Leveraging Containers and Kubernetes in 2022

Challenges and solutions in real-world IT environments

DELLTechnologies

vmware®

Application containerization—packaging software to create a lightweight, portable, consistent executable—delivers technical and business advantages over conventional delivery methods. Containerized apps are quickly deployable for easy scaling, run in diverse environments, and offer security advantages thanks to their isolation from other software. In combination with orchestration software such as Kubernetes, containers can also be centrally dispatched, managed and scaled for IT agility.

Over 50% of applications are containerized on average

In September 2021, Aberdeen Strategy and Research (ASR) surveyed hundreds of IT decision makers with experience in choosing or deploying containers. Our goal was simple: to better understand how and why containers and Kubernetes are being deployed at mid-size as well as larger enterprises, assess container-related performance advantages, and uncover challenges associated with Kubernetes and container environments.

	Current use case	Potential future use case	No plans to implement this use case
Application development	70%	23%	9%
Application testing	63%	31%	6%
Server consolidation	52%	38%	9%
Batch jobs	52%	36%	11%
Multicloud compatibility	52%	39%	9%
Continuous Integration	50%	41%	9%
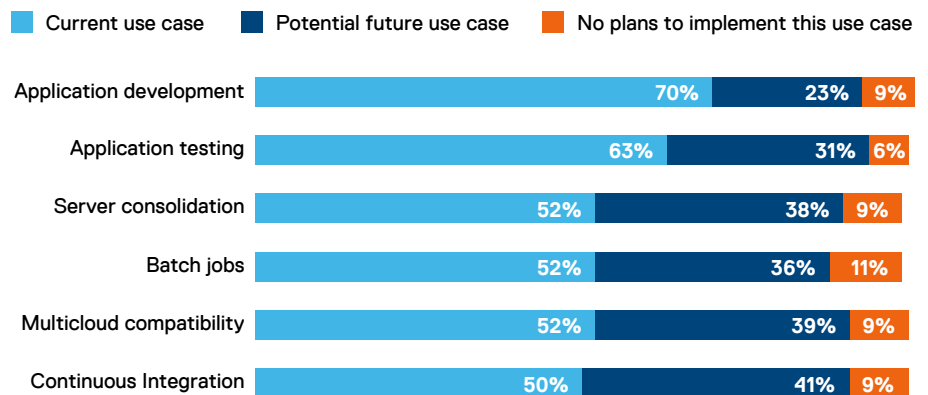
ASR also delved into the factors that keep containers from being even more widely adopted, examining the reasons given by the small number of organizations that have not yet embraced them. In some cases, IT decision makers are understandably reluctant to disrupt a currently satisfactory IT environment—a case of "If it's not broke, don't fix it."

However, respondents also named challenges that prevent them from gaining the advantages of containers they would otherwise like. The most commonly named obstacle: Enabling technology that is too complex to justify the advantages of containers. Other reasons include uncertainty about security capabilities, lack of internal know-how, and fear of high costs.

Luckily, there are turn-key solutions to make containers easy, efficient and affordable to deploy.

Why containers?

Personnel, time, security, and complexity are all constraints on application development and deployment. The organizations represented in our survey have an average developer workforce of 111, and 56% rely on extensive in-house development. Fully 80% have at least some development in-house.

Even for organizations that do little more than tie together existing applications with lightweight scripts, or use off-the-shelf applications, containerization offers logistical benefits. By their nature, containers give IT administrators discrete, functional units that they can deploy as needed and update independently, and in whatever part of their IT environment is best suited to host them. A containerized application can run in a local data center, on a virtual machine, in the public cloud, or elsewhere. Its portability means administrators can take advantage of the most economical platform that meets the needs of the particular application.

Of the advantages that respondents see in containerized applications, however, security and privacy concerns stand out as the biggest drivers, with **46%** naming them as factors.

The technical and logistics benefits are still important factors, though, with 34% of respondents citing faster development time as a containerization driver. Nearly as many called out related time-to-market demands (31%). Beyond time pressures, containerization offers technical and business advantages, with 30% of respondents saying that containers deliver improved deployment capabilities for their applications, along with 19% citing lower startup and maintenance costs.

State of the art:
How organizations deploy containers today

For containerization, the question of "Why?" leads directly to the question of "How?"

Organizations are deploying in production both turn-key apps and services (at 63% of organizations) and those developed by their own team (at 59%). Another 22% are testing or piloting containers but have not yet put them into production, and a further 17% are researching container use. Just 3% say they have no current plans to use containers at all.

Level of container usage
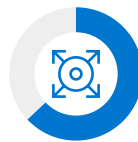
63%
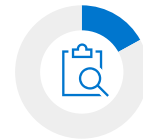Deploying 3rd-party apps and services with containers

59%
Developing our own apps and services with containers

22%
Testing or piloting the use of containers
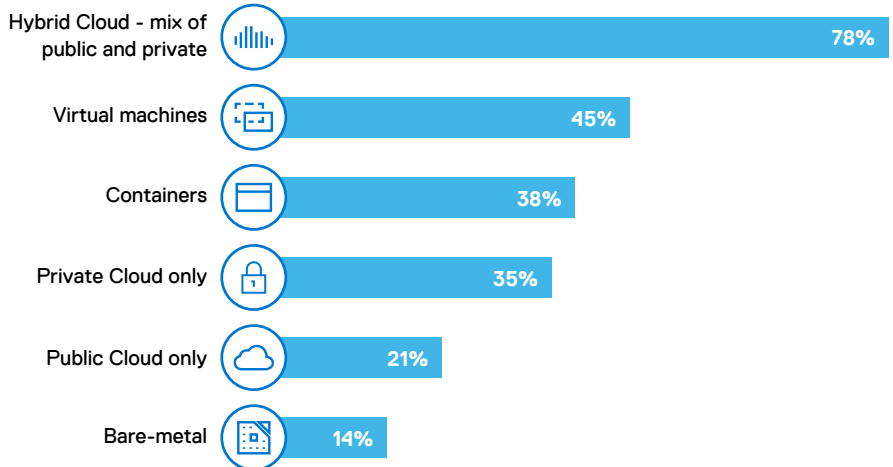
17%
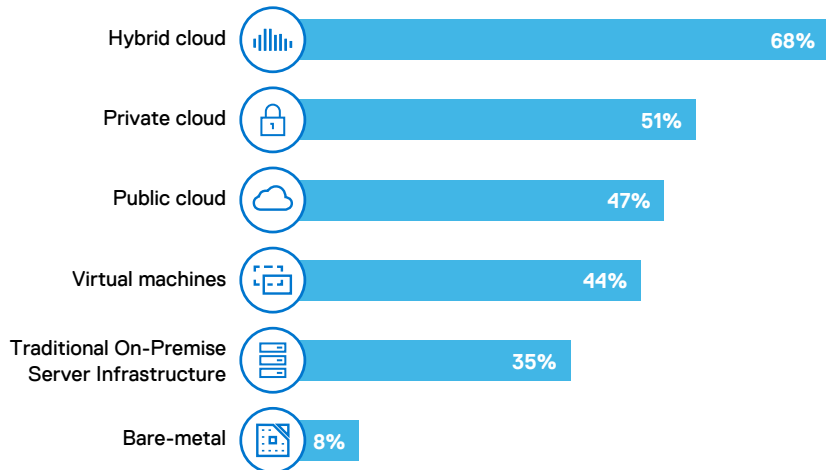Currently researching the use of containers

3%
No current or planned use of containers

Containerized apps and services must be deployed somewhere, and organizations' container deployments track well how they deploy applications more generally. In both cases, the most common deployment method by far is within a hybrid cloud environment, with smaller numbers using exclusively private or exclusively public cloud infrastructure. There is also a smaller but not insignificant use of traditional on-premises server infrastructure, and of bare-metal servers.

How do you deploy your applications?

- Hybrid Cloud - mix of public and private — **78%**
- Virtual machines — **45%**
- Containers — **38%**
- Private Cloud only — **35%**
- Public Cloud only — **21%**
- Bare-metal — **14%**

How are you currently deploying containers?

- Hybrid cloud — **68%**
- Private cloud — **51%**
- Public cloud — **47%**
- Virtual machines — **44%**
- Traditional On-Premise Server Infrastructure — **35%**
- Bare-metal — **8%**

Respondents: Respondents who are currently using containers (N=403)

The public cloud providers most commonly used in container deployment are Azure, Amazon Web Services (AWS) and Google Cloud, named by 78%, 65% and 62% of respondents, respectively; other substantial container deployments use IBM Cloud, Oracle Cloud, and Red Hat's OpenStack.

For any but the simplest container environment, hosting is only one requirement. Orchestrating the administration of the entire fleet of containers is vital. Azure Arc is the most frequently deployed container management solution among our respondents, as it matches Azure, the most commonly used container hosting environment. Cloud Foundry, Red Hat OpenShift. VMware Tanzu and Docker round out the top five.

Challenges containers can meet

Survey respondents named several specific pressures that drive their organizations to improve infrastructure and application deployment. Topping the list are operating costs, where 42% of respondents described reducing IT operating costs as an ongoing pressure. Another 29% called out a similar need to increase revenue, and 18% mentioned the need to maximize ROI on IT investments. The lean strategy of containerized apps can help on all three of these fronts.

However, several other drivers for modernization are also key factors in creating a containerization strategy. An increasingly cloud-based infrastructure, including a hybrid or multicloud infrastructure, can be complemented and supplemented by containerized apps, with less pressure to install apps on end-point devices. Systems can scale quickly, and SLAs can be met reliably, with quickly deployed containerized apps.

The demand for robust container infrastructure is rising. Containers demand orchestration, though, and organizations deploying Kubernetes report faster deployment time and high satisfaction.

On average, enterprise companies have already deployed over 100 container-based applications

Top factors influencing decision makers to consider container orchestration with Kubernetes include easier migration for VMs and cloud-based applications along with better centralized management, security harmonization across containers, and greater collaboration opportunities for developers and IT operations.

How Dell Technologies and VMware can help

IT architects and administrators may choose to deploy containers on the public cloud, in an existing data center, in a hybrid cloud environment, or hosted locally. Any of these may be appropriate, but none necessarily align with their business priorities or greatest efficiency.

Choosing a deployment type is not the only reason that some organizations are deploying containers slowly, which explains why 39% of the organizations surveyed are only piloting or researching containerization. Deployment can also be delayed by the need for a consistent management framework encompassing both conventional and containerized apps for efficiency, and the need to support existing apps even while modernizing. Other challenges: Virtualized monoliths and containerized microservices must co-exist gracefully, and IT operations need poolable resources to span containerized and virtual applications.

With Kubernetes embedded in the core of the vSphere kernel, Dell and VMware offer VMware Tanzu-based solutions that not only support a wide range of containers hosting methods, but enable a transparent mix of containerized and conventional virtualization. They also allow you to upgrade to a hyperconverged infrastructure environment, or to host containers with a pay-as-you-go subscription service. Cloud technologies are the foundation for new application infrastructure, and Dell Technologies solutions featuring VMware Tanzu let you start building with cloud-native technologies now.

Modernize your infrastructure today!

About the survey:
Aberdeen Strategy & Research surveyed 456 IT professionals with experience working with and making decisions about Kubernetes and containers at their organizations. (All respondents were drawn from U.S.-based organizations with $50 million or more in annual revenue.) Industries represented in the survey include manufacturing, software engineering, education, education, and more.

DELLTechnologies

vmware®