

The Strategy to Build Secure Multi-cloud Networking



Success of multi-cloud adoption depends on a network architecture that facilitates distribution of applications while maintaining security and configuration policies, ensuring performance.



The data center is no longer the center of gravity. Today, applications are distributed across data centers, multiple public clouds, and Edge. The current network architecture cannot meet the related performance and reliability expectations. Cloud adoption continues to expand as agile development, swift deployment, and unrestricted scale become the new normal for customers across industries, sizes, and geographies.

Distributed hybrid multi-cloud deployment, decoupled cloud services from a centralized physical location can potentially address client concerns around operational control, performance, and geographical location of the services, providing fuel for a new growth engine.

This paper discusses how to approach conventional network design, including security and operations, as organizations transform to hybrid multi-cloud environments.

Multi-cloud: An effective cloud strategy

A Gartner survey revealed that [81% of organizations](#) using the public cloud were currently working with two or more external providers. Further, if you have anything on-premises or at a co-location, this means you need at least 3 networking consoles for configuration, troubleshooting, reporting, analytics, etc. And the improper and inefficient network connectivity would lead to poor cloud application performance and major productivity challenges.

The networking world continues to evolve to meet the high cloud and as-a-service demands. Enterprises are searching for better programmability, automation,

orchestration, and data center interoperability to build private clouds or cloud-based data centers.

By the end of 2022, the number of enterprise network teams using a SaaS-based console to manage data center networks will increase by more than 10 times to over 1,500, according to [Gartner's new 2020 Magic Quadrant for Data Center and Cloud Networking](#).ⁱ

Organizations have entered a new era of application centric computing where they are quickly adopting multi-cloud architectures. They are choosing more than one public cloud service provider, and empowering end users with a choice of the best components for their use cases. It is also helping organizations avoid circumstances such as a single point of failure and vendor lock-in.

Not leveraging a multi-cloud approach makes organizations fully reliant on one public cloud service provider for all their cloud-related services, and in such cases, there is a possibility that some of the services may not offer the best value to address specific use cases.



Key reasons for adoption of Multi-cloud architecture



Choice of service

No single cloud service provider poses the best set of services to meet all the requirements of an organization. However, a multi-cloud environment allows enterprises to select the best service from multiple vendors for their specific use cases.



Reduced vendor lock-in

A multi-cloud environment allows enterprises to choose the best service from different cloud service providers delivering to their specific requirements. Empowering organizations to choose services from multiple vendors will eventually help them not only to distribute workloads across multiple providers but also reduce vendor-specific dependency.



Low latency

Latency plays a crucial role while deciding the cloud strategy. Choosing a service and infrastructure closer to users will offer better performance. When an organization plans for multi-region deployment of an application to provide a uniform and seamless user experience, a multi-cloud strategy empowers them to choose the closest services and infrastructure from multiple providers.




Improved disaster recovery

Multi-cloud environments help organizations to improve the management of their disaster recovery by adding the flexibility to choose redundant servers from different cloud providers. A multi-cloud arrangement allows replicas of applications in two or more clouds. In case of downtime in one cloud, all relevant requests can be redirected to the applications hosted in the other cloud. This arrangement can also be extended to multiple regions to achieve greater resiliency.




Challenges of Multi-cloud


While multi-cloud deployment becomes the new normal, there are some challenges that organizations face at the beginning of their journey -




Multiple panes needed to configure, manage, monitor, and operate multi-cloud instances




Real time traffic monitoring and analysis across different public cloud, private cloud and on-premises data center are not available



Complex operational models due to diverse and disjointed visibility and troubleshooting capabilities, with no correlation across different cloud service providers



Inability to deliver a common compliance and security policy for the infrastructure and application environment across multiple clouds and on-premises



Inconsistent segmentation capabilities across hybrid instances pose security, compliance, and governance challenges

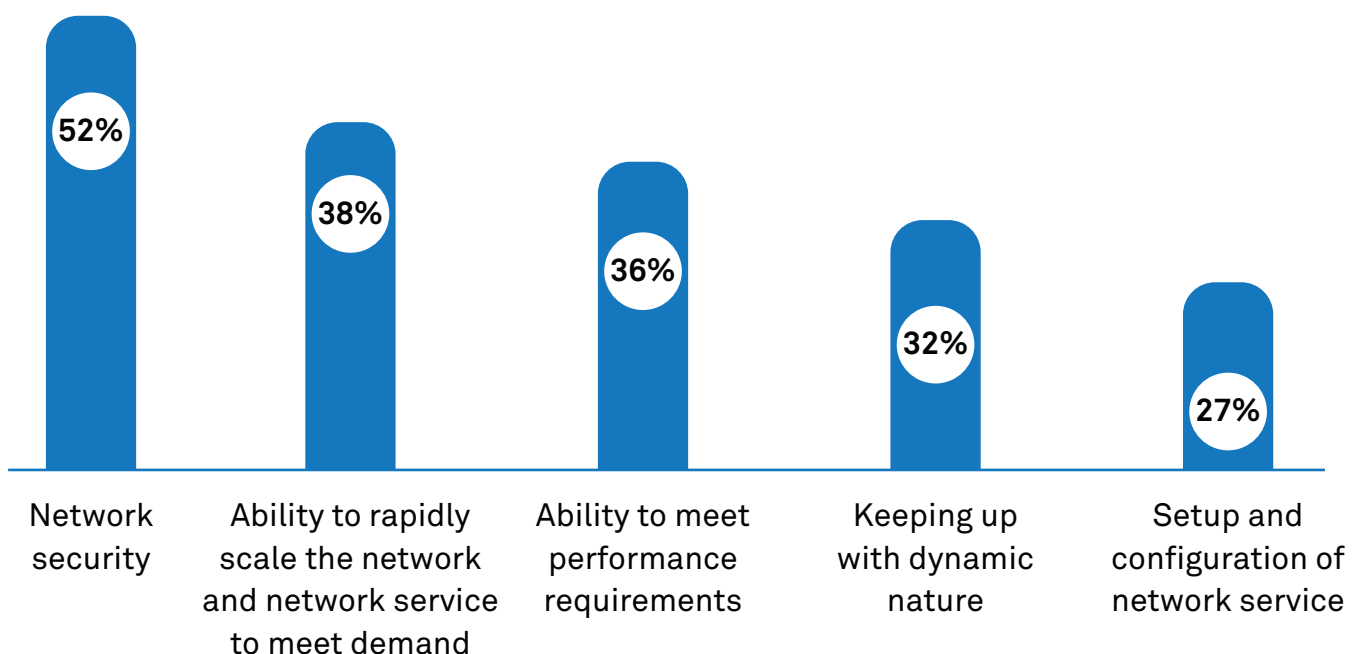


Figure 1: Top five network challenges in modern multi-cloud environments

Network requirements for evolving multi-cloud environments

Organizations need to recognize that in order to successfully migrate and optimize applications and workloads across on-premises locations and public clouds, new network architectures will be required. Specifically, a network architecture, that facilitates distribution of applications while maintaining security, configuration policies and ensuring performance, will be essential.

To be successful, organizations should partner with providers who deliver:



Comprehensive **software defined networking** control plane to simplify network management. This would include policy-based identity and authentication capabilities for both users and microservices components of applications or workloads.



Simplified control and automation where possible. Ideally, solutions should minimize the amount of manual intervention required.



The ability to support modern application environments.



Support to help accelerate the transition to the cloud.



Ideal multi-cloud network architecture

Organizations adopt different public cloud and hybrid cloud environments to build their IT infrastructure to leverage larger benefits such as flexibility, performance, agility, and cost savings. However, the major bottleneck occurs while interconnecting workloads scattered across on-premises data center and multiple public clouds.

The need of today is an application-aware architecture that offers consistent network services across all technology silos and specifies service details that are fundamentally decoupled from the underlying infrastructure, allowing them to be applied through policy translation administered dynamically by the centralized controller with complete visibility of business applications.

The key components of an application-aware cloud-ready network architecture are:



The Cloud edge connects the enterprise WAN to the cloud and ensures proper and seamless interconnection across different regions and between multiple public clouds. This may consist of various transit gateways and native cloud interconnects.



The WAN edge connects the on-prem workloads and end users to the external networks, through private WAN and/or internet. The WAN edge is architected by the SD-WAN (Software defined WAN) to ensure superior application experience for the end users working from office or remotely.



The transport links (MPLS, Internet, LTE, 4G, 5G) connecting the WAN edge and cloud edge become part of SD-WAN fabric enabling better utilization, superior performance, and cost-effectiveness.



In cloud-ready architecture, the **cloud-based network and security** services such as DNS security, URL filtering, proxy services will be consumed in as-a-service model



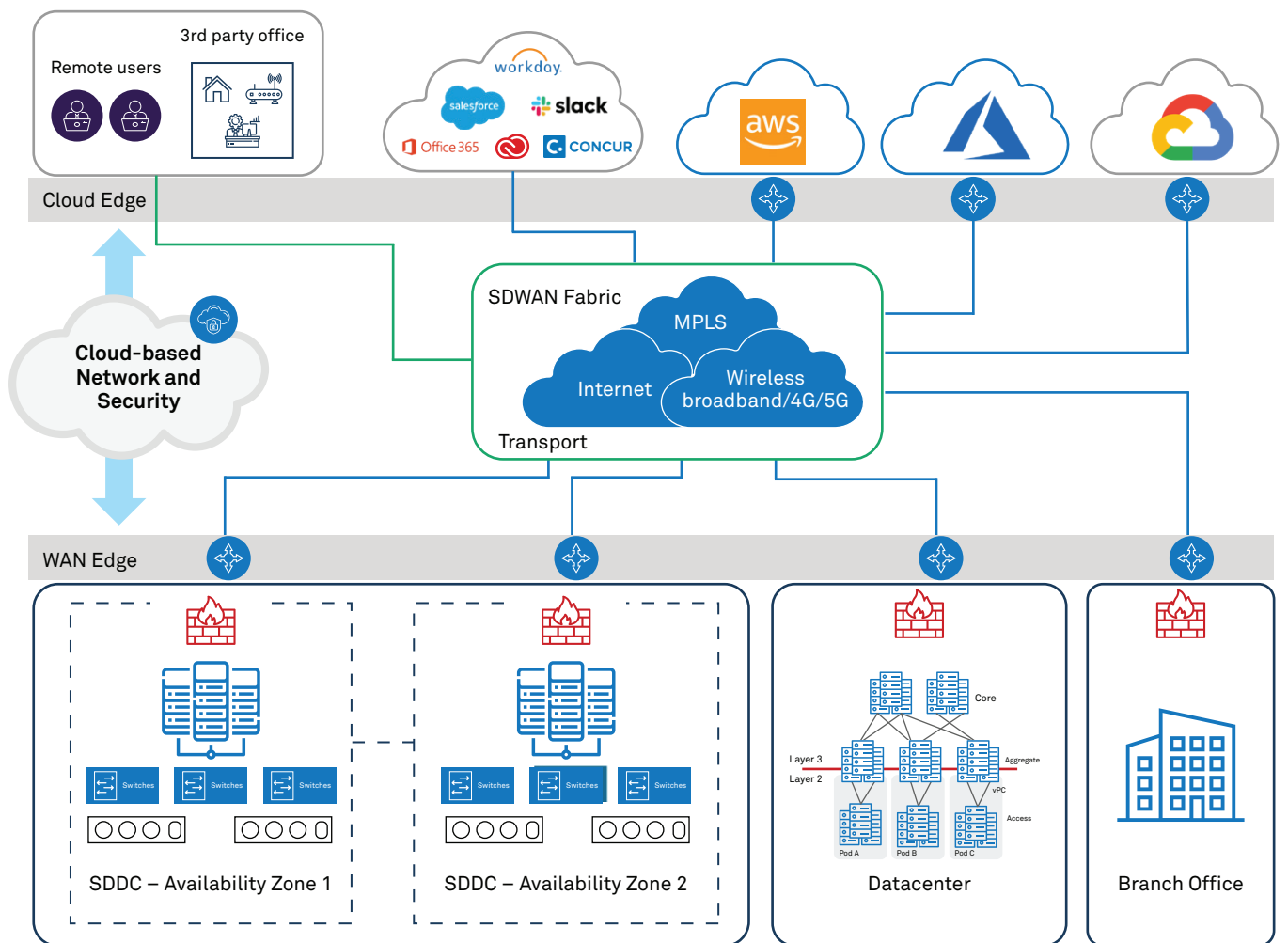
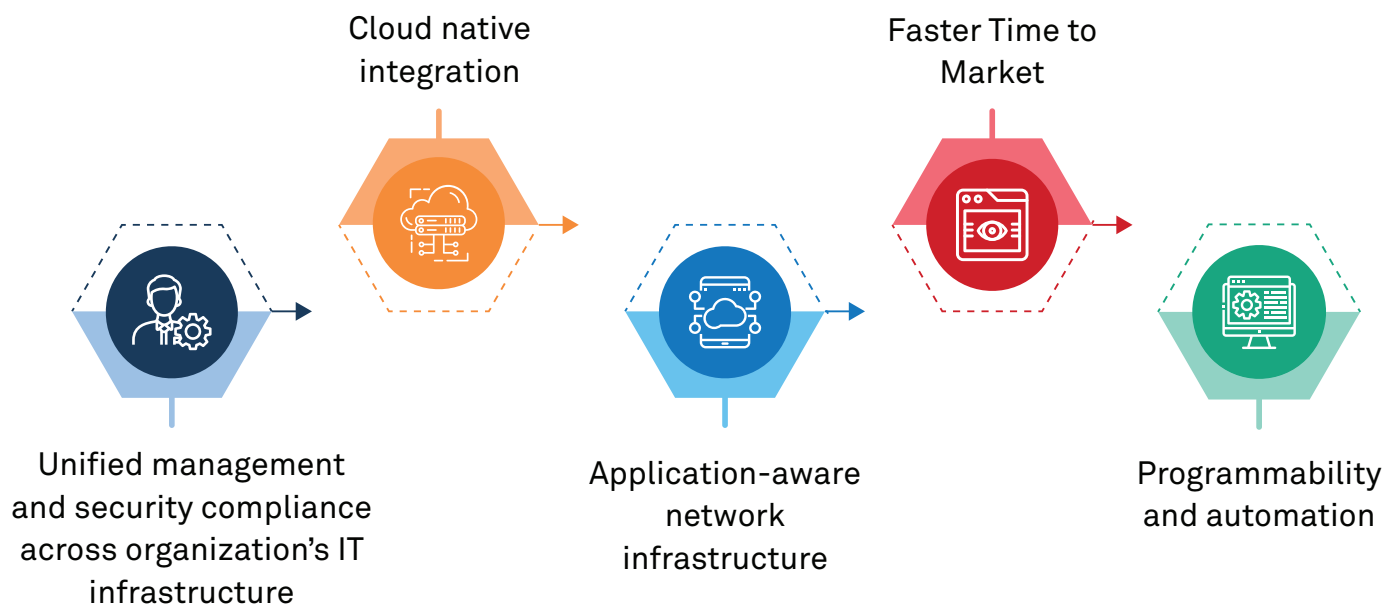


Figure2: Software defined Multi-Cloud Network architecture



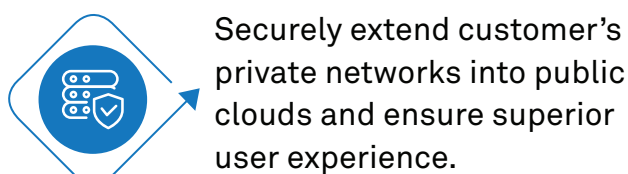
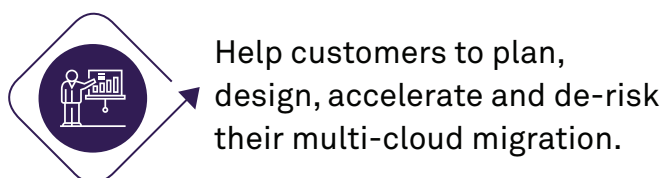
Software-defined multi-cloud network solution benefits

The software defined multicloud network solution enables flexibility to address changing needs by adopting “cloud-aware” network architecture with following benefits:



Wipro's multi-cloud network services

Wipro's highly skilled team of network experts helps customers in their cloud journey with consulting, planning and designing, transformation and management services covering the end-to-end lifecycle.



Protect customer's identities across different cloud environments such as direct-to-cloud connectivity, data, and applications, including SaaS.



Deploy, monitor, and optimize applications in multi-cloud environments with governance and lifecycle management.



Help customers minimize manual intervention by codifying infrastructure wherever possible.

The right path to multi-cloud networking

At the heart of the network paradigm is software-defined networking that helps automate network workflows and consistently maintain a healthy information security posture. The other aspects of network transformation include increasing network bandwidth utilization and establishing flexible but security-conscious controls that support both on-premises and public cloud workloads. Wipro's Software Defined Multi-Cloud Network Solution can deliver secure and simplified cloud connectivity with single pane of glass network management and visibility.

There are plenty of ways that your enterprise can benefit from adopting an ideal multi-cloud network. To learn more about how Wipro can help in your transformation journey, [connect with us.](#)

About the author

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Hareesh has 18 years of experience in the field of information technology, networking infrastructure architecting, and technical delivery. He specializes in software defined, traditional and cloud networking areas. Currently, he leads the cloud networking practice globally within Wipro's Cloud & Infrastructure Services. He holds multiple industry leading certifications, which include Cisco Certified Internetwork Expert Routing & Switching Lab Certification, AWS Certified Solution Architect Associate and Microsoft Certified Azure Solutions Architect Expert.





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strong commitment to sustainability and good corporate citizenship, we have over 2,00,000 dedicated employees serving clients across six continents. Together, we discover ideas and connect the dots to build a better and a bold new future.

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