the top 20 organizations in the Customer Interest Indicator (CII) defined by Gartner for this Magic Quadrant research. Data inputs used to calculate customer interest for this research include a balanced set of measures:

- Gartner customer search, inquiry volume or pricing requests
- Frequency of mentions as a competitor to other vendors in this research in reviews for similar use cases on Gartner's Peer Insights forum as of 13 March 2024
- Evaluations and frequency of mentions, as measured in Gartner Peer Insights
- Significant innovations in the market as noted by major publications, product enhancements or introductions, or industry awards
- Other significant developments in corporate posture, such as merger and acquisition (M&A) activity
- Volume of job listings specifying the container management service and offerings on a range of employment websites in North America, Europe and Asia/Pacific

Honorable Mentions

IBM: IBM offers a range of container management services (e.g., Red Hat OpenShift on IBM Cloud, IBM Cloud Code Engine, IBM Cloud Satellite, IBM Cloud Kubernetes Service, IBM Cloud Container Registry, and Istio on IBM Cloud Kubernetes Service). IBM's container management strategy is built on Red Hat OpenShift. Red Hat is covered separately and is a Leader in this Magic Quadrant.

Evaluation Criteria

Ability to Execute

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

Product or service — This looks at the core container technologies that compete in the container management market, including current product/service capabilities, quality and feature sets. Additional consideration was given to the vendor's scalability, availability and integration, as well as its security features.

Overall viability — This criterion includes an assessment of the organization's overall financial health, as well as the financial and practical success of the business unit. Considerations include profitability, geographic distribution of revenue and R&D spending.

Sales execution/pricing — This covers the assessment of a vendor's success in the market. Vendors' pricing models and proposals are compared for value and complexity, as well as pricing transparency. Considerations include pricing and discounting, new versus repeat business, and competitive dynamics, including awareness of competitors.

Market responsiveness/record — This criterion looks at a vendor's ability to respond and change direction, based on the evolution of customer container management needs and changes in market dynamics. Considerations include response to competitors and ability to listen and respond to customer feedback.

Marketing execution: This looks at the clarity, quality, creativity and efficacy of programs designed to deliver the vendor's message in order to influence the market, promote the brand, increase awareness of products and establish a positive identification in the minds of customers.

Customer experience — This covers the products/services and/or programs that enable customers to achieve anticipated results with the products/services evaluated. This may also include ancillary services, customer support programs and availability of user groups. Considerations include postsales support, programs for high-touch or VIP customers, and specific delivery partners in region.

Operations — This criterion looks at the ability of the vendor to meet goals and commitments. Factors include quality of the organizational structure, skills and relationships, and their ability to meet service-level agreements. Considerations include partnerships, outages that affect customers and SLA-adherence.

Table 1: Ability to Execute Evaluation Criteria

Evaluation Criteria ↓	*Weighting* ↓
Product or Service	High
Overall Viability	High

Evaluation Criteria ↓	*Weighting* ↓
Sales Execution/Pricing	Medium
Market Responsiveness/Record	High
Marketing Execution	Medium
Customer Experience	Medium
Operations	Medium

Source: Gartner (September 2024)

Completeness of Vision

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

Market understanding — This criterion considers a vendor's ability to understand customer needs and translate them into products/services. Consideration was given to understanding the rapidly evolving container management landscape.

Marketing strategy — This criterion looks for clear, differentiated messaging consistently communicated internally and externalized through social media, advertising, customer programs and positioning statements. Consideration was given to new market outreach, innovative marketing initiatives and true differentiation.

Sales strategy — This criterion considers whether the vendor has a sound strategy for selling that uses the appropriate networks. Consideration was given to channel strategy and understanding the buyers and influencers involved in selection of container management products/services.

Offering (product/service) strategy — This criterion evaluates whether a vendor's approach to container management product/service development and delivery emphasizes market differentiation, functionality, methodology and features that cover current and future requirements. Consideration is given to quality and cadence of vendors' product/service roadmap and investment priorities into adjacent container technology market segments.

Business model — This criterion looks at the design, logic and execution of the vendor's business proposition to achieve continued success. Consideration is given to vendors' business, value proposition, ability to anticipate shifts in licensing/pricing models and relationship with the massive open-source container technology communities.

Vertical/industry strategy — As container management products/services tend not to be industry-specific, evaluating these in detail is not a key element of this research. Where vertical or industry differentiation is relevant, questions are included.

Innovation — This criterion looks at direct, related, complementary and synergistic layouts of resources, and expertise or capital for investment, consolidation, defensive or preemptive purposes. Consideration was given to the level of investment in product/service development in new areas related or adjacent to container management, third-party and partner relationships and integrations, and use of AI/ML and other novel capabilities.

Geographic strategy — This criterion looks at the provider's strategy to direct resources, skills and offerings to meet the specific needs of geographies outside its "home" or native geography. Additional consideration was given to the number of employees allocated to different regions, tailoring of go-to-market or product/service strategy to address regional differences, and the depth and scope of partners available in countries with existing and new customers.

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

Evaluation Criteria ↓	Weighting ↓
Geographic Strategy	Low

Source: Gartner (September 2024)

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. Leaders in this market have appreciable 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 fast enough 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. Their services are still emerging, and they have many capabilities in development that are not yet generally available. Although they may have many customers, they might not yet serve a broad range of use cases well, or may have a limited geographic scope.

Niche Players

The Niche Players in the market for container management may be excellent providers for particular use cases or in regions in which they operate, but they should ultimately be viewed as specialist providers. They often do not serve a broad range of use cases well or have a broadly ambitious roadmap. Some may have solid leadership positions in markets adjacent to this market, but have developed only limited capabilities in this market.

Context

The container management market has grown more than 20% over the past year, with a market value of $2 billion in 2023. The market is forecast to exceed $4.5 billion in constant currency by 2028, with a 17.6% compound annual growth rate (CAGR). Among the major container management services are:

- **Container management software** — Solutions that enable the deployment and management of containerized workloads at scale. Some solutions are multifaceted (e.g., addressing service mesh, security, observability); others are primarily Kubernetes distributions. They can be software solutions deployed and managed by enterprise staff or a hired third party (on-premises or within a public cloud environment). Container management software can also be offered as a cloud service by a cloud vendor that automates deployment and management of an orchestrator/scheduler (i.e., Kubernetes), but users normally still must manage infrastructure nodes that provide compute resources for containerized workloads.

- **Edge-optimized solutions** — Scaled-down solutions (mostly Kubernetes) that are intended to be deployed at remote locations with minimal service requirements. Increasingly, these solutions combine orchestration and operating system capabilities.

- **Container instance services** — The first generation of serverless container services in which the service automatically provisions container hosts so users do not have to configure or manage such nodes. The underlying container orchestration functionality is not visible to the consumer. Most major cloud service providers offer this type of service.

- **Serverless Kubernetes** — A variant of container instance services that maintains compatibility with Kubernetes applications and APIs. This style automates management of the processing nodes while allowing users to run Kubernetes pods and use Kubernetes APIs, such as regular Kubernetes services.

- **Cluster management tools** — Solution offerings (often SaaS-based) that enable enterprises to deploy and operate Kubernetes distributions from the same vendor and possibly Kubernetes distributions from other vendors. Their most important features are multicluster life cycle management and “fleet management” of policy, packages and security.

Market Overview

The business and technical benefits associated with container deployments are still mostly centered around enabling enterprise business agility and speed. Some enterprises have commenced container deployments while seeking cost savings and protection against vendor lock-in. Both of these goals are attractive, but difficult to achieve with container deployments. In many cases, container deployments increase costs as enterprises add additional staff and technology assets. And although most solutions are Kubernetes-based, vendors add other components that make the entire technology stack proprietary, which often prevents portability, thus enforcing lock-in.

Long-standing technical challenges continue for late adopters, including operational complexity, security concerns and tooling immaturity. Many mainstream adopters are still in the early stages of expanding their usage beyond initial production deployments. This factor is causing many enterprises to consider cloud-based container offerings instead of those that are purely software-based. In addition, serverless container offerings provide an inherent appeal to organizations that wish to take advantage of the benefits of containers but with lesser operational burden.

Container-related expertise is still limited, but improving. Successful enterprises often aggregate support within a platform engineering/operations group (e.g., an I&O-based infrastructure platform engineering group) that sits between the application development groups and organizations providing infrastructure (i.e., I&O and/or cloud providers). Such groups prove to be efficient versus having support distributed among multiple application development groups.

Two key challenges are enterprises commencing container deployments without an ability to adopt DevOps principles and practices, and enterprises taking a “build it and they will come” approach. Both approaches often lead to disappointment with container deployments. The combination of DevOps and container technology can be a powerful enabler for application development agility and speed, making DevOps skills the critical factor to deployment success. I&O should never deploy container management without deep knowledge of developer requirements.

The most impactful deployment approach is to leverage containers to build net new applications, which allows development efforts to be unencumbered by legacy systems. In addition, many enterprises have targeted the refactoring of existing applications. As part of application modernization initiatives, the examination of application portfolios is also increasing attention on the volume of applications that can be optimized or refactored.

Interest in hybrid and multicloud use cases continues to grow. The broader public cloud focus has evolved into a hybrid (in some cases, distributed) and/or multicloud discussion in which most enterprises are open to using multiple cloud environments. Many enterprises believe containers and/or Kubernetes enable multicloud. However, although most vendors offer Kubernetes services, each tends to have proprietary features that make them “sticky,” inhibiting easy portability. Management solutions offer the ability to operationalize management across these different cloud environments through a multienvironment control panel. Additionally, public cloud vendors are offering container management software that can be deployed in a variety of environments. These offerings initially targeted more of a hybrid than multicloud model (that is, extending their technology from the cloud to on-premises).

Gartner sees some bare-metal deployments. Although the amount has been generally low, it is likely to increase in 2025. It is often seen as a way to replace or reduce hypervisor usage and its focus will increase due to disruption in the server virtualization market. A major drawback continues to be a lack of operational tooling to support bare-metal deployments.

Vendors are continually enhancing their marketplaces to enable easy access to third-party container tools and applications that are optimized for containers and Kubernetes, sometimes packaged as operators that help manage their life cycles. Closely monitoring a vendor’s activity in this domain is a good way to gauge the health of its ecosystem.

Finally, container technologies are beginning to intersect with the need to deploy AI workload. The inherent container capabilities around scalability makes container technology an excellent environmental enabler for AI workloads. A significant portion of this workload is being deployed on containers. Container management vendors have been building a cohesive link between

DevOps toolchains and AI/ML workflow, along with providing ecosystem integration with independent software and hardware vendors that offer AI infrastructure and data science workbench tools.

Evidence

This research is based on more than 2,000 customer interactions over the past 12 months. In addition, as part of our analysis, we have collected information from Gartner Peer Insights, client inquiries and publicly available sources to supplement the information provided by participating vendors. For Alibaba Cloud, Huawei Cloud, and Tencent Cloud: This Magic Quadrant evaluation is focused on their international businesses, and our technical assessment was performed using their international services.

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 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.