

Delivering Business Value through Transitioning from Managing VMs to Orchestrating Containers

Understanding the key business value outcomes
from selecting the appropriate container
management platform

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Summary

Catalyst

The growth in cloud-native, or microservices-based, applications is synonymous with the use of containers. However, containers as a technology introduce some specific challenges for CIOs, not least of which is the lack of skills when it comes to the management of large-scale container environments. This report aims to explain what key business benefits can be delivered by selecting a container management approach that addresses these management challenges.

Ovum view

The shift from a predominantly VM-based world to a more mixed cloud-native and VM-based world is the new reality. Over the next five years, the dominance of VMs will be eroded as more workloads are developed and deployed in a container-based environment. While Ovum does not believe that all workloads will become container based, we expect it to represent a significant proportion of workloads by 2023. However, this shift requires an equally big cultural and skills shift, and this is one of the resistant forces holding back faster adoption of containers – the other resistant force being the difficulty in modernizing legacy systems. The developer community has been quick to see the potential of containers and has embraced the technology, while the same is not true for operations, security, and data protection teams, which are struggling to see where operational value can be delivered.

Operational management of a container-based environment is fundamentally different from that currently deployed for a VM environment, and this means that not only do roles and responsibilities need to change but tools and the wider ecosystem need to evolve into more of a DevOps approach to support it. The transition to the new structures and work practices required will take time to become ingrained in organizational culture, but platforms that can help with the management of container-based environments will accelerate this migration. Ovum expects these platform approaches to proliferate over the next few years and to increasingly become more comprehensive in terms of the capabilities offered. The OpenStack User Survey in 2017 found that nearly half of respondents, 47%, were using Kubernetes; this was an increase of 2% from the previous year. The second-most popular tool for management was build it yourself; this demonstrates that the market is coalescing around Kubernetes as the standard approach to container orchestration.

Key messages

- Increasing the development velocity leads to increased organizational revenue.
- Using a container management platform reduces the operational expense of supporting large-scale dynamic cloud-native environments.
- Delivering service excellence while maintaining the agility and flexibility demanded from a continuous delivery process requires a new approach to management.

Survey

Ovum conducted primary research by performing a detailed survey of a number of IBM Cloud Private customers in the mid-market as well as interviewing a selection of non-IBM customers. Ovum used this information combined with its own data to demonstrate where using a cloud management platform adds value to an organization. The three key areas the survey focused on were

- the increased productivity of the application development process
- the increased operation efficiency that using a platform approach yields
- the resulting impact on service quality, costs, and business confidence.

The respondents in the survey were all leading companies in the use of cloud-native development, with all having more than 30% of their workloads as cloud native.

Market context

The traditional data center is a complex environment to manage, as it typically consists of multiple different technologies, but because of the time it takes to add new services, its cost are well known. IaaS, in comparison, has a more variable cost, as the environments can be created and used within a short time, but it still involves a level of management complexity in dealing with different environment types and resources. PaaS is "easier," as much of the underlying infrastructure and connective tissue is abstracted away, but often these environments are designed only for very specific application types and components. Also, the costs in PaaS are more predictable because of the approach to licensing and usage. The rise of containers will require a PaaS-like approach, because containers can be more volatile (they are started and stopped more often) than VMs currently are, which can lead to more variable costs. Organizations looking to deploy container technology based on the ability to be agile and move the workload to wherever it is best run will need platforms that can deal with the complexity of technology, cost, and people. The business value from these container management platforms will lie in the ability to manage the services being delivered at a more granular level in terms of performance, availability, scale, and cost and to manage the service levels independently from the infrastructure.

Key capabilities of a container management platform

The important elements of any container management platform differ significantly from those of a traditional VM management solution. Customers are looking to build high-scale services consisting of microservices, and this differs from a traditional VM management solution, since container management is application based rather than machine based as with VMs. Container platforms take into account that environments are distributed and applications move and are ephemeral, unlike infrastructure, which is more static and long lived. Ovum considers the following seven capabilities are key to any container management platform:

- **Security.** The security challenges in a container environment are different from those experienced in a VM environment, and any platform must deal with the specific threats containers represent as well as more traditional threats.

- **Ease of use.** One of the main reasons why container management platforms are popular is a skills shortage, which makes it necessary for existing IT staff to be able to manage containers with as much familiarity as possible.
- **Network management.** As with security, network challenges differ in a container-based environment; therefore any platform must support the container-native network management approaches and technologies.
- **Resource and service management.** Managing the container is similar to managing a VM but managing only the workload inside the VM, separately from the VM itself. However, in a container-based environment, the containers are more portable and significantly greater in number. Therefore, resource and service management must operate at the very granular resource level, the core infrastructure level (Kubernetes elements such as pods, worker, and master nodes), and the service level (the combination of many different containers).
- **Automation.** Managing any container deployment at scale requires that the underlying nodes are managed correctly and these nodes remain up to date with current patch levels. Automation plays a big role in simplifying the management tasks, whether the system is customer managed or being delivered as a managed service. This is key to being able to operationally support containers at scale.
- **Flexibility.** The big challenge is for organizations to be able to manage the new containerized deployments as well as existing environments and to do this irrespective of where the containers are executing, whether on-premises or in a cloud.
- **Standardization and interoperability.** The containers market is a nascent market and as such has a number of competing technology standards. The key element is that any platform can manage the most popular, currently OCI-compliant containers such as Docker and Kubernetes orchestration engine.

Introducing IBM Cloud Private ecosystem as a single platform designed to accelerate cloud adoption

IBM has added more tools to its offerings that enable an organization to start its journey to the cloud and to meet the challenges that migrating to a cloud environment brings to the management and orchestration tasks. IBM Cloud Private (the current release is 3.1.1, with 3.1.2 due for release in February) is designed to help enterprise customers adopt cloud computing faster by making the workload migration simpler. IBM Cloud Private is a platform that uses Kubernetes and is designed so that containerized applications can be developed on-premises and deployed in any environment that supports containers. The move to the cloud, and in particular the use of cloud-native applications (applications written in a composable way using container technology), has a number of challenges, one of which is a lack of skills in the enterprise. With IBM Cloud Private, IBM has produced an on-premises platform approach that is not just for on-premises environments but can also be deployed on the infrastructure of choice – including public cloud IaaS (e.g., AWS, IBM, Google, Microsoft). The introduction of more AI-based tools such as advanced threat analytics (ATA), IBM Cloud Automation Manager, and IBM Cloud Private for Data will help enterprises with the process of developing in-house skills by providing a single platform for the generation and execution of cloud-native workloads.

IBM Cloud Paks is a new solution from IBM that enables organizations to easily deploy IBM software either on-premises or in the cloud. The platform brings together all the essential elements required such as thoroughly tested workload software container images, Helm charts with intelligent defaults for simplified configuration and management, and additional assets – such as prebuilt monitoring dashboards – for integrating with the core services of IBM's container platforms, in a single archive from a trusted source.

IBM Multicloud Manager is the final piece of the jigsaw; it enables the workloads to be managed across different cloud environments, and it does this by providing a compliance management capability that delivers a consistent approach to application deployment and management. All three of these capabilities together provide customers with a comprehensive toolkit that can be used to start, accelerate, and optimize the journey to cloud computing.

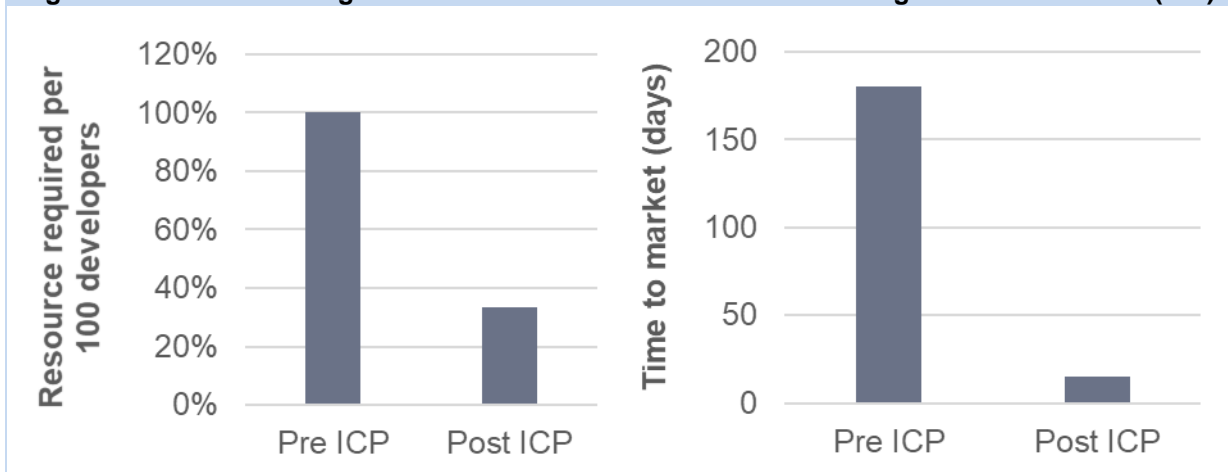
Business value from adopting IBM Cloud Private

Increasing the development velocity leads to increased organizational value through a twelvefold increase in efficiency

In the digital economy, speed to market is measured in days, not months, and being able to reduce this time to market and increase value to the business is a critical metric of success. The link between customer satisfaction and increased sales is a well-reported correlation and was the driver behind the mobile application revolution. However, for organizations, the ability to continuously apply improvements in the customer-facing applications that support the customer experience is critical to increasing revenue. The survey found that, on average, cloud-native applications increased the hit-rate tenfold compared to older legacy applications. This, according to the survey customers, can be directly attributed to business growth year on year, which in the survey was in excess of 20% across all respondents in all sectors. Detailed financial information was shared by the participants to establish the value of cloud native, but cannot be shared in the report in other than general percentage terms.

Those organizations Ovum surveyed that were using a combination of IBM Cloud Private and IBM Multicloud Manager reported a 66% saving in the computing resources required to operate a continuous delivery/continuous integration (CD/CI) pipeline. Figure 1 shows the resource requirements normalized based on resources needed per 100 developers both before and after IBM Cloud Private deployment. While this represents a significant saving, it does not immediately translate to a business saving; many development systems were sized and financed to meet current demand. However, it does mean that the same systems can support a threefold increase in CD/CI activity. When this is combined with the reported 50% saving in people resources needed to operate a CD/CI pipeline, it means the same resources and people can double throughput. The research also found that the cost of analysis is greatly reduced because of the rapid feedback from the CD/CI pipeline. The cost of testing was reduced because the increments of change are small, therefore the cost of failure was lower. These additional findings were not quantified in the survey but are provided as evidence to support the benefits from using IBM Cloud Private.

Figure 1: Resource saving and reduced time to market achieved using IBM Cloud Private (ICP)



Source Ovum

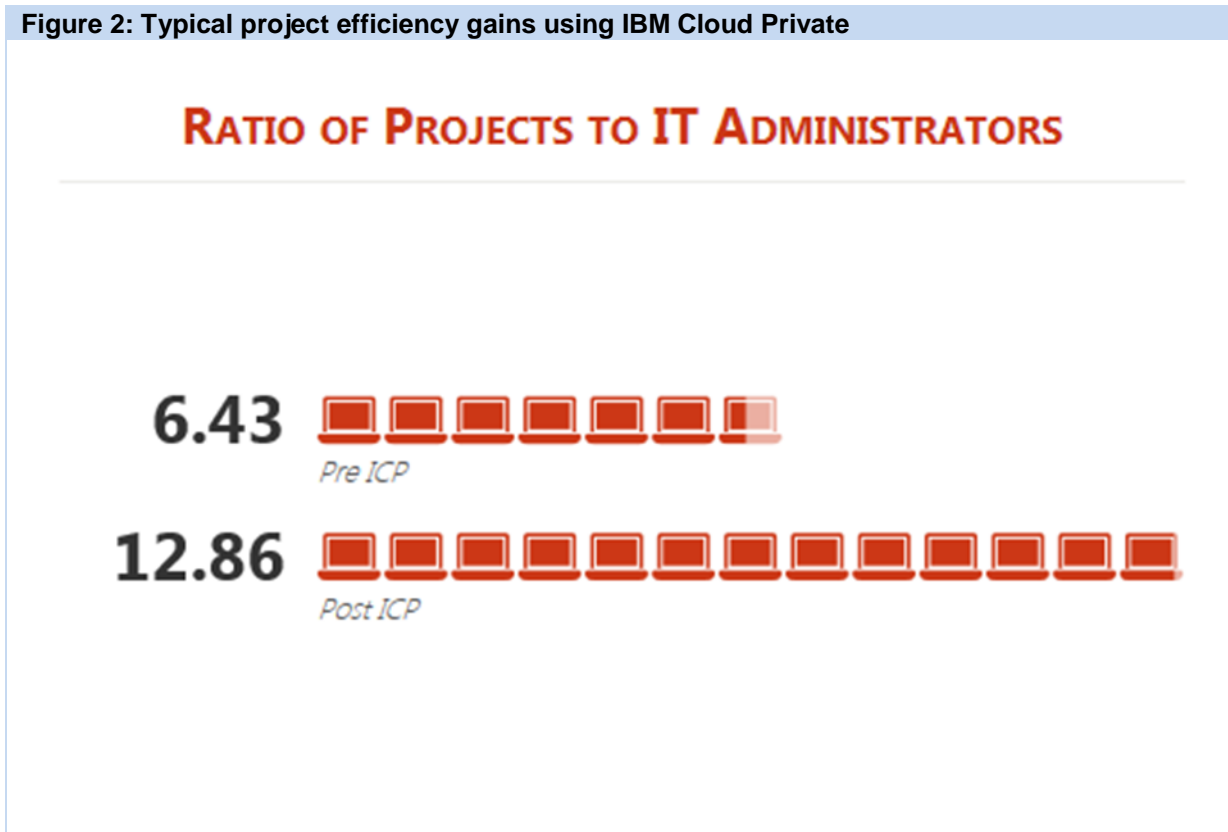
Responses from the organizations surveyed and Ovum's own data indicate that the speed to market can be reduced by as much as 84%, depending on which market is being evaluated. Figure 1 shows the reduction in time to market in the fintech sector achieved using IBM Cloud Private, which was on average a drop from 180 days to 15 days. This reduction contributed to organizations in the fintech sector being able to represent a value to the enterprise based on a twelfold increase in the number of changes deployed per year.

Reducing the operational expense of supporting large-scale dynamic cloud-native environments is a key value proposition of container management platforms

The survey discovered that, on average, organizations achieved a 75% reduction in operational overhead in managing the cloud-native environment. This operational efficiency gain comes in three main areas identified by the survey where using a container management platform approach to cloud-native management yields savings.

The first area identified as a key contributor was the number of projects IT administrators could support. The survey found that this increased on average by 60%. This increase in projects per IT operational administrator is shown in Figure 2.

Figure 2: Typical project efficiency gains using IBM Cloud Private



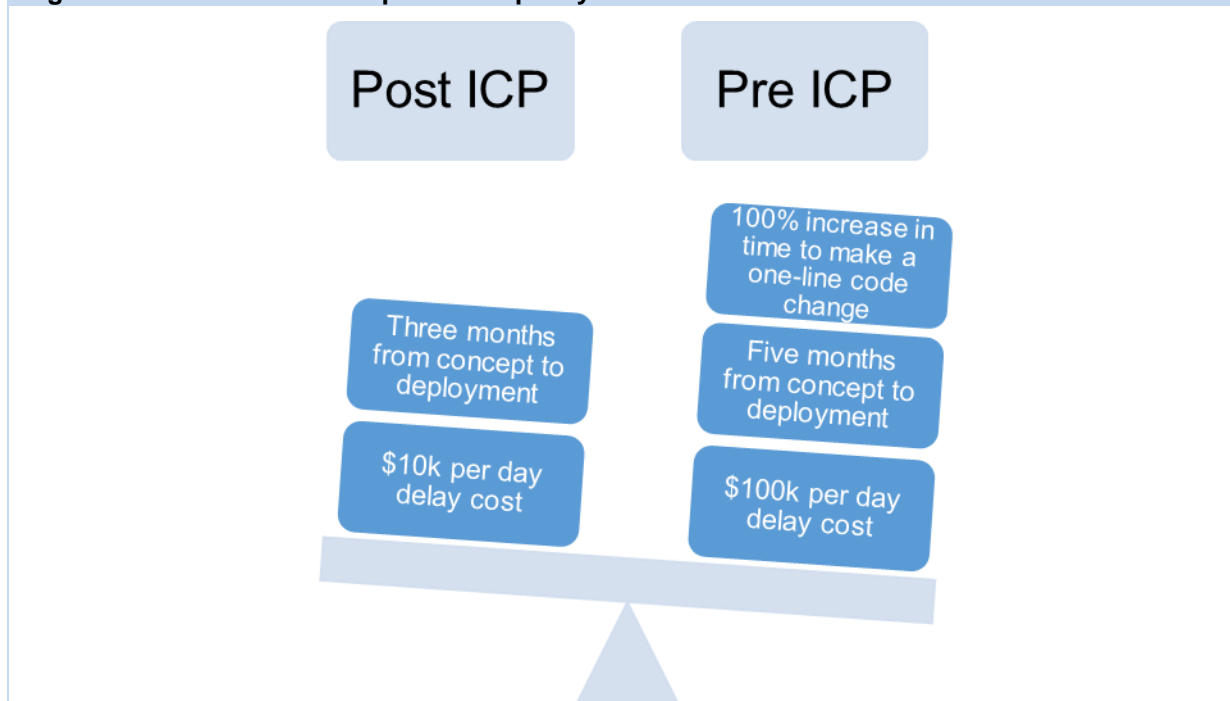
Source Ovum

Another key responsibility of the operations team is to ensure all relevant patches are applied to the different environments. The survey found that organizations spend just over one labor-hour per month per VM on applying patches, and on average this is 15 patches per month per 100 VMs. The use of IBM Cloud Private reduced this time: for a typical mid-market company, the effort per 100 VMs to maintain patch level compliance was 121 labor-hours per month before moving to a cloud-native approach. This reduced to 90 labor-hours per month per 100 VMs using IBM Cloud Private as the management platform for cloud-native development, a saving of more than 30 labor-hours per month per 100 VMs, or a 26% improvement in terms of effort required. Using a standard cost per hour for an IT administrator in the US, this for a typical mid-market company represents an annual saving of \$18,000 per 100 VMs. The other aspect of moving to a container management platform is the reduction in number of VMs needed to run the workloads. This resulted in a 75% reduction in the number of patches required per month on average. Therefore, the saving of \$18,000 per 100 VMs was based on having the same number of VMs and is just one aspect of the benefit from adopting cloud native. Cloud-native adoption was also shown to reduce the number of VMs needed, which reduces the cost of the resources needed to run them as well as reducing the cost of applying patches. Overall, the survey found that adopting IBM Cloud Private generated a 60% increase in administrator efficiency compared to the traditional approach to application development and deployment.

Delivering service excellence in a cloud-native environment is a balancing act between speed and quality

One of the biggest benefits that the survey highlighted was the impact IBM Cloud Private yielded in terms of the service desk and in improving the quality of cloud-native deployments. Respondents reported a 50% reduction in the number of calls to the service desk after IBM Cloud Private deployment. Ovum calculated that using these results, the average saving for a typical mid-market company would be approximately \$518,000 per year, which for a 3,000-employee company is equal to \$172.80 per employee per year. While this figure relates to the savings in terms of moving the current cloud-native workloads to IBM Cloud Private, the bigger cloud-native adoption benefit could be greater. In the survey, the companies reported on average that 30% of the workloads were cloud native, which is significantly higher than the global average, where 5–10% of workloads are cloud native. This discrepancy was not unexpected, as the survey was focused on companies leading in cloud-native development. The results did demonstrate that the management platform plays a significant role in obtaining the best quality-to-speed ratio. The survey found that those IBM Cloud Private customers reported that on average a 5% increase in system availability accompanied the 50% reduction in service desk calls. Ovum believes these benefits are the result of a combination of IBM Cloud Private, IBM Cloud Paks, and IBM Multicloud Manager working together to ensure the DevOps teams have the tools needed to ensure problems are identified early and resolved fast.

Figure 3: Balance between speed and quality



Source Ovum

The business benefit from using IBM Cloud Private was reported in the survey to be a 90% reduction in terms of business impact caused by the delay of introducing a change. This was a difficult metric to quantify, but from an IT perspective, the time from concept to deployment reduced from an average of five months to less than three months when using IBM Cloud Private. This figure shows the increase in the speed at which the IT department could deliver, but the businesses reported that it was in the

impact of a delay to an agreed schedule where the majority of the reduction in business impact was seen. Using the figures from the survey, customers reported that on average the cost per day of a delay was \$100,000 (this figure is across all verticals in the mid-market customers surveyed) before IBM Cloud Private, and this was reduced to \$10,000 when using IBM Cloud Private.

Appendix

Methodology

Ovum developed an in-depth questionnaire that was completed by IBM customers and returned directly to Ovum. This data was combined with interviews conducted with a sample of other end-user organizations and Ovum data to establish a broad TCO of adopting cloud-native developments. The report was peer-reviewed by Ovum analysts in different teams.

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