POLY CLOUD AND MULTI CLOUD CHALLENGES AND SOLUTION

Abstract

With faster evolution of public cloud technologies in the recent past, multi cloud and poly cloud are fast becoming industry standards. This is going to gain more momentum with top 3 public cloud providers focusing on their strengths in terms of service offerings. Organizations can offer new services to their customers by taking advantage different strengths of public cloud providers. This paper discusses about different challenges in multi and poly cloud and probable solutions.

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Cloud deployment models

Traditionally deployments were of only one type with on premise systems. The deployable will be placed in a shared location or drop box which will be picked up by deployment team and deployed to the physical or virtual servers in on premise data center. With the introduction of DevOps, some of the deployments were automated but the deployment target didn't change. With evolution of cloud technologies, different deployment/operating models came into existence. There are three main models that we will discuss here:

Hybrid Cloud

Hybrid cloud refers to the combination of on-premises data center and cloud infrastructure. This is one of the most commonly used deployment models by financial organizations and other organizations that deal with sensitive data such as PII, PHI data. On premise workloads may run in a private cloud in the data center or directly on data center infrastructure. In hybrid scenario, organizations typically want to retain data sources and some key business critical apps on premise and non-critical apps on public cloud. This helps the organizations meet their compliance needs without any additional efforts during cloud migration.
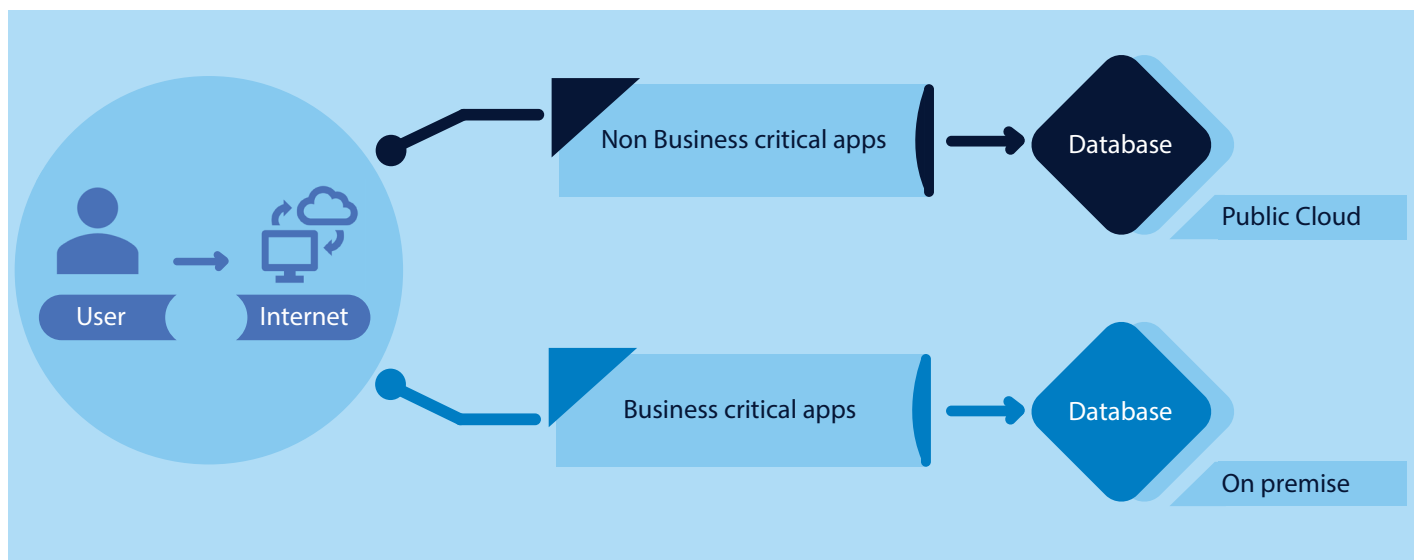

Figure 1. Hybrid cloud

Multi Cloud

Many organizations have multi cloud as part of their cloud adoption strategy to mitigate risks with vendor lock-in etc. Some organizations may choose to deploy certain workloads on certain cloud provider infrastructure but may choose to deploy some workloads across the cloud providers. In multi cloud deployment model, typically same workload is deployed on two different public clouds except for some configuration changes. Workloads which use basic public cloud capabilities are generally deployed using this model. This model is generally adopted to mitigate any region constraints and any availability issues with a given public cloud provider. This generally comes with higher cost and hence generally used for business-critical workloads.
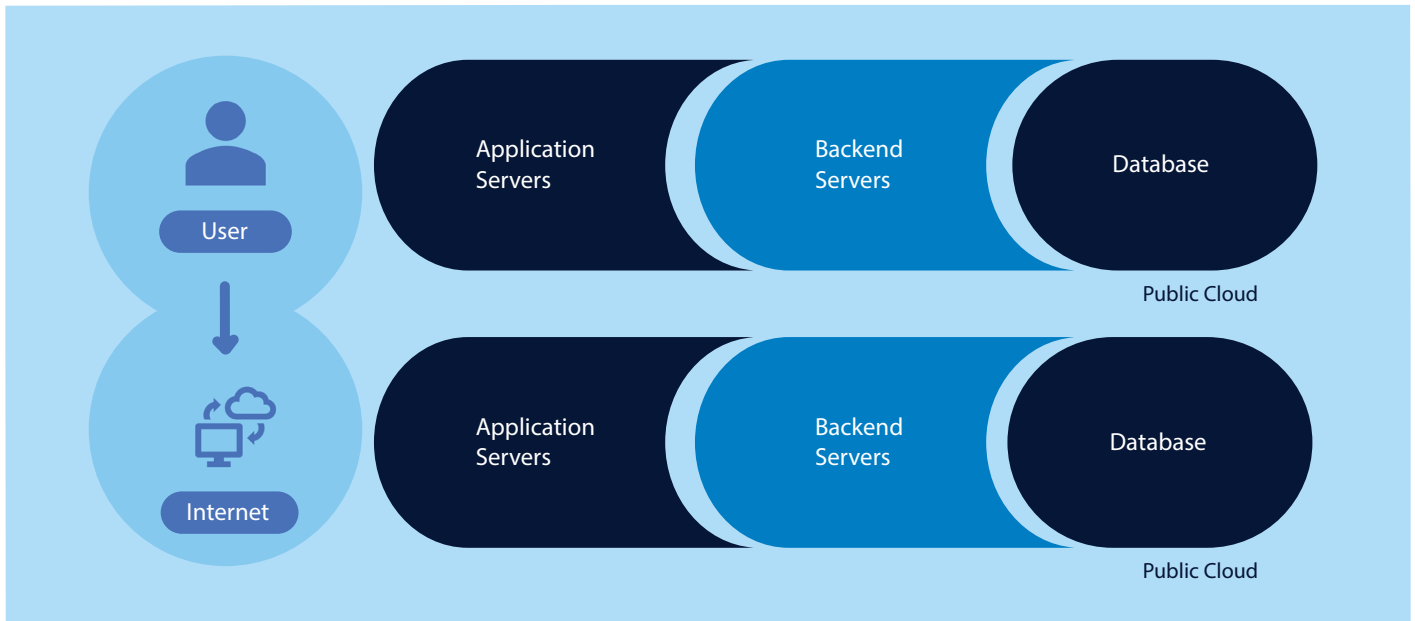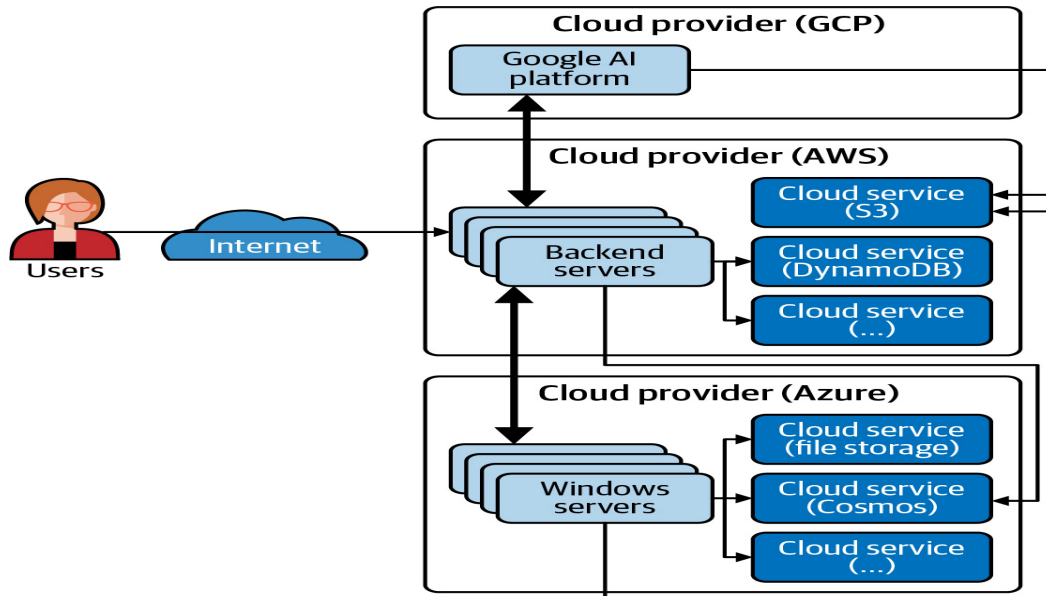

Figure 2. Multi cloud

Poly Cloud

Poly cloud and multi cloud are generally used interchangeably but there are few key differences. Poly cloud model focuses on taking advantage of the best capabilities of the public cloud providers. This model is generally used in developing new service capabilities for the organizations which will help in creating new business offerings.
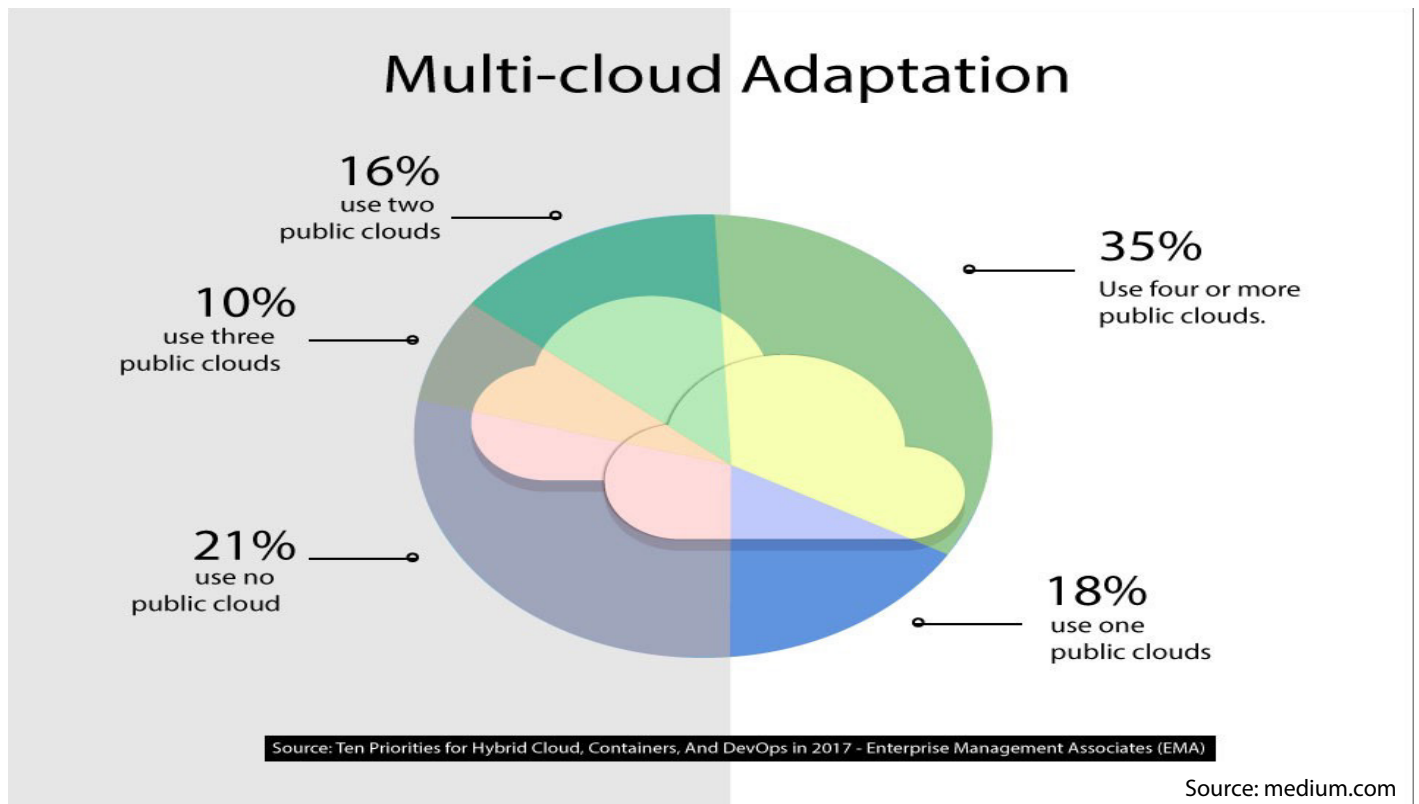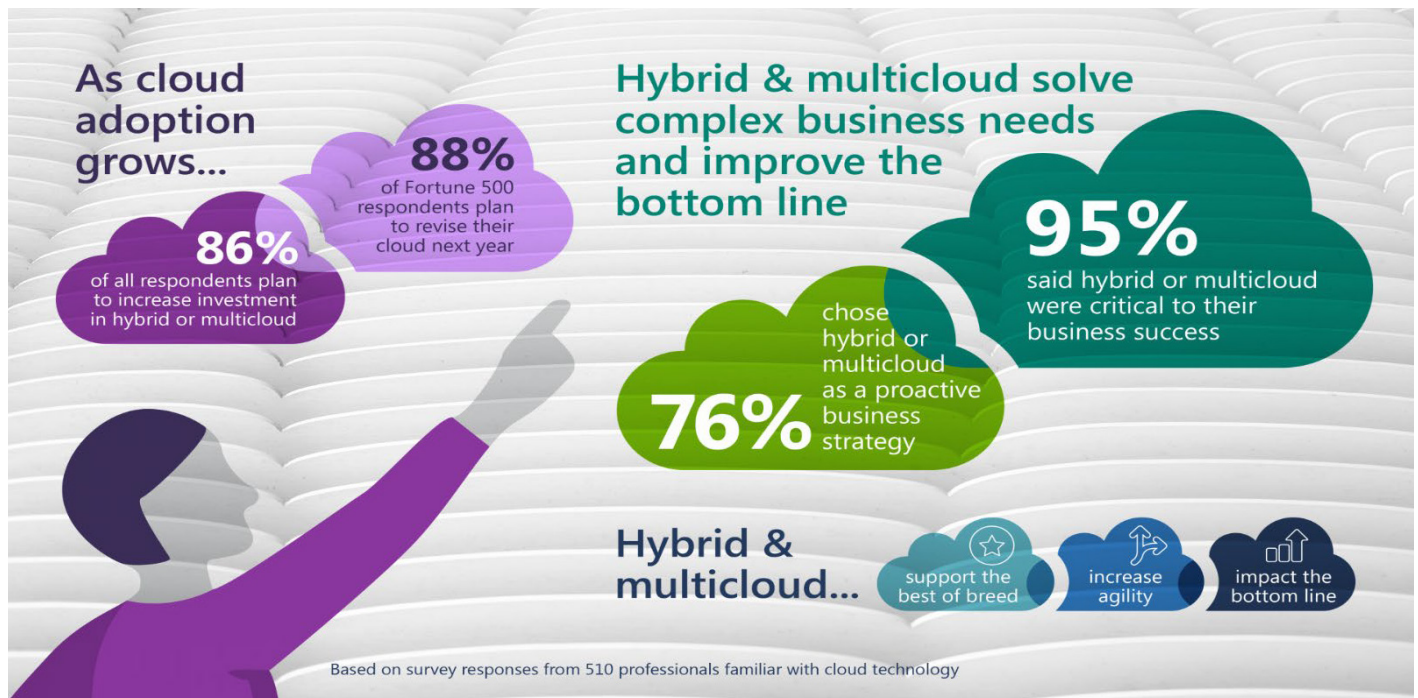

Source: O'Reilly

Figure 3. Poly cloud

Cloud adoption trends

Gartner says that multi cloud is going to be one of the four trends which will shape the future of public cloud. As per the survey by Faction, 92% of the organizations have a multi-cloud strategy in place or underway as of 2022. On average, organizations are using 2.6 public and 2.7 private clouds. (Source: FactionInc)

Multi-cloud Adaptation

16% use two public clouds

10% use three public clouds

21% use no public cloud

35% Use four or more public clouds.

18% use one public clouds

Source: Ten Priorities for Hybrid Cloud, Containers, And DevOps in 2017 - Enterprise Management Associates (EMA)

Source: medium.com

As per the latest report by Microsoft, there is increase in multi and hybrid cloud investments by large enterprises as of 2022. Enterprises look at it as critical success factor to their business success. Key factors influencing these decisions are flexibility, ability to take advantage of each CSP strength etc

As cloud adoption grows...

88% of Fortune 500 respondents plan to revise their cloud next year

86% of all respondents plan to increase investment in hybrid or multicloud

Hybrid & multicloud solve complex business needs and improve the bottom line

95% said hybrid or multicloud were critical to their business success

76% chose hybrid or multicloud as a proactive business strategy

Hybrid & multicloud... support the best of breed | increase agility | impact the bottom line

Based on survey responses from 510 professionals familiar with cloud technology

Source: medium.com

Challenges with multi and poly cloud

Major cloud providers have very strong governance tools and processes, but they don't possess the ability to govern resources across different cloud service providers. This will become a major challenge and has direct cost impact due to the following reasons:

Multi skilled resources

In multi or poly cloud scenario, the technology stacks may be different for selected services on different cloud providers. Even if the programming languages are the same, cloud provider specific technology would be different.

Organization would need resources who possess more than one cloud provider skills to effectively support the applications. As organizations increase the number of cloud providers service provider services as part of their multi/poly cloud strategy, the need for more number of resources with multiple cloud provider skills increases. Organizations often find it difficult to find such resources at scale in the market.

Management complexity

Majority of the cloud providers have very sophisticated resource monitoring services for the services they offer but they don't cover services across clouds. In the absence of single overarching management solution, enterprises will need to build custom solutions for single view of resources or go for third party solutions. There will be considerable manual effort if enterprises don't go for such solutions.

Latency/Outage

Since the applications uses different services across cloud providers, there may be latency issues at times. This could be due to latency issues on one of the cloud providers services or service outage. Service outage on one cloud provider side may result in outage of the application partially or fully though services from other cloud providers are working fine.
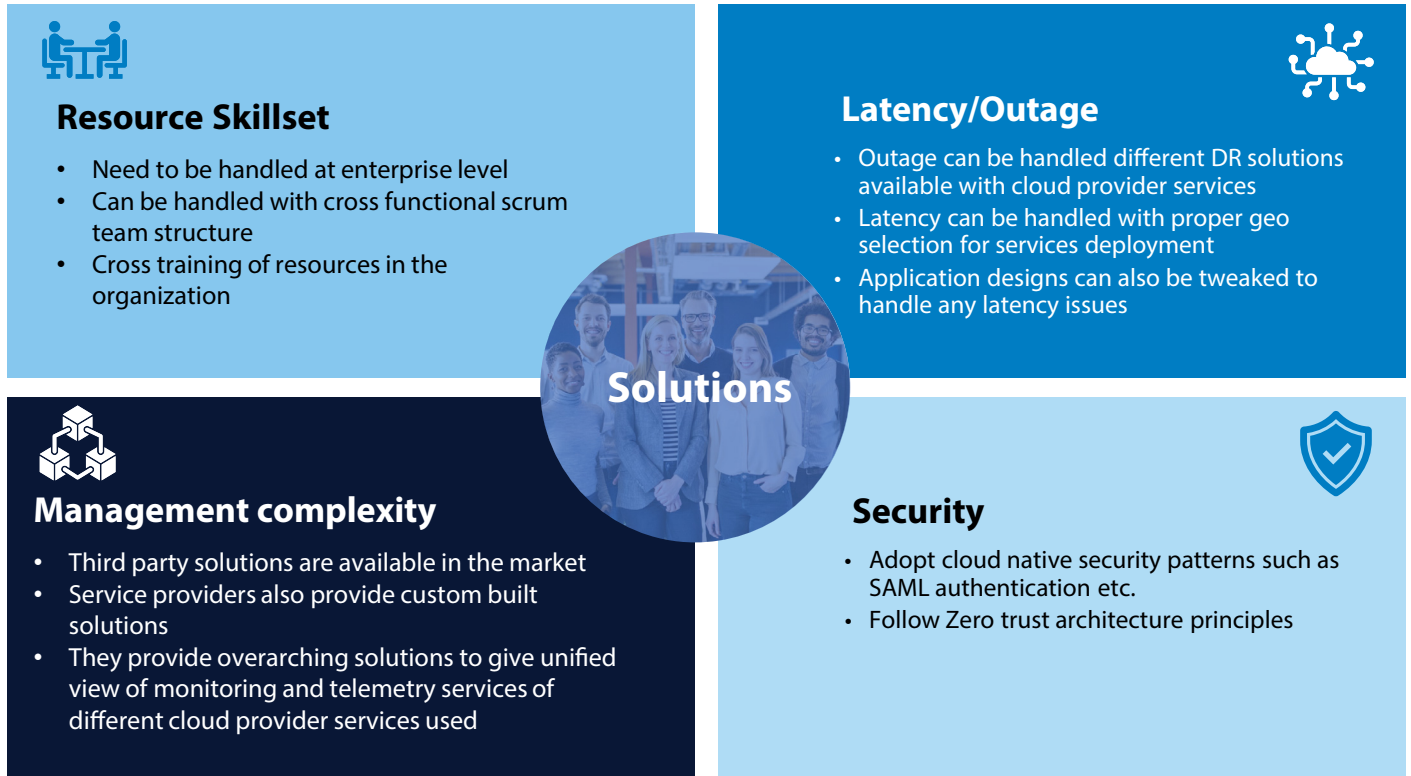
Security

Each cloud provider will come with their own security standards and features. Though they align with industry standard practices, the implementation flavors vary. For example, some services may require role based authentication for which the application should have a role created in that cloud provider identity management system and some services may use SAML authentication. Handling such diversity coming from different cloud provider services in single application could be a challenge.
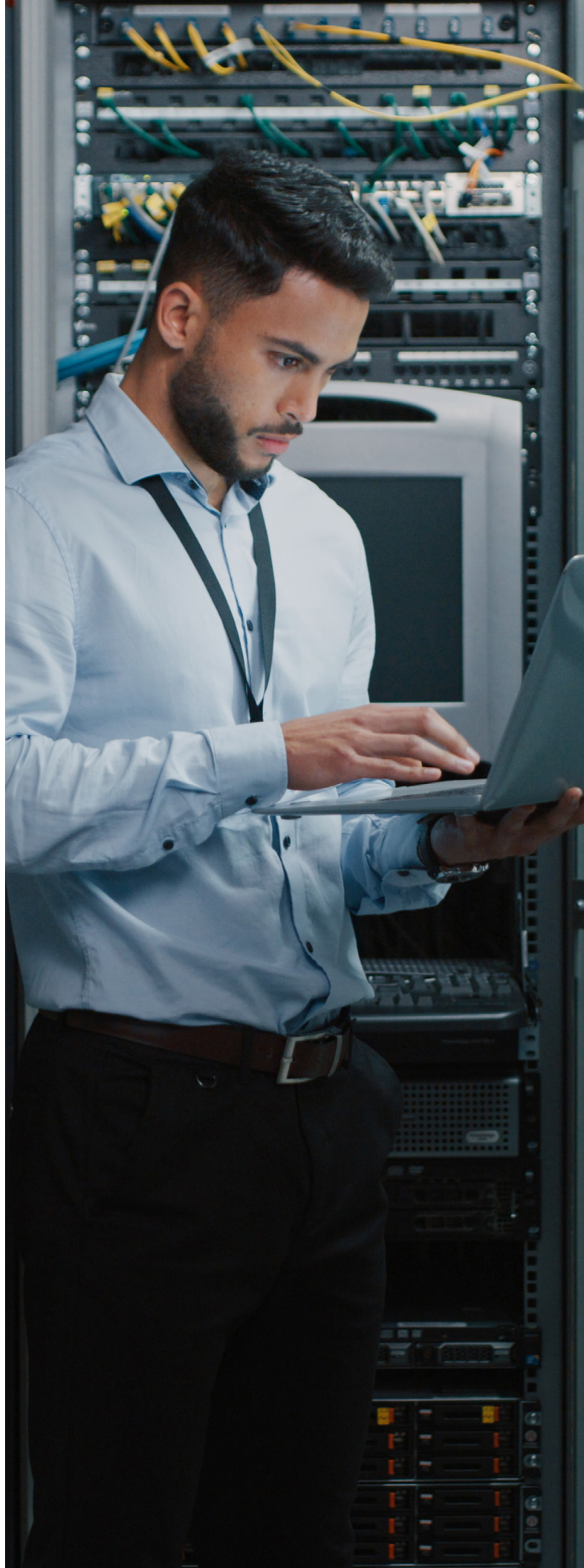
Solutions

While some of the challenges such as resources skillset etc. will need to be handled at enterprise level, there are good solutions available in the market to help with management and governance of resources. They generally have different components which will help with observability, telemetry services, governance modules etc. Such solutions help enterprise focus on delivering better end user capability using the best services in the market and worry less about operations. The Infosys Polycloud Platform is one such example.

Here is the high-level solution summary view for the challenges mentioned above:

Resource Skillset

- Need to be handled at enterprise level
- Can be handled with cross functional scrum team structure
- Cross training of resources in the organization

Latency/Outage

- Outage can be handled different DR solutions available with cloud provider services
- Latency can be handled with proper geo selection for services deployment
- Application designs can also be tweaked to handle any latency issues

Solutions

Management complexity

- Third party solutions are available in the market
- Service providers also provide custom built solutions
- They provide overarching solutions to give unified view of monitoring and telemetry services of different cloud provider services used

Security

- Adopt cloud native security patterns such as SAML authentication etc.
- Follow Zero trust architecture principles

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