

BUILD AND MANAGE CLOUD-NATIVE APPS WITH VMWARE PIVOTAL CONTAINER SERVICE

Modernize with Microservices and Kubernetes

Fundamental changes taking place in the world are ushering in a new era of computing. The proliferation of mobile devices, the growth of cloud computing, the ubiquity of data, and the acceleration of life mean that the only change that's guaranteed is change itself. Paperless, time-pressed consumers are demanding innovative products and services, and companies are responding by striving to rapidly create software that engages their customers.

But quickly producing applications primed to accommodate shifting sentiments requires modernization. By combining container technology with the orchestration of Kubernetes and the modularity of microservices, cloud-native applications are the basis of that modernization. Using microservices and containers improves an application's time to market and delivers it in a highly modifiable, scalable state.

Developing an Application with Microservices

The digital transformation is driving a shift toward new application architectures. Developing a new application or refactoring an existing one with containers and microservices is often motivated by the following outcomes:

- Extend an application's capabilities more easily
- Add new features more quickly and easily
- Improve maintainability
- Reduce vulnerabilities
- Make it perform faster or scale better

Microservices Architecture

Microservices, coupled with containers, are increasingly becoming the architectural pattern of choice for developing a new application. The architecture breaks up the functions of an application into a set of small, discrete, decentralized, goal-oriented processes, each of which can be independently developed, tested, deployed, replaced, and scaled. For cloud-native applications, the services often take the form of databases, message queues, key-value stores, tooling, and so forth.

For the software development process, a key outcome of using microservices with containers is continuous integration and continuous deployment. A software developer can modify, test, or scale one part of the application without other developers having to rebuild and redeploy other parts of the application. Running containers on virtual machines also adds a beneficial level of isolation to applications built with microservices. You can isolate a set of services from each other and then group them inside a virtual machine.

THE BUSINESS BENEFITS OF MODERNIZATION

The use of containers, microservices, and Kubernetes modernizes application development, yielding business benefits that ultimately bolster your competitive advantage:

- Shorten software's time to market
- Improve developer agility and productivity
- Respond faster to change

THE BENEFITS OF MICROSERVICES

The set of small, discrete processes of a microservices architecture fosters the independent development and scaling of each application function. Each microservice can perform a function while sharing no state with its peers. When the application is deployed, Kubernetes manages the services, each of which can reside in its own container for scalability.

- Increase modularity
- Make app easier to develop and test
- Parallelize development: A team can develop and deploy a service independently of other teams working on other services
- Support continuous code refactoring to heighten the benefits of microservices over time
- Drive a model of continuous integration and deployment

LEARN MORE ABOUT VMWARE CLOUD-NATIVE SOLUTIONS

To learn how VMware helps customers build, run, and manage cloud-native applications, visit:
cloud.vmware.com/cloud-native-apps

Managing Cloud-Native Applications

Applications built with a microservices architecture, however, do not come without their challenges. Running the application's services in production and at scale requires coordination and the right infrastructure. Kubernetes orchestrates distributed clusters of containers to manage and automate resource utilization, failure handling, availability, configuration, scalability, and desired state.

Kubernetes brings key technical advantages to modern applications:

- Consolidate servers and reduce costs through efficient resource utilization
- Elegantly manage machine failure through self-healing and high availability
- Automate scalability
- Decouple applications and services from machines for portability and flexibility
- Easily update, extend, or redeploy services or applications without affecting other workloads

By managing a distributed cluster of containerized applications, including their microservices, Kubernetes helps fulfill the business promise of digital transformation:

- Kubernetes makes it easier and cheaper to run applications in public, private, or hybrid clouds.
- Kubernetes accelerates application development and deployment, improving time to market.
- Kubernetes increases agility, flexibility, and the ability to adapt to change.

Pivotal Container Service

VMware® Pivotal Container Service provides production-grade Kubernetes for deploying and operating cloud-native and 12-factor applications across private and public clouds. Based on the open source project Kubo, Pivotal Container Service delivers high availability, advanced security, and operational efficiency. The service includes BOSH, an open source system that unifies release engineering, deployment, and lifecycle management.

To provide a fast path to production for microservices, Pivotal Container Service establishes a unified virtualization and container infrastructure on VMware vSphere® or in a VMware software-defined data center. With VMware NSX®, this unified container architecture implements network virtualization technology to support microservices architectures and Kubernetes clusters. The result enables development teams to build, test, and deploy a cloud-native application quickly and efficiently. The application's time to market improves, and adapting to change becomes easier.

