Enabling Agile Integration in Cloud-Native Architecture

The 451 Take

To stay relevant in the digital age, enterprises must plan and execute changes to IT infrastructure and software quickly, based on business needs. The quest for adaptive infrastructure and portable applications is under way, and is driving the migration of IT strategy toward agile development techniques, DevOps practices and cloud-native applications. Cloud-native apps are built, delivered and operated differently. They make use of agile development techniques and DevOps methods, cloud services (open source, compute, storage, database, analytics, etc.), containers, microservices and APIs. They run in modern cloud architecture that supports continuous delivery, allowing IT teams to create discrete, reusable components to rapidly iterate code using repeatable automation and orchestration. Moreover, cloud-native applications are loosely coupled – code is not hard-wired to the underlying infrastructure. It makes them portable across execution venues (e.g., public clouds, managed services, on-prem and hosted private clouds), and they can scale up and down on demand.

To better understand the shift to cloud-native architecture, 451 Research conducted a Voice of the Enterprise (VotE) survey asking IT decision-makers about the prevalence of their cloud-native efforts and the importance of application portability. It revealed that cloud-native development has made its way into 75% of internally developed enterprise software, and is all or mostly prevalent in 26% of this homegrown software. It also reveals a gap: Portability is very important to 46% of respondents, but 30% were not confident in the portability of their software without significant refactoring.

Portability and Interoperability are Critical to Cloud-Native Applications

Source: 451 Research, Voice of the Enterprise: Cloud, Hosting and Managed Services, Workloads and Key Projects - Quarterly Advisory Report June 2019
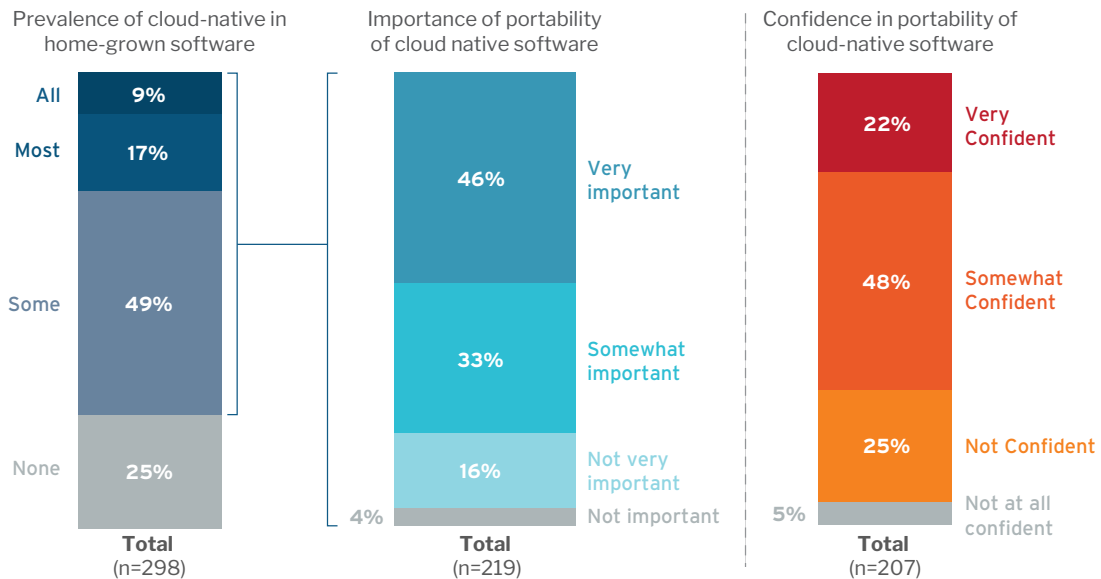
Moreover, the gap widens when the future of enterprise IT architecture is examined. In another VotE survey, which concluded that the future of enterprise IT lies in hybrid multi-cloud architecture, 38% of IT decision-makers said that multiple applications running in separate environments must 'interoperate seamlessly.' Enterprises that improve their cloud-native development capabilities to close the portability confidence gap increase the likelihood of application migration across distributed hybrid multi-clouds. Portable 'applications in motion' will challenge the need to achieve the 'seamless interoperability' (i.e., data and business process flows) when applications run in and across separate environments. This is driving a new set of technologies to enable what is now being referred to as 'agile integration.'

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Agile integration doesn't necessarily refer directly to agile software development. Rather, the traditional meaning of 'agile' is applied: *flexible, able to move quickly*. Agile development methodology attempts to improve and streamline how applications are created. DevOps uses agile techniques to accelerate application delivery. Similarly, agile integration can quickly facilitate the interoperability of distributed applications of any type. It is enabled by next-generation technology now referred to as a hybrid integration platform (HIP). A HIP is a set of tools and resources structured within a uniform framework to rapidly design, automate, deploy, monitor and run integration processes. It generally includes common integration patterns and pattern development tools, messaging, data integration and API management (APIM) capabilities. It includes a low-/no-code user experience with visual models, prepackaged templates and graphical drag-and-drop design tools to compose, rather than code, integrations. Changes can be made on the fly, making HIPs agile integration platforms in support of DevOps strategy and cloud-native development.

Among the essential capabilities within modern HIPs is APIM that, among other functions, manages the relationship between API/services and their consumers. APIs enable communications across any type of IT assets (internal and external). Within the context of cloud-native applications, they also enable data interchange between microservices. But APIM can only go so far. Other means are required for the orchestration of the many microservices that may compose cloud-native applications. This is the role of a service mesh. In general, a service mesh orchestrates the microservices that compose a cloud-native application. It complements APIM and enables the controls and communications (via APIs) needed to exchange data between microservices. It includes policy enforcement of microservice orchestration, load balancing and traffic routing to manage the flow of API calls and data between microservices, internally within the mesh and externally to other networks. Its security features can include authentication, authorization and encryption of communications. It also offers observability features such as tracing, monitoring and logging to manage the performance of service mesh deployment.

In recent years, APIM capabilities have become integral to evolving HIP architecture to control data exchange across distributed hybrid IT. We believe service mesh architecture will play an equally vital role within and alongside evolving HIPs to control microservices orchestration. Collectively, these technologies provide a common framework for the agile integration requirements of cloud-native application development and hybrid multi-cloud IT architecture.

Business Impact

ON IT ORGANIZATIONS. The accelerating pace of application modernization, cloud-native architecture and the gradual shift to microservices-based application architectures will require comprehensive orchestration capabilities to assure that the logic and processes composed across containers and microservices execute properly and reliably.

ON DEVELOPERS. The concept of agile integration embodied in a HIP is one that abstracts away complexity and makes underlying IT infrastructure invisible to developers – allowing them to concentrate on the logic and interoperability of applications, devices and things in hybrid IT.

ON THE ENTERPRISE. Agile integration is not a subset of infrastructure – it's a conceptual approach to infrastructure that incorporates data and applications with hardware and platforms to make entire systems more adaptable. By aligning integration technologies with agile and DevOps techniques, it's possible to create a platform that enables enterprises to change as quickly as the market demands.

Looking Ahead

Cloud-native application development currently resides deep within many IT organizations, in a realm where only the technologically sophisticated can enter. Going forward this will not do. The technology needs to be demystified. Simple concepts like agile integration enabled by low-/no-code HIPs that conceal the complexity of cloud-native and service mesh technology can help bring this about. Looking ahead, all the capabilities born of the modern technology used in the hybrid multi-cloud-native era must be exposed to business teams to ascertain how business processes and decision-making can be streamlined, improved and accelerated. This will be the role of next-generation business process application development technologies enabled by an emerging class of digital automation platforms.

Application portability and interoperability is a key driver for adopting cloud-native architecture. Red Hat proposes an agile integration approach which is based on key capabilities such as distributed integration, containers and APIs. This approach enables interoperability of portable applications across hybrid deployments. This approach is enabled by a cloud-native hybrid integration platform that supports connectivity with existing applications, SaaS apps, IoT apps, microservices style apps and compatibility with emerging technologies like service mesh.