Matching the workload characteristics to the cloud's capabilities

How Oracle Cloud Infrastructure (OCI) meets the demands of mission-critical, custom, and cloud-native workloads

Summary

Catalyst

The COVID-19 pandemic has accelerated the move to adopt cloud computing. Omdia's annual ICT Enterprise Insights survey found that, between 2019 and 2020, the proportion of workloads using some form of cloud computing had increased from 25% to 35%. One of the biggest learnings that COVID-19 exposed, and one of the main reasons for increased cloud computing adoption, is the recognition that the cloud can support and deliver change at the speed of business. However, not all workloads or clouds are equal, and therefore matching the characteristics of the workloads to the cloud can help meet organizational priorities.

Omdia view

The movement of workloads from an on-premises environment to a cloud computing environment is now beginning to address different requirements that more-complex applications exhibit. Omdia has identified three specific classifications of workloads that have specific characteristics and therefore require any cloud environment to address these if migration is to be successful:

- **Mission-critical.** The core workloads that run the business and deliver the backend processing of sensitive data, such as ERP, financial management, and CRM, must be able to meet organizational security protocols and deliver consistent performance to ensure business activity is not impeded.
- **Custom applications.** These workloads are typically built by the organization to address specific needs and involve a large number of integrations with other applications and data. They must be able to integrate with workloads that are in any environment: cloud, on-premises, or at the edge.
- **Cloud-native.** The adoption of technologies such as containers and Kubernetes is aimed at exploiting all the benefits a cloud environment can deliver. These workloads differ from the traditional workloads based on virtual machines (VMs): they can vary in resource requirements and priority on a very granular level. In turn, this means they need more-precise resource allocation to ensure efficiency.

Key messages

- Oracle's second-generation cloud architecture is designed to provide a highly secure environment for mission-critical applications.
- Oracle has a history of migrating custom applications and managing various types of integrations for these applications.
- Oracle's new cloud offerings are designed to provide cloud-native workloads with cost-effective solutions.
- Being future ready today is a key capability cloud vendors must provide.

Oracle's second-generation cloud architecture is designed to provide a highly secure environment for mission-critical applications

Omdia's data shows that one of the fastest-growing application categories organizations are planning to move to the cloud is the mission-critical core business systems such as financial management, ERP, and CRM. In fact, according to Omdia's *IoT, Cloud, AI & 5G – ICT Enterprise Insights 2021*, 23% of respondents expect to be running financial management workloads in hybrid cloud environments by 2022. Oracle delivers several mission-critical applications, including E-Business Suite, PeopleSoft, and JD Edwards, in addition to its software-as-a-service (SaaS) applications. It is in a different position from its main rival cloud vendors with its experience of supporting all the different cloud types: infrastructure as a service (IaaS), platform as a service (PaaS), and SaaS.

Ensuring these workloads can deliver the expected levels of performance and security requires a new architecture for cloud providers. Oracle Cloud Infrastructure was one of the first to develop this new generation of cloud architecture. The Oracle second-generation cloud is based on the concept that it does not allow the Oracle control plane to coexist alongside the user's data, and therefore it creates an air gap between them that provides the higher level of security needed for these mission-critical workloads.

The challenge for current cloud architectures is how they can provide the security needed for these mission-critical workloads. Typically, first-generation cloud environments were designed to be multi-tenant so the cloud provider could efficiently support multiple different customers and scale as demand dictated. This architecture may be ideal for the cloud providers in terms of how they can deliver the services to customers cost effectively, but the concept of a shared environment does raise some serious security questions.

Oracle's next-generation cloud architecture has separated the control plane from the customer's data. This separation of customer's and provider's data provides two key security benefits:

- Oracle cannot see customer data and has no way of accessing it without the customer's permission and help.
- Having the provider's control plane on a separate set of servers with controlled port access open for allowed communications in one direction only means any malicious attacker, if they get access to a customer's data, cannot also reach other customers' data or the Oracle Cloud Infrastructure's control plane.

This level of security is precisely what is needed when organizations move these mission-critical workloads to the cloud. Omdia's research indicates this move will begin to accelerate in 2021/2022.

Oracle has a history of migrating custom applications and managing various types of integrations for these applications

Custom applications by their very nature integrate with multiple different third-party solutions and technologies. This is a challenge for cloud providers, which to enable these custom applications to be migrated must support the different solutions and technologies. Oracle's approach is to provide a range of different third-party reference architectures through the Architecture Center as well as free migration assistance for all customers that use Oracle Cloud Lift Services. Oracle Cloud Lift Services provide the customer with a guided approach to migration and implementation. Additionally, Oracle provides preconfigured images to automate any deployment, and these are available on its Oracle Cloud Marketplace. A final point of note about migration of custom applications is the database these applications connect to. Migrating databases and enabling them to support new capabilities such as mobile use requires careful consideration. Oracle provides an integrated PaaS service for such database migrations and has managed services for Oracle Database (Exadata, Autonomous Database, etc.), MySQL, JSON Database, and others.

Oracle's new cloud offerings are designed to provide cloud-native workloads with cost-effective solutions

The move away from VMs to cloud-native environments is now well established. Omdia's *IoT, Cloud, AI & 5G – ICT Enterprise Insights 2021* survey showed the respondents' use of VMs will decline in favor of cloud-native environments. In fact, respondents reported VM use in production will fall to 47% of all workloads by 2022. These cloud-native workloads require a wider selection of processors on which to execute because the applications range from single containers to clusters of hundreds of containers. Since 2019, Oracle has offered a set of AMD-based compute instances based on AMD EPYC™ processor. In fact, Oracle was one of the first public cloud providers to have a bare-metal compute offering with AMD EPYC processors, and today it offers both bare-metal and flexible VMs. The relative cost per core per hour of these AMD instances is significantly lower than that of the equivalent Intel processors, which offers flexibility for cloud-native deployments. One of the criticisms of using an AMD processor has been its performance in terms of memory bandwidth, but the Oracle deployment of AMD EPYC can deliver greater than 336GBps, a significant advantage for high-throughput workloads such as simulations and gaming. Another key capability of OCI that cloud-native applications need is the introduction of clustered networking. Using Oracle's remote direct memory access (RDMA) protocol, the clustered networking can support up to 100Gbps, providing an ultralow-latency and high-bandwidth solution that is ideal for distributed cloud-native workloads.

Being future ready today is a key capability cloud vendors must provide

The migration to cloud computing and cloud-native environments is now well established and has been accelerated by the COVID-19 pandemic. Omdia considers that as organizations look to continue this journey, they expect the cloud providers to have built and deployed the day-two operational management capabilities they will need as they deploy a greater proportion of workloads in these environments. In the case of OCI, customers can use Oracle Accelerated Value Services for day-two operations and offerings such as Oracle Cloud Lift Services and Oracle Consulting Services for cloud migration. Oracle Cloud Lift Services provide customers with free and dedicated cloud engineering resources for planning, designing, prototyping, and managing cloud migrations. Clients can move critical workloads in weeks or even days instead of months by leveraging these included services.

Organizations remember the last major technology transition, server virtualization, where the day-two management capabilities were not developed sufficiently in time to meet the needs of organizations that were rapidly deploying server virtualization. As a cloud vendor, Oracle is addressing expected growth in demand with integrated capabilities for cloud migration and operations.

Final thoughts

As organizations move to the cloud, they migrate mission-critical applications and custom applications that may be cloud-native. Oracle Cloud Infrastructure provides a high level of security, performance, and competitive cloud vendor economics to support varied applications. Furthermore, OCI enables its customers to be future ready with its offerings for migration and day-two operations.

Appendix

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