NUCLEUS RESEARCH

IAAS TECHNOLOGY VALUE MATRIX 2020

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THE BOTTOM LINE

Cloud computing, and more specifically, infrastructure-as-a-service (IaaS), has rapidly matured in both technological capability and user understanding; the COVID-19 pandemic and subsequent work-from-home movement further thrust the technology into the spotlight as an essential capability, enabling remote work and collaboration, along with distributed access to internal applications and databases. The core areas of computation power and data storage are well-documented; all viable vendors offer a variety of compute and storage options to fit intended use cases and customer budgets. Progressive vendors look to add value to their offerings with expanded hybrid and multi-cloud capabilities and integrations; built-in data science and artificial intelligence (AI) capabilities available as-a-service, and advanced networking like edge computing, IoT device support, and 5G connectivity.

FACILITATOR

LEADER

AWS

Microsoft Azure

HPE GreenLake

IBM

Google Cloud Platform

Oracle Cloud
Infrastructure

Dell

CORE PROVIDER

EXPERT

Greater Usability ➤

Better Functionality ➤

OVERVIEW

As application ecosystems become increasingly complex, the underlying infrastructure used to support the technology, share and store data between them, and ensure reliable performance has become a critical differentiator. Further, as workers were sent out of offices and into their homes, strain on corporate technologies (and the necessity that they perform correctly) only increased as all business operations moved online, and companies sought to

limit disruption. This trend isn't likely to reverse, and we at Nucleus believe this pandemic only accelerated the inevitable industry-wide digital transformation away from on-premises infrastructure and toward fully integrated cloud systems. We have also identified the following key trends and areas of investment for IaaS vendors through 2020 and beyond. These areas include:

- Expanded hybrid and multi-cloud integration. Customers are looking to avoid vendor lock-in and to leverage the benefits and differentiated capabilities of the various cloud vendors. Rather than resist this momentum and try to insulate their clouds from others, savvy vendors are building integrations to allow for seamless dataflow between clouds. Additionally, vendors recognize the massive investments that many companies have made in building up and supporting their own proprietary on-premises networks; rather than suggest they abandon these, supporting hybrid cloud capabilities allows vendors to help slowly transition these workloads to the cloud while preserving the function and investment for customers. Containerization offerings are key areas of investment for vendors. Using technologies like Docker, Kubernetes, and IBM RedHat, workloads can be containerized and run on any infrastructure without extensive retooling. As multi-cloud environments proliferate, containerization capabilities become essential to ensuring the smooth integration of all the cloud technologies.

- Cloud data acquisition, AI, and data science as-a-service. Companies are looking to acquire third-party data catalogues to enrich customer datasets and enable more sophisticated multifactor analytics. This is one way to improve the stickiness of the cloud technology and add differentiated value. Further, with larger amounts of high-quality, trusted data, AI model performance can be improved, and new models or use cases can be deployed. As companies look to automate repeated manual actions, detect anomalies, and create proactive alerts for users, being able to add training data or provide pre-trained models out-of-the-box is a key differentiator. As analytics becomes a key focus area for businesses of all sizes (not just the largest enterprise players), offering data science capabilities like regular analyses and reports can allow smaller companies without the budgets to support internal data science teams to still become data-driven. This can be a key differentiator for cloud vendors, especially as the enterprise market becomes saturated and they look to smaller and midsized organizations to drive new growth.

- Advanced networking for edge analytics, IoT device integration, and 5G connectivity. With the increasing performance and decreasing cost of cloud networks, more internet-connected ("smart") devices are being deployed. Cloud vendors are offering specialized capabilities that run on the more limited on-device resources of IoT devices. Additionally, the network needs to enable orchestration and management of the data flow from these devices. As mobile connectivity

becomes a greater part of business and everyday life, support for 5G to enable faster processing and data transfer will be critical as more 5G-capable devices become widely adopted.

LEADERS

The Leaders in the Value Matrix include Amazon Web Services (AWS), Microsoft Azure, and IBM.

AWS

Amazon Web Services (AWS) is not only the largest, but also one of the fastest-growing IaaS platforms covering 76 availability zones across 24 geographic regions worldwide, with plans for nine more Availability Zones and three more AWS regions in Indonesia, Japan, and Spain. With data centers in all geographic regions, AWS users can localize workloads to their region. With AWS, customers choose which region to store their data and they have control of this data in terms of where it is stored, how it is stored, and who has access. AWS does not move customer data from the selected region without the consent of the customer and users concerned about protecting data can choose to encrypt their data in motion or at rest. For example, to learn how AWS can help customers comply with the privacy laws in Australia, Australian companies download a whitepaper on the AWS compliance website that specifically addresses their potential concerns.

AWS has a shared responsibility model with the customer; AWS manages and controls components from the host operating system and virtualization layer down to the physical security of the facilities in which the services operate, and AWS customers are responsible for building secure applications. AWS provides a wide variety of best practices documents, encryption tools, and other guidance for customers to leverage in delivering application-level security measures. In addition, AWS partners offer hundreds of tools and features to help customers meet their security objectives, ranging from network security, configuration management, access control, and data encryption. AWS has the capacity and technology to support workloads at any scale. Since the infrastructure is all maintained and networked by AWS, customers can select the proper hardware for their workload types and the amount of storage needed. If the demand for storage or compute increases or decreases suddenly, the customer can scale accordingly and only pay for what they use, eliminating the ongoing cost of maintaining idle hardware internally. Additionally, all the tools have documentation readily available online with code libraries, explanations, and examples to help users get answers independently. Given that AWS is an established leader in the public cloud arena

with millions of active users, there is regular sharing of best practices and tips to help answer questions in the community.

The breadth of services from AWS are more comprehensive than any other current cloud offering. AWS offers the most considerable number of cloud services (over 175 fully featured), including application development, data management, and data optimization. A couple of examples are AWS Lambda for serverless computing, multiple container deployment, and orchestration tools, and Amazon SageMaker and Amazon Forecast for managing, deploying, and training machine learning models, and for leveraging machine learning for time series analysis and forecasting, respectively.

Key AWS 2020 updates and release notes include:

- In April 2020, AWS announced its Snowball Edge Storage Optimized now utilizing 40 vCPUs as compared to 24 previously. Additionally, data transfer speeds have increased by 25% on a new gigabit networking adapter.

- In April 2020, Amazon announced the launch of AppFlow, which is a fully managed service for dictating SaaS data flows. The service aims to allow customers to control the flow of data between AWS and third-party SaaS applications and create bidirectional data flows without writing custom integration code. Furthermore, the service can operate with AWS PrivateLink allowing users to route data flows through Amazon's network as opposed to the public Internet.

- In May 2020, Amazon launched a new SaaS competency program for AWS partners. The program focuses on simplifying the process of building SaaS solutions for end-users by providing expertise on AWS's public cloud infrastructure.

- In May 2020, Amazon released Kendra to simplify the enterprise search process with AI and machine learning. Using best practices from search engines like Google, Amazon uses natural language processing to intake user's questions and search across repositories connected to the search engine to find an exact answer.

- In May 2020, Amazon announced enhancements to Amazon Macie, a cloud security tool powered by machine learning to identify and protect critical data stored in the AWS public cloud. New features include updated machine learning models to accurately detect Personally Identifiable Information (PII), support for customer-defined data types, and native multi-account management.

- In June 2020, Amazon launched AMD-based C5a instances designed for compute-heavy workloads such as analytics applications. The new chips utilize AMD's second-generation Epyc Rome processors, which are based on a seven-nanometer design delivering 23% more instructions per clock than previous iterations.

AWS continues to display efforts towards increasing the availability, security, and performance of the platform. By successfully executing the strategies and best practices for critical areas within the IaaS space, and for the breadth of capabilities, customers, and applicable use cases, AWS is positioned as a Leader in the 2020 IaaS Value Matrix.

MICROSOFT AZURE

Microsoft Azure provides a hybrid cloud computing environment for storage and application deployment across Microsoft's 54 availability regions. Currently, Microsoft plans to expand to seven additional regions to strengthen the already best-in-class IaaS availability. Continuing this trend, Azure offers up to 960 CPU threads and 480 vCPU cores, which provide some of the most reliable cloud computing capabilities among IaaS offerings. With this performance level, Azure can dynamically allocate resources through storage capacity, memory availability, and processing power.

Azure covers service areas such as, among many others, AI, machine learning, blockchain management, analytics, containers, databases, integration, stack, and storage. When speaking with customers, users noted that the Azure platform's efficiency increased while operating within the Microsoft ecosystem. Azure offers an extensive level of Microsoft applications as well as integrations with external products allowing companies to maintain the existing infrastructure when migrating to Azure. The platform works with Linux applications and all programming languages with integrations for applications for SAP, Oracle, IBM, and SharePoint.

As AI and machine learning advance, more companies are looking to automate processes and eliminate human error to increase efficiency. Azure Automation enables the control of front-end VMs to save money when the machines are not in use. For example, Azure Automation could be set to shut down all but one VM at the end of the day and then start the VMs again in the morning savings user's time and money. Furthermore, Azure machine learning algorithms process petabytes of data and make predictions giving users insights into whether a company's data is managed and utilized efficiently.

For 2020, Microsoft plans to continue innovation and adaptation of the Azure platform, as shown in recent months. Recent company announcements include:

- In February 2020, Microsoft announced support of virtual networks for Azure Firewall Manager with a new certification and additional features included in the update. The new certification is the ICSA Labs Corporate Firewall Certification aimed at testing the security, functionality, and assurance of the firewall and requiring ongoing testing to ensure it remains a strong line of defense against data breaches. New features include forced tunneling support, IP groups, customer configured SNAT private IP address ranges and high port restriction relaxation.

- In March 2020, Microsoft announced a partnership between Azure, 5G, carriers, and technology partners to enable new 5G scenarios with Azure Edge Zones. The new scenarios include a select set of Azure services that let you run latency-sensitive and throughput-intensive applications close to end users, accelerating IoT and AT and enabling development of distributed applications across cloud, on-premises, and edge using the same Azure Portal.

- In April 2020, Microsoft announced query acceleration for Azure Data Lake Storage, which improves both performance and cost of the solution. The improvements to performance and value are achieved by enabling applications and frameworks to "push-down predicates and column projections," allowing them to be applied when data is first read.

- In May 2020, Microsoft announced the next generation of Azure VMware Solution enabling customers to extend or completely migrate their existing on-premises VMware applications to Azure. The migration can be achieved without the cost of restructuring the architecture of existing applications. Additionally, in May 2020, Microsoft announced the ability to build applications of any size or scale with Azure Cosmos DB. The solution is Microsoft's NoSQL cloud database providing affordable ways to scale performance for rapid application development.

In 2020, AI and machine learning capabilities will prove to be the defining functionalities of cloud services. The elimination of manual tasks and the addition of automated analytics and insights will be invaluable to organizations. Microsoft continues to release updates across the Azure platform, including advancements in AI capabilities and improvements to performance and cost-efficiency. With the most significant number of availability zones, Azure shows a dedication to creating a scalable and available platform.

IBM

The IBM approach to IaaS and cloud computing specializes in bringing modern cloud-native capabilities to high complexity enterprise workloads. It offers the greatest level of instance customization from full stack down to bare metal, and integrates with on-premises infrastructure to enable hybrid cloud deployments and preserve customers' existing investments in on-premises infrastructure while still enabling the benefits delivered by cloud technology. IBM maintains over 60 datacenters around the world so customers can scale their resource usage as needed and localize workloads as needed to optimize performance and remain complaint with data collection and usage regulations like GDPR, CCPA, and others. The IBM cloud is further differentiated in security, without having suffered a high-profile security incident on its platform; it is compliant with all requisite encryption and security certifications such as FedRAMP, CSA STAR, HIPAA, and DoD DISA, among many others. In particular with a number of federal certifications, IBM is well-positioned to help

modernize US government workloads to its cloud (this is a high priority for those agencies and departments that still haven't migrated from their ultra-secure on-premises systems).

Among its infrastructure products, IBM offers a wide range of configurable bare metal servers with specialized options like GPU-accelerated processing for compute-heavy workloads. It also offers virtual servers, different levels of object storage ranging from read- and write-heavy workloads to longer-term cold storage for disaster recovery or precautionary backups. For the most security-intensive use cases, IBM offers Cloud Virtual Servers for VPC (Virtual Private Cloud); these are for isolating network segments within the IBM cloud to allow for more granular control of network configuration and resource consumption. To support the rising interest and demand for DevOps support, IBM acquired RedHat and has expanded its containerization options to support Kubernetes deployments as well. With containerization from RedHat OpenShift and others, customers can modernize applications to run on any cloud or infrastructure. This fits nicely with its mastery of the hybrid cloud space, a subset of cloud computing where customers leverage a combination of public and private cloud, as well as on-premises resources to run and manage their applications and workloads. Rather than push customers to migrate fully to the cloud and abandon their on-premises investments, IBM provides customers a more natural pathway to the cloud with its hybrid options. Particularly among security-conscious customers in sensitive industries like government and financial services, the control, customization, and security of the IBM IaaS offerings are key drivers for its success.

Another key value driver for IBM is its interoperability with third-party technologies and even other vendor clouds such as Azure and AWS. It doesn't look to push customers to become locked into a singular cloud but rather looks to help customers optimize their cloud strategy by working to complement and manage existing infrastructure, regardless of provider. For customers with existing legacy technologies like on-premises SAP systems, or IBM Z mainframes, the IBM cloud will integrate with these to preserve their function while helping modernize on the cloud. It has machine learning and artificial intelligence services from IBM Watson available across the platform for customers to embed within applications and begin using without requiring an expensive custom build (and allowing customers to save money that would be spent on internal data science resources).

Relevant updates and announcements from IBM include:

- In March 2020, IBM and Infosys announced a collaborative initiative to help businesses accelerate digital transformation processes through IBM public cloud. Infosys is a digital service, business consulting, and outsourcing service provider to help develop and maintain validation services for companies in finance, insurance, and healthcare sectors. The collaboration aims to assist enterprise-level organizations in the industries mentioned above to modernize workloads and applications through the IBM public cloud's innovative capabilities. Infosys will

provide clients with open source offerings on the IBM public cloud to achieve greater scalability and resources surrounding cloud-driven digital transformation.

- In April 2020, IBM and Tech Mahindra Ltd. announced collaborative efforts to create innovation centers to help solve complex business problems across industries, including telecommunication, manufacturing, financial services, insurance, and healthcare. Tech Mahindra provides customer-centric information technology services. The initial development will leverage IBM Cloud Paks, which utilize enterprise-ready containerized software solutions operating on Red Har OpenShift.

- In May 2020, IBM announced new offerings to help clients achieve digital transformation goals through new capabilities in AI, edge, and cloud capabilities. At IBM's Think Digital event, CEO Arvind Krishna announced new AI-powered capabilities and services designed to help CIOs automate IT infrastructures and reduce costs while protecting against potential disruptions. New IBM solutions centered around 5G and edge computing built on Red Har OpenShift allows enterprises to automate workflow management processes across large volumes of edge devise giving telecommunications providers streamlines access to virtual and container network functions.

- In May 2020, IBM continued public cloud announcements at its Think Digital conference with a reimagined Business Partner program. The program aims to capture substantial market opportunities around the shift to cloud services and help partners develop new revenue streams to create additional value for clients. The program brings a new incentive structure that rewards Business Partners to deliver client value in Cloud and Systems, which includes investing in the development of bespoke solutions and IP and demonstrating deep skills and industry knowledge of integrating IBM software and hardware offerings. Additionally, the program focuses on delivering value through the new IBM Partner Packages, which bundle Cloud and Cognitive benefits allowing for efficient development and testing of solutions on the IBM Cloud.

- In June 2020, IBM and Persistent Systems announced a collaboration to accelerate IBM Cloud Pak deployments. The collaboration will allow clients to modernize enterprise operations and migrate to the cloud efficiently. Persistent has been an IBM Business Partner for more than 17 years, helping clients migrate to applications to the cloud by utilizing the IBM Cloud Pak portfolio for data, automation, and security.

- In June 2020, IBM announced the acquisition of Spanugo, a provider of cloud cybersecurity management solutions. The acquisitions come amidst modern security demands in highly regulated industries. The integration of Spanugo software will increase the availability of a security control center enabling IBM clients to define

compliance profiles, manage controls, and monitor compliance across the organization in continuous real-time.

From speaking with IBM customers and IT decision-makers responsible for cloud computing, trust is one of the key components of the relationship. As an enterprise technology vendor for so long, many of the top global organizations have longstanding investments in IBM technology and relationships; rather than abandon these, IBM has in recent years provided a viable pathway to the cloud. In particular, customers expressed that IBM is the preferred partner for highly complex enterprise workloads with many dependent components and infrastructure types working together. Also, for highly secure on-premises systems like banks, government organizations, and defense contractors, the configurability and granular control of the instances gives IBM an advantage over competitors like AWS and Azure. Nucleus positions IBM as a Leader in this Value Matrix for the wide array of cloud services and solutions and the fine-detailed level of control customers have over these instances. It may not be the most easy-to-setup cloud because of this, and the usability positioning reflects this customer sentiment, however altogether IBM is a proven, trusted partner for highly complex enterprise cloud applications. With the acquisition of RedHat and embrace of a cloud-first long-term strategy, we expect IBM to experience strong continued growth across its IaaS portfolio.

EXPERTS

The Experts in the Value Matrix include Google and Oracle.

GOOGLE CLOUD PLATFORM

Google Cloud Platform (GCP) continues to hold its own among IaaS providers with investments in Google Compute Engine to improve virtual machines and infrastructure tools for building applications and services. To compete with other IaaS providers, Google began adding product lines, including DNS, monitoring tools, and data analysis tools. Like many IaaS solutions, Google provides secure access to AI and machine learning capabilities, API management, developer tools, hybrid cloud capabilities, migration tools, and cloud storage. In 2020, Google continues to make GCP more widely accessible, focusing on hybrid and multi-cloud workloads managed on GCP and Google Kubernetes Engine as well as on AWS and Azure.

The capabilities of a single company are extracted through the analysis and interpretation of the data collected. For exploring a company's capabilities through data, Google proves to be the best solution with years of experience managing, leveraging, and analyzing data

from users, machines, and organizations. The GCP is well suited for multi-environment testing, development, and experimentation with a low cost for running small instances of data analytics.

Key Google Cloud 2020 updates and release notes include:

- In March 2020, Google announced the beta launch of Cloud AI Platform Pipelines, providing a path to deploy repeatable machine learning pipelines along with monitoring, auditing, version tracking, and reproducibility. The service includes integration with GCP managed services like BigQuery, Dataflow, AI Platform Training and Serving, and Cloud Functions.

- In May 2020, Google fully released new WAF capabilities for DDoS mitigation helping users protect their web applications and services at the edge of Google's Network. New features include geo-based access control, pre-configured WAF rules for SQL injection (SQLi) and Cross-Site Scripting (XSS) defense, custom rules language for custom Layer 7 filtering policies, and Security Command Center integration. In June 2020, Google continued to improve the firewall capabilities by adding hierarchical firewall policies that provide flexibility, control, visibility, and optimizations by using ingress and egress rules at the organization and folder levels.

- In May 2020, Google announced the deployment of Google Cloud VMware Engine, an integrated offering with end-to-end support for migrating and operating a VMware environment on the GCP.

- In May 2020, Google announced updates to the existing NVIDIA-based GPU architecture by adding support for NVIDIA Ampere and NVIDIA A100 Tensor Core GPUs. The new A100 GPUs add efficient hardware and software functionalities to streamline AI and HPC applications.

- In June 2020, Google introduced table-level access controls in BigQuery, allowing users to control specific data and share it in a more secure and controlled manner. The update builds upon Google Cloud's enterprise-level access control platform, Cloud Identity and Access Management (Cloud IAM).

For the rapid growth and robust capabilities of the platform, Google Cloud is placed as an Expert in the 2020 IaaS Value Matrix. Nucleus predicts the platform will excel in AI, machine learning, and big data processing tools for 2020 with Google's Cloud Machine Learning Engine. As the platform continues to grow, Nucleus expects Google Cloud to join the Leaders' quadrant of the Value Matrix in future years.

ORACLE CLOUD INFRASTRUCTURE

For over a decade, Oracle has been an essential provider in the IaaS space with pioneering innovations such as isolated network virtualization, or "off-box." Currently, Oracle operates across 21 total cloud regions with a plan to reach 36 total regions by the end of 2020. Within these regions, Oracle offers a set of integrated, subscription-based infrastructure services enabling workload management with no existing infrastructure changes or the need to build new native applications. By using Oracle Cloud Infrastructure (OCI) and remaining in the Oracle ecosystem, customers can take advantage of Oracle Application Express (APEX), a low-code development platform enabling scalable enterprise applications.

Developers can expect an efficient development of Java-based applications along with issue tracking, code versioning, agile-development tools, integration, and delivery automation. Within the Oracle ecosystem, users can deploy and develop numerous applications with a high level of compatibility. For cloud computing, OCI provides virtual computing capabilities through VMs and NVIDIA-based graphics processing for demanding AI and machine-learning algorithms. Oracle's deployment of OCPUs and NVIDIA GPUs bring powerful on-premises computing and rendering capabilities to all users.

OCI provides Oracle Identity and Access Management (IAM) services as security measures giving administrators control over who accesses cloud resources, what type of access is allowed, and which specific function can be obtained. The OCI Web Application Firewall (WAF) protects internet-facing applications from security threats through bot management, DDoS protection, and a layered approach to bar unwanted traffic from websites and web applications. The security functionalities extend to database security with a layered approach for both on-premises and cloud security, including Oracle Autonomous Database. The Autonomous Database is a fully automated service providing the functions of Oracle Database within an automated environment for data warehouse workloads allowing users to eliminate manual tasks.

Another key strength of OCI noted by users is the reliability of the platform, which can be accredited to Oracle tools and solutions consistently over time. Oracle was one of the first providers to utilize an "off-box" or isolated network virtualization method and continues to deploy this method today. Isolated network virtualization removes network and IO virtualization from the server stack and puts it in the network allowing users more control over provisioning resources with no shared resources or hypervisor overhead. Additionally, side-by-side VMs, containers, and optimized databases are enabled by isolated network virtualization using a set of APIs.

In September 2019, Oracle developed improvements to the OCI platform when it announced Generation 2 Cloud built to deliver a suite of infrastructure and platform cloud services. The Generation 2 Cloud supports all legacy workloads and is built to run Oracle Autonomous Database operating on the latest CPUs, GPUs, and NVMe SSD storage devices.

OCI is positioned as an Expert in this year's 2020 IaaS Value Matrix as one of the most experienced infrastructure providers. Oracle continues to show consistency in terms of scalability, provisioning resources, and providing a cost-efficient platform. With continued customer growth and development towards integrations for applications outside of the Oracle ecosystem, OCI can progress toward the Leaders' quadrant in future Matrices.

FACILITATORS

Hewlett Packard Enterprise (HPE) is positioned as a Facilitator in this year's Value Matrix.

HPE GREENLAKE

HPE GreenLake provides a suite of software tools and IT services to help users manage public clouds such as AWS, Azure, and Google Cloud. HPE GreenLake is an as-a-service offering that delivers on-demand capacity and planning, combining the agility and economics of the public cloud with the security and performance of on-premises IT. Similar to the other offerings in this year's Value Matrix, HPE GreenLake offers a pay-as-you-go solution that varies on a company's usage.

In August 2019, HPE and VMware partnered to integrate HPE GreenLake and HPE Synergy with VMware Cloud Foundation. The partnership enables improved processes for control, security, and workload optimization by allowing users to identify which workloads are suitable for public cloud or private cloud. In October 2019, HPE announced improvements to HPE SimpliVity, the hyper-converged infrastructure (HCI) platform. Utilizing additions such as AI and VM management, HPE SimpliVity can help predict and prevent IT issues relating to unexpected disruptions and application delays. In November 2019, HPE announced the integration of its AI and machine learning driven HPE Primera storage platform with the composability of HPE synergy and HPE Composable Rack. The integration brings new applications and tools to users on an intelligent cloud platform supporting any application and service-level agreement (SLA).

For 2020, a key announcement came in May when HPE released GreenLake Central, a new software platform for unifying existing customer solutions on a single software platform. The new solution aims to provide a more consistent and simplified experience for the end-users by including monitoring and management options for compliance, security, and resource utilization of public and private clouds within a single location. Additionally, GreenLake Central provides more freedom to the user with tools for self-provisioning a virtual machine or web server.

HPE GreenLake is positioned as a Facilitator in the 2020 IaaS Value Matrix with solutions to help users streamline their experience when operating in the public cloud sector through offerings such as AWS, Azure, and Google Cloud.

CORE PROVIDERS

Dell is positioned as a Core Provider in this year's Value Matrix.

DELL TECHNOLOGIES

Dell utilizes VMware Cloud on Dell Technologies to provide a cloud infrastructure installed on-premises in an organization's data center and edge locations. By doing so, users can configure and monitor edge workloads at a scale similar to data center workloads. Additionally, users save resources by maintaining a company's hybrid cloud consistency with drag-and-drop workloads and unified policies. Dell Technologies Cloud supports physical, virtual, and containerized infrastructures and runs traditional applications, cloud applications, and open-source Kubernetes containers. The containers utilize the same infrastructure and tools deployed at a company and give an administrator the ability to provision Kubernetes clusters.

Utilizing VMware Tanzu Kubernetes Grid and VMware Cloud Foundation, Dell Technologies Cloud aims to automate manual tasks such as lifecycle management of virtualized and containerized infrastructures and the deployment of standard upstream Kubernetes. Additionally, Dell Technologies Cloud is built on VxRail, a hyper-converged infrastructure solution with VMware Cloud Foundation enabling the deployment of integrated cloud management services in both private and public environments. The implementation of the VMware Cloud Foundation on VxRail allows for a straightforward process for hybrid cloud and automated infrastructures.

In February 2020, Dell announced the Dell ECM Streaming Data Platform, a software offering that enables the ingestion and analytics of real-time streaming edge data. With data moving towards real-time projections, collecting that data from the edge will create a continuous data stream granting organization's access to an on-demand and unified analytics solution both for real-time and historical data insights. In February 2020, Dell announced a new subscription-based offering for Dell Technologies Cloud allowing users to get started with a hybrid cloud environment for $70 per node per day and deploy the hybrid cloud in 14 days. In May 2020, Dell announced innovations to the Dell Technologies Cloud Platform with a Dell ECM SD-WAN solution powered by VMware. The solution provides

software-defined tools to modernize networking with upgrades to simplicity, performance, and scalability.

Dell Technologies Cloud Platform is positioned as a Core Provider in the 2020 IaaS Value Matrix with a cost-effective, reliable, and easy-to-use solution for a diverse group of customers.