



DENODO GLOBAL CLOUD SURVEY 2021



Contents

- Introduction 3
- Cloud Adoption, Challenges, and Motivation 5
- Cloud Deployment, Provider, and Roles 8
- Cloud Use Cases, In-Demand Services 11
- Cloud DataOps, Kubernetes, Containers, and the Role of IT 15
- Cloud Marketplaces, Benefits, and Budget Spend 17
- Methodology 20
- The Denodo Platform at-a-Glance 21



Introduction

The cloud has exploded in a way that has changed how enterprises do business, and it shows no sign of slowing down. Businesses recognize that cloud data management should not rely on one specific cloud platform or infrastructure, it should enable stakeholders to choose the right solution for the job at hand. Cloud data management is about modernizing the data architecture so that it provides the right foundation to meet organizations' critical challenges. In 2021, the emerging cloud trend is that enterprises are becoming less worried about sticking with one cloud vendor, and are embracing a multi-cloud or hybrid-cloud configuration that offers the best out of each platform.

Denodo's global cloud survey 2021 results are out, with new facts and figures that validate some of the leading trends. You will see how cloud adoption has sprung into the fast track, enabling a variety of go-to-market strategies, with cloud marketplaces being in the forefront. As cloud vendors add new services and tools to handle data versatility, the thirst for data insights and timely access has never slackened.

2020 was a year like no other. The COVID-19 pandemic and subsequent government-imposed restrictions introduced new realities for everyone. The economic pressure of these restrictions made cost-cutting measures the top priority. The pandemic led to a fundamental shift in priorities, whether that meant a surge in demand for core products or the need to respond to unexpected market behavior. The mechanics and logistics of working remotely meant that access to physical labs or data centers had to be adjusted, accelerating the digital transformation journey for all types of users.

The same flexibility that made the cloud attractive for experimenting with new technologies became critical for adjusting to the realities of the pandemic. Some would benefit from the ability to reduce operational expenses amid declining revenues, while others would turn to the cloud to rapidly scale infrastructure to meet sudden demand spikes.

Security remains a top concern, and cloud skills and cloud spending are emerging challenges faced by organizations in their cloud journeys. Here, we cover key insights into a variety of trends around cloud adoption and drivers.

KEY TAKEAWAYS

Cloud technology continues to be one of the fundamental pillars of the modern workload. Organizations are looking at cloud solutions with a lot more confidence despite growing compliance and security concerns. The results of the Denodo Global Cloud Survey 2021 provide key insights, such as:

Cloud adoption is on the rise, with a 25% increase year-over-year in advanced cloud workloads, indicating that more complex workloads are moving to the cloud and that COVID-19 has perhaps driven that increase.

Cloud skills cannot be underestimated and account for one of the top challenges behind security and governance. Close to 50% of users complained that without the right set of skills, businesses look for solutions that are user friendly and self-serviceable.

The hybrid cloud model remains in the lead, with more than one-third users leveraging that architecture. Private cloud saw some good boost, with nearly 25% of their workloads still being run on-premises.

Data architect and cloud architect roles are in top demand, according to close to 50% of participant companies. This means that with the data proliferation and faster growing workloads in the cloud, it is imperative to ensure that the enterprise infrastructure is well planned and designed, and accounts for the right set of skills.

One of the key benefits that cloud technologies provide is the ability to scale faster, although performance and ease of data management also provide strong benefits, identified by 31% and 20% of participants, respectively.

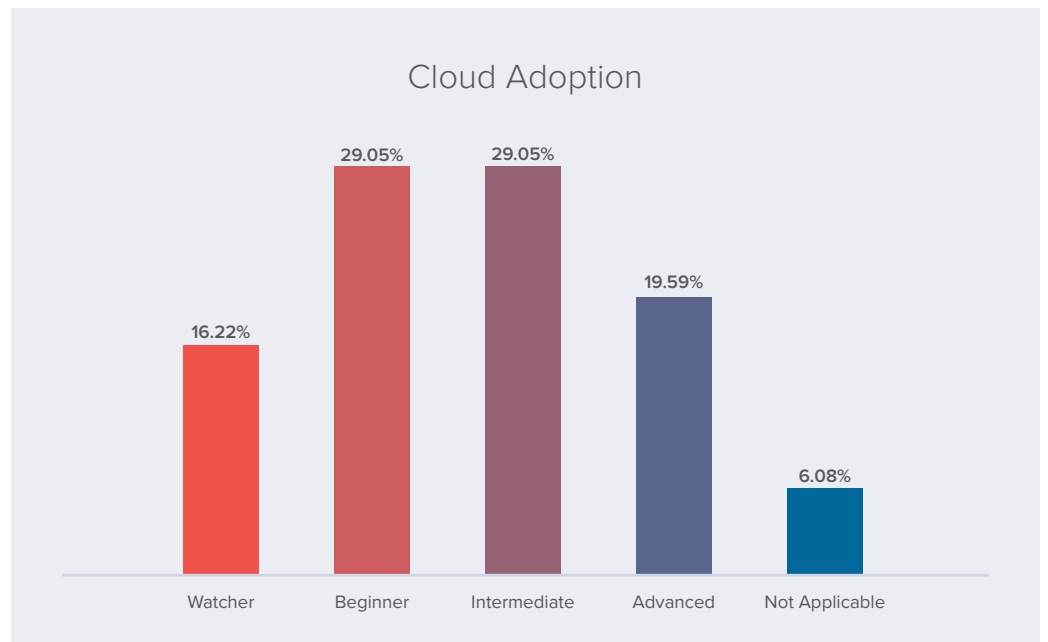
Cloud marketplaces are becoming a key go-to-market strategy and a means to faster digital transformation, with close to 50% of participants looking for pay-as-you-go pricing and self-serviceability.



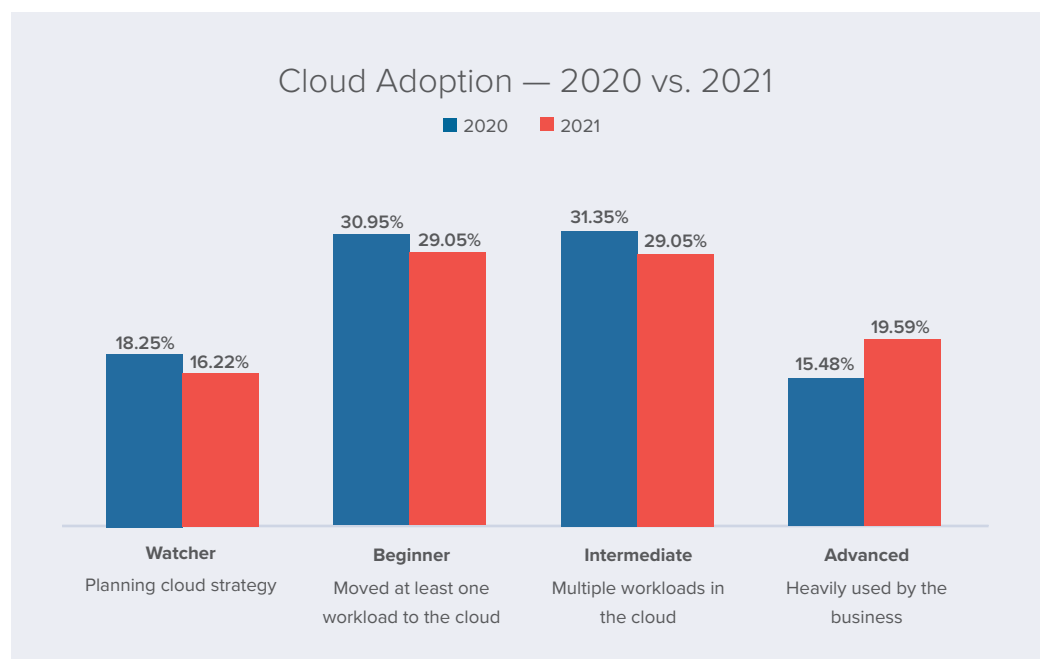
1 / Cloud Adoption, Challenges, and Motivation

Cloud adoption defines a strategy whereby enterprises are looking for scalability within their applications and a means to save costs. Cloud computing is not new, and the transition to the cloud is driven by effective planning and assessment of the workloads that can benefit from the cloud architecture.

Cloud adoption maturity is on the rise, with close to 80% of those surveyed already running some kind of workload in the cloud.



25% growth in the number of advanced users clearly indicates an upward trend in cloud usage and adoption.



1
Adoption
Challenges
Motivation

2
Deployment
Provider
Roles

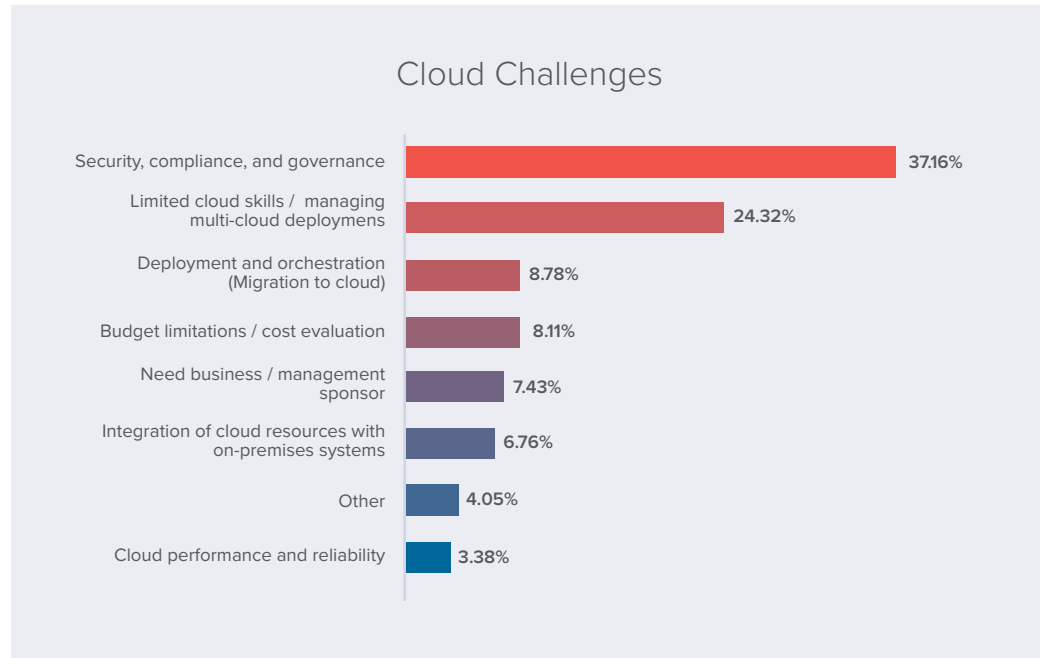
3
Use Cases
In-Demand
Services

4
DataOps
Kubernetes
Containers

5
Marketplaces
Benefits
Budget

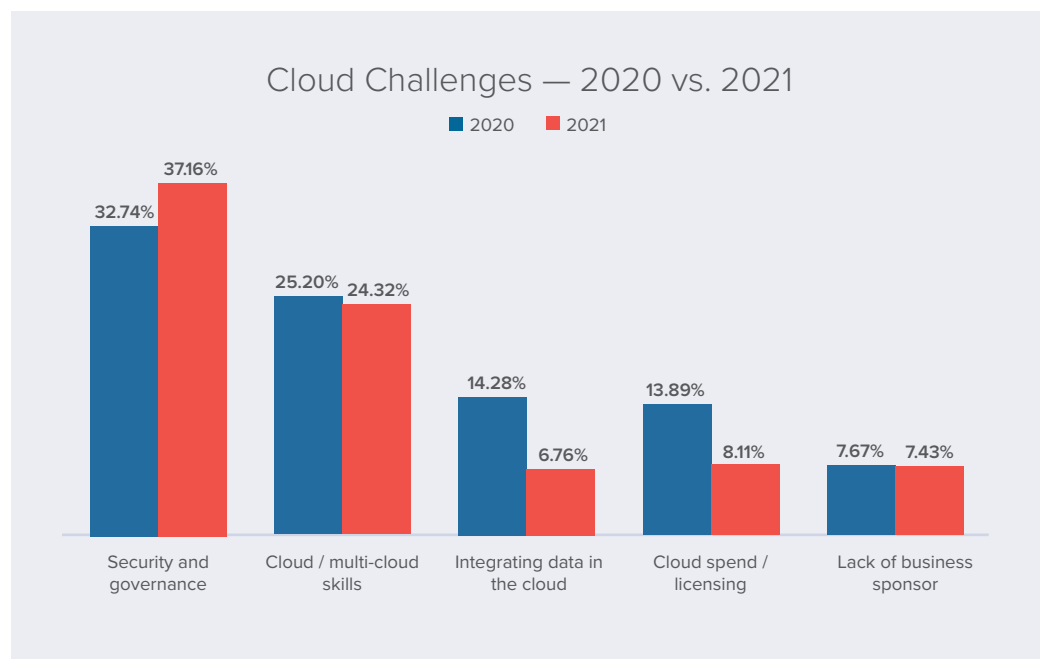
With cloud adoption comes challenges. While security issues are at the forefront of cloud adoption concerns, other challenges are equally important to address.

Close to 25% of participants indicated **concerns over the limited cloud skills and ability to manage workload deployments** in a multi-cloud environment.



As applications are being built on or shifted into the cloud increasingly quickly, it is becoming clear that IT organizations will need to either aggressively develop new skills internally or recruit IT professionals that already have them.

Security and governance remain a top concern, while a quarter (25%) of the surveyed users do recognize the value of cloud upskilling. At the same time, users have become a bit more savvy when dealing with the data integration and cloud spend challenges, year over year.



1
Adoption
Challenges
Motivation

2
Deployment
Provider
Roles

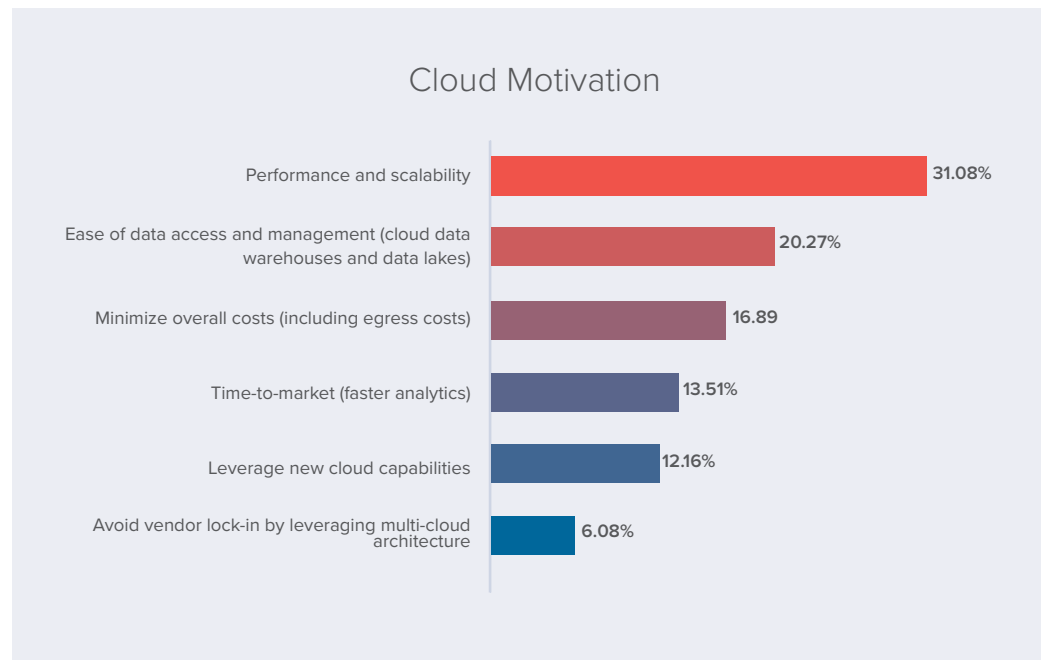
3
Use Cases
In-Demand
Services

4
DataOps
Kubernetes
Containers

5
Marketplaces
Benefits
Budget

Cloud adoption is on the rise, and while cloud challenges will not simply disappear, there are some key motivating factors that drive cloud journeys and cloud adoption. For some, it may be the cloud's performance-scaling capabilities, while for others, it may be the simplification of data management by bringing all the data in a single data lake repository. The overall time-to-market for new applications is always important, and so is the cost management that can be achieved in a better fashion through the cloud.

Close to one-third (31%) of participants saw **performance scaling as the top reason to move to the cloud** while for others, cloud data management, such as modernizing a data warehouse and overall data access and protection, were top-of-mind.



1
Adoption
Challenges
Motivation

2
Deployment
Provider
Roles

3
Use Cases
In-Demand
Services

4
DataOps
Kubernetes
Containers

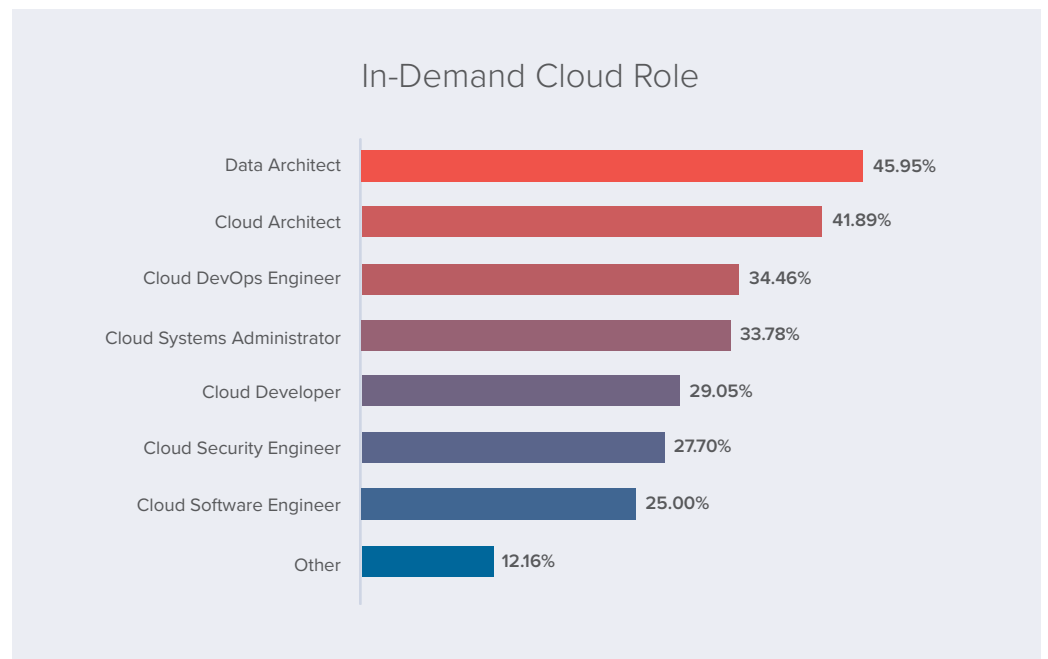
5
Marketplaces
Benefits
Budget

2

Cloud Deployment, Provider, and Roles

As organizations begin to solve and address cloud challenges, they often identify a clear need for expertise in handling and managing the vast amount of cloud data as well as the data architecture and DevOps. Investments in such expertise can go a long way.

Understanding data management and deployment architecture in the cloud is not a small feat. Close to 50% of our participants expressed **a demand for data and cloud architect roles**, closely followed by the demand for a DevOps and Cloud administrator, at 33%.



Cloud deployment types vary depending on who controls the infrastructure and where it is located. The right choice depends on the organization's computing, networking, and storage requirements, available resources, and business goals, as well as the pros and cons of different cloud deployment models. On one hand, the public cloud provides key benefits such as hassle-free infrastructure management, ease of scaling, and reduced costs, but on the other hand, it can pose challenges with data privacy and sometimes reliability. At the same time, private cloud provides a lot more control and flexibility although that can also be a concern from a cost management perspective. Multi-cloud is slowly on the rise, with users looking for the best of services pertaining to the public cloud while avoiding lock-in of any kind.

1
Adoption
Challenges
Motivation

2
Deployment
Provider
Roles

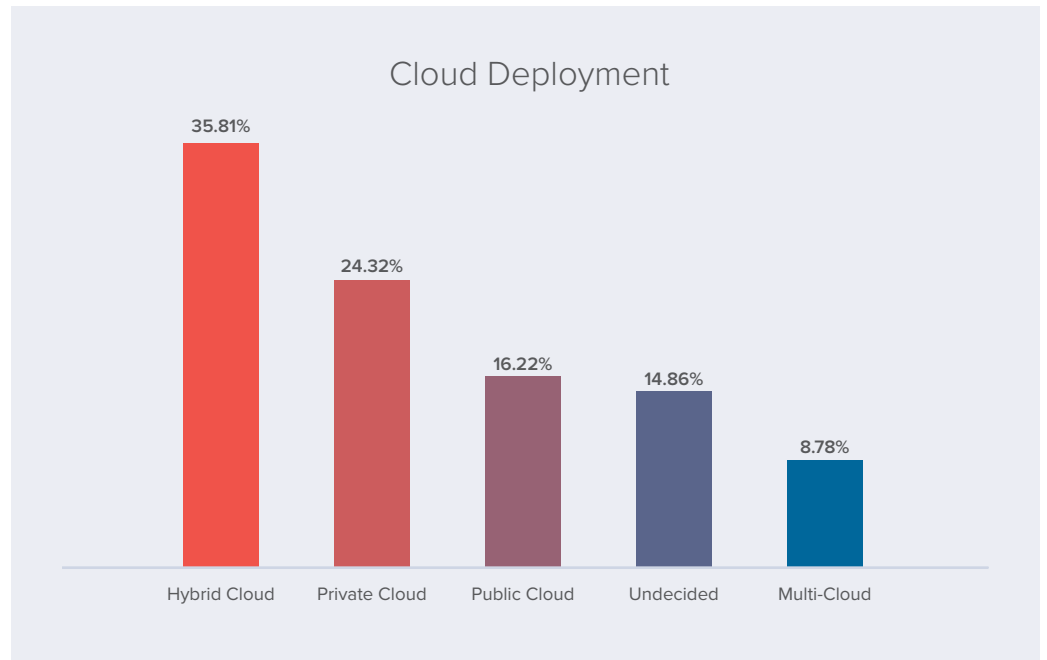
3
Use Cases
In-Demand
Services

4
DataOps
Kubernetes
Containers

5
Marketplaces
Benefits
Budget

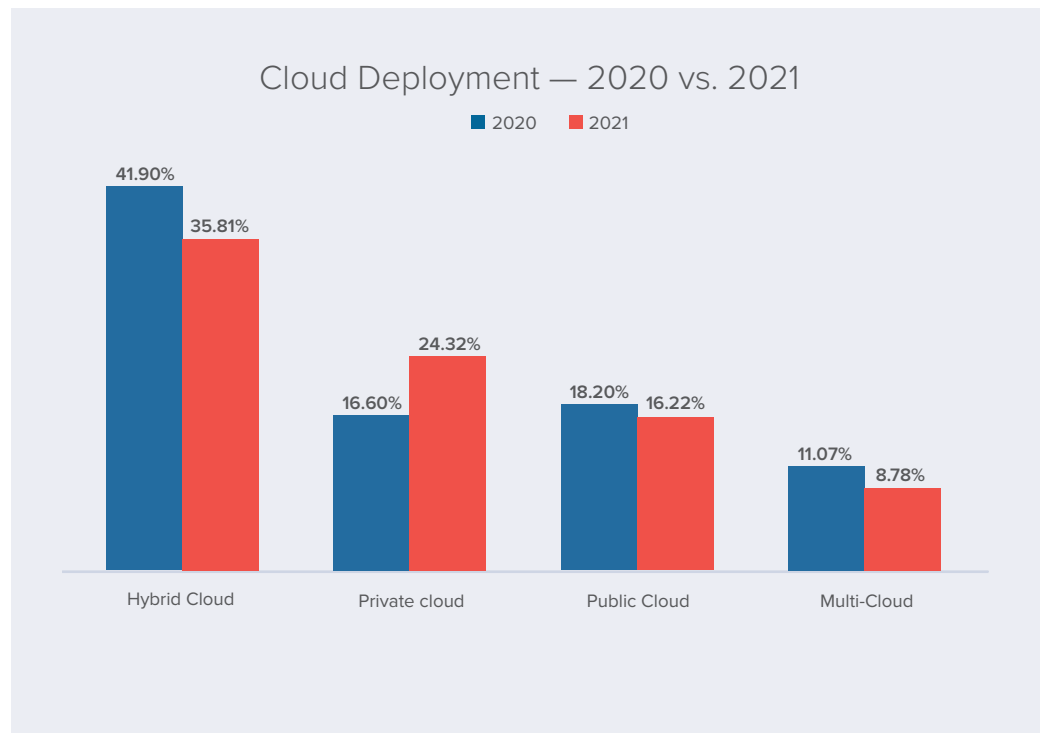
Hybrid cloud has consistently been the top choice over the past years as organizations migrate workloads to the cloud.

More than one-third (36%) of participants are leveraging hybrid cloud while private cloud is still the go-to deployment model for privacy-bound applications or those that safeguard mission critical operations.



Cloud deployment varies by adoption and the type of workloads in the cloud. In contrast with last year, this year we noticed a steady usage of the hybrid cloud model while private cloud resonates better with our participants compared to last year.

Private cloud is showing some vibrant usage contributing to 25% of total workloads, while hybrid cloud has become somewhat of a standard for cloud deployments, with more than one-third of participants leading with it.



1
Adoption
Challenges
Motivation

2
**Deployment
Provider
Roles**

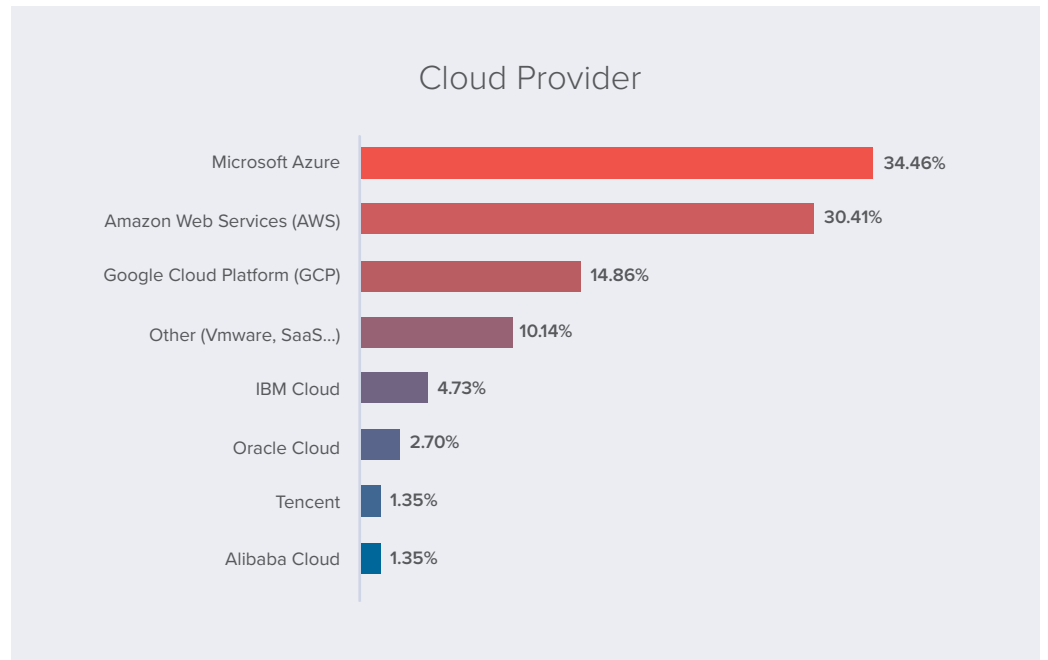
3
Use Cases
In-Demand
Services

4
DataOps
Kubernetes
Containers

5
Marketplaces
Benefits
Budget

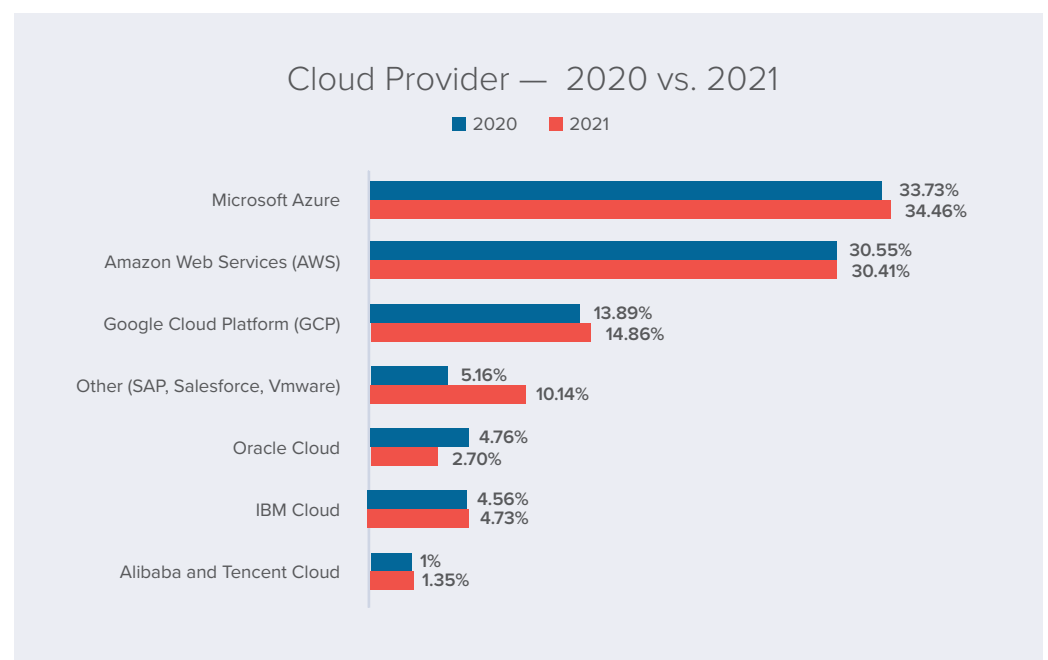
Cloud service providers are not leaving a single stone unturned and are doing all they can to gain users trust and confidence to be the preferential cloud partner of choice. Successfully moving to a public cloud is a long-term investment in time, planning, effort, and adoption, and it requires new paradigms and tools.

Microsoft Azure, for the second time in a row, has come out as the lead cloud provider, with 34% of participants, with Amazon right behind it. While there could be regional influences, the survey has shown that the EMEA region has a slightly higher preference for Azure compared to the other cloud providers.



There have not been any surprises in terms of cloud vendors' leadership positions, with Microsoft Azure, Amazon Web Services (AWS), and Google Cloud platform (GCP) keeping the top 3 positions, while Tencent and Alibaba cloud have shown some growing activity in the APAC region.

Close to two-thirds (65%) of the cloud market share is still led by AWS and Microsoft Azure, with Google, IBM, and Oracle working to catch up.



1
Adoption
Challenges
Motivation

2
Deployment
Provider
Roles

3
Use Cases
In-Demand
Services

4
DataOps
Kubernetes
Containers

5
Marketplaces
Benefits
Budget

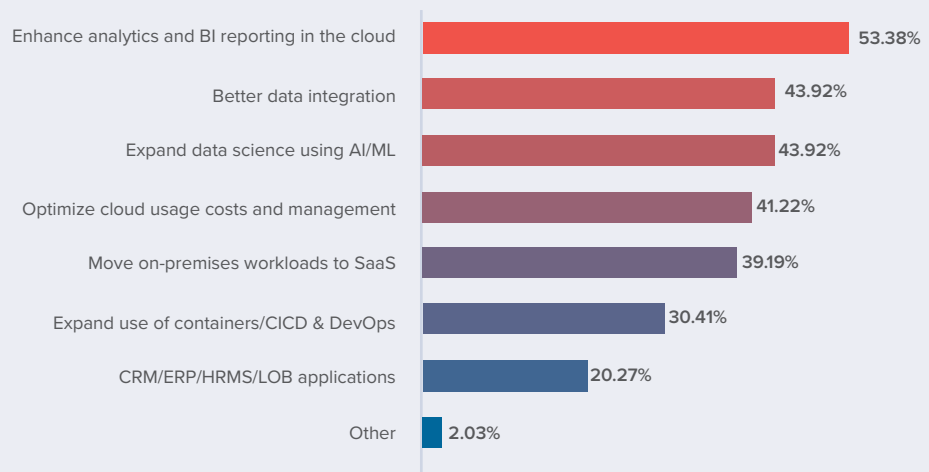
3

Cloud Use Cases and In-Demand Cloud Services

Organizations have gotten a mandate to move to the cloud, and the excitement could quickly turn into a challenge if the journey is not planned properly. There are multiple initiatives that take precedence, although one has to be careful about cloud costs and the movement of data in and out of the cloud. Business intelligence (BI) analytics and data integration in the cloud are popular use cases, while embracing machine learning/artificial intelligence (ML/AI) and finding smarter ways to optimize costs are also important.

Data analytics remains the key use case initiative (54%) and establishing better data integration techniques to facilitate ML/AI projects are complementary initiatives of parallel importance.

Top Cloud Initiatives/Use Cases



Cloud services provide users with choices with which to accomplish their initiatives and use cases in the cloud. There is no shortage of them, with over a hundred different services across a variety of domains. It becomes critical to understand and choose the right set of services that provide the right solution for each use case. In some scenarios, third-party solutions can provide a better way to bring these services together from a data integration standpoint.

1
Adoption
Challenges
Motivation

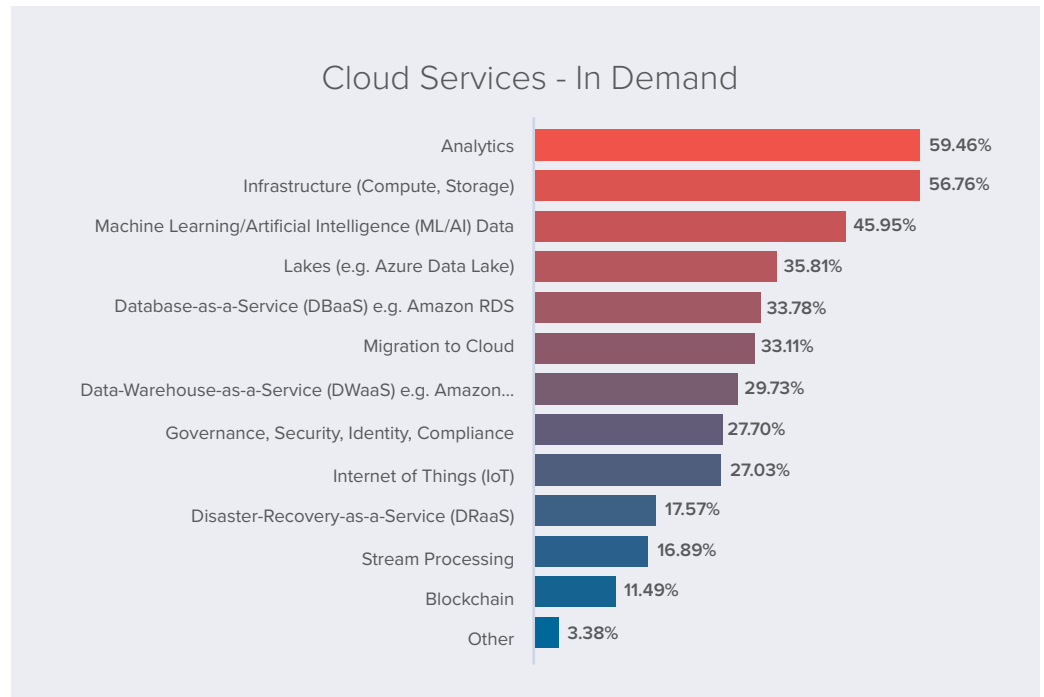
2
Deployment
Provider
Roles

3
**Use Cases
In-Demand
Services**

4
DataOps
Kubernetes
Containers

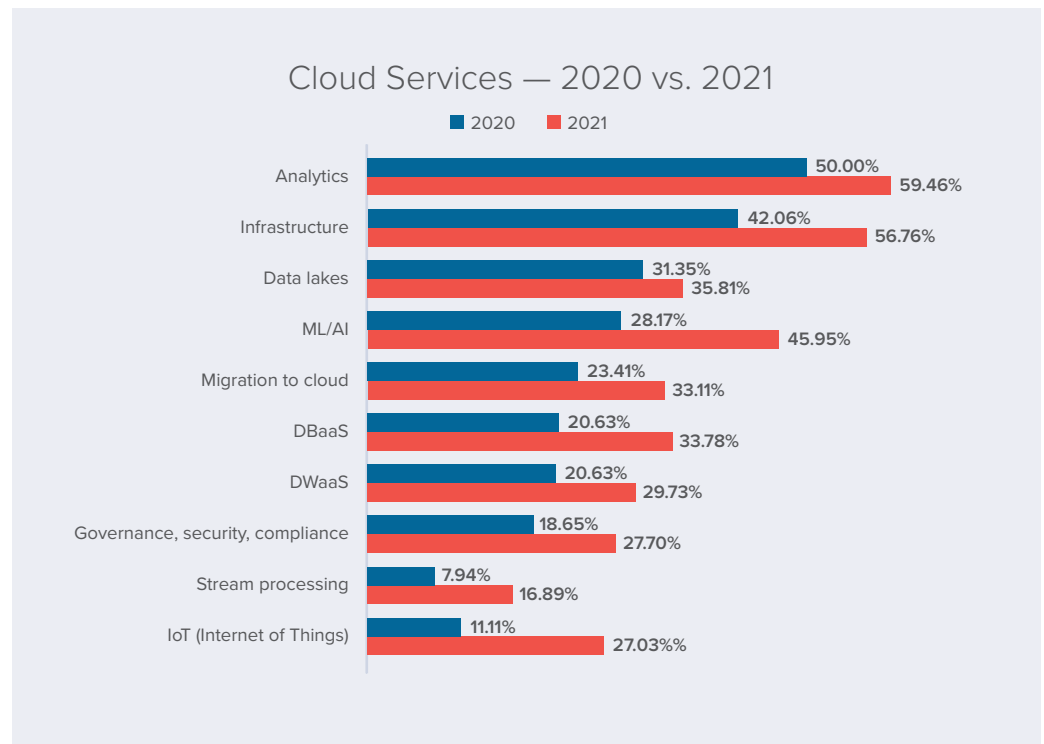
5
Marketplaces
Benefits
Budget

Infrastructure and Analytics services (60%) represent the biggest share of investment from a cloud initiative perspective. Data lakes, DWaaS, and DBaaS constitute fairly good adoption and usage (close to 40%) when it comes to cloud services.



When comparing cloud services across two years, we are seeing some new patterns that could set the stage in the coming years. Real-time analytics and streams processing are beginning to get attention.

ML/AI and streams processing services see big jumps in usage, close to 50%, while infrastructure usage demonstrates fairly good consumption after analytics.



1
Adoption
Challenges
Motivation

2
Deployment
Provider
Roles

3
Use Cases
In-Demand
Services

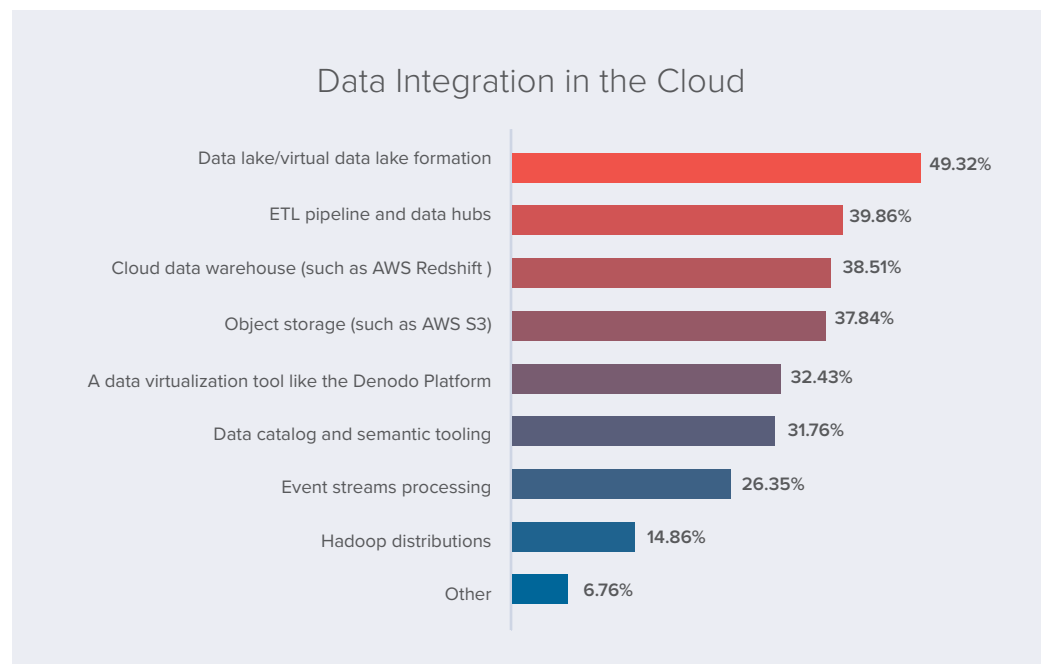
4
DataOps
Kubernetes
Containers

5
Marketplaces
Benefits
Budget

So far, we have seen a variety of use cases and cloud-based initiatives that users are immersing themselves in when it comes to solving business problems. Cloud services provide a wide list of choices for solving these use cases. One of the most important aspects of managing data in the cloud is ensuring that data management is a well-thought-out strategy. One needs to look at overall cloud architecture, security, and operations to define a clear and concise way to handle cloud data.

Data lakes have become fairly common as are cloud data warehouses, though they do not address all requirements and can be expensive. While object storage is cheap and easy, it is meant for only certain types of data and workloads. A data virtualization approach to data integration can provide strong support for managing all sorts of complex data without replication or moving data while also complementing existing cloud services.

Close to 50% of our participants leverage multiple solutions such as data lakes and data warehouses for data management in the cloud. Data virtualization can nicely support data infrastructure modernization while providing core capabilities such as data catalogs and support for handling streams.



1
Adoption
Challenges
Motivation

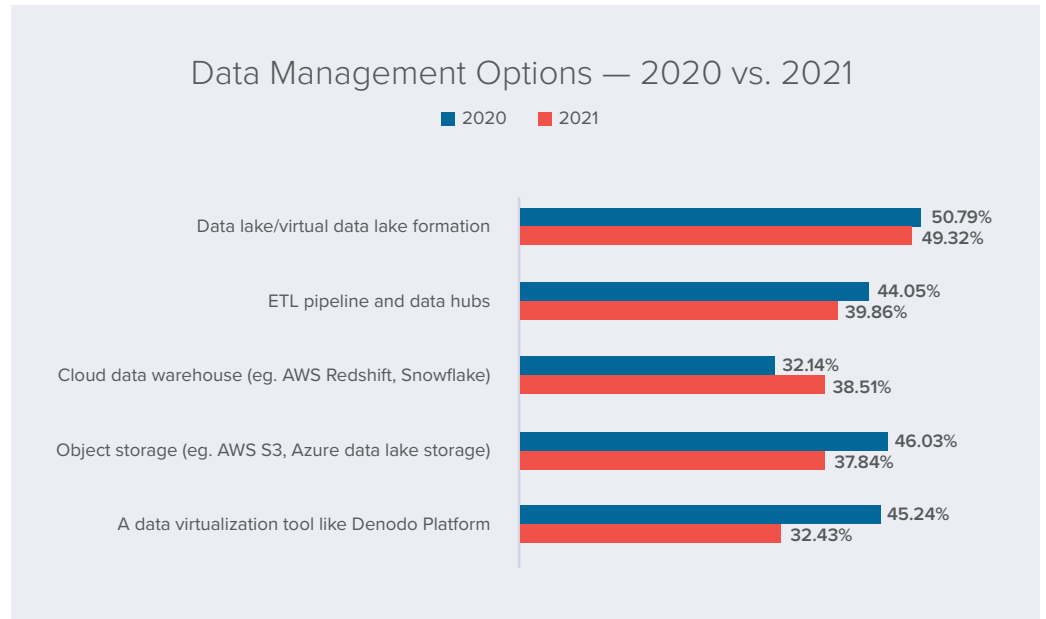
2
Deployment
Provider
Roles

3
Use Cases
In-Demand
Services

4
DataOps
Kubernetes
Containers

5
Marketplaces
Benefits
Budget

Looking at some of the data from the past year, we see that data lakes are still chosen as one of the top solutions for managing the data sprawl. Object storage has seen a slight increase in adoption, and data virtualization is one of the hidden gems that could come to the rescue for a variety of data management use cases.



1
Adoption
Challenges
Motivation

2
Deployment
Provider
Roles

3
Use Cases
In-Demand
Services

4
DataOps
Kubernetes
Containers

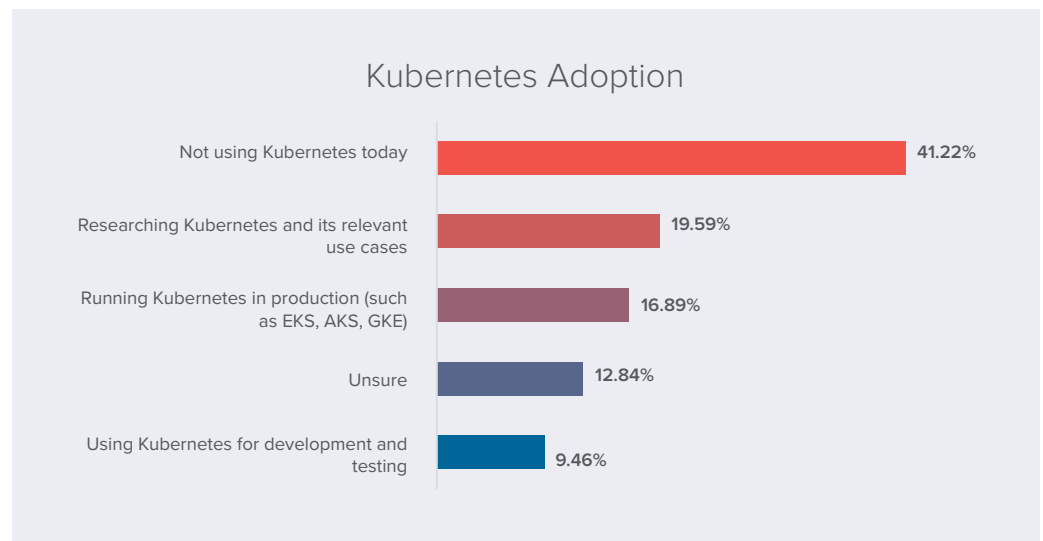
5
Marketplaces
Benefits
Budget

4

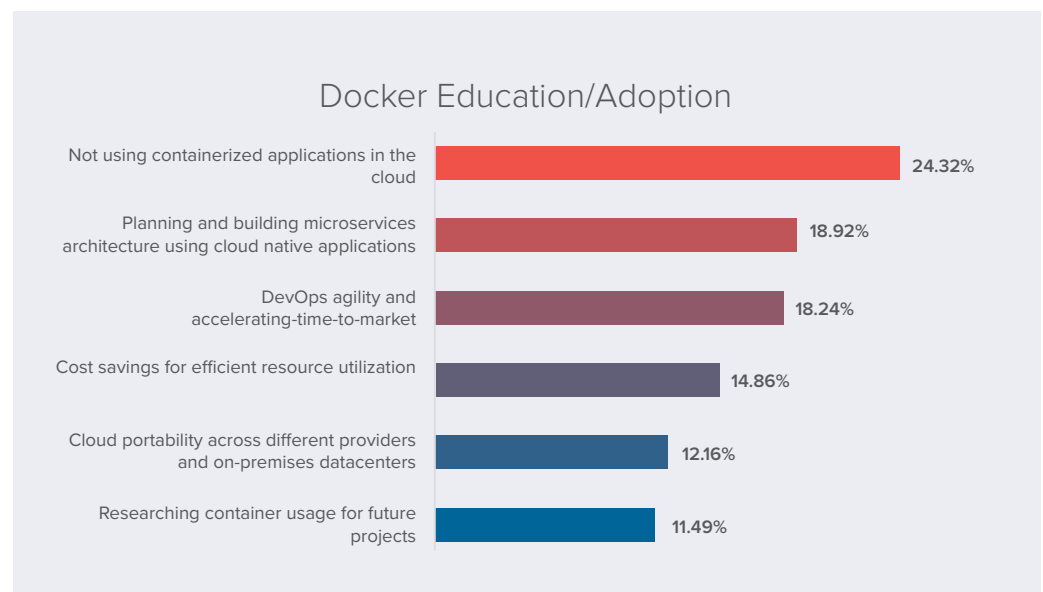
Cloud DataOps, Kubernetes, Containers, and the Role of IT

DevOps is a set of practices that combines software development (Dev) and IT operations (Ops), and with the rapid growth of data, DataOps has become a collaborative data management practice focused on improving the communication, integration, and automation of data flows between data managers and data consumers across an organization. Both of these practices are well governed by the use of containers and Kubernetes, which helps by making the workloads portable, scaling containers easily, and building more flexible and extensible apps.

Kubernetes adoption is slowly growing with less than 20% using it for production workloads, and an equal number of them researching and exploring at the same time.



Docker use has been quite versatile for various reasons with nearly 50% users leveraging it in their DevOps architecture, automation and cloud portability use cases.



1
Adoption
Challenges
Motivation

2
Deployment
Provider
Roles

3
Use Cases
In-Demand
Services

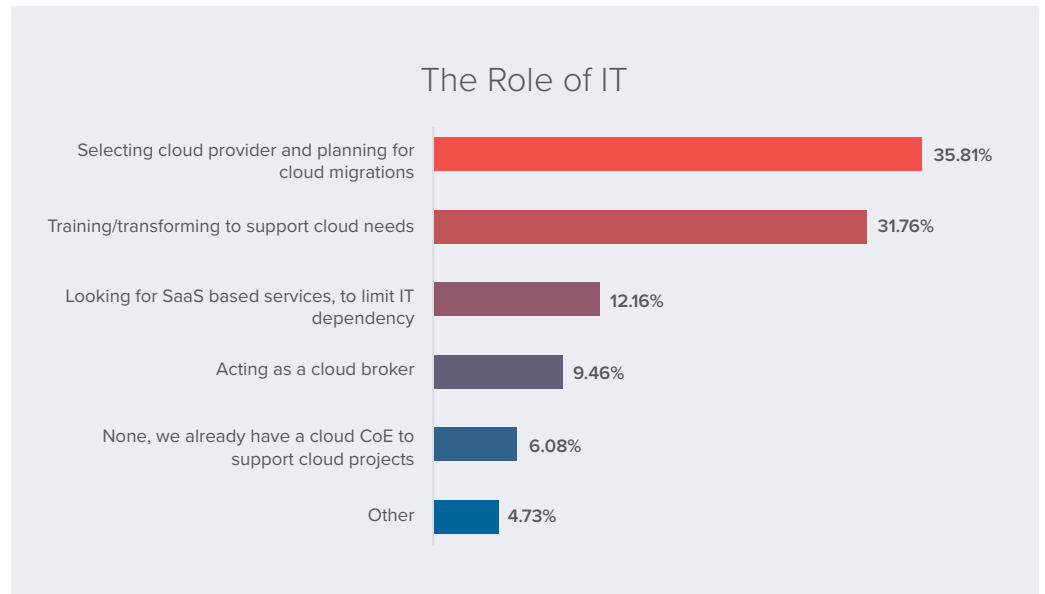
4
DataOps
Kubernetes
Containers

5
Marketplaces
Benefits
Budget

With agile development methodology within the cloud ecosystem, one can easily anticipate a change in the role of IT and how it influences cloud adoption.

The challenge is that IT processes that need to be automated are themselves rapidly transforming as IT organizations move beyond deploying monolithic applications on virtual machines in the cloud. The rise of microservices is requiring IT organizations to deploy, manage, and secure what could easily become hundreds, even thousands, of microservices across the enterprise. In fact, such microservices are likely to span both on-premises IT environments and multiple public clouds.

More than two-thirds (67%) of the surveyed users are driving and transforming their IT teams **to focus around training and cloud migration planning** exercises.



1
Adoption
Challenges
Motivation

2
Deployment
Provider
Roles

3
Use Cases
In-Demand
Services

4
DataOps
Kubernetes
Containers

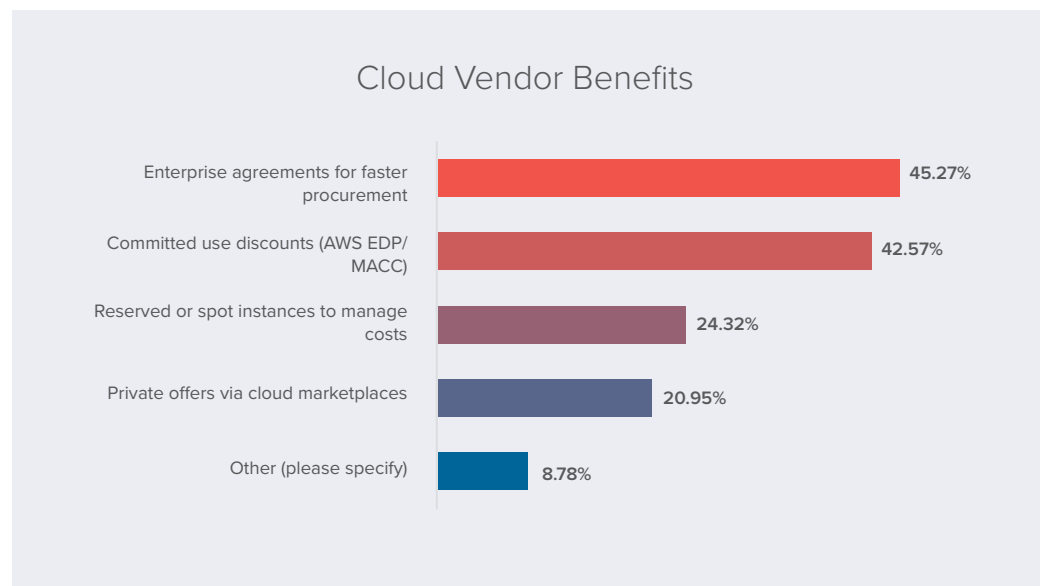
5
Marketplaces
Benefits
Budget

5

Cloud Marketplaces, Benefits, and Budget Spend

Cloud marketplaces have become a strong go-to-market vehicle on various fronts, presenting an attractive sales channel for enterprise software. It enables software sellers to tap into and leverage pools of committed enterprise spend across cloud providers. In talking to the cloud vendors, we realized that users are embracing and expanding their digital footprints through these marketplaces, which play an important role in facilitating self-service capabilities, simplified onboarding, and centralized billing, all of which users are looking for in terms of no-haggle and pay-as-you-go pricing. Private offers, a means to transact via the marketplaces using custom pricing and license terms, were cited by 20% of our participants, and have become an attractive proposition, as the cloud vendors' sales teams are incentivized when it comes to co-selling.

45% of our participants see a strong value in leveraging enterprise agreements via marketplaces to close deals faster, and a similar percentage value discount programs, which help exploit budgets from a procurement perspective.



Cloud marketplaces offer an ideal combination of ease of onboarding and incentives for both software buyers and sellers—removing friction on both sides to facilitate seamless B2B transactions. As companies enable faster innovation with migrations to the cloud, marketplaces enable them to quickly and efficiently buy the tools needed to complement that digital transformation. More than one third of our participants (35.14%) see consumption-based pricing as a stepping stone to managing the overall budget. The ease of doing business in the form of simplified procurement and billing was seen as a good motivator (13%), while limiting IT dependency via self-service deployment (25%) on the marketplace is a clear signal that the solutions need to be user-friendly and easy to deploy.

1
Adoption
Challenges
Motivation

2
Deployment
Provider
Roles

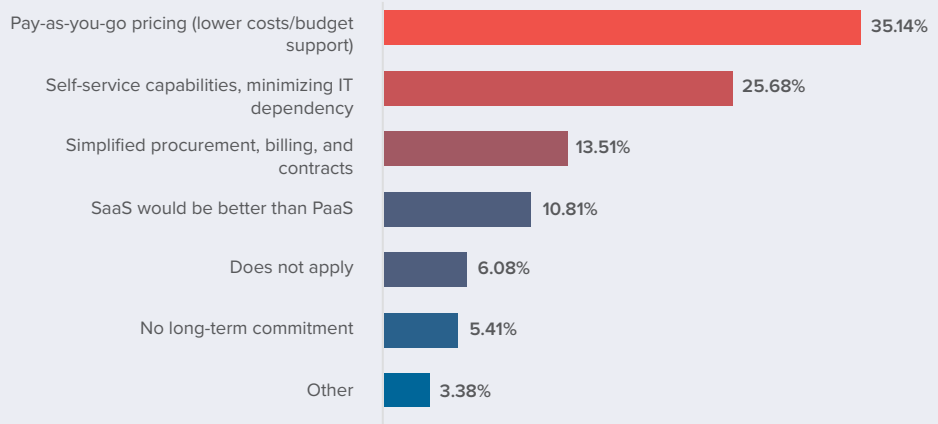
3
Use Cases
In-Demand
Services

4
DataOps
Kubernetes
Containers

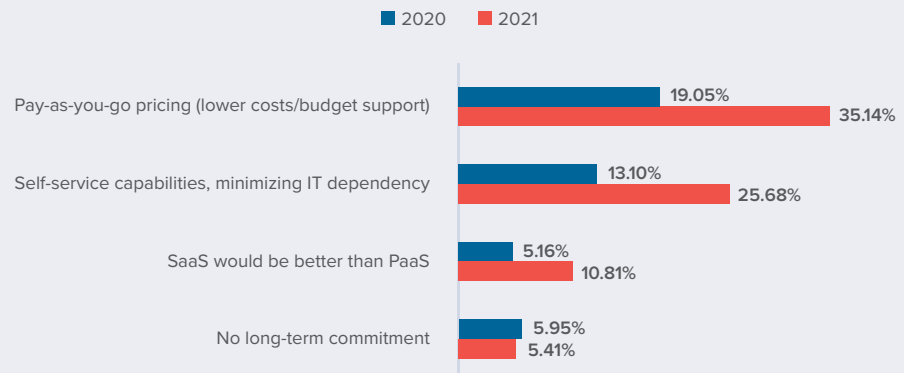
5
Marketplaces
Benefits
Budget

Over 35% of our participants consider **pay-as-you-go pricing as an attractive way** to manage their budgets and a way to start small and grow at their own pace.

Why Cloud Marketplaces?



Cloud Marketplaces Benefits — 2020 vs. 2021



The year-over-year trend projects a strong story by validating the fact that the number of participants interested in pay-as-you-go pricing and self-serviceability almost doubled.

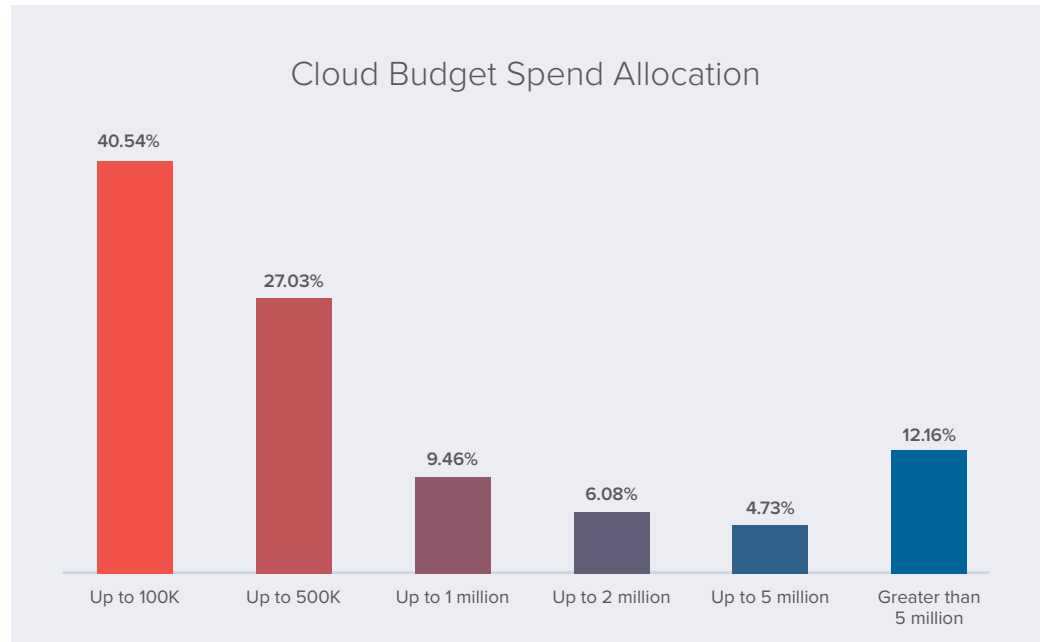
1
Adoption
Challenges
Motivation

2
Deployment
Provider
Roles

3
Use Cases
In-Demand
Services

4
DataOps
Kubernetes
Containers

5
Marketplaces
Benefits
Budget



When it comes to cloud budgets, 60% of those surveyed are starting off with a sizeable investment ranging from \$100K to \$500K while at least 10% have a solid investment plan of over \$5 million, indicating that they may be able to leverage the spend commitment to drive better, faster growth.

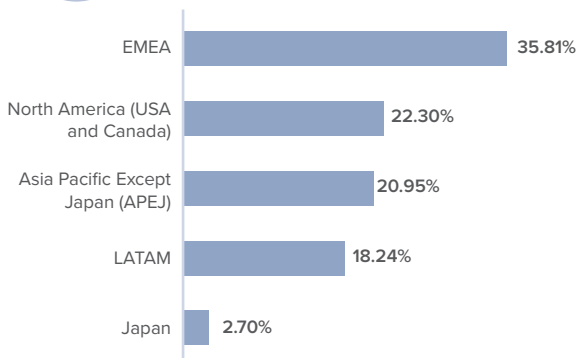
Methodology

This study surveyed about 150 organizations across 3 major global regions - North America, EMEA, and APAC. Users from various backgrounds and roles participated and shared their insights. The results from the Denodo Global Cloud Survey 2021 highlights where organizations are in their cloud adoption journeys. Surveys were fielded online in March 2021.

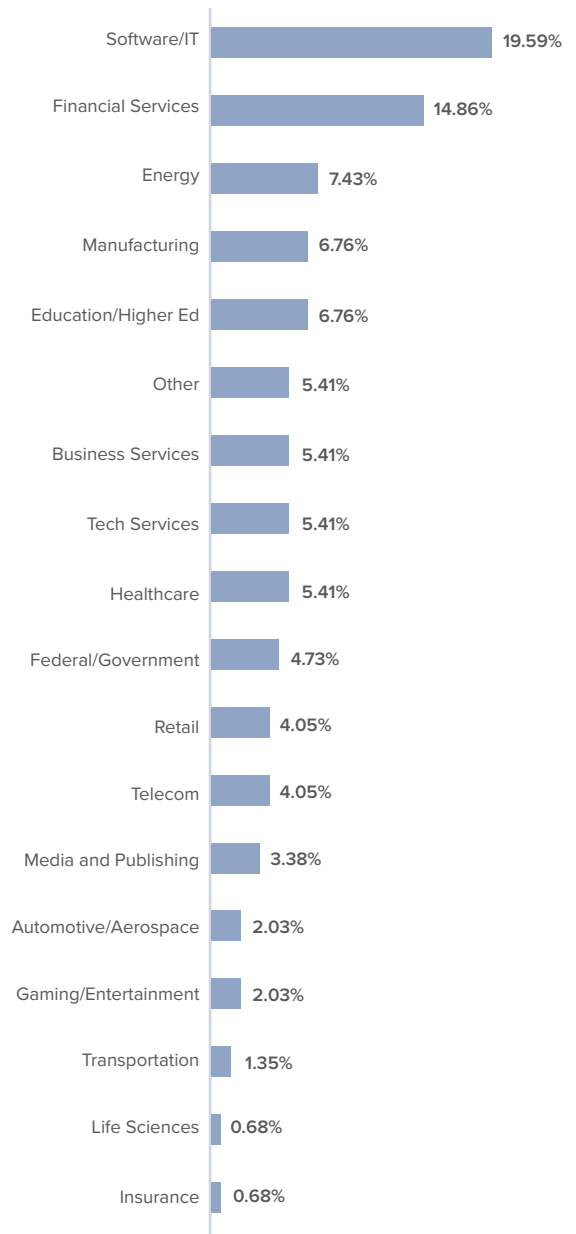
DEMOGRAPHICS



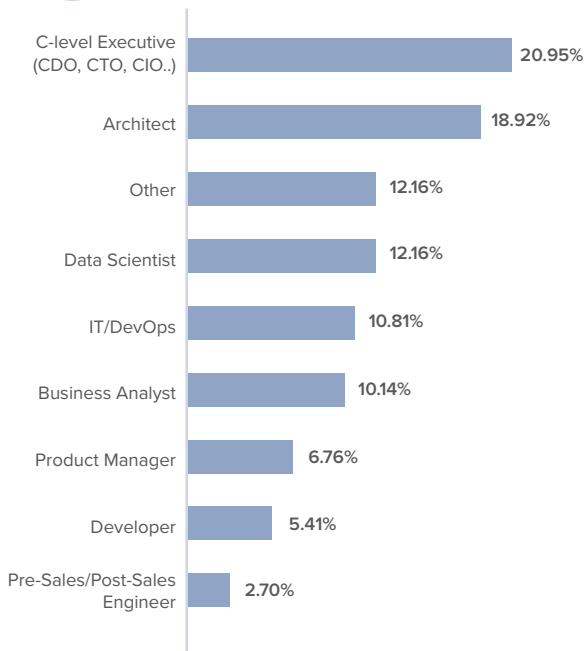
Respondents by Region



Respondents by Industry



Respondents by Role





The Denodo Platform at-a-Glance

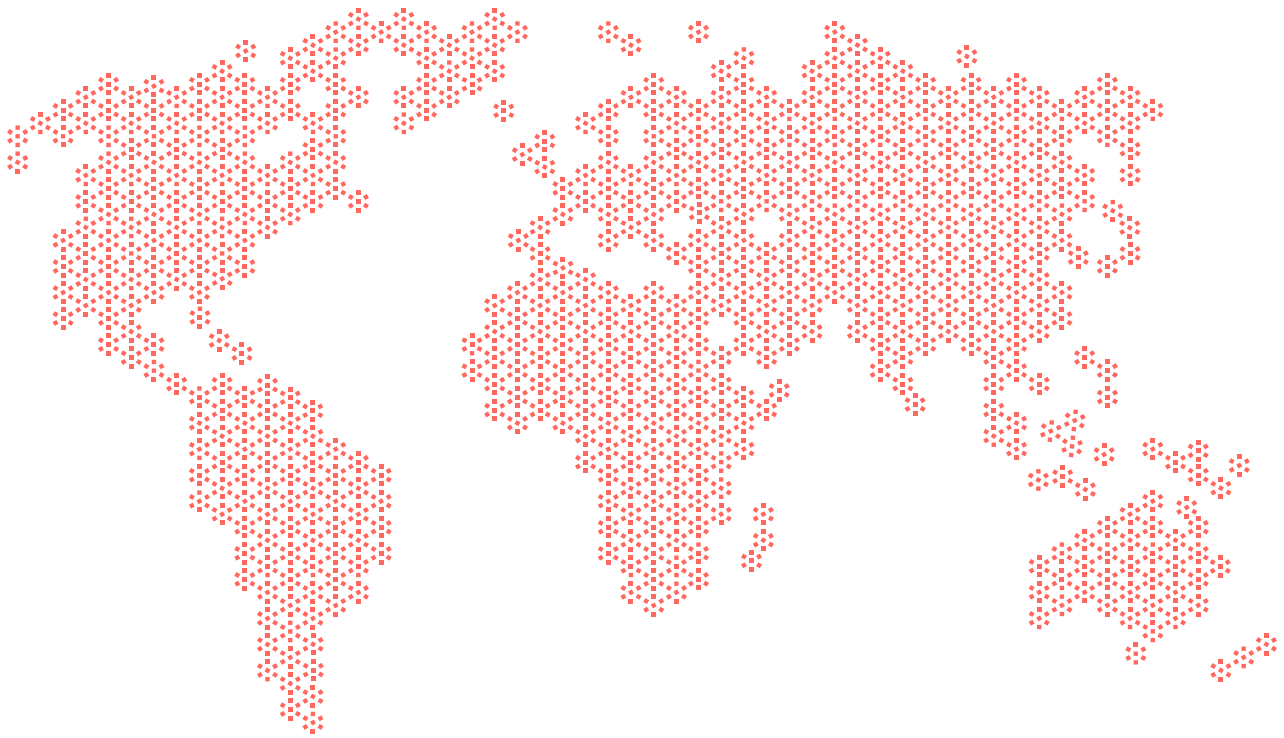
Denodo offers a solution that integrates data in real time, directly from the data sources, without having to move the data to a new, consolidated location. Denodo's no-code/low-code, modern data virtualization solution provides a data abstraction layer that accelerates access to data while providing security and governance.

The **Denodo Platform** can be used to speed analytics by enabling the creation of a logical data warehouse, which can seamlessly combine data from cloud and on-premises warehouses, in real time. The data from all of the connected sources can also be made available as data services, through the Denodo Platform's no-code data-API-creation capabilities.

Denodo's modern data virtualization is the key technology for creating a responsive logical data warehouse that can seamlessly combine data from systems in different clouds or in hybrid data ecosystems. Data virtualization makes data available to any business intelligence (BI) or analytics tool without having to copy or move it. The Denodo Platform integrates and delivers data with up to 85% reduction in time and as much as 80% cost savings compared with other approaches.

Denodo Standard expands the power of Denodo's modern data virtualization to small and medium-sized organizations or departmental use cases by providing an easier and more cost-effective starting point. Available pay-as-you-go in leading cloud marketplaces with automated setup and configuration, it lowers the cost and commitment for analytics and data services scenarios. The low-entry price point for Denodo Standard 8.0 makes it a great fit for small to medium sized businesses that are looking for ROI without making a large financial commitment.

Denodo Standard offers a 30-day free trial across AWS, Microsoft Azure, and Google Cloud Platform marketplaces; [click here](#) to get started with a free trial.



Denodo is the leader in data virtualization providing agile, high performance data integration, data abstraction, and real-time data services across the broadest range of enterprise, cloud, big data, and unstructured data sources at half the cost of traditional approaches. Denodo's customers across every major industry have gained significant business agility and ROI.

Visit www.denodo.com | Email info@denodo.com | Discover community.denodo.com

