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SPOTLIGHT

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As organizations' Kubernetes workloads grow in scale and criticality, managing them at the application, storage, and data levels becomes crucial.

Bridging the Kubernetes Management Gap

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Introduction

Businesses face a management challenge as they containerize more of their application estate. How does an organization ensure that applications of varying criticality and resource needs maintain uptime, optimize their resource use, and run in a protected and secure manner?

IDC research found that about 80% of organizations intend to increase their container spending in the next year and that nearly two-thirds are already implementing full data protection solutions for containerized applications. Although this indicates that containers are seeing greater adoption and applications running in containers are being treated as seriously as ones in traditional environments, further research has shown that complexity, security concerns, and unexpected costs are common hurdles to container and Kubernetes adoption.

AT A GLANCE

KEY TAKEAWAYS

- Addressing Kubernetes complexity requires consolidating management of Kubernetes applications, storage, and data.
- At a large scale, Kubernetes management needs a dedicated team consisting of members of DevOps and ITOps.
- Automation is the key to scalability, but it needs to be combined with visibility of the entire Kubernetes estate and staff knowledge of what policies to set.

With Criticality Comes Complexity

As organizations have containerized more of their IT infrastructure, they have finished picking the "low-hanging fruit" of workloads to containerize and moved on to ones with greater criticality and scale. Managing the deployment and orchestration of these applications alongside less critical ones adds a layer of complexity, which additional requirements at the storage and data management layer further exacerbate. The increased importance of critical applications drives a greater need for robust storage resource visibility and controls, data protection, and disaster recovery (DR).

Adding critical applications to container environments means that true Kubernetes management can't stop at the application management layer. Application, storage, and data management must work in unison, from both a tool and an IT staff standpoint. Organizations looking to address complexity and management challenges in large-scale Kubernetes deployments need solutions that integrate container application management with storage and data management.

Benefits

To handle critical applications on a large scale, a Kubernetes management solution must be able to unify application, storage, and data management. It must also be able to simplify the complexity that is inherent with scale. Here are the hallmarks of such a solution:

- **A wide range of support:** There are many opinionated Kubernetes distributions for enterprises to choose from, and not all organizations use just one. Some may use one for most of their applications and others for special projects, or they may use different distributions depending on whether they deploy their applications on premises or in the cloud. A management solution must be able to support this wide range of Kubernetes distributions, as well as on-premises, cloud-based, hybrid cloud, and multicloud deployments.
- **Built-in application availability:** Ensuring uptime is paramount for critical applications. A Kubernetes management solution must have methods to address node failure, such as health monitoring, alerting, and automatic failover to healthy nodes. There must also be a control plane to allow administrators to fine-tune remediation, including thresholds on when to automatically attempt remediation or whether to attempt to restart nodes rather than failover immediately.
- **Multicluster visibility and monitoring:** As a Kubernetes environment grows in scale, it is critical for a management solution to keep track of its entire estate. An organization could have applications running on premises, on multiple clouds, and on different Kubernetes clusters, with a single platform to manage it all.
- **Integration between container orchestration and container storage and data management:** Container orchestration tools focus on the life cycle of containerized applications, while container storage and data management tools focus on the back-end support necessary for the applications to run. Although they are separate tools for separate tasks, they must work in tandem to ensure applications are resilient against failure, optimize their resource consumption, and run in a secure and protected manner.
- **Automation:** The key to reducing complexity and addressing scale is automating as much as possible. This includes setting and properly applying policies for storage provisioning and tiering to ensure applications receive the right resources for their needs, backup and DR policies based on applications' criticality, and security and access control policies to prevent unauthorized access and ensure compliance.

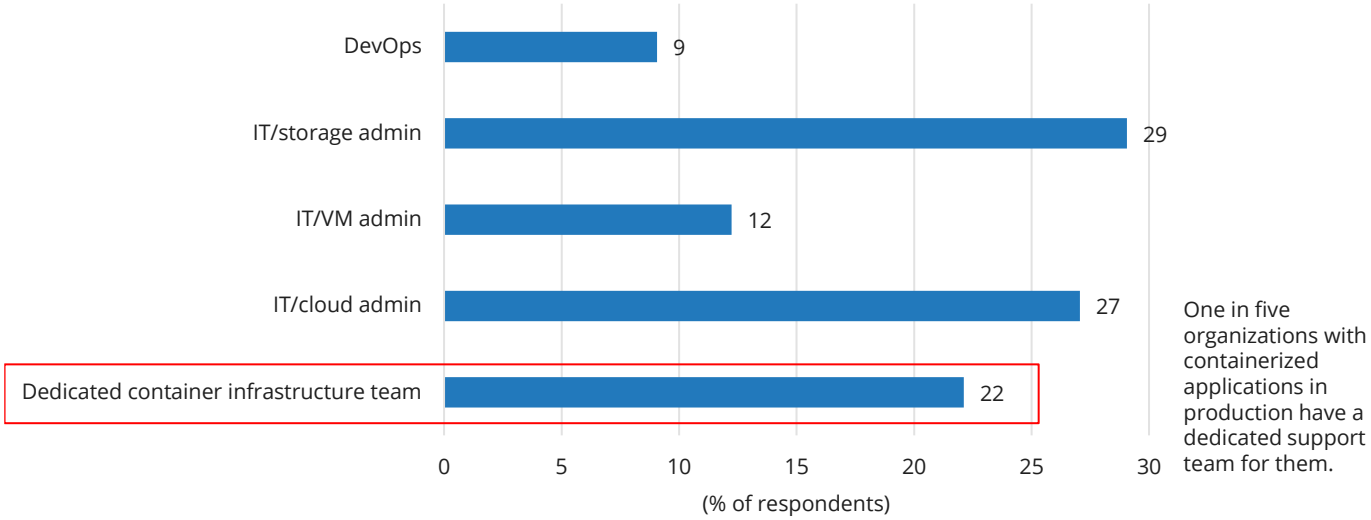
Trends

IDC research found that only 22% of organizations have a dedicated team for container infrastructure management (see Figure 1). Similar to how tools that manage the life cycle and deployment for containerized applications must work with those that manage storage and data, organizations need DevOps and ITOps to work closely together. While this will rely on culture and training, an integrated Kubernetes management solution can go a long way toward unifying the two IT disciplines.

FIGURE 1: ***Most Organizations Lean on IT for Container Infrastructure Management***

Container back-end support is widely regarded as an IT responsibility.

Q *Who is primarily responsible for providing back-end storage management functions and infrastructure support (e.g., storage provisioning, data protection, security) for your containerized applications?*



n = 850

Base = respondents with containerized applications running in production

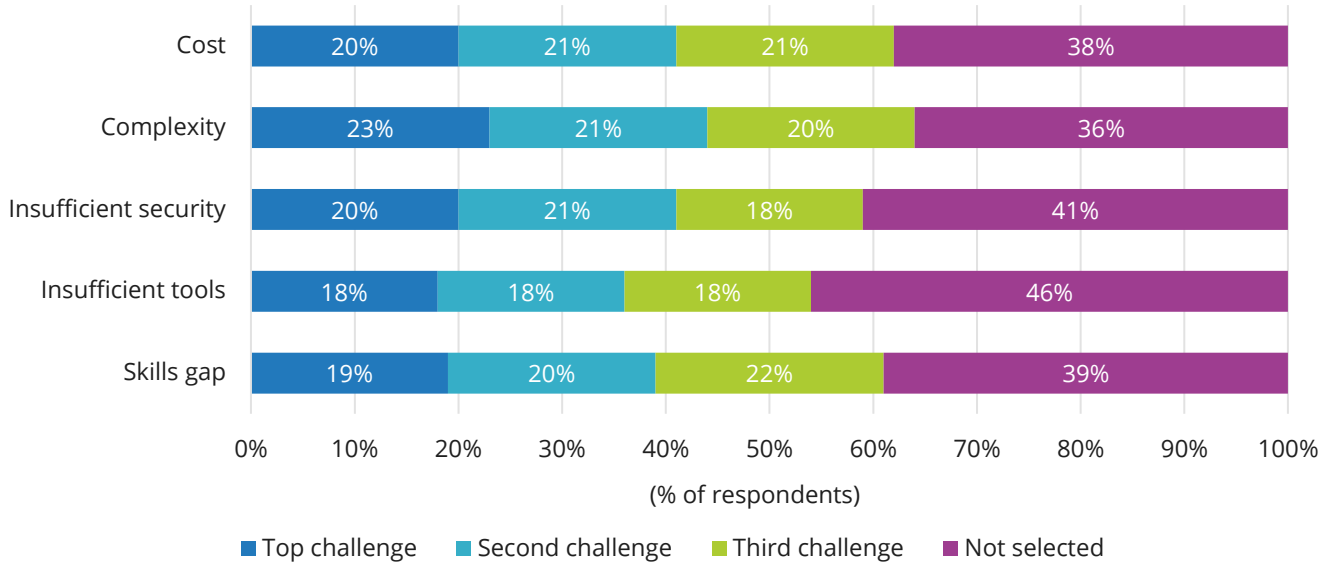
Source: IDC's Enterprise Infrastructure Pulse Survey, 3Q24, November 2024

IDC research found cost and complexity to be the top 2 challenges of deploying and maintaining container infrastructure, with the latter being the top challenge for 23% of organizations (see Figure 2). A Kubernetes management solution that solves this latter challenge also addresses the former. By reducing the complexity of Kubernetes management, organizations can optimize resource use and streamline future application deployment, ensuring a scaling environment that doesn't translate into unexpected cost burdens.

FIGURE 2: ***Organizations' Difficulties with Container Infrastructure***

Cost and complexity are major hurdles to adopting container infrastructure.

Q *What are the top 3 challenges of deploying and maintaining container infrastructure?*



n = 850

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Source: IDC's Enterprise Infrastructure Pulse Survey, 3Q24, November 2024

Considering SUSE and Portworx

Pairing SUSE Rancher Prime with Portworx by Pure Storage addresses many of the challenges of the Kubernetes management gap.

SUSE Rancher Prime is a Kubernetes management platform that supports all CNCF-certified K8s distributions, including EKS, AKS, and GKE. It is a commercial product that builds upon its open source community counterpart, SUSE Rancher, by adding enterprise features such as a library of integrations with open source cloud-native applications, built-in security features, observability, and support services. SUSE Rancher Prime also includes SUSE Observability, which enables full visibility of the cloud-native estate. This allows customers to gain insights, get early alerts to potential problems, and perform rapid remediation.

As a multicluster management platform, SUSE Rancher Prime identifies issues with nodes and can move workloads between nodes as needed. Its Application Collection, a portfolio of trusted, verified, and cloud-native applications, includes load-balancing applications to enable enterprises to build out SUSE Rancher Prime's management capabilities as needed. Multiple layers of security features, such as vulnerability scanning during application build, test, and deployment; network rules enforcement; and risk assessment and reports, help ensure the CI/CD pipeline is secure and compliant.

Portworx is a Kubernetes storage and data management platform. It consists of storage, backup, and DR components that work together to deliver persistent storage to stateful Kubernetes applications while protecting the applications' data and ensuring data availability. In short, the Portworx platform contains tools for organizations to manage the back-end infrastructure necessary for containerized applications to run.

Portworx storage capabilities allow organizations to provision storage for their Kubernetes applications and fine-tune I/O paths to optimize performance or prevent interference from competing applications. Kubernetes storage can be dynamically resized, allowing organizations to scale or balance as needed. Rules can be set to automate this, lowering the management burden. Portworx also has its own set of built-in security features, such as volume encryption and role-based access control, to protect storage operations.

For data protection, Portworx provides container-level and application-aware backups to restore from. The backups are managed from a centralized plane that gives administrators a full view of all data under the platform's protection, enabling them to set and apply backup policies on a wide scale. For availability, Portworx DR provides both synchronous and asynchronous replication to address various RPO requirements and can recover on-premises, cloud-based, or hybrid cloud applications.

Through the integration between SUSE Rancher Prime and Portworx, Portworx cluster information is visible in SUSE Rancher Prime's user interface, providing administrators with a consolidated view. With SUSE Rancher Prime managing application deployment and Portworx managing storage and data, the two combine to form a robust solution for unifying and simplifying Kubernetes management.

Challenges

Although container adoption is growing and more organizations are running containerized applications in production, the market is still nascent, and general container knowledge and maturity levels are low. A joint SUSE and Portworx solution is ideal for organizations that are high on the maturity curve, but customers with a shallower understanding of running Kubernetes in the enterprise will struggle to take full advantage of the solution. This problem will solve itself over time as containers see wider adoption.

Another difficult hurdle in the market is the separation of DevOps and ITOps in Kubernetes management. Organizations have historically taken the logical approach of putting application management in the hands of developers and the management of underlying infrastructure in the hands of IT administrators; however, the best practice is to have a dedicated team comprising both developers and IT administrators. IDC found that only 22% of organizations do this. Although no management tool can address this challenge directly, a unified Kubernetes management solution could help organizations take the first step.

Conclusion

As organizations continue along their container and Kubernetes journeys, their challenges shift from building and deploying to maintaining and managing. The scale and criticality of workloads have increased compared with the earlier stages of Kubernetes' adoption, and organizations need tools that can simplify an increasingly complex environment.

It's important that Kubernetes management looks at both the development and administrative sides of Kubernetes applications and has ways to streamline the management of each. SUSE Rancher Prime and Portworx address these two sides, respectively, and their joint solution represents a comprehensive approach to overcoming the management hurdles of deploying large-scale, critical applications in Kubernetes.

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About the Analyst

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Johnny Yu is research manager within IDC's Worldwide Infrastructure Research organization and part of the Infrastructure Software Platforms practice. His coverage includes storage software, data replication, protection and archiving software, storage device management, and container data management. Johnny focuses on cost optimization, storage and data security, and service quality as companies bridge their infrastructure between on premises and cloud.

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