

WHITE PAPER

IBM Fusion

Hyperconverged Infrastructure Pre-integrated With Red Hat OpenShift

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Introduction

Application modernization initiatives have become increasingly prominent across the modern business landscape, and organizations have needed to modernize their infrastructures accordingly. Take container adoption, for example, which continues to rise, driven by the positive contributions that containers make to the speed, agility, and quality of application development.

The motivation to adopt container-based workloads is often driven by the portability benefits of containers as well. Achieving container portability requires a way to support hybrid IT (i.e., workloads running on and off premises, often in a multi-cloud infrastructure). In other words, organizations need to modernize their entire infrastructures—not only to support the needs of Kubernetes container-based and virtualized workloads, but also to create a consistent management experience across all locations.

[Red Hat OpenShift on IBM Cloud](#) is a leading Kubernetes-based application platform that is designed to deliver that level of consistent application experience across hybrid and multi-cloud environments. It offers:

- A single, coherent hybrid-cloud platform designed to enable businesses to build, deploy, run, manage, automate, and protect their modernized application environments.
- A set of tested and validated open source services that can help organizations develop and modernize their applications as part of a longer-term IT transformation strategy.

IBM also now offers [IBM Fusion HCI](#), which is a hyperconverged infrastructure solution pre-integrated with Red Hat OpenShift on bare-metal hardware with IBM storage to simplify and accelerate the deployment, management, and maintenance of these environments even further.

Container-based Applications Are Mainstream

Research by TechTarget's Enterprise Strategy Group provides context and insight into the state of container-based application environments today, showing that 67% of surveyed organizations are now using containers for production applications.¹

A separate Enterprise Strategy Group (ESG) study of IT, DevOps, and AppDev professionals who evaluate, purchase, manage, and build application infrastructures found that 87% of them regard application portability as very important or even critical to their organizations. Portability is a must. Container-based application environments are often distributed across locations. ESG found that 53% of the respondents deploy them either on premises or across a mix of on-premises sites and public cloud infrastructures.²

However, building, deploying, and managing applications to operate in the cloud (i.e., establishing a cloud-native environment) comes with challenges. The challenges are typically tied to ensuring security, reining in the cost of operations and the infrastructure, improving control, and incorporating automation (see Figure 1).³ Data storage management and protection is a particularly significant challenge as well.

In addition, 77% of the respondents report that they are hosting 11 or more containers per host, which introduces additional complexity in the form of container sprawl and complicates management efforts if the environment does

¹ Source: Enterprise Strategy Group Complete Survey Results, [Distributed Cloud Series: The State of Infrastructure Modernization Across the Distributed Cloud](#), August 2023.

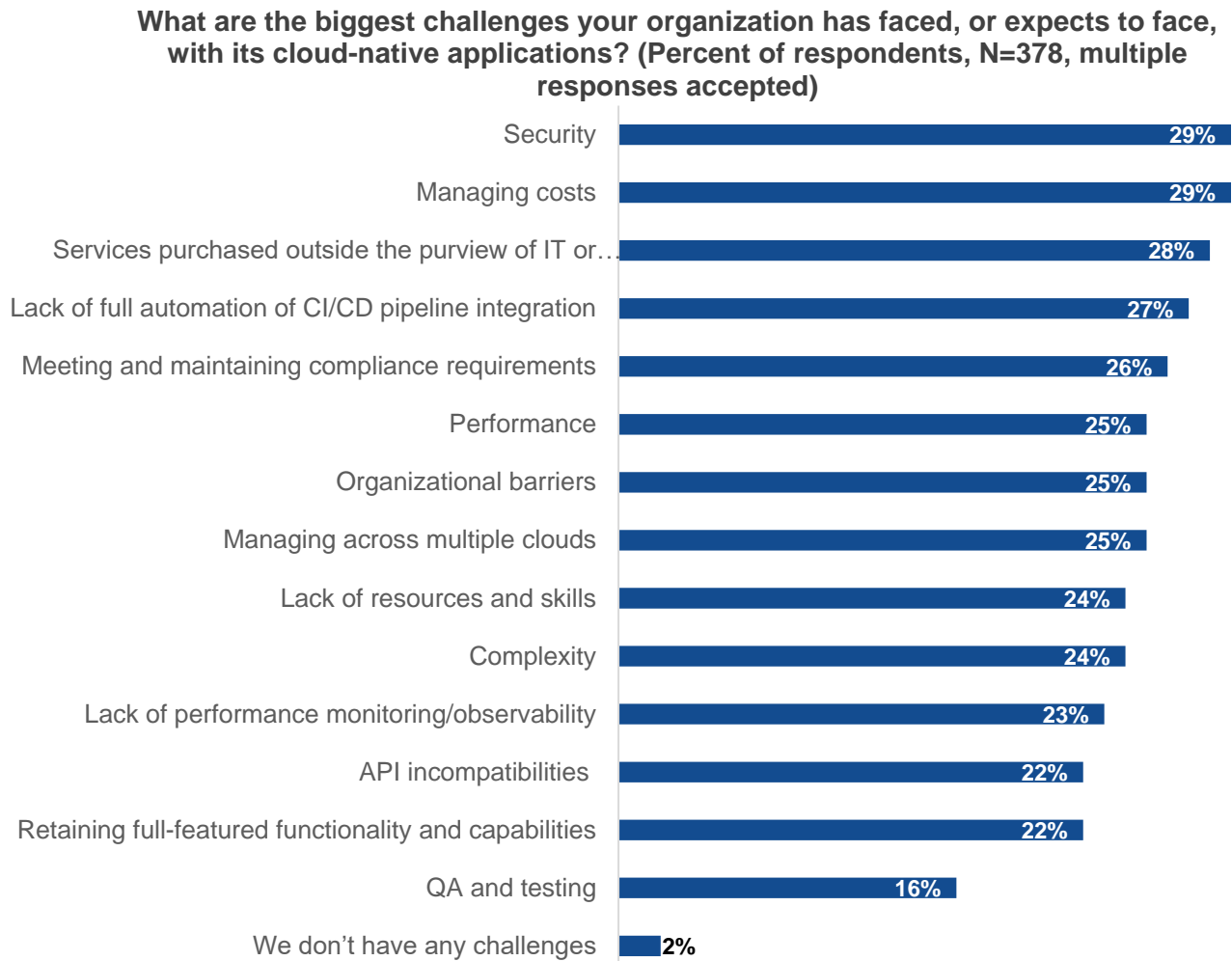
² Source: Enterprise Strategy Group Complete Survey Results, [Distributed Cloud Series: The Mainstreaming of Cloud-native Apps and Methodologies](#), May 2023.

³ Ibid.

not have the proper tools and resources for operational oversight.⁴ In fact, 82% of respondents say that they struggle to properly size workloads to achieve the optimal on- and off-premises infrastructure environment.⁵

These organizations face a real need for a simple, secure, scalable, automated, and enterprise-grade solution that will enable them to address their infrastructure modernization goals as effectively as possible.

Figure 1. Top Reported Challenges With Cloud-native Application Environments



Source: Enterprise Strategy Group, a division of TechTarget, Inc.

IBM Fusion HCI Simplifies and Accelerates App Modernization

IBM Fusion is a validated, consolidated container application platform that integrates Red Hat OpenShift technology. It is available as a hyperconverged infrastructure system and as software that can be deployed on public cloud services. In this architecture, Red Hat OpenShift is deployed on bare metal and does not require additional VMware or other hypervisor licenses.

This container platform draws upon the capabilities of IBM Storage technology, specifically by providing Red Hat OpenShift Kubernetes Engine orchestration and cluster services that include:

⁴ Ibid.

⁵ Source: Enterprise Strategy Group Research Report, [Multi-cloud Application Deployment and Delivery Decision Making](#), June 2023.

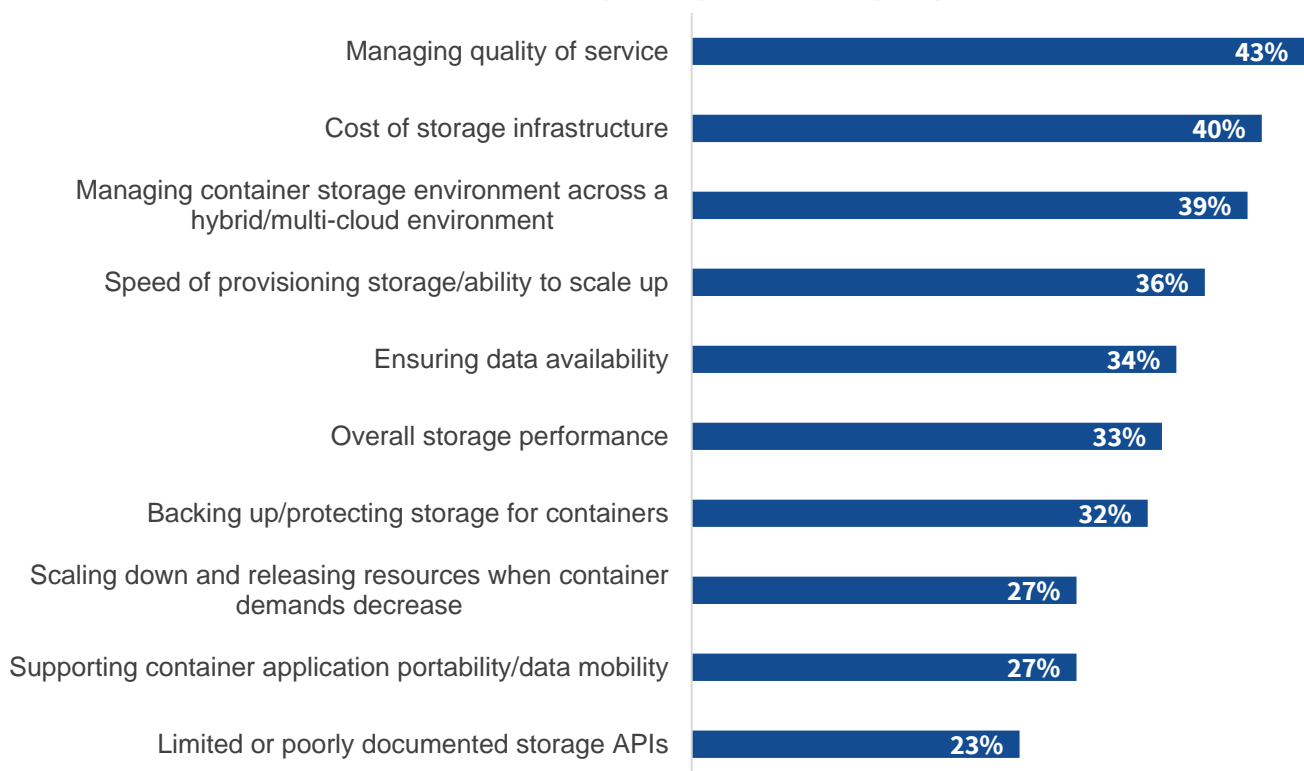
- Platform and developer services with tools including Serverless, Service Mesh, and Pipelines, along with features for distributed tracing, log management, and cost management.
- Application services for API management and process automation.
- Data services for better support of databases, data ingest tasks, and AI/ML workloads, including specific optimized support for the [IBM watsonx™ AI and data platform](#).

Added innovations from IBM further simplify managing and protecting these Kubernetes environments via the following integrated, enterprise-level data services:

- Data persistence with integrated automation to simplify and accelerate provisioning.
- Persistent storage for container-based environments, addressing a common IT challenge (see Figure 2).⁶
- Application and data resilience features to provide enterprise-level availability.
- Automated, policy-based data protection.
- Data security features for encryption and recovery.
- Data mobility features to simplify data movement across hybrid and multi-cloud environments.
- Support of public cloud, private cloud, on-premises, off-premises, and edge deployments.
- Data cataloging features to help simplify data access by data science teams for analytics and AI workloads.

Figure 2. Top Challenges Organizations Face With Persistent Storage for Containers

In general, what would you say are your organization’s biggest challenges with persistent storage for its container-based environment? (Percent of respondents, N=288, multiple responses accepted)



Source: Enterprise Strategy Group, a division of TechTarget, Inc.

⁶ Source: Enterprise Strategy Group Complete Survey Results, [2021 Data Infrastructure Trends](#), September 2021.

How IBM Fusion Modernizes Infrastructures to Simplify Container Design, Deployment, and Operations

The objective of most IT and developer operations is to empower the rest of the business. To achieve a meaningful competitive advantage, those teams must move quickly. Enterprise Strategy Group (ESG) has found that, over the last three years, 91% of the organizations it surveyed have needed to accelerate their IT operations.⁷ Specifically:

- 36% are increasing their investments in cloud-native architectures (e.g., containers).
- 32% are modernizing their on-premises infrastructures to consolidate and simplify operations.

IBM Fusion can deliver many benefits to IT operations, developers, platform engineers, data scientists, and the business as a whole in those areas. Here's a more detailed look at some of the benefits.

Operational Acceleration by Reducing the Complexity and Cost of Application Modernization Through Integrated, Validated Technology

IBM and its independent subsidiary Red Hat have designed a consolidated Kubernetes orchestration and automation platform, complete with developer tools and enterprise-level data services. It is a software solution that is deployable anywhere—on premises as software, on premises as an HCI solution, in the cloud, or at the edge. The solution is pre-validated and pre-integrated, which significantly reduces the burden on IT and accelerates deployment projects.

That aspect of the solution is important because complexity hinders operations. Consider that 64% of survey respondents report that the complexity of their IT infrastructure is slowing their IT operations and digital initiatives.⁸ The diversity and breadth of new technologies that organizations must now maintain not only slow operations, but also increase costs and hamper the business's ability to stay competitive.

IBM and Red Hat have applied tremendous levels of innovation to offload much of the integration, testing, deployment, and configuration work from internal teams while reducing risk and time associated with infrastructure modernization and scaling.

The Architecture Facilitates Fast Scalability by Supporting as Many Kubernetes Clusters as Are Needed

For more clusters, organizations can create a larger number of smaller clusters. This approach is great for multiple environments: development, pre-production, and production alike. It is true agile, granular scalability—IT simply spins up clusters as needed, knowing the architecture will be able to support them all.

Reduced Cost, Risk, and Complexity of Application and Data Movement Across Hybrid Cloud Environments With Consistent Technology Everywhere

The deployment flexibility of IBM Fusion also means that the same technology and experience can be deployed across a hybrid, multi-cloud environment. Such consistency is essential to reduce the cost and complexity of movement and to support the portability associated with containers. Among respondents to an ESG survey, 86% stated that they regularly migrate applications and/or data from on-premises locations to the public cloud. And 81% reported facing challenges with application and data portability across data center, public cloud, and edge locations.⁹

⁷ Source: Enterprise Strategy Group Complete Survey Results, [Distributed Cloud Series: The State of Infrastructure Modernization Across the Distributed Cloud](#), August 2023.

⁸ Source: Enterprise Strategy Group Complete Survey Results, [2021 Data Infrastructure Trends](#), September 2021.

⁹ Source: Enterprise Strategy Group Complete Survey Results, [Distributed Cloud Series: The State of Infrastructure Modernization Across the Distributed Cloud](#), August 2023.

Data movement is a challenging yet pervasive practice within digital enterprises. The adoption of containers is fueled largely by a desire to optimize the portability of applications. IBM Fusion makes such movements much easier, safer, and faster.

Enterprise Data Services That Enhance the Protection, Security, and Usage of Data

IBM offers enterprise-level data storage and services as part of the IBM Fusion platform. The storage foundation is [IBM Storage Scale](#), a proven parallel file and object storage system that offers superior performance and scalability.

As part of the overall solution, the IBM Storage technology offers data persistence and resilience for business-critical production container-based applications, with integrated recovery features. It also provides integrated data security features including encryption.

No Impediments to Application Development or Innovation

Several benefits extend to the areas of application development, DevOps, and platform engineering. The consistent end-to-end management and observability features of this solution enable organizations to apply operational policies across on-premises and cloud infrastructures tied to improved security, configuration, compliance, and governance of Kubernetes clusters. The solution also comes with comprehensive tools for cloud-native application developers and production IT teams to build, deploy, run, and safeguard applications and data.

Optimized Infrastructure for IBM watsonx

IBM Fusion HCI offers an appliance-like experience for the watsonx AI and data platform (comprising three components: watsonx.data, watsonx.ai, and watsonx.governance), with simple, integrated, validated deployment capabilities and an option to deploy with pre-configured, integrated GPUs. IBM Fusion data cataloging services further enhance data science support by better identifying and preparing data to support training operations, providing an automated, effective way to accelerate time to value for AI and GenAI projects.

Conclusion

This solution is still relatively new, but it is gaining traction fast as more developers, IT leaders, and, especially, platform engineers learn of it. To build and quickly roll out interesting, lucrative applications that will help their companies thrive, platform engineers and other specialists will need this product's capabilities: performance, sustainable economics, container-related flexibility/portability, hybrid-cloud consistency, and more.

It is a technology that can empower platform engineering at many organizations. And that empowerment is crucial in an age of emerging workloads, including AI-based workloads. For example, it will be possible to use the product to install an appliance hosting an on-prem AI solution in a way that allows proof-of-concept testing to begin in less than a week.

That kind of efficiency is vital to any IT organization that is trying to refactor its environment to support next-generation workloads and applications. Modernization can be a daunting task. It's best to find ways to short-circuit as much complexity as possible. Ideally, that effort will unfold in a manner that mitigates risk, accelerates time to value, and enables delivery of new services more repeatably—by leveraging a pre-engineered, validated solution such as IBM Fusion.

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