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The Forrester Wave™: Hyperconverged Infrastructure, Q4 2023

The 11 Providers That Matter Most And How They Stack Up

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Summary

In our 36-criterion evaluation of hyperconverged infrastructure (HCI) providers, we identified the most significant ones and researched, analyzed, and scored them. This report shows how each provider measures up and helps infrastructure professionals select the right one for their needs.

Flexibility, Scalability, Security, And Resilience Matter Most

Enterprise infrastructure leaders are increasingly managing more complex environments that balance workload support across multiple data center, public cloud, and edge environments. There is a growing need for abstraction across platforms, advanced levels of resiliency, improved security, and resource deployment patterns that maximize resource utilization and reduce total cost of ownership — not just for infrastructure but also the applications that consume it. Hyperconverged infrastructure vendors are rapidly iterating on existing platforms to meet these needs by improving flexibility, scalability, security, and resilience features within their products.

As a result of these trends, infrastructure professionals should look for HCI solutions with:

- **Advanced snapshot and replication capabilities.** These capabilities are essential to creating resilient replicas of running workloads. Features like immutability enable restore capabilities in the case of a ransomware attack. Many disaster recovery, high-availability (HA), and security features depend on the underlying snapshot and replication capabilities of the HCI solution.
- **Disaggregated scaling of storage and compute resources.** Independent scaling of compute and storage resources in a cluster gives infrastructure professionals the flexibility to add the resources they need, whether they are compute-focused nodes or storage-focused nodes. Infrastructure professionals only buy the required resources for a cluster, rather than having to purchase nodes with both compute and storage resources. Disaggregation also helps address application licensing costs for enterprise software that requires licensing all available CPUs or CPU cores in a compute cluster by excluding the CPUs dedicated to storage-heavy nodes.



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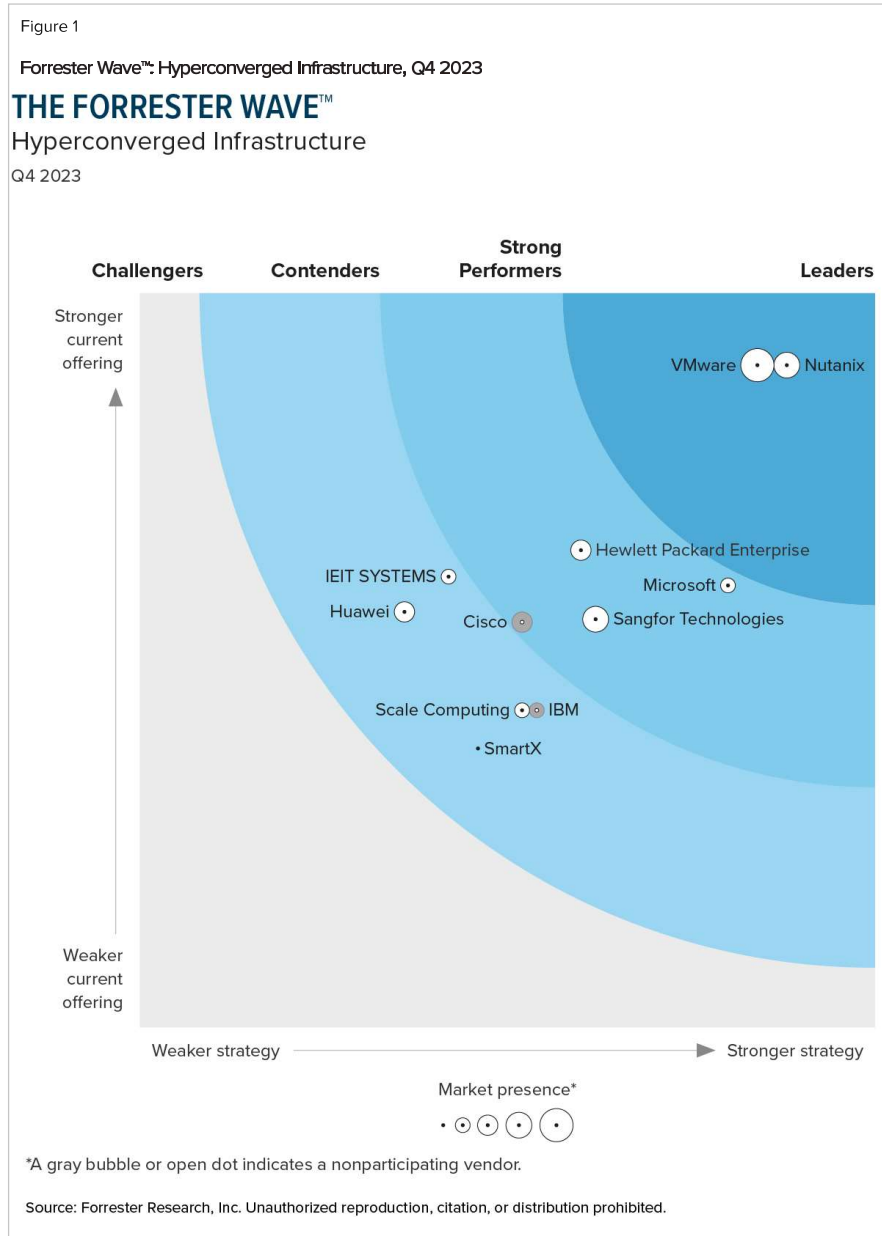
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enable security-related functions like microsegmentation, packet inspection, and network encryption to support Zero Trust strategies for data and workloads.

Evaluation Summary

The Forrester Wave™ evaluation highlights Leaders, Strong Performers, Contenders, and Challengers. It's an assessment of the top vendors in the market; it doesn't represent the entire vendor landscape. You'll find more information about this market in our report on [The Hyperconverged Infrastructure \(HCI\) Landscape, Q2 2023](#).

We intend this evaluation to be a starting point only and encourage clients to view product evaluations and adapt criteria weightings using the Excel-based vendor comparison tool (see Figures 1 and 2). Click the link at the beginning of this report on Forrester.com to download the tool.



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Current offering	50%	2.76	3.25	2.83	2.16	3.07	3.01	4.51	2.78	2.16	1.90	4.51
Compute and network	20%	2.70	2.30	2.25	1.45	3.40	2.40	4.30	2.70	1.85	3.40	4.30
Storage and data	20%	3.00	3.90	2.60	2.30	3.40	3.40	5.00	2.60	1.80	2.00	4.60
Scalability and cloud	20%	2.10	2.90	3.30	1.70	3.30	2.90	4.00	2.20	2.65	1.55	4.40
Security	15%	3.00	3.50	3.00	2.50	2.50	3.00	4.50	3.50	2.00	1.25	5.00
Operations	10%	3.00	3.00	3.00	2.40	3.00	3.70	5.00	3.00	3.00	1.70	5.00
Support and experience	15%	3.00	4.00	3.00	3.00	2.50	3.00	4.50	3.00	2.00	1.00	4.00
Strategy	50%	2.60	3.00	1.80	2.70	2.10	4.00	4.40	3.10	2.60	2.30	4.20
Vision	20%	1.00	3.00	3.00	3.00	3.00	5.00	5.00	3.00	3.00	1.00	3.00
Innovation	20%	3.00	3.00	3.00	3.00	3.00	3.00	5.00	5.00	1.00	3.00	3.00
Roadmap	15%	3.00	3.00	1.00	3.00	1.00	5.00	3.00	1.00	3.00	1.00	5.00
Partner ecosystem	15%	3.00	3.00	1.00	3.00	1.00	5.00	3.00	3.00	3.00	3.00	5.00
Pricing flexibility and transparency	15%	3.00	3.00	1.00	3.00	1.00	3.00	5.00	3.00	3.00	3.00	5.00
Community	15%	3.00	3.00	1.00	1.00	3.00	3.00	5.00	3.00	3.00	3.00	5.00
Market presence	0%	3.00	2.50	3.00	1.50	2.00	1.50	4.00	3.50	1.50	1.00	5.00
Revenue	50%	3.00	2.00	3.00	2.00	3.00	1.00	4.00	3.00	1.00	1.00	5.00
Number of customers	50%	3.00	3.00	3.00	1.00	1.00	2.00	4.00	4.00	2.00	1.00	5.00

All scores are based on a scale of 0 (weak) to 5 (strong).
*Indicates a nonparticipating vendor

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Forrester evaluated the offerings listed below (see Figure 3).

Figure 3

Evaluated Vendors And Product Information

Vendor	Product evaluated
Cisco	Cisco HyperFlex Systems
Hewlett Packard Enterprise	HPE SimpliVity
Huawei	Huawei FusionCube 1000, FusionCube 500
IBM	IBM Storage Fusion HCI
IEIT SYSTEMS	IEIT SYSTEMS InCloud Rail
Microsoft	Microsoft Azure Stack HCI
Nutanix	Nutanix Cloud Platform
Sangfor Technologies	Sangfor HCI — Hyper Converged Infrastructure
Scale Computing	Scale Computing SC//Platform (SC//HyperCore, SC//Fleet Manager)
SmartX	SmartX HCI
VMware	VMware vSAN

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- **Nutanix is pushing the line between hyperconverged and cloud native.** Nutanix is known for simplifying infrastructure complexity and is applying that philosophy to hybrid cloud infrastructure as well. Nutanix's dedicated customer base stands out, and the company boasts a [Net Promoter Score™](#) (NPS) of more than 90. It has the second largest HCI market presence by revenue and customers. The Nutanix vision focuses on building a hybrid and multicloud platform for business applications, easing adoption of cloud-native architecture. It has a strong partner ecosystem, but there's room for growth with both hardware vendors and hyperscalers. Pricing is simple, flexible, and very competitive. Nutanix puts customers at the heart of its innovation strategy, using its strong community ties to source new features for its roadmap. The company has a compelling and aggressive feature roadmap centered on data services, multicloud scaling, and containers, but delivery on its roadmap has been shaky in the past.

Nutanix has excellent, modern GPU support; its Flow Virtual Networking provides great network virtualization function support; and the platform has workflows for containers, including OpenShift integration and its own Nutanix Kubernetes Engine. Nutanix supports its AHV hypervisor as well as VMware's ESXi hypervisor. It also features strong cloud replication and migration capabilities. The platform has best-in-class scores for storage functionality and operations. It is highly securable with advanced encryption options and certified FIPS 140-2 compliance. Reference customers are satisfied with the platform and say that they often wish they had adopted AHV upfront for ease of management and licensing reasons. Nutanix is a good fit for customers looking for a simple, scalable hyperconverged platform designed to enable cloud-native architecture in or out of the public cloud.

- **VMware maintains its edge with strong hybrid cloud functionality.** VMware has reimaged its vSAN 8 offering for improved performance, cloud functionality, and scalability. VMware is the largest HCI provider on the market, with significant integrations between the vSAN product and the rest of the VMware portfolio. Strategically, the company has developed a broad network of partners across cloud providers, systems integrators, infrastructure vendors, and sales channels. While it is transitioning to universal licensing to ease workload portability for its customers, it maintains multiple pricing models with many options and tiers, enabling large enterprises to optimize overall licensing. As the largest virtualization software vendor, it has an enormous user community that is active on social media and at VMware-sponsored events. VMware scored well in strategy for roadmap development, with items to improve disaggregated HCI (dHCI), cybersecurity, and data services.

VMware's vSAN platform integrates with vSphere to provide strong GPU and DPU options. VMware's NSX networking enables advanced network virtualization function support and can be offloaded to a DPU, further freeing up CPU resources. Securitywise, the platform maintains both FIPS 140-2 and 140-3 certifications and excellent identity management capabilities. Innovations in vSAN 8 make it a top performer in scalability for hyperscaler integration, stretched clusters, disaggregated HCI, cloud migration/replication, and scripting and automation. Reference customers have been eager to test the limits of vSAN 8 ESA; they also expressed overall satisfaction with VMware support. VMware is a good fit for enterprises that need vSphere integration, cross-cloud workload support, and a broad partner ecosystem.



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has successfully leveraged long-time partners, from systems integrators to infrastructure vendors, to help sell the solution and accompanying physical hardware. Microsoft stays close to enterprise customer needs, adding their requests to the feature backlog, sharing its product roadmap, and opening release candidates for public preview.

Microsoft's strongest functionality area is operations, with platform management integrated with the Azure console, Windows Admin Center, and Azure Arc. Multicenter management is relatively simple to accomplish, and management via API for at-scale automation purposes is well supported. Azure Stack HCI excels in cloud replication and migration (if that cloud is Azure). The product is tuned for small edge clusters with the ability to deploy single-node clusters without HA or two-node HA clusters. However, an individual cluster doesn't support more than 16 nodes, and it also cannot scale storage and compute separately. It is noticeably weaker in hypervisor and DPU support. Reference customers enjoy the ability to extend Azure services on-premises but expressed frustration about key features present in Azure but absent from Azure Stack HCI. Microsoft is a good fit for enterprises heavily invested in Azure, especially Azure Kubernetes Service and Azure Virtual Desktop.

- **HPE has a solid HCI portfolio, but its lack of hybrid cloud integration limits the platform.**

Hewlett Packard Enterprise (HPE) SimpliVity has new life as the HCI underpinnings of HPE GreenLake for Private Cloud Business Edition. The product provides federated storage cluster support for VMware environments. HPE's overall HCI market presence is small compared with the Leaders but comparable to the next tier of vendors we evaluated. Its product strategy is balanced, but not differentiated, with a focus on steady innovation and transitioning customers to its GreenLake consumption model. HPE uses customer feedback to drive product functionality and maintains an ecosystem of channel sales and integration partners. HPE's feature roadmap is conservative; however, it addresses vSphere 8 support, hybrid cloud integration, and NVMe drive support in the near term and has a steady stream of enhancements planned through 2025.

HPE's implementation support and customer success capabilities stand out with a large global services group and a network of partners to help customers globally. All reference customers we interviewed remarked that HPE is a great partner with excellent support and relationship management. HPE differentiates in regard to hardware-based encryption support with a feature it calls "Silicon Root of Trust," which creates a system fingerprint embedded into its hardware to prevent rootkits and system-level compromise. Strengths include snapshots and replication, disk fault tolerance, large cluster support, and federated cluster support for global-scale cluster management arranged in availability zones. The platform lacks hyperscaler integration, and it leaves network virtualization and advanced SmartNIC support up to VMware. HPE is a good fit for businesses seeking a reliable, scalable storage platform for VMware, especially for existing HPE customers.

- **Sangfor stands out in identity management but otherwise delivers expected functionality.**

Sangfor Technologies' Sangfor HCI is the foundation of the Sangfor Cloud Platform, offering storage, compute, and network virtualization. The company has invested significant resources into innovation, with multiple R&D centers in China, year-over-year increases in R&D budgets, and a focus on hiring personnel with advanced degrees to spur innovation further. Global



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Sangfor's functionality is broad, and depth of and support for modern identity management stand out with differentiated identity and access management support, granular role-based access control, and account auditing features. The platform also has strong scripting and automation functionality. Individual functionality is mostly on par relative to others we evaluated. Specific weaknesses include hypervisor support, hyperscaler integration, disaggregated scaling, and automation support. Reference customers found Sangfor support helpful and the platform easy to use. Sangfor is a good fit for customers doing business in China.

- **Cisco's HyperFlex platform continues to perform well but is being discontinued.** Cisco HyperFlex takes advantage of the Cisco UCS platform with the evolved form of its Springpath acquisition in 2017. We estimate that Cisco has the third largest market presence in the HCI market, though it trails the Leaders by a wide margin. Cisco benefits from good partner and channel relationships, long-term customer relationships, and a dedicated community of Cisco users. The once-innovative platform has an unclear long-term vision and limited available long-term roadmap, appearing to lose its edge as others iterate faster on cloud and cloud-native technologies. Known roadmap features include AMD processor support, vSphere 8, and hybrid cloud enhancements for virtual machines (VMs) and containers.

HyperFlex is on par with most others in this evaluation in terms of functionality, though it doesn't stand out in any significant areas. The platform has some weaknesses, largely centered on limited hyperscaler integrations that affect its cloud replication capabilities and container support. Cisco has been a good fit for customers looking for a VMware platform with integrated Cisco network features. In September 2023, Cisco announced that it will discontinue the HyperFlex platform and has supplied a planned migration path that uses the company's UCS servers and the Nutanix Cloud Platform. Cisco declined to participate in the full Forrester Wave evaluation process.

Contenders

- **IEIT SYSTEMS' dSAN and InCloud Rail form a good HCI platform but need focus.** IEIT SYSTEMS is known for server hardware in China and has developed its HCI platform on top of its server and storage hardware. It has a small market presence but envisions an innovative future for HCI focused on increased use of hardware accelerators for offloading, improved private cloud functionality, and improved Zero Trust support. IEIT SYSTEMS will also need to strengthen its partner ecosystem and bring clarity and flexibility to its pricing model, especially as it seeks to compete outside of China. For now, investments in R&D have showcased interesting ideas, but the company's roadmap isn't detailed. Known roadmap features include AMD processor support, vSphere 8, improved SmartNIC/DPU offloading support, encryption enhancements, and hybrid cloud enhancements for VMs and containers.

IEIT SYSTEMS leverages both conventional x86 and ARM virtualization (in China). ARM hypervisor support allows for lower overall power consumption and enables easier workload portability into low-cost cloud instances using ARM CPUs. It has differentiated support for storage services like SMB, NFS, S3, and Swift APIs; K8s CSI drivers; and iSCSI volume export. It boasts good stretch cluster support and large cluster support as well as SmartNIC/DPU



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- IBM's bare metal container HCI platform is disruptive, but OCP coupling limits adoption.** IBM's Storage Fusion HCI combines storage-dense servers with the Red Hat OpenShift Container Platform (OCP), Storage Protect Plus, and parts of Storage Scale to create an enterprise-ready, bare metal Kubernetes platform. Hidden under the covers is VM workload support that uses both Red Hat Virtualization and VMware's hypervisor. IBM's product vision is a turnkey container environment with easy storage management and increased container performance. Entry price of the appliance is high due to the minimum cluster size of six nodes, but IBM touts total-cost-of-ownership advantages related to software licensing and hardware reliability. Fusion doesn't yet have a noticeable community. Future roadmap items include regional replication (metro sync is already generally available), a hosted control plane, and additional backup functionality.

IBM's offering flips HCI virtualization on its head, focusing on bare metal containers first. Compared with VM-centric HCI products, it doesn't currently stand out, but with greater hardware options, a less costly entry-level offering, storage flexibility, and non-OpenShift cluster functionality, it could be disruptive. IBM's global support means getting the product delivered and implemented is easy. It's worth noting that Kubernetes handles workload portability by default, and IBM enables data portability by creating a cross-platform common storage namespace with local caching. Fusion HCI lacks the ability to scale past 20 nodes, storage media choices, and support for storage- or compute-only nodes, and scant training for product operators is available. IBM is a good fit for enterprise customers looking for bare metal Kubernetes in a turnkey appliance. IBM declined to participate in the full Forrester Wave evaluation process.

- Scale Computing scales out at the edge but leaves scale-up workloads behind.** Scale Computing's HyperCore is tailored for distributed edge environments with HA support. The company has a dedicated customer base with consistent NPS scores of 90 or higher. Scale Computing has a vision centered on simple management and deployment of HCI and virtualization technologies. It does not share a published feature roadmap, though the company claims to have a process for innovating and validating future roadmap features through a customer joint development program. Overall, however, the company's marketing message, pricing flexibility, and customer community are on par with others we evaluated.

Scale Computing stands out with its small cluster/edge deployment flexibility and the massive number of nodes that the Fleet Manager product can support. Additionally, no two nodes need to be alike in a Scale Computing cluster, meaning future deployments don't require a rip and replace of existing infrastructure — an uncommon feature even in modern disaggregated HCI platforms. The product does not have stretch cluster support, but it partners with Google for cloud-based replication and disaster recovery. It also lags in options for high-end GPUs and processors and has no support for SmartNIC/DPUs. Reference customers highlight HyperCore's simplicity, which makes it easy to deploy and manage both at the local cluster level and at scale with the Fleet Manager product. Scale Computing is a good fit for businesses with modest compute needs looking to make operations easier or for customers with numerous edge locations that need distributed management capabilities.

- Huawei has mastered scaling up and down, though it provides a mediocre HCI product.**



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leveraging that community. Huawei defines a process for creating its roadmap, but the company has no specific features on its future roadmap.

Huawei boasts very large cluster support for up to 256 nodes in its commercial license. The overall product meets market needs, but it has some gaps. For instance, Huawei does not use etcd in its container orchestration platform. While OCI containers should still run, operations built up around standard Kubernetes processes may have issues. Additionally, though it reports supported cluster sizes up to 256 nodes, node failure tolerance doesn't scale linearly, with a maximum of four failed nodes in a cluster. It is also missing DPU/SmartNIC support. Despite the gaps, customers were happy with ease of use, platform reliability, and support. Huawei is a good fit for APAC-based companies that require large cluster support or that have significant operations in Huawei Cloud. Huawei is constrained by sanctions that effectively bar it from the US and several other countries, and we can't recommend it to firms with IT operations in those countries; support options are similarly constrained.

- **SmartX is gaining traction in APAC but must fill feature gaps as it grows.** SmartX is a relatively new HCI competitor that focuses on the financial services and manufacturing industries for core business applications, virtual desktop infrastructure, and branch office use cases. Its vision is pragmatic, focusing on helping customers with total cost of ownership and ease of use, but it is unrefined and not measurable. Innovation strategy includes commitments to R&D but lacks a plan for turning those investments into new features. SmartX's near-term roadmap includes file storage services, memory overcommitment, multitenant operation, virtual private cloud support, and continuous data protection functionality. The company has successfully attracted customers with simple, competitive pricing models and good customer satisfaction.

While the product doesn't stand out in many areas, it has excellent diversity of CPU support, with the ability to virtualize on top of Intel, and AMD x86-64, as well as ARM. The platform has a native KVM-derived hypervisor as well as support for both VMware and Citrix hypervisors. However, in many other categories, the platform falls short. For instance, there is no stated support for deduplication or compression, a lack of cloud integration and replication, and no native encryption capabilities. While the product supports very large clusters, management performance issues with large cluster sizes can be problematic. Reference customers we interviewed found that SmartX meets their specific needs, and they reported that SmartX provided much better support in the Chinese market compared with the vendors that were displaced. SmartX is a good fit for Chinese financial services firms, especially those looking to reduce total cost of ownership for existing VDI and core application infrastructure environments.

Evaluation Overview

We grouped our evaluation criteria into three high-level categories:

- **Current offering.** Each vendor's position on the vertical axis of the Forrester Wave graphic indicates the strength of its current offering. Key criteria for these solutions include compute and network, storage and data, scalability and cloud, security, operations, and support and experience.



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using the solution.

Vendor Inclusion Criteria

Each of the vendors we included in this assessment has:

- **A comprehensive set of software-defined HCI capabilities.** Evaluated vendors deliver a software-defined hyperconverged platform with support for virtualized compute, storage, and/or network resources.
- **At least \$50 million in annual category revenue.** Evaluated vendors have an annual HCI product revenue of \$50 million or greater.
- **Forrester client mindshare.** Evaluated vendors have HCI mindshare with Forrester end-user organizations and vendors. The vendors we evaluated are frequently mentioned in Forrester end-user client inquiries, vendor selection RFPs, shortlists, consulting projects, and case studies. The vendors we evaluated are also frequently mentioned by other vendors during Forrester briefings as viable and formidable competitors.

Supplemental Material

Online Resource

We publish all our Forrester Wave scores and weightings in an Excel file that provides detailed product evaluations and customizable rankings; download this tool by clicking the link at the beginning of this report on Forrester.com. We intend these scores and default weightings to serve only as a starting point and encourage readers to adapt the weightings to fit their individual needs.

The Forrester Wave Methodology

A Forrester Wave is a guide for buyers considering their purchasing options in a technology marketplace. To offer an equitable process for all participants, Forrester follows [The Forrester Wave™ Methodology](#) to evaluate participating vendors.

In our review, we conduct primary research to develop a list of vendors to consider for the evaluation. From that initial pool of vendors, we narrow our final list based on the inclusion criteria. We then gather details of product and strategy through a detailed questionnaire, demos/briefings, and customer reference surveys/interviews. We use those inputs, along with the analyst's experience and expertise in the marketplace, to score vendors, using a relative rating system that compares each vendor against the others in the evaluation.

We include the Forrester Wave publishing date (quarter and year) clearly in the title of each Forrester Wave report. We evaluated the vendors participating in this Forrester Wave using materials they provided to us by July 2023 and did not allow additional information after that point. We encourage readers to evaluate how the market and vendor offerings change over time.

In accordance with [our vendor review policy](#), Forrester asks vendors to review our findings prior to publishing to check for accuracy. Vendors marked as nonparticipating vendors in the Forrester Wave graphic met our defined inclusion criteria but declined to participate in or contributed only partially to the evaluation. We score these vendors in accordance with [our vendor participation policy](#) and publish their positioning along with those of the participating vendors.



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