Containers and Serverless:
Essential Cloud-Native Technologies for Modern Application Development

by William Fellows

IT modernization and the mainstreaming of cloud are converging to create a perfect storm. Cloud infrastructure and cloud-native application development are no longer special 'snowflake' variations – they're now mainstream IT. The re-platforming to cloud-native applications is well underway across all industries, and, similar to the re-platforming to the internet and web in the 2000s, it will take a few years and presents a tremendous opportunity for organizations to fundamentally transform their businesses.

However, this cloud-native 'mindset' will exist alongside legacy IT for the foreseeable future, creating an ongoing environment of complexity with technologies such as Kubernetes, container runtimes (Docker, CRI-O, and containerd) and serverless functions (K-native, Fn Project [the basis of Oracle Functions] and OpenWhisk). Should organizations modernize applications and undertake net new cloud-native development? Recent survey data from 451 Research indicates there are multiple reasons to do so.

How Cloud Vendors Can Help Adopt Containers and Other Cloud-Native Technologies

Containers, Kubernetes, microservices and other cloud-native technologies enable services to be assembled, connected, consumed and reused using DevOps processes. This enables faster software releases and delivers incremental value more quickly, reducing technical debt and improving collaboration. The benefits associated with loosely coupling infrastructure, logic and data in cloud-native environments can enable a great deal of development and runtime execution flexibility. Developers can focus on logic and quality of application development, free from having to understand underlying IT architectures.

IT operations efficiency, security and developer speed/productivity are the key cloud-native benefits identified by respondents in 451 Research's Voice of The Enterprise: DevOps, Workloads & Key Projects 2021 survey (see figure). Enterprises are also tapping into cloud-native technologies to enable 'run anywhere' application deployment, so workloads can run in the venues that are best suited for their specific performance needs.

Top Benefits of Containers, Serverless and Other Cloud-Native Technologies
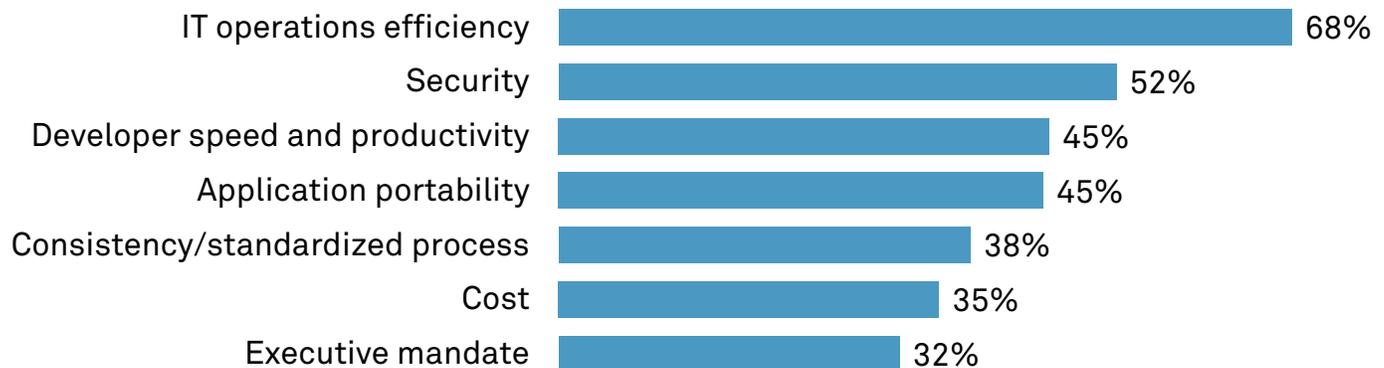
Q. What are the primary benefits of cloud-native technology such as containers, Kubernetes or serverless for your organization? Please select all that apply.

Base: All respondents (n=548)

Source: 451 Research's Voice of the Enterprise: DevOps, Workloads & Key Projects 2021

While cloud-native computing brings multiple benefits, it also presents some challenges. Among them is how to best integrate all the moving parts associated with cloud-native applications (e.g., containers, microservices, code, logic). Cloud-native approaches change how data, applications and processes are integrated across a hybrid IT landscape. Traditional enterprises must embrace fundamental structural change in order to 'turn the ship around' and compete with more nimble cloud-native competitors.

Vendor-managed Kubernetes and serverless platforms, such as Oracle Container Engine for Kubernetes and Oracle Functions, address the burden of adopting these technologies by simplifying the management and operations of cloud-native infrastructure for organizations. As an example, the Archaeological Park of Pompeii tapped Oracle's cloud-native expertise (Oracle Consulting, in the case of Oracle Cloud Infrastructure) to simplify its cloud-native transition. Additionally, customers can use cloud vendor capabilities, including those from OCI, for artificial intelligence and machine learning to develop cloud-native applications that incorporate chatbots as well as text, speech and image recognition.

Enterprise Priorities for Cloud-Native vs. Traditional Applications

Applications are increasingly being delivered and managed via microservices running in containers and Kubernetes. While changing legacy software to use this type of architecture can be difficult, many see it as the best way to take advantage of the continuous product development enabled by cloud – and the competitive advantage that confers.

Many enterprises have already picked the low-hanging fruit of cloud transformation – the easy wins in terms of ROI. These include HR, CRM, sales and productivity suites that have largely moved to subscriptions and SaaS delivery models. The next phase – decomposing big, gnarly legacy applications by carving away functional blocks that can be maintained independently – is going to be tougher.

The use of stateful applications means that more data is generated by and being retained by cloud-native applications. Accordingly, database and storage vendors are incorporating cloud-native technologies into their own offerings as they evolve to meet new challenges in the market. Moving forward there will be increased demand for databases and storage platforms that can accommodate highly distributed and data-rich cloud-native applications. Using converged databases such as Oracle Database to store multiple data types is an approach being more frequently adopted to reduce the complexity associated with managing several single-purpose databases.

Final Thoughts

The cloud-native market offers high-utility components and agile design processes, but assembling and managing them into a scalable production environment is hugely complex, and it requires significant domain expertise. Services that automate provisioning and operations of Kubernetes and serverless, such as Oracle Container Engine for Kubernetes and Oracle Functions, can reduce barriers to entry. In addition, cloud vendors and partners offer technical support and consulting services to aid with cloud-native adoption.

The overall shift to cloud native is being fueled largely by digital businesses that undertake new application development. 451 Research's Voice of The Enterprise: Cloud, Hosting & Managed Services, Workloads and Key Projects 2021 study found that cloud-mature organizations, which run broad ranges of production applications in public cloud environments, boast the highest levels of internal cloud-native software development, accounting for half of internal app development on average.

However, because most organizations are not born-in-the-cloud businesses and have existing application estates that will need to be managed as part of hybrid environments going forward, suppliers that have a foot in the old world and one in the new are going to be required to bridge these gaps and then simplify the transformation journey. Cloud infrastructure with an integrated modern application development environment supported with a robust partner ecosystem can meet these needs. Aligned with this requirement, Oracle offers a modern development framework aimed at simplifying application development and delivering incremental value faster.