





# APPROACH TO SEAMLESS MULTI-CLOUD WAN TRANSFORMATION



# Introduction

The transformation of an enterprise multi-cloud Wide Area Network (WAN) network can be a complex and time-consuming task. Several challenges can elongate the transformation process, impacting overall efficiency and timely completion of the project. This document discusses the challenges, pitfalls, and recommends a comprehensive approach to managing the transformation based on our expertise from large enterprise deployments.

# Key challenges and pitfalls with multi-cloud WAN transformation

There are several aspects to keep in mind when managing a multi-cloud WAN transition. These include challenges related to network policy synchronization, performance optimization, dependency management (Cloud, IT Network and MSP teams), legacy infrastructure integration and cloud service provider limitations.



#### Some of the common pitfalls encountered are:



Lack of visibility into virtual networks and route settings within the cloud provider. This can lead to asymmetrical routing, ultimately resulting in incorrect application detection and traffic steering by the overlay platform. It's worth noting that in many enterprise environments, the responsibility for managing cloud routing settings lies with the cloud team rather than the network IT team. This division of responsibilities can introduce additional delays during the migration process, requiring effective coordination between the teams.



During the period of technology transformation, the presence of multiple global cloud interconnect hubs connecting to both legacy and transformed networks can create route loops. These loops can cause inefficiencies and potential disruptions in network connectivity. Therefore, it's crucial to carefully plan and coordinate the migration process to minimize the occurrence of such loops and ensure smooth transitions.



Suboptimal routing can occur when legacy backup VPNs are not properly cleaned up. These remnants of the old network configuration can lead to inefficient routing paths, impacting performance and potentially causing bottlenecks. As part of the migration process, thorough cleanup of legacy VPN configurations should be performed to optimize routing and ensure optimal network performance.



Inter-region traffic sometimes takes the cloud provider's backbone route instead of utilizing lower-cost overlay routes. This can result in higher expenses for organizations. It's important to assess and configure the routing settings carefully during the migration process to ensure that inter-regional traffic takes advantage of the most cost-effective paths, optimizing the use of available resources.



Delays can arise due to incorrect Cloud VPC service key mapping with private connections, which can lead to inaccurate port mapping. Troubleshooting such issues requires advanced expertise in both the cloud service provider's technologies and the cloud exchange provider's technologies and cause delays if not investigated early.



In the context of companies undergoing mergers and acquisitions, as well as application and infrastructure consolidation, effective network segmentation becomes crucial. This segmentation should be applied across both the overlay network and the cloud service provider's infrastructure. By comprehensively planning robust network segmentation practices, one can avoid last-minute surprises that may result in cost leakage and project delays, ensuring a smooth and efficient migration process.



Delays can occur when selecting OEM licenses for cloud services. Cloud service providers offer two distinct options: bring your own license and subscription license. These options may have different lead times, even though they are both electronic licenses. Moreover, transitioning from one licensing model to another can be complex. To mitigate potential delays, the project teams should proactively plan license selection and ensure a clear understanding of the associated processes and timelines.



It's essential to account for planned platform upgrades by cloud exchange providers when scheduling the migration. These upgrades often aim to introduce features or introduce new virtual network functions (VNFs). However, they can also bring about user interface (UI) changes and additional automation. Without proper understanding and awareness of these changes, confusion can arise during the migration process. To minimize disruptions, the migration planning window should consider and align with the scheduled maintenance activities planned by the exchange providers, ensuring advanced interlocks with the exchange provided to understand the potential changes.

# Recommended approach to multi-cloud transformation

Mitigating the challenges mentioned above involves meticulous planning and conducting thorough assessments of application dependencies and performance requirements. It also requires close collaboration with stakeholders across regions, leveraging appropriate cloud networking services and features, and engaging with experts experienced in global multi-cloud WAN migrations.

In addition, network architects and engineers must employ a comprehensive approach to network design. This involves carefully analysing the routing requirements within and between regions, considering factors such as network latency, bandwidth availability, and security requirements. The evaluation process should include assessing the impact of routing policies on application performance, identifying potential routing loops, and optimizing paths to ensure efficient data transmission.



During the transition state of the WAN overlay design, coordination and collaboration are of paramount importance. Stakeholders across various technology domains and regions need to work together to implement consistent and synchronized policies. By aligning the teams efforts, organizations can mitigate potential issues and maintain a seamless end-user experience throughout the WAN overlay design transition.

Here is a recommended multi-cloud WAN transformation approach developed based on the various deployment learnings and engagement with customers globally -



## Discovery

Begin by conducting a comprehensive discovery and assessment of the existing network infrastructure, including the legacy WAN, application flows, control plane routes, and backdoor connectivity between clouds and data centres. Identify the key components, dependencies, and routing policies involved.



#### Design transformed state and migration plan

Develop a detailed design for the transformed WAN overlay and create a step-by-step migration plan including pre and post migration test plans. Ensure factors such as the Cloud networking constructs, routing protocols, Overlay topology, security measures, and specific requirements for application flows and control plane integration are captured in detail.



#### **Define multi-cloud WAN** transformation success criteria

Clearly define the objectives and goals of the WAN transformation. This could include improving cloud network performance, enhancing security, optimizing network efficiency, and achieving seamless application connectivity across regions.



## **Policy evaluation**

Evaluate the existing routing, security and traffic flow policies in the legacy WAN and determine how they need to be adapted or redesigned for the transformed state. Analyse the impact of these policies on application flows and identify any potential routing loops. Ensure that the shortest path between users and applications is maintained, both within and across regions.



# Synchronization of policies across network domains

Collaborate with the customer to share WAN policies, legacy integration architecture and review customer managed policies with in the cloud service provider, backdoor connectivity the legacy and transformed WAN networks. This synchronization is crucial to ensure consistency in policies and prevent conflicts or inconsistencies during the migration process.



## Incremental migration

Adopt an incremental migration approach to minimize disruptions and mitigate risks. Gradually migrate individual regions or segments of the network to the transformed state, closely monitoring the impact on application flows and routing. This allows for iterative refinement and adjustments as needed.



#### Performance optimization

Continuously monitor and optimize the performance of the transformed WAN overlay. Fine-tune routing policies, adjust network configurations, and leverage performance monitoring tools to ensure optimal application delivery and efficient data transmission.



## Pilot testing

Before implementing the transformation across all regions, conduct pilot testing in a controlled environment across a few critical sites. Deploy the transformed WAN design in a limited scope, monitor the application performance, validate routing policies, and address any issues or challenges that arise.



## Collaboration and communication

Maintain continuous collaboration and communication with stakeholders involved in the migration, including network administrators, application owners, and cloud service providers. Regularly share updates, progress reports, and address any concerns or dependencies that arise.

# Documentation and knowledge transfer

Document the entire migration process, including network designs, routing policies, and any lessons learned. This documentation serves as a reference for future maintenance, troubleshooting, and knowledge transfer to the operational teams.

By following this migration approach, organizations can effectively navigate the complexities of transitioning from a legacy WAN to a transformed state while ensuring minimal disruptions and maintaining a robust and efficient network infrastructure.

# Conclusion

Transforming a multi-cloud WAN network requires careful planning, coordination, and a comprehensive approach. By being aware of the potential pitfalls, following the recommended approach and investing in thorough planning one can navigate the complexities of multi-cloud WAN transformation and establish a robust network infrastructure and ensure superior application experience on time and within stipulated budget.



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