

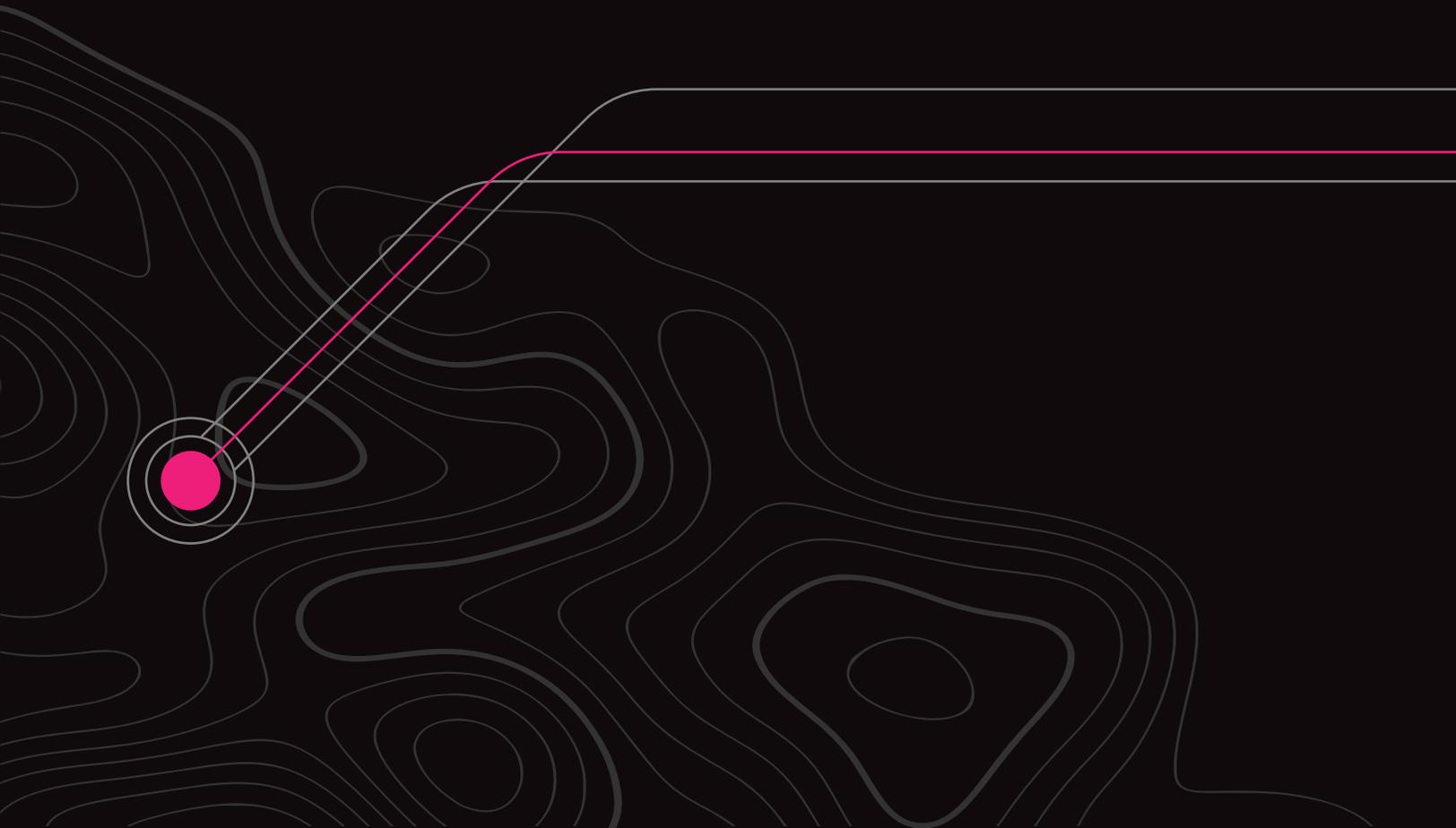
Enabling Cloud-Native Voice for a Cloud-First Service Provider

Crossing the Chasm





In his book **Crossing the Chasm**, organizational theorist Geoffrey A. Moore argues that the key to technology adoption is overcoming the critical inflection point of the “chasm” between early adopters and the early majority. Once a technology **crosses the chasm**, the next phase is adoption by the early majority, followed by adoption by the late majority, and ultimately by the laggards.



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5G is the tailwind that pushed the telecommunications industry across the chasm for cloud-native workloads. 5G specifications were drafted with the expectation that mobile network operators would adopt cloud-native architectural and operational principles, essentially forcing the industry's hand.

5G data services were the first applications to get pushed across the chasm, and there are clear indications that cloud-native voice services have also hit this critical inflection point and will be ramping up next.



Benefits of Cloud-Native Architectures and Operations

Many cloud-native attributes have become industry buzzwords. Microservices, observability, containers, continuous integration, continuous delivery, continuous deployment, and automation are just a few examples of today's favorites. However, Communication Service Providers (CSPs) need more than buzzwords to drive investment decisions – they need clearly defined benefits.

Three key benefits for CSPs who invest in cloud-native voice applications are the ability to:

1 Accelerate the deployment of software releases and features which generate faster revenue, ensure up-to-date security, and increase customer satisfaction

- Typical network element upgrades involve extensive lab and trial network testing before a full rollout, which means that there can be a significant amount of time between updates, sometimes as much as multiple years. This slows access to new service capabilities and can lead to an outdated security posture.
- Customers' expectations, and their ensuing satisfaction, are driven by their experience with hyperscalers and the pace of application deployment in public clouds. Legacy deployments with annual or potentially bi-annual upgrades are neither agile nor practical in a world where service responsiveness is increasingly thought of in terms of days or weeks.
- Vendors and CSPs alike must embrace cloud-native technology and operations. Continuous integration/continuous delivery (CI/CD), test automation, and software upgrades using blue/green or canary methods can significantly enhance the speed and agility of software delivery, upgrades and deployment. Enhanced operational processes are a critical step toward enabling CSPs to move applications into cloud-native environments.

2 Fully optimize resource allocation to reduce costs and increase return on investment in cloud-native infrastructure

- Telecommunications vendors who adopt cloud-native technologies like microservices design, containerization, and Kubernetes for orchestration enable their CSP customers to save money by optimizing the cloud resources required to deliver on-demand scaling of their cloud-native network functions. This is especially important for real-time voice services, which traditionally tend to be less elastic in their resource consumption than most data services.
- Because a microservices architecture breaks applications into independent (micro)services, it is possible to accommodate demand for a particular function without necessarily requiring a corresponding increase in resources for other functions. Two excellent examples of how microservices optimize resources for cloud-native voice applications are:
 - Session Border Controller (SBC) Transcoding: a key SBC function is to provide transcoding between codec types. Many voice calls are established where the codec type at the originating and terminating end are the same, thus treated as passthrough which does not require allocation of resources for transcoding. Because transcoding is resource intensive it is an ideal function to be implemented as a microservice where the resources are only allocated and scaled on-demand.
 - SBC Security: an effective security posture only requires certain functions to be 'always on' – many others only need resources on-demand. For example, an always-on function is needed every time there is a request to establish a new voice session. Resources must be available in order to determine if this request is a legitimate set-up request or a potential malicious attack. On the other hand, resource allocation for media packet replication for secure call recording is only needed on-demand as a very small percentage of calls will ever need this requirement, such as for legal intercept.

3 Leverage automation and API-based observability to maximize voice application reliability

In the Cloud Native Computing Foundation's [Cloud Native Glossary](#), observability is defined as “a system property that defines the degree to which the system can generate actionable insights allowing users to understand a system's state from its external output and take (corrective) action.”

- When cloud-native network functions are architected as microservices and implemented with observability, it becomes an imperative to know the state of each microservice and understand traffic behavior:
 - For each microservice as well as between microservices
 - For dynamic demand on common resources
 - For interworking with other cloud-native network functions
 - For an entire cloud-native network function, ensuring service reliability
- The volume of data generated, and the ethereal nature of cloud-native resource allocation requires automation of “observability.” It is simply impossible to manually execute and correlate the results of every task. Only automation can yield the user insights and steps required to optimize system functionality and reliability.
- Given the increase in deployments of cloud-native OSS/BSS systems, vendors must enable observability using open APIs. These APIs can deliver seamless interworking with 3rd party applications or the ecosystem components needed to collect data across an entire network.



Two Industry Segments Are Taking the Lead for Cloud-Native Voice

Two industry segments have taken the lead in the adoption and deployment of cloud-native voice services. Mobile Network Operators (MNOs) have already crossed the chasm by adopting cloud-native workloads for 5G data services and some are already moving their 5G voice services onto a common cloud-native infrastructure. The second segment is Unified Communications as a Service (UCaaS) and Contact Center as a Service (CCaaS) service providers who are already operating in the cloud. These providers are investing in ways to be more efficient and responsive to usage demands by using a more sustainable and cost-effective cloud-native infrastructure.

1 5G voice service growth is driving the demand to deploy a cloud-native IMS core

MNOs have already started shutting down their legacy 2G and 3G RANs to re-farm (free up) spectrum for 5G, with many more expected to follow in the next 2-3 years. Shuttering 2G and 3G RANs has a direct effect on an MNO's subscribers and their roaming partners for voice service support.

Without a 2G/3G voice network, MNOs must support 4G (VoLTE) or 5G (VoNR), which requires the deployment of an IP Multimedia Subsystem (IMS). IMS is an industry-standard architecture for delivering a seamless communications experience to mobile and fixed network subscribers alike. Ideally, MNOs will deploy a cloud-native IMS core leveraging the commonalities with their cloud-native investments in a 5G core infrastructure to support 5G voice and backward compatibility with 4G voice.

2 UCaaS/CCaaS provider adoption of cloud-native voice

A large majority of UCaaS and CCaaS service providers already operate their businesses in the cloud, whether public or private. These service providers are anticipated to "cross the chasm", if they have not already done so, with investments in cloud-native infrastructure and deployments of cloud-native applications, putting them squarely in the early adopters or early majority category.

Voice services currently represent a small portion of total users for leading UCaaS providers such as Microsoft Teams, Zoom, and Webex, accounting for less than 5% in the case of Microsoft Teams. However, this is rapidly evolving, and these providers are seeing significant year-over-year growth in their users' uptake of voice services, driving the convergence onto a more efficient cloud-native infrastructure.

The story is much the same for CCaaS providers where a critical attribute of contact center success is the ability to be omnichannel, and support customer interaction interchangeably across multiple channels including website chat, text, voice, and in some cases video. Like UCaaS providers, many of the leading CCaaS providers, such as Genesys, RingCentral, Talkdesk, and Five9 are, or will soon be, implementing their deployment strategies for cloud-native voice service that can run in the same cloud-native environment as the rest of their contact center applications.

Ribbon's Telco Cloud Portfolio Enables Cloud-Native Voice Services

In the telecommunications industry, new technology adoption often follows a phased approach, resulting in networks with multiple deployment models existing simultaneously. For this reason, Ribbon's Telco Cloud portfolio encompasses both new cloud-native products and prior virtualized versions with the entire portfolio designed to coexist within a network with multiple deployment models.

Here are five attributes it takes to enable cloud-native voice services that will ensure widespread adoption by the market:

- **Security and interoperability**

Security and interoperability for VoIP traffic and the underlying VoIP network infrastructure are provided by an SBC in a cloud-native deployment. Think of the SBC as a firewall specifically built to address the unique requirements of real-time VoIP communications. Ribbon's Telco Cloud portfolio includes its SBC Cloud Native edition (SBC CNe) which has been designed to take advantage of cloud-native architectural and operational principles while delivering the exceptional level of security and interoperability that CSPs demand.

- **Traffic policy and routing control**

In addition to security and interoperability for VoIP signaling and media, network-wide traffic policy and routing control is required for optimal voice traffic management. While this function can be integrated with an SBC, in a cloud-native environment, it is more appropriately provided as a separate cloud-native function. For Ribbon, this is delivered using the Policy & Routing Server Cloud Native edition (PSX CNe). Designed based upon the same cloud-native architectural and operational principles as the SBC CNe, the PSX and SBC functions are tightly integrated at the application layer yet designed to be deployed independently as cloud-native functions, allowing for the most efficient use of network resources.

- **Common application management across cloud-native and virtualized domains**

When multiple elements are deployed in a cloud-native environment, management must be optimized for cloud-native deployments. This includes visibility and management at the microservices / container level as well as the aggregate application level, such as an entire SBC CNF.

As discussed above, CSPs will typically migrate voice services to cloud-native deployments in a phased manner, meaning that a common application management must be backward compatible, and at the application layer, independent of the deployment model.

These two goals – cloud-native visibility and management, along with commonality across both cloud-native and virtual deployments, have heavily influenced the design and development of Ribbon Application Management Platform (RAMP). RAMP is designed to be deployed in a cloud-native or a virtualized environment to manage Ribbon's portfolio of network functions.

- **Simplification of operational complexity with automation**

One of the most valuable attributes of a cloud-native deployment is the ability to leverage automation, a key cloud-native operational principle. Aligning vendor adoption of CI/CD with its adoption by a CSP increases the efficiency and maximizes the value associated with rolling out new services and features. Ribbon Automation supports software delivery, service and feature testing, lifecycle management (leading with Kubernetes), and configuration management.

Taken collectively, these four automation domains will provide a significant step forward toward the achievement of operational simplification, enabling the optimized implementation of new services and functions.

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- **Analytic insights for network operations and security**

Proactive analysis of network and service traffic using machine learning (ML) models and Artificial Intelligence (AI) offers valuable insights for both operational and security management.

From a network operations perspective, this insight provides advance warning of potential network or service issues and identification of most probable cause to minimize troubleshooting time and resources. It is also possible to identify whether problems are new or recurring. This enables more rapid problem resolution, often before they negatively affect customer experience and satisfaction

From a network and service security perspective, analytics insights provide identification of malicious or unwanted threats, assess whether they are re-occurring or new, and initiate mitigation of such threats through complementary security products such as SBCs.

Ribbon Analytics delivers a full suite of analytics insights, dashboards, reporting, alerting and downstream interworking with complementary products for cloud-native voice network and service operations and security.

Conclusion

The majority of CSP investment in cloud-native infrastructure is in the RAN to support 5G data services. Thus, cloud-native voice services becomes an incremental investment.

As described in this whitepaper, the right investments for cloud-native voice services deliver essential benefits to a CSP, unlocking far more rapid ways to securely deploy voice and collaboration-type applications leveraging optimized resource allocation and increased reliability with automation and API-based observability.

Mobile network operators and UCaaS/CCaaS service providers are two telecom industry segments taking the lead in deploying, or planning to deploy, cloud-native voice services. As they continue to drive industry acceptance, this early CSP majority will emerge as a substantial market opportunity for a multitude of vendors, including those which have been serving that market segment for years as incumbent suppliers IF they can rapidly innovate and deliver new cloud-native products and solutions.

With a broad portfolio designed specifically to address cloud-native voice services and support backward compatibility into already deployed virtualized environments, Ribbon is well positioned to address the early adopters and the early majority who are planning or already deploying cloud-native voice services.

In the end, the migration to, and successful deployment of, cloud-native voice services and the network functions that enable them will be proven out by market leaders who can show a positive return on investment by combining voice and data services on the same cloud-native infrastructure. As outlined above, the ability to observe, analyze, and manage network functions in both cloud-native and virtualized domains will be critical as CSPs manage a multi-year migration plan.



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About Ribbon

Ribbon Communications (Nasdaq: RBBN) delivers communications software, IP and optical networking solutions to service providers, enterprises and critical infrastructure sectors globally. We engage deeply with our customers, helping them modernize their networks for improved competitive positioning and business outcomes in today's smart, always-on and data-hungry world. Our innovative, end-to-end solutions portfolio delivers unparalleled scale, performance, and agility, including core to edge software-centric solutions, cloud-native offers, leading-edge security and analytics tools, along with IP and optical networking solutions for 5G. We maintain a keen focus on our commitments to Environmental, Social and Governance (ESG) matters, offering an annual Sustainability Report to our stakeholders. To learn more about Ribbon visit [ribbon.com](https://www.ribbon.com).

