TECHNOLOGY BUSINESS RESEARCH, INC.

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TOP 3 PREDICTIONS FOR CLOUD INFRASTRUCTURE & PLATFORMS IN 2022

As vendors embrace open, hybrid architectures PaaS emerges as the source of differentiation

TECHNOLOGY BUSINESS RESEARCH *2022 PREDICTIONS* IS A SPECIAL SERIES EXAMINING MARKET TRENDS AND BUSINESS CHANGES IN KEY MARKETS.

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VENDORS ADJUST STRATEGIES AS CLIENTS ASK FOR OPEN AND FLEXIBLE IT

Customer demand for more open, cross-cloud services will shape vendor investments through 2022. Vendors traditionally known for locking customers in to their technology, including IaaS incumbent Amazon Web Services (AWS), will likely re-evaluate their portfolios and go-to-market messaging in the coming year. This could have lasting impacts on peers such as IBM and Google Cloud, which use openness as a competitive differentiator. For example, this past year AWS took a big leap forward with the general availability of EKS (Elastic Kubernetes Service) Anywhere, which allows customers to create and manage Kubernetes clusters inside their data centers. Along with Outposts, AWS markets EKS Anywhere as part of its hybrid portfolio, which is typically just an extension of AWS cloud services to on-premises environments. However, for many competing vendors like IBM and Google Cloud, hybrid cloud has come to mean supporting customers' workloads not only on premises but also across competitors' clouds. AWS could similarly go down this route to better compete and may surprise the market in 2022 by offering EKS on other public clouds. Oracle is another example of a vendor known for confining customers to its cloud stack; yet, as Oracle looks to position itself as the No. 4 cloud leader in 2022, it could slowly embrace deployment methods outside Oracle Cloud Infrastructure (OCI). This trend is reflected in Oracle's newer open-source application development and management platform, which is somewhat comparable to Red Hat OpenShift, and is expected to be deployable to third-party clouds.

While IaaS consolidation benefits today's cloud leaders, future leadership will hinge on robust PaaS suites to support a maturing enterprise client

While interoperability addresses client preferences for multicloud environments, it has also strengthened the positioning of leading IaaS providers that are turning to platform-led innovations as a means of differentiation. Highlighting this trend is Microsoft, which has increasingly sought to bolster the capabilities of its Power Platform to broaden the applicability of its cloud portfolio in workloads where the company historically lacks a strong presence. Through 2022, Microsoft will continue to focus investments around its PaaS offerings by using capabilities like data integration and automation as well as low-code development tool sets to give customers more flexibility in how they deploy cloud assets alongside their existing IT environments. For instance, offerings like Power Automate allow clients to integrate new cloud workloads, like Intelligent Order Management from Dynamics 365, with on-premises offerings to augment, rather than replace, existing solutions. Staying the course on this strategy, Microsoft announced the acquisition of Clear Software in October, an integration Platform as a Service (iPaaS) provider that specializes in connecting with SAP and Oracle systems. Upon the acquisition's close, Clear Software's capabilities will be folded into the Power Platform, providing clients with 100 prebuilt connectors that enable them to establish automation between Microsoft's first-party services and Oracle's and SAP's core offerings, namely ERP.

PREDICTIONS

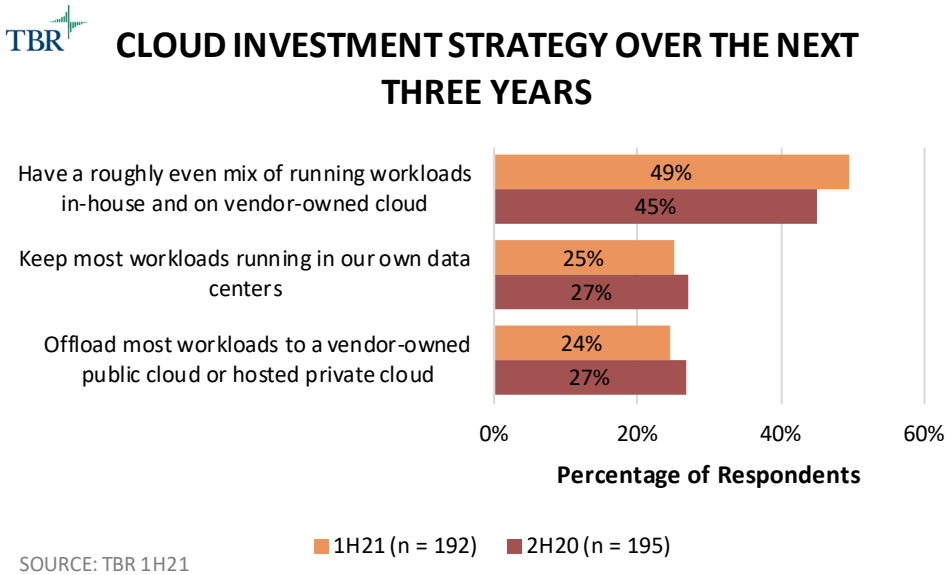
HYBRID REMAINS THE NEW NORM

Trend: As use cases become increasingly complex, customers are shifting away from monocloud, resulting in more demand for hybrid cloud and multivendor solutions.

Driver: Clients want to avoid being locked in to one provider and be able to take advantage of the unique capabilities each vendor offers.

Result: To support customers' needs to run certain workloads on premises or at the edge, vendors embrace more open architectures and ecosystems and become increasingly agnostic to IT delivery method.

As the COVID-19 pandemic continued to take its toll on the global economy in 2021, enterprises ramped up their adoption of hybrid cloud deployments, with nearly half of respondents in TBR's *1H21 Cloud Infrastructure & Platforms Customer Research* indicating they run workloads both in-house and across public clouds. This trend will likely accelerate in 2022, as making migration decisions on a workload-by-workload basis helps IT teams justify ROI through increased scalability, business continuity and flexibility, all attributes that will remain important as global workforces remain distributed due to the pandemic. Further, with a hybrid approach, many customers enjoy the benefits of augmenting — rather than replacing — their existing IT investments with cloud solutions and services depending on where they are in the IT maturity phase. Meanwhile, hybrid cloud helps enterprises better avoid vendor lock-in and deploy cloud infrastructure or applications based on the strengths and weaknesses of a particular vendor's portfolio.



SOURCE: TBR 1H21

The DOD's decision to cancel JEDI underscores criticality of hybrid cloud

One example of how quickly the cloud buying landscape is shifting away from monocloud was reflected in the Department of Defense's (DODs) decision to cancel the Joint Enterprise Defense Infrastructure (JEDI) contract awarded in 2019. The termination of the JEDI contract not only reflects the DOD's evolving cloud needs over the past two years but also strongly suggests the DOD wants maximum flexibility in choosing the vendors that will provide the most mission-appropriate cloud services on an agency-by-agency basis, while concurrently avoiding the risk of over-reliance on a single contractor for the entire agencywide cloud platform.

JEDI will be replaced by the multicloud, multivendor, and likely multibillion-dollar, Joint Warfighter Cloud Capability (JWCC) IDIQ (indefinite delivery/indefinite quantity) program. The DOD will evaluate other cloud vendors, including Google, IBM and Oracle, for future cloud procurements. However, AWS and Microsoft will remain the principal cloud competitors, at least at the outset, as the DOD stated that they were the only vendors able to meet DOD cloud requirements.

BRINGING CLOUD TO THE CUSTOMER: DISTRIBUTED CLOUD MOVES FROM EXPERIMENT TO NICHE DELIVERY METHOD

Trend: Vendors strive to bring public cloud services to customers in their preferred locations be it data centers, the edge or other public clouds.

Driver: Customers look to maximize their existing IT environments, which is resulting in hesitancy to migrate to a public cloud environment; data sovereignty and governance are also emerging factors impacting migration decisions.

Result: Vendors deliver cloud to the customer and offer the end-user the benefits of cloud in different forms.

The rising complexity of IT has pushed many vendors to broaden their definitions of hybrid. While the ultimate goal is still to unlock on-premises data and extend it to the cloud, hybrid for some vendors has become more about bringing the cloud to the customer wherever their data resides, be it in their own data centers, other clouds or at the network's edge. This trend comes as customers ask vendors to meet more specific requirements, including local data processing, protecting their investments in existing IT, and addressing latency and security concerns. Further, geopolitical factors are increasingly impacting cloud migration decisions; regulations like the General Data Protection Regulation (GDPR) and China's new data security law (DSL) that restricts the flow of data beyond borders could push customers to require cloud services to be delivered to their own specified locations.

Vendor Developments

- Through 2022, TBR expects **IBM** will continue to innovate around its distributed PaaS solution, IBM Cloud Satellite, by offering additional data cloud services and expanding service delivery options through colocation and pure play edge partners. Satellite could also help IBM refine its industry cloud approach by allowing customers to extend certain industry policies and controls into their Satellite locations, which could help IBM gain a stronger foothold in data-sensitive verticals like financial services, healthcare and government.

- **Google Cloud** also recently entered the distributed cloud space by previewing a portfolio of cloud infrastructure services that can be deployed across edge locations, data centers and clouds. Google Distributed Cloud is a manifestation of the Anthos platform and offers a similar approach to IBM Cloud Satellite, which is underpinned by Red Hat OpenShift. Anthos acts as the central control plane supporting application management across environments. Google Cloud will continue to embrace hybrid multicloud through Anthos, which will be critical for the company as it looks to better assert itself in the enterprise space.

- While marketed differently, **Microsoft's** Azure Arc platform offers similar functions as IBM's and Google Cloud's platforms. Azure Arc extends governance and management tooling for Windows, Linux and Kubernetes workloads beyond Microsoft environments. As Microsoft remains more committed to its internal hybrid portfolio with Azure and Azure Stack through 2022, the company could end up ceding opportunities to more open vendors like Google Cloud. Meanwhile, competitive PaaS dynamics will persist between Microsoft and IBM as both vendors look to commoditize the control plane layer, building off their incumbent positions in the OS with Windows and Linux, respectively.

IAAS IS ABOUT SCALE; PAAS IS ABOUT DIFFERENTIATION

Trend: IaaS leaders drive global data center investments to broaden their reach and rely on PaaS capabilities as a means of enhancing their value proposition to customers.

Driver: SaaS providers work with IaaS vendors to expand total addressable market (TAM) and reduce hosting costs.

Result: IaaS providers accelerate investments around low-code/no-code development and data management and integration to support client preferences for deployment flexibility and empower citizen developers across lines of business.

The leading IaaS vendors have further separated themselves in the market as the infrastructure opportunity has consolidated around AWS, Microsoft, Alibaba and Google, which collectively are projected to hold 83% of the public cloud IaaS market in 2022, according to TBR's *2020-2025 Public Cloud Market Forecast*. All these vendors have driven data center expansion efforts globally to support accelerating cloud requirements and will continue to actively do so in the coming year. Further, SaaS providers are increasingly turning to IaaS partners to expand their addressable markets without having to make regional investments, an effort best characterized by Salesforce's launch of Hyperforce.

Moving into 2022, vendors will increasingly be differentiated by the depth and breadth of their PaaS offerings, providing enterprise clients with capabilities like data management and integration, which will enable them to embed cloud solutions alongside their existing IT architectures. Additionally, low-code development capabilities will address clients' growing desire for customized outcomes, which are increasingly being defined by the industry in which they operate, resulting in a renewed vendor focus around industry-led cloud portfolios.

Specifically, while vendor investment around industry-led suites soared in 2021, these portfolios are largely still in their infancy. For instance, the value of Microsoft's Cloud for Healthcare stems from the prebuilt data model that allows customers to seamlessly integrate with healthcare data hubs, like the electronic health record systems of Epic and Cerner. The value of this data though, is only as good as the portfolio of healthcare-specific solutions and services sitting atop the platform. This dynamic presents a substantial opportunity for the ISV partner ecosystem to act as go-to-market catalysts for platform providers like Microsoft, AWS and Google, whose growing war chest of capabilities like AI, machine learning and IoT can be used to complement and extend the value of ISVs' niche applications.

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