



Pivotal Container Service Delivers Cloud-Native Solutions to the Enterprise Enhanced by VMware

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IDC's Quick Take

The announcement of the general availability of Pivotal Container Service (PKS) by VMware and Pivotal represents a milestone in the evolution of Kubernetes, a container orchestration technology, that has radically transformed application development in recent years. The general availability of PKS promises to accelerate container-native, cloud-native application development and subsequently transform and enrich practices related to software development more generally. Pivotal Container Service enables developers to provision, deploy, monitor, manage high availability of, upgrade, patch, and implement networking and enterprise-grade security for Kubernetes clusters. The platform's integrated functionality accelerates enterprise adoption of modern development practices such as microservices, cloud-native development, and DevOps while enhancing application portability and enterprise-grade security with respect to Kubernetes.

Product Announcement Highlights

Subsequent to the announcement of its initial availability in December 2017, VMware and Pivotal announced the general availability of [Pivotal Container Service](#) on February 12. Pivotal Container Service represents a commercial form of the open source project Kubo, which resulted from a collaboration between Pivotal and Google to integrate the open source project BOSH with Kubernetes.

Following the integration of BOSH and Kubernetes, VMware and Pivotal worked together to create a production-grade, commercial version of Kubo in the form of the Pivotal Container Service, which delivers high availability, automated monitoring, and health checks at the level of both clusters of containers and the physical and virtualized infrastructures on which they run. In addition to high availability and self-healing functionality for Kubernetes clusters, Pivotal Container Service gives customers the ability to rapidly provision Kubernetes clusters on demand.

Moreover, the platform supports multicloud deployments of Kubernetes clusters, with initial support for vSphere and the Google Cloud Platform. PKS also features advanced networking functionality as a result of its integration with VMware NSX-T and enterprise-grade security marked by vulnerability scanning, image verification, and identity and access management.

IDC's Point of View

The general availability of Pivotal Container Service promises to accelerate adoption of cloud-native development and DevOps while delivering multicloud application portability and enterprise-grade security as noted in the sections that follow.

Cloud-Native Development

Pivotal Container Service delivers high availability to Kubernetes clusters by means of BOSH, an open source toolchain, that monitors the health of clusters of containers and auto-remediates the restoration of clusters in cases where the optimal functioning of a cluster has been compromised. Importantly, BOSH's ability to restore the health of a Kubernetes cluster extends to the physical and virtual machines on which clusters run in addition to pods that represent groupings of discrete containers.

Whereas Kubernetes excels at managing containers, it falls short with respect to the management of containers on virtualized infrastructure. In the event that a pod constituted by a multitude of containers running on a virtual or physical machine fails, Kubernetes will be unable to restore the virtual or physical machine to enable the cluster to operate at full strength. Using BOSH, however, the Pivotal Container Service can restore a failed node in the form of a physical or virtual machine and redeploy the pods associated with the failed node.

From a developer's standpoint, Pivotal Container Service accelerates the development of container-based applications by giving developers access to a framework that empowers them to build, deploy, monitor, update, and manage production-grade, cloud-native, container-native applications. For example, the self-healing qualities of the Pivotal Container Service that operate at the level of pods and nodes mean that developers can feel confident about deploying mission-critical applications using Kubernetes clusters.

Acceleration of DevOps

Pivotal Container Service simplifies, streamlines, and automates the process of deploying and managing Kubernetes clusters by giving developers the ability to provision enterprise-grade Kubernetes clusters on demand that embody the latest stable release of Kubernetes. In addition, Pivotal Container Service gives developers native exposure to Kubernetes that empowers them to automate the deployment of Kubernetes clusters and control dependencies related to networking, security, and load-balancing policies by means of a command-line interface and APIs.

From a monitoring perspective, BOSH's support for tools such as Datadog, CloudWatch, and Prometheus provides developers with a portfolio of tools for proactively understanding the health of their applications. BOSH's integration with Pivotal Container Services gives container-native developers tools for understanding the health of their applications. BOSH's ability to proactively manage the life cycle of a container-based application enhances the development of container-based applications built using the Pivotal Container Service and provides developers with increased agility and granular insight into the performance and health of both their applications and their underlying infrastructure.

In addition to presiding over enterprise-grade high availability and healing functionality, BOSH's integration with Pivotal Container Services enables developers to deploy, patch, and upgrade a cluster with zero downtime. Moreover, BOSH manages the scaling of applications in ways that allow developers to scale up and scale down their applications with zero downtime and no disruption to the application.

Application Portability and Multicloud Support

Another important attribute of the Pivotal Container Service consists of its ability to deploy container-based applications to more than one public cloud. While the initial release of Pivotal Container Service supports vSphere as well as the Google Compute Platform, the platform is expected to support AWS, Azure, and OpenStack in the future.

The ability of the Pivotal Container Service to facilitate application portability responds to concerns by contemporary developers about vendor lock-in on any one of the major public cloud platforms. Pivotal Container Service's ability to deliver an infrastructure-agnostic orchestration layer and APIs renders it an attractive framework for developers interested not only in its self-healing capabilities but also in its ability to seamlessly deploy applications to a multitude of cloud environments.

Separate from its multicloud support, the Pivotal Container Service delivers constant compatibility to the most recent release of the Google Kubernetes Engine. As such, developers can rest assured that their Pivotal Container Service application has the ability to harness the latest enhancements to Kubernetes, without the need to concern themselves with checking for Kubernetes upgrades and enhancements.

Enterprise Cloud Adoption

As cloud technologies penetrate the enterprise, containers are becoming the destination of choice for workloads while applications are broken up into microservices to gain agility in the application life cycle. Hybrid models will continue to dominate the landscape in large enterprises, especially in the financial and healthcare sectors as compliance and regulations require some solutions to stay in an on-premises model. Enterprises typically pick a trusted vendor for new technologies that can provide support needed during adoption. With VMware already playing an important role in most enterprise customers, the Pivotal Container Service running on VMware vSphere gives IT departments an opportunity to refactor their existing IT portfolio.

Security

In addition, the integration of advanced security functionality into the Pivotal Container Service means that developers can focus on ensuring the optimal design and functionality of their applications, while leaving it to PKS to manage application security through micro-segmentation, container image management, identity and access management, and vulnerability scanning. Pivotal Container Service leverages micro-segmentation methodologies to isolate clusters by means of network security protocols using its integration with VMware NSX-T. Moreover, Pivotal Container Service's integration with Project Harbor, an open source container registry, enhances its security by means of vulnerability scanning and identity management functionality.

Conclusion

Available as a virtual appliance that leverages vSphere as its IaaS infrastructure, the Pivotal Container Service helps enterprises transition to cloud-native, container-native development methodologies by providing an integrated toolset that empowers developers to provision containers, scale applications, and manage high availability, compute, storage, networking, security, patches, and upgrades.

While containers allow developers to package code and application dependencies in ways that abstract them from the infrastructure on which they run, automating high availability, security, and networking requires considerable effort and skill. The ability of Pivotal Container Service to handle "Day 2" operations such as high availability, application monitoring, and upgrades automates a slew of operational activities that simplify the management of Kubernetes clusters, thereby empowering developers to focus their efforts on writing efficacious code.

Enterprises that have struggled to embrace DevOps and containers, cloud-native development will find it easier to do so with Pivotal Container Service combined with VMware vSphere in their IT toolbox. The platform's integration of networking and security considerations into Kubernetes deployments gives enterprises much-needed support in the thorny area of cloud security. Moreover, the platform's inherent DevOps functionality stands to accelerate the education of enterprise developers in application deployment, monitoring, and life-cycle management.

That said, one area in which Pivotal Container Service could improve concerns its integration with developer tools and environments for writing code, which thus far has been absent from its scope and purview. A deeper integration of code tooling functionality with the platform has the potential to improve the design of Kubernetes applications by providing developers with enhanced development tools for understanding dependencies and relationships between containers and their constituent code. Moreover, tighter integration between development tooling infrastructures and the Pivotal Container Service would empower developers to more expeditiously debug Kubernetes applications by identifying containers that are differentially responsible for application errors or performance degradation. Combining Pivotal and VMware products with Dell Technology hardware would complete the puzzle for the enterprise need for an end-to-end cloud-native solution.

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