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The State of Application Modernization and Hybrid Cloud Computing

VMware research snapshot:
Cloud market study by
Management Insight
Technologies,
commissioned
by VMware

February 2020
Europe

4 Takeaways

1. **Hybrid cloud is winning, adding longevity to the data center.**

2. **IT organizations are rushing to meet expectations for developer-ready Kubernetes.**

3. **Silos are out. Consistent operations is in, for preferred tools and processes onsite and off-site.**

4. **Cloud-ready is the new normal. Any IT modernization effort should include a foundation for modernizing and extending to cloud and cloud services.**

Findings

Applications are the heart of digital business. Because organizations recognize this reality, they are choosing cloud strategies to match the applications that are transforming business capabilities.

Most IT organizations support a mix of existing applications while also deploying new cloud-native application architectures—both on premises and in public cloud.

This heterogeneity has them looking for ways to modernize IT capabilities to ease application and infrastructure operations and management, across hybrid environments.

To gain insight into best practices for managing applications and environments, VMware commissioned independent research firm Management Insight Technologies to survey more than a thousand global companies worldwide about their strategies.

This report summarizes the application and cloud trends, challenges, and opportunities researchers uncovered by studying 300 organizations across the United Kingdom, France, and Germany.

Key Research Findings

Cloud Trends
Hybrid cloud is winning.

Hybrid cloud is the preferred IT strategy even as businesses migrate and modernize workloads across multiple public clouds. Application migration to cloud continues at a steady pace while refactoring apps to cloud-native architectures is slow-going. Yet IT teams are challenged by inconsistent data center and cloud operations, making it harder to achieve security, control, portability, and collaboration benefits.

On-premises deployment anchors hybrid cloud, even as 65 percent of organizations are actively engaged in public cloud migration.

Hybrid Operations
Silos are out.
Consistent operations is in.

IT organizations want a hybrid operating model that extends IT tools and processes from the data center to public cloud or multiple clouds, rather than bringing siloed cloud tools and processes back to the data center. IT leaders believe consistent operations make IT and developers more efficient while also improving speed and responsiveness in support of digital business initiatives.

By a 2 to 1 margin, respondents want to extend data center tools and processes to the public cloud, rather than bring cloud operations tools to the data center.

Modern Workloads
IT organizations are rushing to meet expectations.

For modern workloads, developers are choosing containers to speed feature velocity, boost app availability, and improve staff efficiency. Many, but not all, new workloads will be deployed to public cloud. That puts the onus on IT organizations to deliver developer-ready Kubernetes—and ensure cluster and application performance—anywhere Kubernetes is deployed.

Eight in ten organizations (81%) want IT Ops to provide developer-ready Kubernetes.

IT Modernization
Cloud-ready is the new normal.

While workloads are expected to grow 7% annually, IT teams plan to leave more than half of their applications on premises where performance, data control, and security are a concern. IT leaders recognize modernization is critical to digital business success and want a foundation for cloud capabilities as they modernize onsite environments. Their priorities: automating more core processes, virtualization beyond compute, and adding new monitoring technologies to support containerized workloads.

To handle modern applications and hybrid operations, IT teams are looking to add cloud-like capabilities to their on-premises environments.

Existing Applications

Growth in public cloud adoption continues. Survey respondents, more than 300 IT organizations in Europe, expect their **use of public cloud for application deployment to grow** from an average of 36 percent today to 49 percent in the next three years, matching expected data center usage (48%).
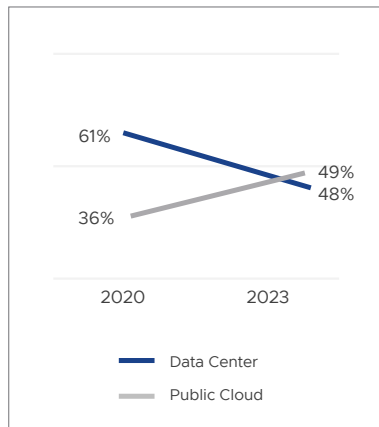
And **cloud preference will continue to be hybrid** for most organizations, refusing an either-or choice.

Although company-specific strategies vary, on-premises deployment still anchors hybrid cloud, with more than half (49%) of applications to remain hosted in the data center in three years, according to respondents.
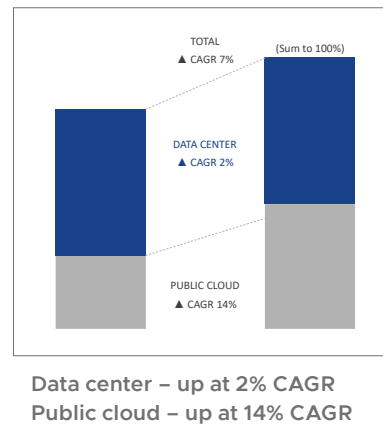
Overall, total workload counts will continue to rise at 7 percent compound annual growth rate (CAGR) over 3 years.

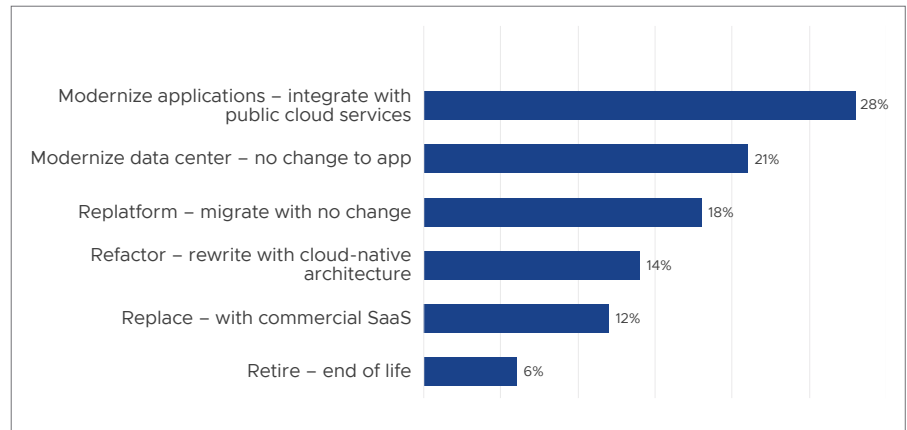And workload counts will see a net increase in both data center and cloud environments:

Plans over the next three years for applications currently deployed in data centers vary widely, according to respondents.

The most popular plan for existing applications is modernization and integration with public cloud services (28%). This may include adding APIs so existing applications can interact with cloud-native applications, or updating a component—such as shifting a database to a cloud version (e.g., Amazon RDS) without changing the application architecture.

Surprisingly, given the focus on cloud migration, only 18 percent will move to cloud unmodified. Two in ten applications (21%) will remain unchanged and in data centers, with plans for these data center to gain new, cloud-like capabilities through modernization.

Only one in six (15%) existing applications are expected to be rewritten for a cloud-native architecture.

Portion of application estate in each (% of app estate)

61%
36%
49%
48%

2020   2023

— Data Center
— Public Cloud

Workload growth for each platform (weighted)

TOTAL
▲ CAGR 7%

(Sum to 100%)

DATA CENTER
▲ CAGR 2%

PUBLIC CLOUD
▲ CAGR 14%

Data center – up at 2% CAGR
Public cloud – up at 14% CAGR

Plans for applications currently deployed in data centers—next three years (% total application estate) N=285

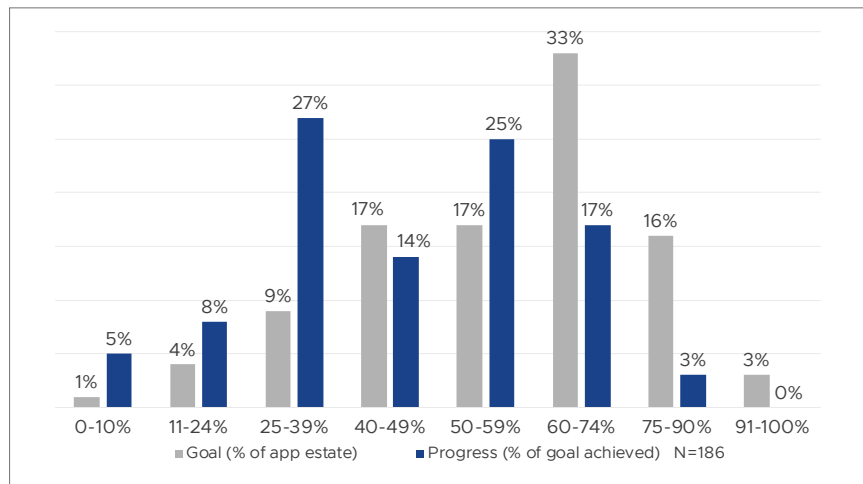| Plan	%
Modernize applications – integrate with public cloud services	28%
Modernize data center – no change to app	21%
Replatform – migrate with no change	18%
Refactor – rewrite with cloud-native architecture	14%
Replace – with commercial SaaS	12%
Retire – end of life	6%

Workload Migration

Of the companies surveyed, **65 percent are actively engaged in public cloud migration.**

They plan to migrate 18 percent of their application estate unchanged, and migrate and modernize 28 percent of applications to integrate with public cloud services.

On average, respondents plan to migrate 57 percent of applications to cloud, and have made 43 percent progress toward their migration goal.

Migration target – percent of companies indicating their goal and progress

Goal (% of app estate)   Progress (% of goal achieved)   N=186

Roughly half of companies (69%) are planning to migrate more than half of their application estate.

Almost half (45%) of companies are more than halfway to their migration goal.

The top expected benefits of migration include hard cost savings (27%); reduced data center investment and elimination of infrastructure operations (24%); and support application modernization objectives (24%).

The most common challenges keeping IT organizations from achieving their goals on schedule involve security, operations, and skills.

Top challenges faced reaching migration goals (% of respondents)

SECURITY CONCERNS **35%**   SKILLS GAP **33%**   PRODUCTION RISK **26%**   REFACTORING COMPLEXITY **25%**
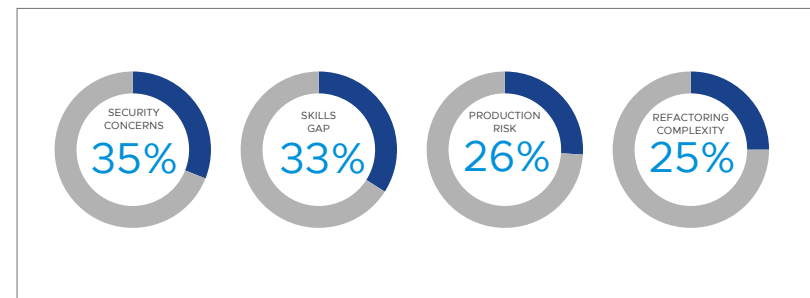
Security
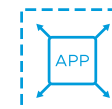Consistently applying security and compliance policies is difficult.

Production risk
Unfamiliar infrastructure and operations constructs can make it difficult to maintain service quality.

Skills gap
Organizations often have to recruit new talent or train existing teams for each unique environment.

Refactoring
Rebuilding applications to work in a specific target cloud takes significant time, money, and resources, without any guarantee the application will function as needed.

New Applications

Organizations responding to the survey have a wide range of plans for deploying new applications. Yet they agree, **not all of their new applications will be deployed to public cloud**.

Over the next three years, they plan to deploy on average 53 percent of net-new applications to public cloud.

**New apps deployed to public cloud in 3 years (% total app estate)
Mean 53% N=261**
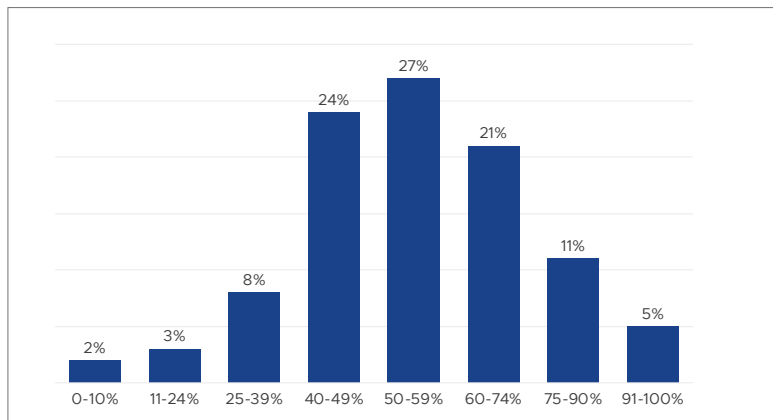
- Half (64%) of companies surveyed believe that more than half of new applications (50% or more) will be deployed to public cloud in the next 3 years.

- Only 5 percent of companies think less than 25 percent of new applications will be deployed to public cloud in the next 3 years.

But as the shift to cloud-native applications grows, companies also expect to deploy new applications to on-premises environments, suggesting the need for ongoing investment in new technologies and cloud service delivery in existing data centers.

What is **the ideal environment** to best support new applications?

Respondents ranked as the top six out of 12 attributes:

1 No matter where an application is deployed—it's secure and protected.

2 IT can consistently manage applications regardless of where they are deployed.

3 Applications are portable from cloud to cloud without refactoring.

4 A single set of tools is used to manage the entire application portfolio wherever applications are deployed.

5 Developers and operations teams can collaborate easily.

6 Developers can build and deploy applications to any public cloud.

IT organizations prioritize security, control, portability, and collaboration in their ideal cloud environment for new applications—all of which come from the use of consistent tools and processes.

A closer look at the top six attributes suggests **respondents favor a single operating model, delivering consistent operations wherever applications are deployed.**

As just under half (44%) of companies report already using more than one public cloud (IaaS) provider, the consistent operating model should extend to multi-cloud for dev/test or production workloads.

Key Takeaway
The ideal cloud environment for both existing and new enterprise application deployment is a hybrid cloud with consistent operations, delivering security, control, portability, and collaboration benefits—even when multiple clouds are in use.
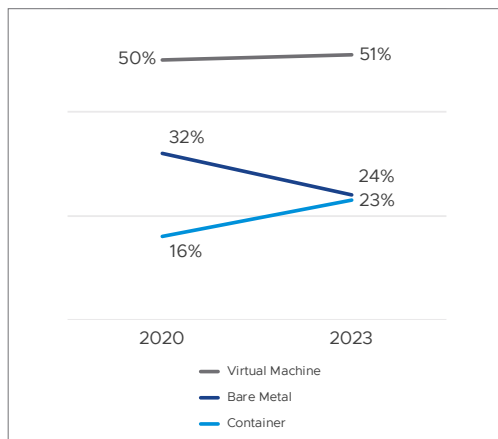
Container Adoption

Containers, as a method of packaging applications, are growing in popularity.

A full 67 percent of respondents have already containerized some applications, and expect to continue to do so.

On average, 16 percent of total application estates are containerized today. In three years, respondents expect that to rise to 23 percent. Virtual machine (VM) use is anticipated to remain the same—at 51 percent of workloads—while bare metal workloads decline.

Smaller firms (<1000 employees) report low current adoption of containers, with an average of only 13 percent of containerized applications. Growth to 18 percent is expected within 3 years (a 37 percent jump).

Global and large IT organizations (>5000 employees) report higher existing container adoption (20% of applications) and expect adoption to be more than a quarter (26%) of their applications over 3 years.

Increased developer productivity (46%) and improving application availability (42%) are the top two reasons IT teams choose containers. Accelerated application development (36%) and making it easier to update features (31%) are also rated as highly important.

**Top reasons for containerizing applications
(chosen by % of respondents) N=194**

Increase developer productivity	46%
Improve availability	42%
Accelerate development efforts	36%
Easier feature updates	34%

Workload types (% of application estate)

	2020	2023
Virtual Machine	50%	51%
Bare Metal	32%	24%
Container	16%	23%

Even as they adopt containers, respondents acknowledge three top challenges:

Finding skilled developers

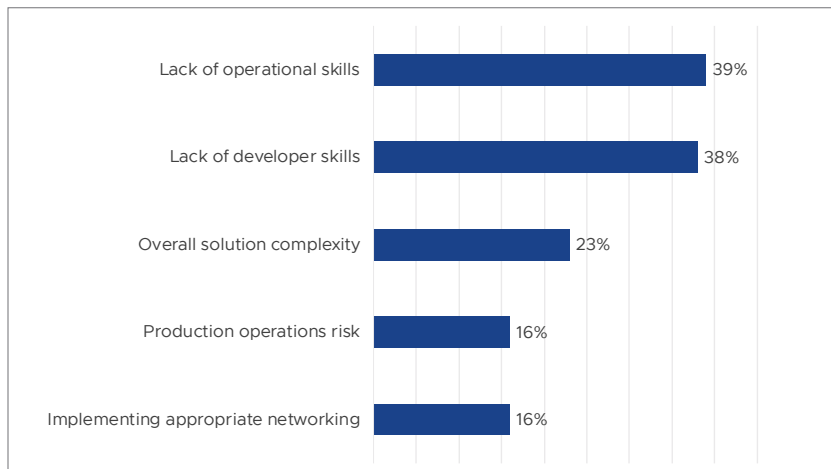Finding skilled operations staff

. Needing new operations tool stack

Kubernetes

Because the open-source container orchestration platform Kubernetes (K8s) enables the operation of an elastic web server framework for cloud applications, 78 percent of IT organizations have it or have plans to use it.

Kubernetes introduces IT organizations to many new and unfamiliar technologies, tools, and processes. While rapidly embracing Kubernetes, survey respondents have encountered challenges. Most often, these are related to lack of skillsets or operational risks such as support for security and appropriate networking.

**Challenges faced when adopting Kubernetes
(chosen by % of respondents) N=234**

Challenge	%
Lack of operational skills	39%
Lack of developer skills	38%
Overall solution complexity	23%
Production operations risk	16%
Implementing appropriate networking	16%

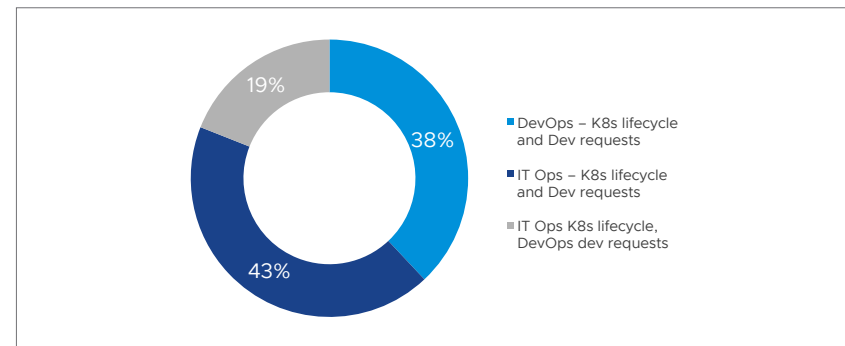As teams grapple with finding their optimal Kubernetes operating model, they often ask three key questions:

1 | Who is responsible for cluster infrastructure, on premises and in cloud?

2 | Who has responsibility for lifecycle management of Kubernetes?

3 | Who will respond to Dev requests for access and resources?

Segregation of duties is mixed.

Only two in ten (19%) organizations surveyed have a DevOps team responsible for lifecycle management of Kubernetes clusters.

Eight in ten **organizations surveyed (81%) want IT Ops to provide developer-ready Kubernetes** including cluster infrastructure and Kubernetes lifecycle management.

Segregation of duties

Segment	%
DevOps – K8s lifecycle and Dev requests	38%
IT Ops – K8s lifecycle and Dev requests	43%
IT Ops K8s lifecycle, DevOps dev requests	19%

Key Takeaway
Containers are the future of app development as they both improve IT and developer efficiency, and speed development and deployment to meet business needs. By a large margin, Kubernetes is the preferred open-source container orchestration platform for new development. And IT operations are most often responsible for developer-ready Kubernetes.

Operating Model

As enterprises speed their adoption of modern applications, workloads, and orchestration platforms, how do IT organizations plan to unlock the benefits of consistent operations across on-premises and cloud environments?

Remember…

✓ The top six attributes of the ideal cloud environment are related to consistent operations.

✓ The top challenges of containers and Kubernetes are related to skills and operations.

Roughly twice as many organizations surveyed want to extend management and operations tools and processes from the data center to public cloud than vice versa. Their preference is not to bring cloud-specific tools and processes back to the data center.

Hybrid tools expansion

38%

62%

■ Extend from data center to cloud
■ Bring from cloud to data center
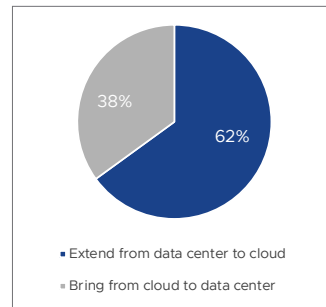
And when asked which consistency features they would most like for their IT operators, they ranked the following:

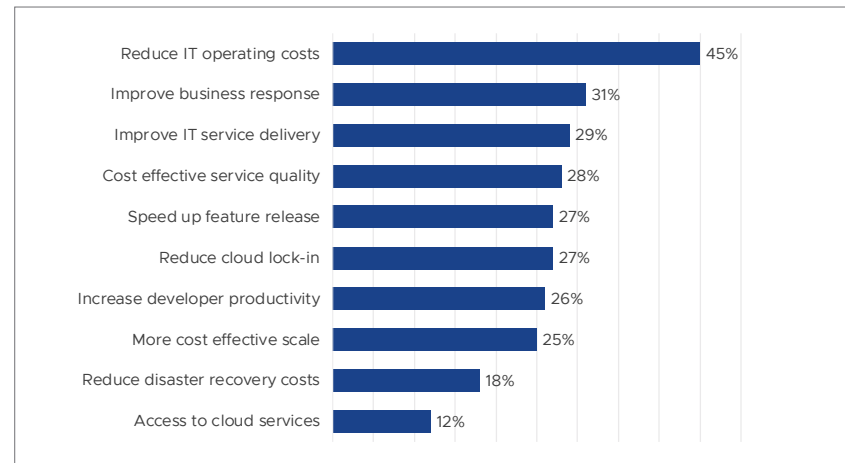**Must-have** consistency capabilities
- Applied security and compliance policies (46%)
- Network visibility, management, and security (43%)
- Consistent storage capabilities and service types (43%)
- Monitoring, troubleshooting, and remediation (42%)

Nice-to-have consistency capabilities
- Automation to speed infrastructure and application deployment (39%)
- Resource visibility, cost monitoring, and optimization (37%)

Half (50%) of organizations already using more than one pubic cloud, see the benefits of a single operating model, including reduced costs, improved staff productivity, and better service to business.

How does a single operating model (chosen by % of respondents) help?

Reduce IT operating costs	45%
Improve business response	31%
Improve IT service delivery	29%
Cost effective service quality	28%
Speed up feature release	27%
Reduce cloud lock-in	27%
Increase developer productivity	26%
More cost effective scale	25%
Reduce disaster recovery costs	18%
Access to cloud services	12%

With a single operating model, organizations report they are both

Boosting IT and developer efficiency.   **AND**   Increasing speed and responsiveness to meet business needs.

44 percent of IT organizations already have multiple IaaS clouds in use.

Key Takeaway
Silos are out. Consistent operations is in, for preferred tools and processes managing IT infrastructure—onsite and off-site. A single operating model—for data center and hybrid/multi-clouds—helps reduce IT costs while accelerating successful digital business initiatives.

Data Center

Organizations are still running applications in global data centers, and expect to continue to do so over the next three years. On average, respondents plan to leave 48 percent of applications in their data centers.
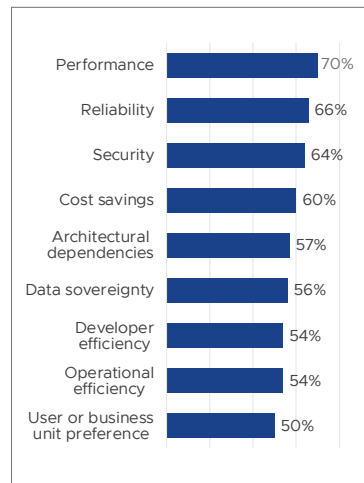
Their considerations for modernizing data centers to improve support for existing applications rather than migrating or refactoring applications rank in this order:

Performance – Leaving applications where they are mitigates latency issues that can arise as part of cloud migrations.

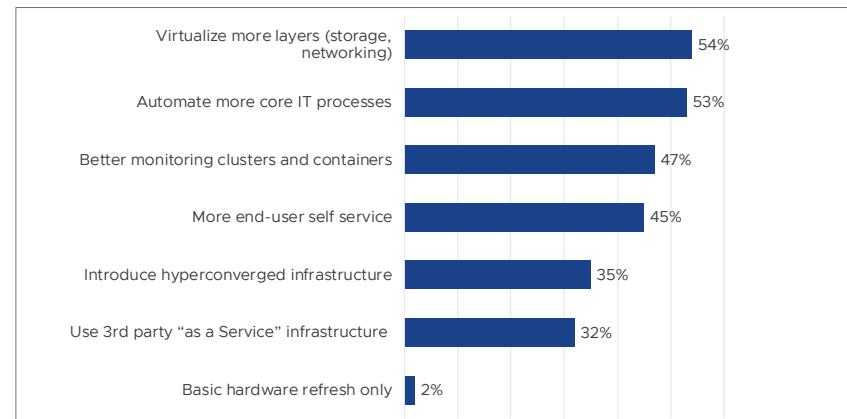**Reliability** – Ensure critical business systems perform as expected.

Security – Loss of control and cyberattack risks keep organizations from moving existing applications out of data centers.

Considerations for data center modernization

Performance	70%
Reliability	66%
Security	64%
Cost savings	60%
Architectural dependencies	57%
Data sovereignty	56%
Developer efficiency	54%
Operational efficiency	54%
User or business unit preference	50%

But IT organizations are well aware of public cloud's infinite scale and on-demand, developer self-service with less hassle. **To handle modern applications and hybrid operations, IT teams are looking to add cloud-like capabilities to their on-premises environments.** Once in place, these will support both existing and modern workloads, including containers and Kubernetes.

Data center modernization priorities

Virtualize more layers (storage, networking)	54%
Automate more core IT processes	53%
Better monitoring clusters and containers	47%
More end-user self service	45%
Introduce hyperconverged infrastructure	35%
Use 3rd party "as a Service" infrastructure	32%
Basic hardware refresh only	2%

When asked how they expect their data centers to evolve over next three years, IT organizations cited these key modernization priorities: virtualize more layers (54%); automate more core IT processes (53%); and better monitoring clusters and containers (47%).

Key Takeaway
Cloud-ready is the new normal. Any IT modernization effort must include a fit-for-purpose foundation on premises, when extending operations from the data center to cloud. Effort must ensure performance, data control, and security for both existing and new applications.

Team With VMware to Modernize Applications and Extend to Cloud

VMware delivers comprehensive solutions that can be the foundation of your private, hybrid, and multi-cloud strategies, including application migration and modernization efforts. Delivering a consistent platform and operating model for data center, cloud, and edge, VMware solutions ensure the integrity and security of digital initiatives and modernization efforts.

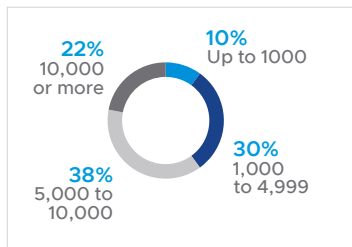## Learn more at vmware.com/go/hybrid-cloud

Methodology

Management Insight Technologies conducted this research in North America (US & Canada), Western Europe (UK, Germany, & France) and APAC (Australia, New Zealand, Japan, India, & China) using combination of web and telephone interviews. All responses were collected exclusively for this project, from 1206 IT leaders, IT decision makers, and developers who are knowledgeable about and involved in decision making for cloud platforms. The sample targeted 10% SMB (2-999 employees), 30% Commercial (1000-4999 employees), and 60% Enterprise (5000+ employees). This custom research summary was commissioned by VMware.
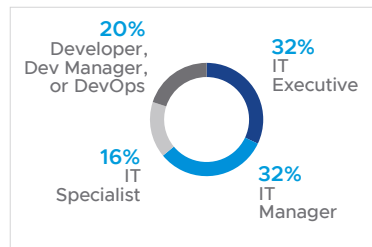
Data was collected for this custom survey from November to December 2019 and research and reporting was completed in January 2020.

This report focused on data from 300 organizations across the United Kindom, France, and Germany.

Company size by employees

- 10% Up to 1000
- 30% 1,000 to 4,999
- 38% 5,000 to 10,000
- 22% 10,000 or more

Respondent roles

- 20% Developer, Dev Manager, or DevOps
- 32% IT Executive
- 32% IT Manager
- 16% IT Specialist

Cloud decision responsibility

- 12% Decision influencer
- 26% Final authority
- 37% Head of deciding team
- 25% Member of deciding team

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