Unified SASE for UCaaS and CCaaS Connectivity

aryaka

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Enterprise WANs are critical to the successful migration of unified communications and contact center applications to the cloud.

A cloud model for unified communications and contact center helps organizations lower costs, reduce complexity, and improve end-user productivity and customer experience.

But to exploit the full potential of these cloud applications, the enterprise WAN must be designed for the cloud-first world, offer the reliability and robustness of MPLS with the flexibility and cost of an Internet-based solution.

Executive Takeaways

You will learn the following from this whitepaper:

1 Understand why enterprise WAN and the choice of architecture is critical for the successful migrating of unified communication and contact center applications to the cloud.

2 Explore commonly used enterprise WAN architectures for UCaaS and CCaaS, like MPLS, broadband Internet, overlay SD-WAN, and fully managed SD-WAN as-a-service.

3 Investigate why MPLS, broadband Internet, and overlay SD-WAN are not an ideal solution for UCaaS and CCaaS application performance.

4 Learn why a fully managed connectivity solution that uses a feature-rich SD-WAN CPE along with a fully meshed layer 2 core network offers the best solution for UCaaS and CCaaS application performance.

IDG's QuickPulse survey found that **52%** of medium-sized enterprises have deployed a UCaaS solution.

Source: IDG

Unified communication is also moving to the cloud at a rapid pace. Acknowledging this shift, Gartner discontinued their UC magic quadrant and replaced it with Unified communications- as-a-service MQ. Leading industry reports and surveys convey a similar message; IDG's QuickPulse survey found that 52% of medium-sized enterprises have deployed a UCaaS solution. Another report from Synergy found that the UCaaS market is accelerating at an annual rate of 29%.

Unified communications & contact center applications move to the cloud

Unified communications and contact centers have come a long way from the days of the humble PABX. Today, unified communication is an umbrella term for a new paradigm in business communication and collaboration. UC combines messaging, rich-calls, VoIP, video conferencing, and whiteboard applications in a single platform. These tools allow teams to interact with each other in ways that were not possible in the PABX era. Until recently, inhouse data centers hosted UC applications. But with the advent of the cloud, an increasing number of organizations are moving these applications to the cloud.

Cloud-based contact center market is expected to reach **USD 33 billion by 2024**, at a CAGR of 24.57%

Acknowledging this shift, Gartner discontinued their UC magic quadrant and replaced it with UC as-a-service magic quadrant. Other, leading industry reports and surveys convey a similar message; IDGs QuickPulse survey found that 52% of medium-sized enterprises have deployed a UCaaS solution. A similar report from Synergy found that the UCaaS market is accelerating at an annual rate of 29%.
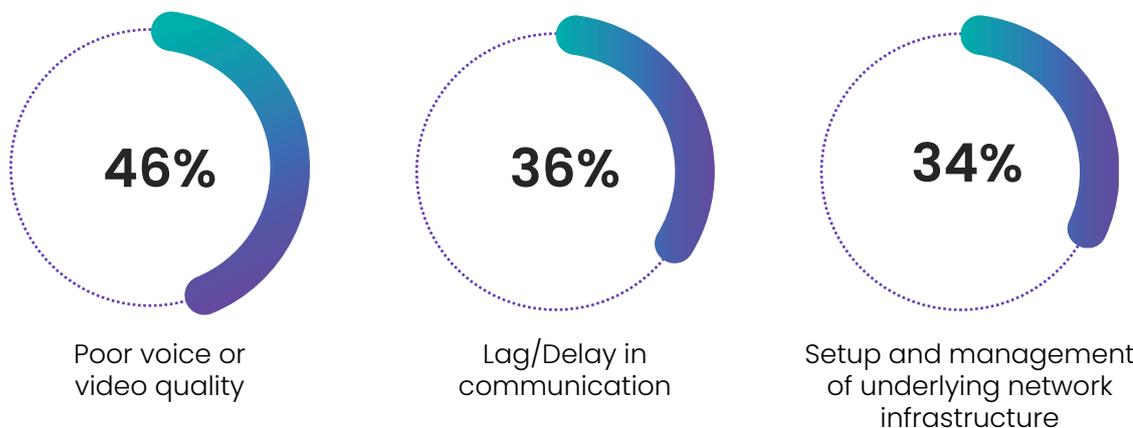
A close relative of unified communication is the contact center application. Excellent customer service is an advantage in an era of intense competition and a marketplace with very little differentiation. Customers have come to expect convenient, consistent, and quick service; 24x7 and 365 days a year. A robust contact center application is a critical business requirement that enables service teams to streamline their interactions with customers.

Contact center applications are complex entities, in addition to voice and video calling capabilities; they also integrate email, chat, text messaging, social media, and customer relationship management software. Recently some contact center application providers have started integrating Artificial Intelligence and Machine learning capacities in their system.

Traditionally contact center applications were hosted on-premise in data centers. But, for reasons of agility, flexibility, and cost, an increasing number of enterprises are moving them to the cloud.

The cloud-based contact center market was valued at USD 8.926 billion in 2018 and is expected to reach USD 33.296 billion by 2024, at a CAGR of 24.57% over the forecast period (2019-2024).

UCaaS & CCaaS Connectivity challenge

46%

Poor voice or
video quality

36%

Lag/Delay in
communication

34%

Setup and management
of underlying network
infrastructure

»Significant challenges with real-time voice and video performance

There is no debate over the advantages of migrating unified communications and contact center applications to the cloud. Still, these applications pose unique issues that must be addressed. UCaaS and CCaaS are different from other cloud-based applications like Office365 and Salesforce, in that they have a real-time communication component. Many of the cloud connectivity and optimization techniques like TCP optimization cannot be applied to UDP traffic. Besides, voice and video transmission have stringent jitter and latency requirements.

> UCaaS is very intolerant of poorly engineered WANs, so IT must tak into accout all elements of the network to optimize performance.

Another area of concern is the massive amounts of data that contact centers generate. Contact centers are at the cutting edge of big-data adoption, vast amounts of data collected during customer interactions, are transferred to some form of cloud-based storage, and processed in cloud-based AI/ML environments like AWS. Typical applications of AI and ML in contact
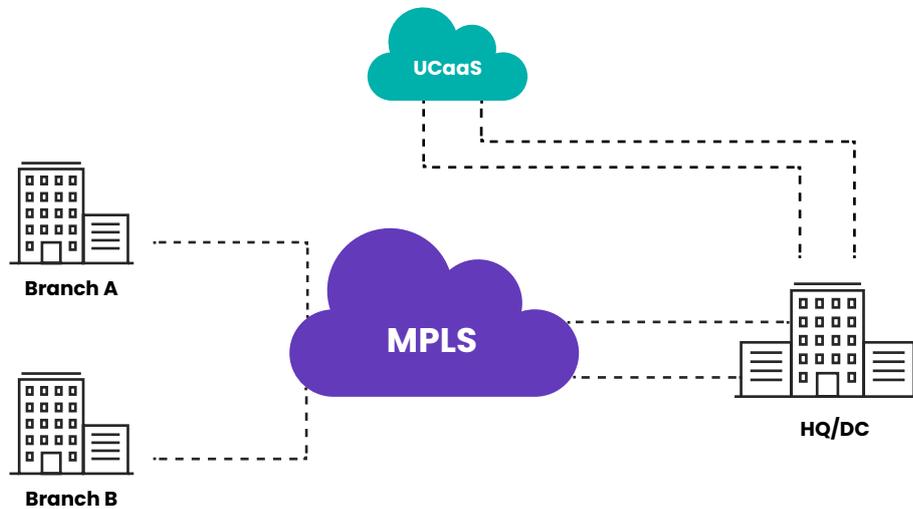
centers are voice recognition, automation of agent responses, and reduction in call hold and average response times.

The third area of concern is the complexity of connecting contact centers in locations like the Philippines and Brazil. To cater to customers in different geographies who demand 24x7 support, enterprises distribute their staff in locations like the Philippines, Brazil, and others. Ensuring good voice quality from these remote locations introduces an additional level of complexity to the enterprise WAN architecture.

Given these issues, it is not surprising that Aryaka's survey of over 700 global IT leaders uncovered significant dissatisfaction with the current state of UCaaS and CCaaS applications.

As part of this survey, global leaders were asked about the most significant challenges with real-time voice and video performance. A large number of them cited poor voice quality, lag/delay, and set up and management as significant challenges.

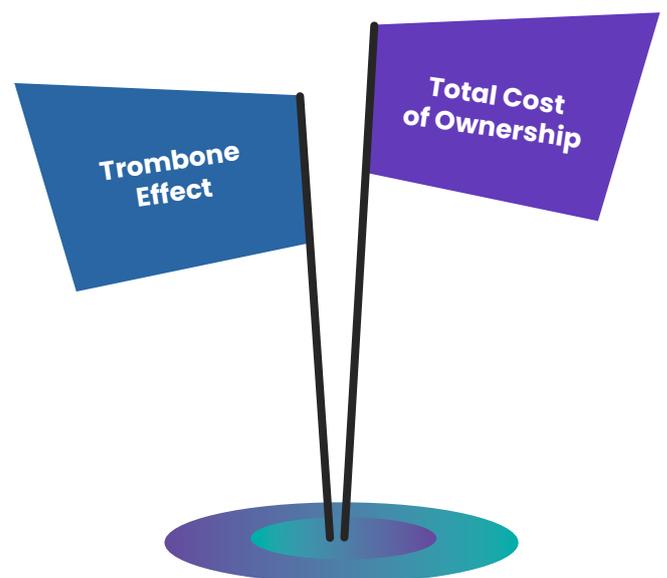# MPLS & UCaaS / CCaaS: Partners who have grown apart
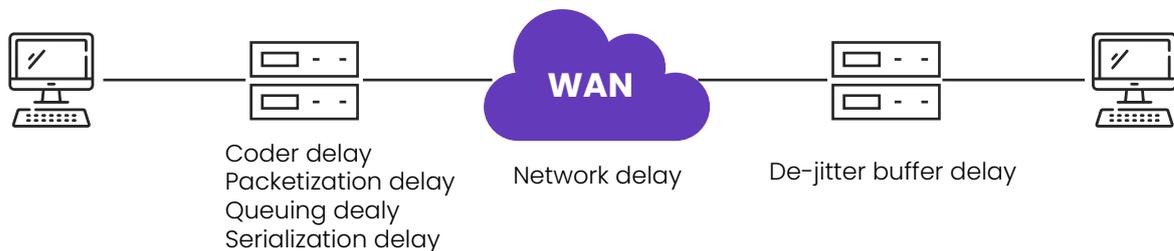

» Calls from Branch A to Branch B routed the HQ/DC

It was not very long ago that MPLS was the answer to most enterprise WAN issues. It was the perfect solution when unified communications and contact center applications were hosted in the in-house data center. Often enterprises invested in dual MPLS links to ensure 99.99% uptime of their VoIP links. These networks followed the hub and spoke model of connecting the branch locations to the data center over robust and redundant MPLS links.

However, this architecture ran into problems when unified communication and contact center applications migrated to the cloud. One typical problem relates to calls between branch locations. A call from Branch A to Branch B traveled to the data center. Further, traveling over the Internet to the UCaaS provider. On the return path, the call is again routed through the data center. This forced routing of calls through the datacenter introduces additional delays and adds to the traffic on the MPLS links.

Another problem is the changing traffic profile. Traffic on the enterprise WAN is no longer restricted to simple office applications. With the deployment of big data analytics, the volume of traffic carried between branch locations and cloud-based storage systems is exploding. Augmenting MPLS links to transport all this data is expensive.

Public Internet & UCaaS/CCaaS: A partnership from hell

Coder delay
Packetization delay
Queuing dealy
Serialization delay

Network delay

De-jitter buffer delay

» Elements that add up to the total delay

Range in Milliseconds	Description
0–150	Acceptable for most user applications
150-400	Acceptable provided that administrators are aware of the transmission time and the impact it has on the transmission quality of user applications
Above 400	Unacceptable for general network planning purposes. However it is recognized that in some exceptional cases the limit is exceeded.

Voice is the primary feature of both UCaaS and CCaaS applications. Sending voice packets over the Internet has always been a challenge. Despite all the technological advances, traditional PSTN networks with their TDM circuits offer the best voice quality. Recognizing this as a critical aspect of the user experience, the International Telecom Union (ITU) listed its recommendations in the G.114 report.

These recommendations are very stringent and primarily targeted at PSTN service providers. In the case of a private VoIP network, the latency criteria can be relaxed to around 200ms – 250ms for acceptable performance. Though not perfect, ping provides a quick and dirty measure of the latency.
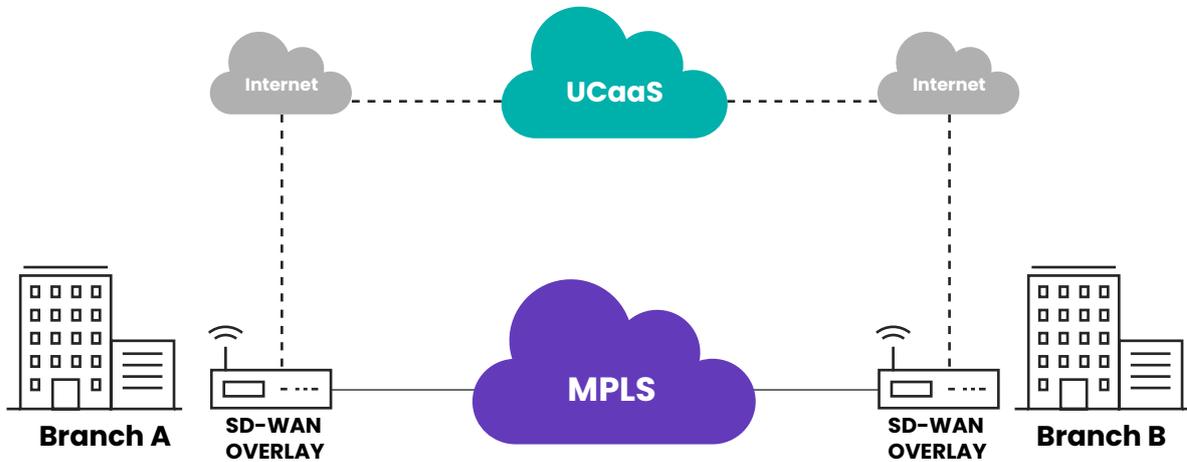
A random survey of the latency figures between cities demonstrates the problem at hand. Ping times between Barcelona and Auckland is around 260ms, while it is 140ms between Paris and LA. At first glance, these numbers seem acceptable. However, when delays related to other areas such as time taken by the codec during the A2D conversion, queuing time at the router, and time in the de-jitter buffers are accounted for, the delay is nudged beyond the recommended levels.

Therefore, to meet the minimal requirement for voice calls, the network delay has to be much lower than the figures indicated in the table. It is practically impossible to meet these requirements over the public Internet. The problem is particularly severe when the connections are between branches in multiple countries.

In today's interconnected world of global commerce, it is not common to find organizations that operate within the boundaries of a single country. Whether it is connecting with customers in other parts of the world, conference calls with offshore branch offices, or coordinating with factories in the Far East, multi location connectivity is the more a norm than an exception.

Overlay SD-WAN & UCaaS/CaaS: Lipstick on the pig

» Overlay SD-WAN with MPLS and internet as the underlying transport technology

SD-WAN often touted as a panacea for every kind of enterprise WAN malaise. The hype associated with SD-WAN has meant that any solution that carries the SD-WAN moniker is regarded as the ideal solution.

Nothing could be further from the truth. SD-WAN can be deployed in a variety of architectures. When done right, it can be part of a perfect solution, but when deployed as an overlay architecture, it is nothing more than an expensive window dressing, it is merely lipstick on the pig.
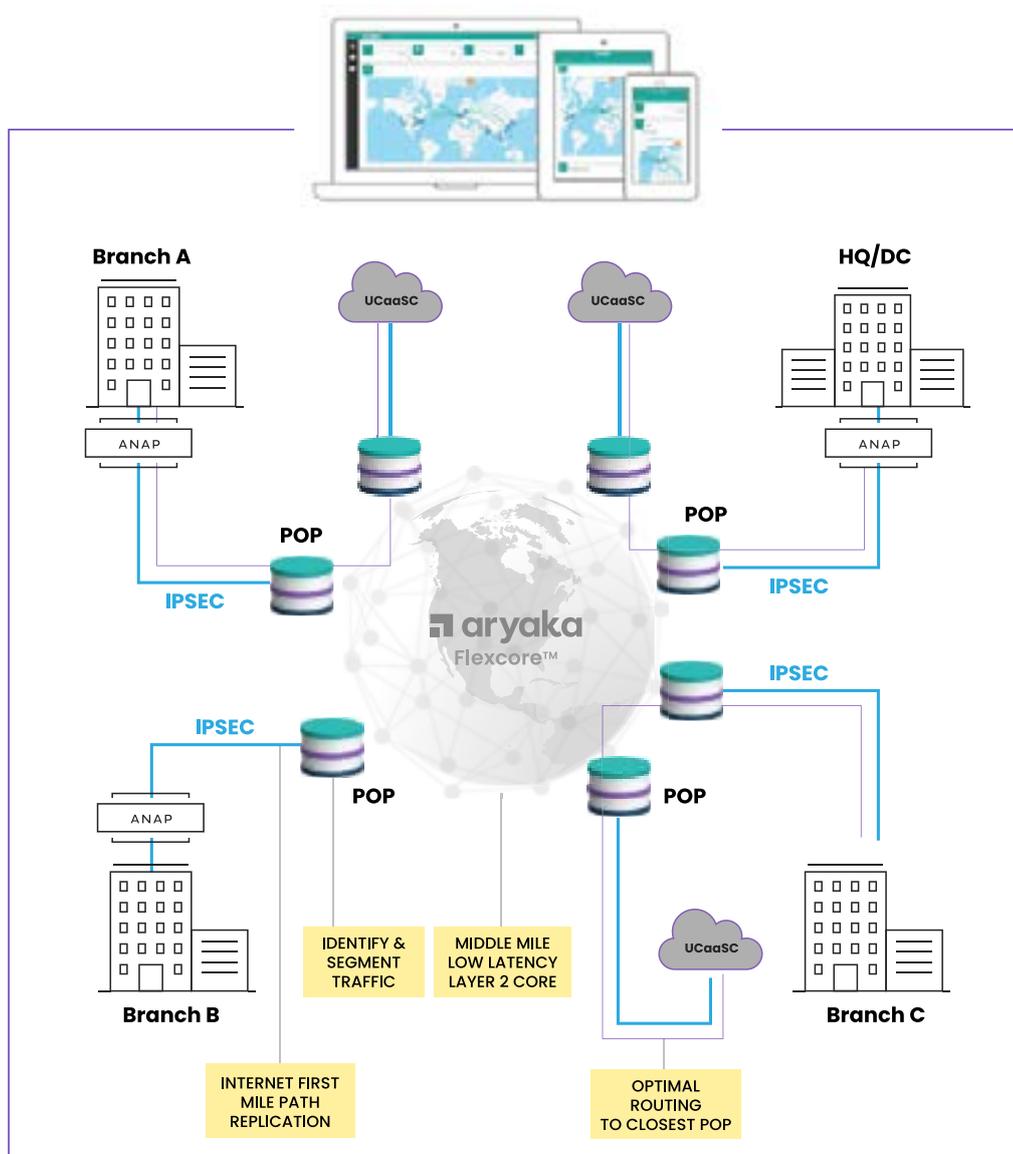
The figure above shows the typical deployment architecture for an overlay SD-WAN solution. In this architecture, the SD-WAN appliance merely performs the function of identifying the UCaaS or CCaaS traffic and routing them either over the MPLS link or the public Internet.

Such an SD-WAN architecture with MPLS and Internet as the underlying transport adds to the cost without actually addressing any of the significant UCaaS or CCaaS connectivity issues.

Diverting non-critical edge traffic to the Internet is one of the few advantages of this architecture. But this is not nearly enough to justify the cost and the effort involved in deploying this solution.

> SD-WAN architecture with MPLS and internet as the underlying transport ads to the cost without actually addressing any of the major UCaaS connectivity issues.

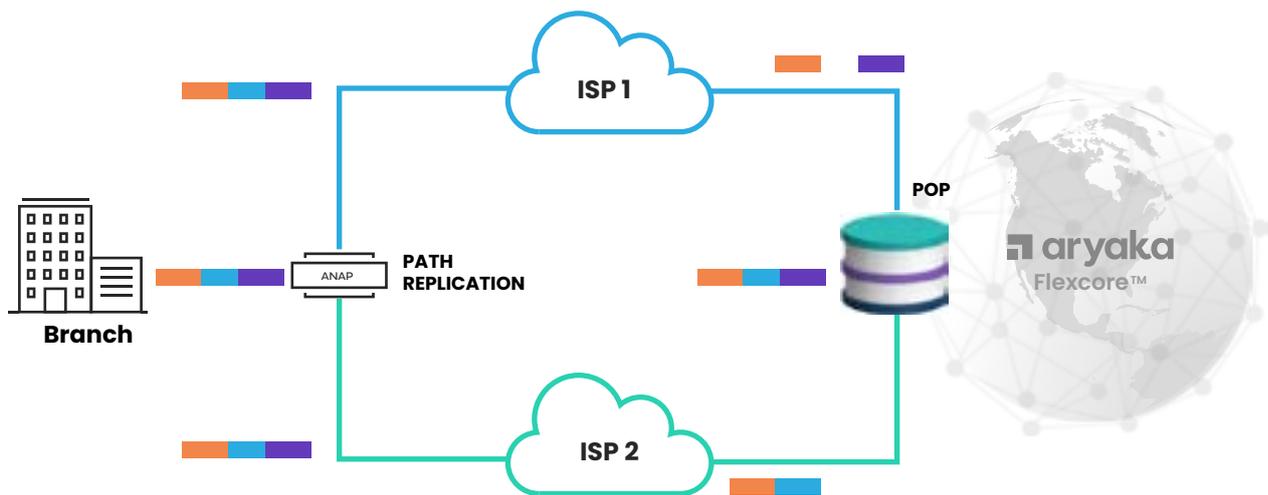# Managed SASE/SD-WAN & UCaaS/CCaaS: A match made in heaven

» Aryaka Architecture for UCaaS connectivity

Before we understand how Aryaka's solution improves the performance of UCaaS and CCaaS applications, let's summarize the most common challenges.

The foremost issue with traditional solutions is that of latency and delays, particularly on long-haul links. The unreliability of the Internet in the first mile is another common problem. And finally, the delays caused by backhauling traffic to the datacentre.

Aryaka's Architecture Advantage

In one of the previous sections, we discussed the drawbacks of an overlay SD-WAN architecture when deployed with MPLS and the Internet as the transport layer. In this section, we understand how the full power of SD-WAN can be un-leased with the right architecture.

» Path Replication with 2 ISPs, LOST packets recovered from alternate link

Aryaka's fully managed solution is built from 3 main components: the Aryaka Network Access Point (ANAP), a global private network of 40+ PoPs, and the MyAryaka reporting and configuration portal. Together they provide an optimal solution for the UCaaS and CCaaS application connectivity. In the following sections, we explain the key features of the solution.

Segmentation, Routing and Ideal Path selection

The first step in improving the performance of applications is the ability to identify and segment traffic. Aryaka's solution uses various mechanisms like port numbers, destination IP, and others to identify hundreds of applications, including UCaaS and CCaaS traffic.

This allows for real-time traffic to be assigned a unique quality of service. The next step in this process is to route the traffic to the UCaaS datacentre that is closest to the remote branch. This ensures an optimal path for the traffic. In the figure, traffic from Branch A is routed to the UCaaS datacenter that is closest to it. Similarly, the HQ is connected to the UCaaS datacenter.

Path Replication & Last Mile Robustness

The short-haul Internet link between the branch and the closest Aryaka PoP is a single point of failure. Any disruption to this link adversely affects voice calls and other real-time applications, leading to frequent disconnections, echo, and other interruptions to the call.
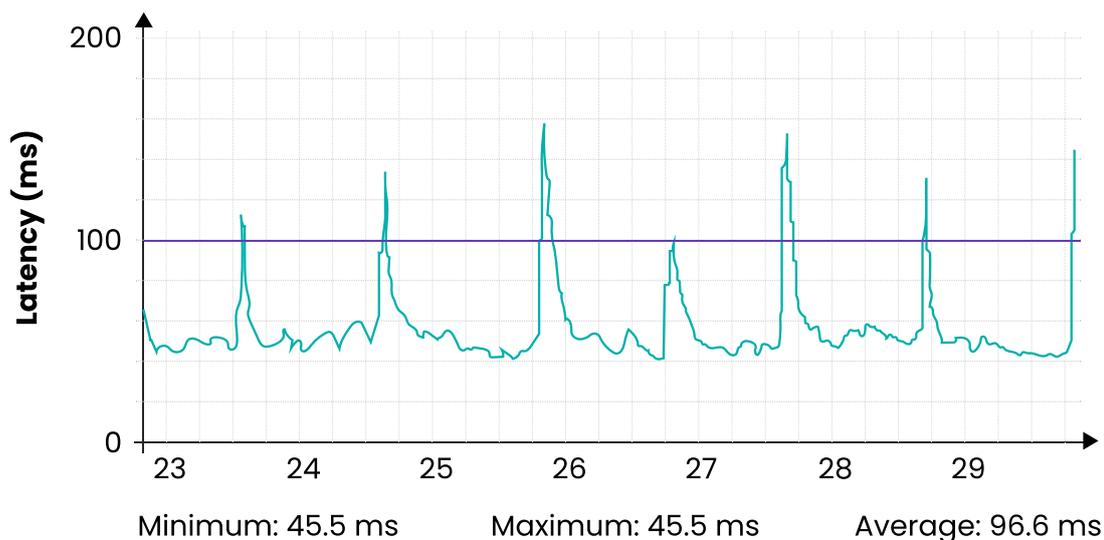
Aryaka's solution overcomes this problem by

using two ISPs from the branch to the Aryaka PoP. Enabling the path replication policy can be considered as a loss recovery mechanism, allowing customers' selected traffic to be replicated over the primary and secondary links. If one of the links experience loss, the second link delivers the same packet to the peer. Enabling Path Replication delivers duplicate packets between peers, with the remote peer consolidating duplicate packets. Path Replication can be applied to any QoS traffic.

Minimizing Middle mile latency

In the middle mile, latency has a significant effect on the quality of the voice call. The middle mile must be optimized to ensure the quality of the voice connection. Aryaka delivers UCaaS acceleration through a private, software-defined network based on both leased fiber wavelengths as well as point-to-point non-peered IP circuits. Through the strategic distribution of PoPs, our private network is within 1-5 milliseconds of leading UCaaS data centers around the world.

Aryaka's proprietary and patented optimization stack is baked into our fully-meshed private global network, freeing businesses from the hassles of maintaining and managing appliances while providing optimized performance to cloud-hosted UC service. Aryaka thus maximizes UCaaS application performance by tailoring the solution for each customer by selecting those locations that minimize the average distance to the users to minimize latency.

| Minimum: 45.5 ms | Maximum: 45.5 ms | Average: 96.6 ms |

» Average Latency in the core network is around 56 milli seconds

Aryaka further solidifies a holistic approach with its SD-WAN edge Aryaka Network Access Point (ANAP). The ANAP is a cloud-managed and provisioned device that provides significant advantages like bandwidth scaling and improved last-mile optimization when deployed within a customer site.

MyAryaka cloud portal - visiblity and analytics in single view

Aryaka provides a fully managed SASE and SD-WAN delivered as a service for global enterprises. We deliver significantly better performance for cloud and on-premises applications, branch offices, and remote/ mobile employees anywhere in the world.

MyAryaka is Aryaka's cloud-based orchestration and visibility portal that gives customers the ability to configure, control, and manage Aryaka's Solutions. Ensuring networks are set up, configured, and remain optimized at scale in an increasingly distributed IT environment is paramount for any enterprise. MyAryaka portal also offers deep, end-to-end network and application visibility for your business and provides APIs for graph data as well as an option to embed URLs that can be used to integrate to customer's existing visibility tools.

Case Study

>> Aryaka and 8x8 deliver superior experience

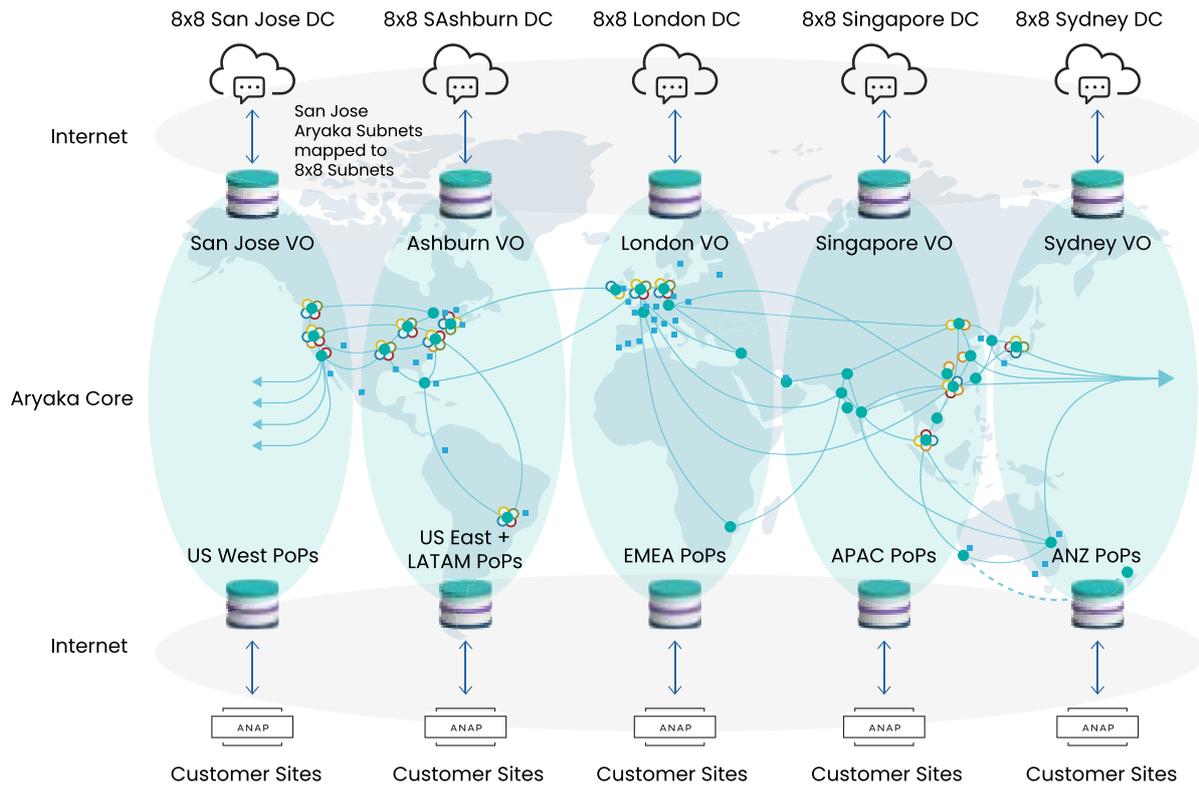| Aryaka PoPs	Region
Los Angeles, San Jose	US-West
Dallas, Miami, Ashburn, Chicago, Sao Paulo	US-East
Frankfurt, Amsterdam, Tel Aviv, London, Johannesburg	EMEA
Singapore, India, Taipei, Dubai, Tokyo, Seoul, China, Hong Kong, Sydney	APAC
Sydney	Sydney

The Problem

When a US-based transportation and logistics company initiated a company-wide digital transformation project, improving the performance of 8x8, their UCaaS solution, was key to the first phase of their plan. To address this issue, as well as futureproof their network for future cloud-based and SaaS application deployments, the company needed to transform its enterprise WAN.

How it works

Aryaka implements connectivity to 8x8 data centers (DC) using it's Virtual Office (VO) implementation. It creates 5 VOs on its backend, and each customer site belonging to Aryaka is mapped to a region, connects to a VO, and is used to access 8x8 for that region. The customer site is mapped based on the POP to which it connects. The following table provides a mapping of the Aryaka customer site POPs and regions:

8x8 provides the public IP subnets to Aryaka, which is hosted in their DCs. The traffic to 8x8 GTM/DNS server IP address is routed over the regional VO. 8x8 maintains a mapping of the Aryaka pubic subnets to that region so that when end points register via Aryaka, they are redirected to the services hosted in that region.

The figure above provides a high-level overview of the solution architecture. It is important to note that Aryaka connects the customer location to the closest 8x8 DC.

Results Achieved

93%
Reduction in data consumption

0%
Packet loss was negligible

20X
Improvement in app performance

Conclusion

The migration of unified communication and contact center applications to the cloud places additional demands on the enterprise WAN. It is essential to meet the real-time requirements of these apps while ensuring the optimal performance of all the other business-critical applications. Dumping additional bandwidth or deploying a poorly designed SD-WAN is not the most effective way to address the challenge. We listed the pros and cons of the various connectivity options ranging from MPLS, Internet, and overlay SD-WAN with Internet / MPLS transport. Finally, we explored a fully managed solution that brings together the power of SASE with SD-WAN with backbone flexibility.

About Aryaka

Aryaka is the leader in delivering Unified SASE as a Service, a fully integrated solution combining networking, security, and observability. Built for the demands of Generative AI as well as today's multi-cloud hybrid world, Aryaka enables enterprises to transform their secure networking to deliver uncompromised performance, agility, simplicity, and security. Aryaka's flexible delivery options empower businesses to choose their preferred approach for implementation and management. Hundreds of global enterprises, including several in the Fortune 100, depend on Aryaka for their secure networking solutions. For more on Aryaka, please visit www.aryaka.com.

Schedule a Free Network Consultation with an Aryaka Expert	Experience Aryaka's Unified SASE as a Service
See How It Works Live →	View Interactive Demo →