



Accelerating Network
Transformation



Ribbon Analytics for Mobile Network Operators

Market Dynamics

MNOs are continually challenged with planning, configuring, monitoring and optimizing their networks. As an example, MNOs typically don't know the quality of video their subscribers are watching, how long it takes to download a video, or when a subscriber is likely to give up trying to watch. Without understanding what's happening, it's difficult to make educated decisions on where to invest and where problems are impacting churn.

Big data analytics gives Mobile Network Operators (MNOs) an unprecedented ability to develop business models well beyond traditional connectivity. When harnessed effectively, analytics deliver customer insights that help operators make educated business decisions - reducing costs and improving operational efficiencies. Armed with these relevant insights, operators can also create personalized services that are more valuable to subscribers. Big data analytics can drive incremental revenue opportunities, while delivering CAPEX and customer lifecycle management savings.

Yet, despite the availability of big data analytics, many operators struggle to leverage it effectively. Yes, operators are collecting vast amounts of data, but it often takes multiple weeks of analysis to derive any actionable insights. As a result, MNOs have only just begun to scratch the surface of what big data analytics presents in terms of business opportunities—from helping to proactively respond to market dynamics, subscriber preferences, and customer service issues, to accelerating troubleshooting.

Ribbon Analytics - Meeting the Challenge

Ribbon Analytics delivers real-time, big data analytics visibility - down to the application, subscriber, device, and location level. Ribbon allows operators to tap rich data stores that produce the insights needed to develop, manage, and deploy innovative and responsive services. Ribbon Analytics eliminates multi-week data analysis periods. It provides immediately actionable intelligence that arms operators with real-time, cross-correlated, time-aligned data. Operators can view that data per subscriber, across access technologies, services, protocols, and applications.

With Ribbon Analytics, operators have ready access to the data that enables educated decision making, especially when it comes to OPEX/CAPEX investments—empowering them to act proactively to changes in apps, devices, connections, and technologies. They don't have to wait until they see a competitor act or get complaints from customers.

From Offline to Real-time Analytics, Ribbon Delivers Actionable Intelligence

Ribbon's content and RAN-aware big data ingestion correlates background measurement data with real-time events - delivering comprehensive modeling and analytics. This data integrates directly with real-time dashboards, analytic applications, and network management systems, without the need for intermediate data manipulation platforms. Enhanced with Ribbon's KPIs, this cloud native solution provides an industry first, protocol-level analytics framework that can be used to generate new monetization strategies and services as well as operational workarounds when integrated with policy, OSS, and other centralized analytics tools.

Ribbon Analytics real-time RAN-aware correlation and reporting engine is built to scale with an operator's network. It delivers meaningful information on what happened in the past, what is happening today, and what will happen in the future.

Ribbon Analytics Works within the Network Operations Lifecycle

The Ribbon Analytics architecture pulls vast amounts of data together to work within the operator's network management and operations lifecycle by:

- Cross-correlating high-dimension protocol data across
 - 5G, LTE, HSPA, CDMA, WiFi
 - Operator and OTT services including voice, video, messaging, web, M2M, broadband data
 - Control plane information including QoS, cause failures
 - URL categories, applications, locations, and devices
- Programmatically modeling predictive and descriptive KPIs across several dimensions including subscribers, locations, applications, and networks, to support various end-to-end applications
- Per Application/Service QoE
 - Congestion and Utilization
 - Usage and Mobility Profiles
- Delivering actionable data for real-time and near real-time closed analytics applications, in various forms
- Enabling continuous, optimal management of an operator's core assets and infrastructure

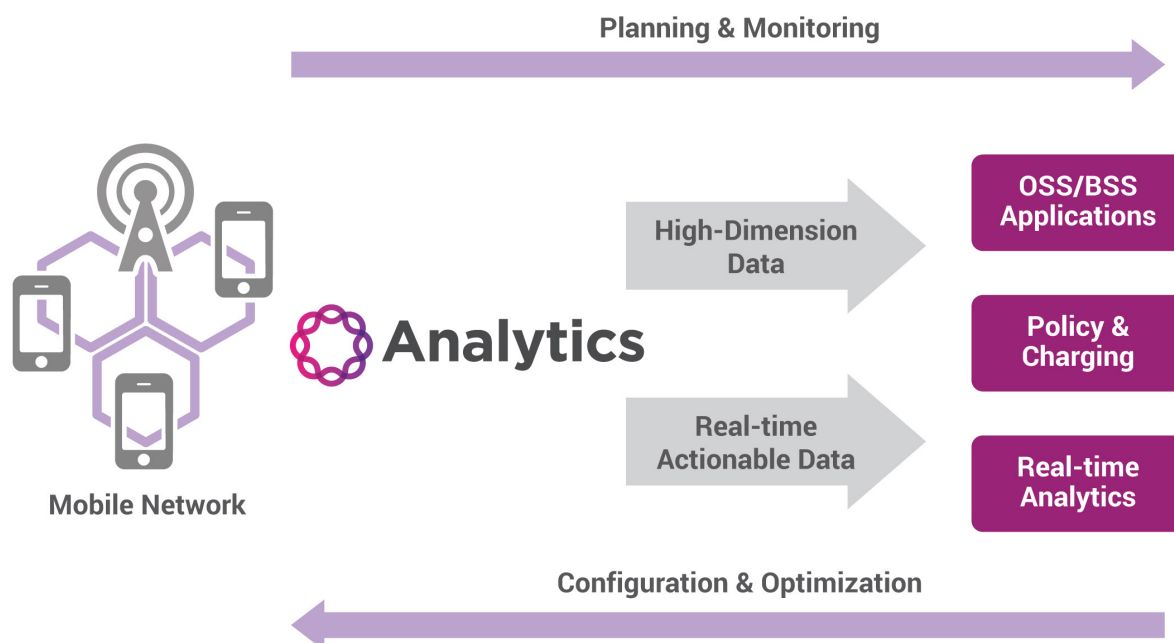


Figure 1. Ribbon seamlessly integrates into operator network lifecycle management to continuously deliver high-dimension and real-time actionable data to the service plane elements

Seamless integration with Operator Interfaces

Ribbon Analytics facilitates a number of phases in data mining including data exploration, data preparation, modeling, and eventual deployment in the form of reporting or closed-loop actions. Ribbon Analytics integrates seamlessly through one or more of the following interfaces:

- Streaming, big data and traditional database ETLs
- Client notification APIs
- Server query APIs

The Ribbon Analytics solution delivers end-to-end analytics, from offline modeling to real-time deployment. This allows operators to conduct forecasting analysis to quantify the advantages of implementing real-time selective optimization, acceleration, CDN/caching, or network selection tied to subscribers or external customers. Operators can expand traditional policy architecture, OSS, and vertical solutions, to implement new services and revenue-generating monetization - in an agile manner.

Operators are already using Ribbon Analytics solutions for new service offerings that require real-time feedback of sectors and subscribers, including:

- Deferred service, for latency-insensitive content delivery such as application updates, or OS upgrades

- Premium service or sponsored data, to provide better experience during peak network activity
- Opt-In notifications, to engage subscribers based on location (e.g., geo-fencing) and activity (e.g. online shopping)

Use Case: Network Planning and Operational Management

Ribbon Analytics solutions help operators expedite troubleshooting, manage their network, and answer questions like, "How can I predict what is going to happen to my network over time?" Having this kind of insight helps operators reduce OPEX, streamline CAPEX spend, and improve the subscriber experience.

Operators are using Ribbon Analytics for end-to-end trace of VoNR and VoLTE and to rapidly troubleshoot scenarios such as:

- 5G/LTE and 3G "ping-pong" as a result of RAT edge node-configuration issues
- 5G/LTE paging failures that expose coverage holes that then create expensive 3G reselection processes
- Voice over New Radio (VoNR), Voice over LTE (VoLTE) and IMS network and subscriber performance metrics to discover end-to-end interoperability problems

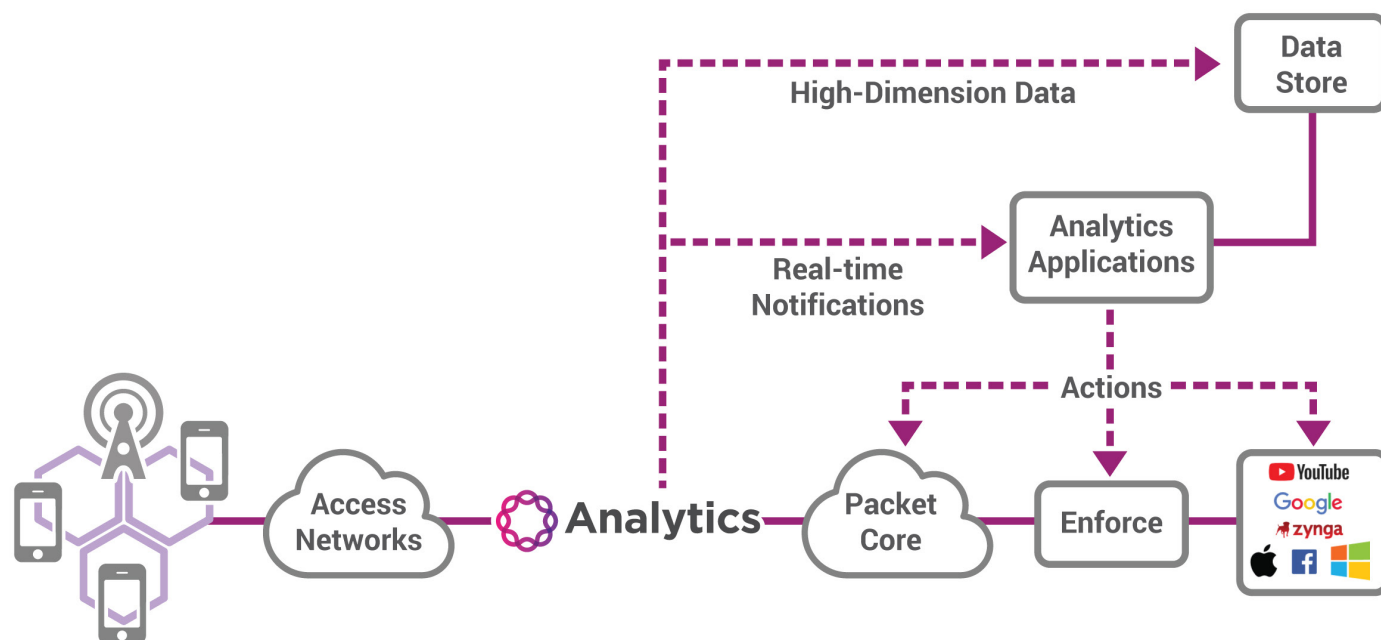


Figure 2. Ribbon Analytics Deployment Architecture

Ribbon Analytics has been instrumental in helping operators with their VoLTE and VoNR deployments. The solution provides transparency across network elements, protocols, services, and devices. As an example, Ribbon's solution enabled one operator to discover that devices from a major manufacturer were causing an IMS signal overload which in turn caused network outages. The operator saved significant troubleshooting time and potential disruptions compared to traditional signaling analysis. They were able to interactively correlate between high-level time series signaling anomalies and finer-grained subscriber, device, and location trends.

Key benefits of Ribbon Analytics include:

- Visibility across control plane and user plane protocols, to track down call failures, and measure latency and jitter
- Support for operator rollout strategies such as:
 - Circuit Switch Fallback (CSFB),
 - VoLTE/SRVCC,
 - VoNR
 - Complete VoLTE and RCS rollouts
- Ability to troubleshoot complex interactions between transport network, IMS network, and services

Use Case: Customer Care/Customer Management

Ribbon Analytics helps operators identify subscriber issues both proactively and reactively, making it ideal for customer care. Ribbon's solution allows operators to take control by providing answers to tough questions like "How can I identify subscribers at risk of switching operators?"

MNOs are using Ribbon Analytics to:

- Identify subscribers that have the potential to churn or move to a competitor
- Distinguish network, application and device issues associated with poor subscriber experience
- Minimize expensive physical probes or manual drive testing by passively collecting customer experience across applications, devices, locations

Competitive Advantages for MNOs

Armed with Ribbon Analytics, operators can proactively meet the needs of their subscribers. Operators can offer customized content, tailored services, and personalized messages to interested subscribers. Focused outreach improves response rates, drives higher sales, and reduces churn.

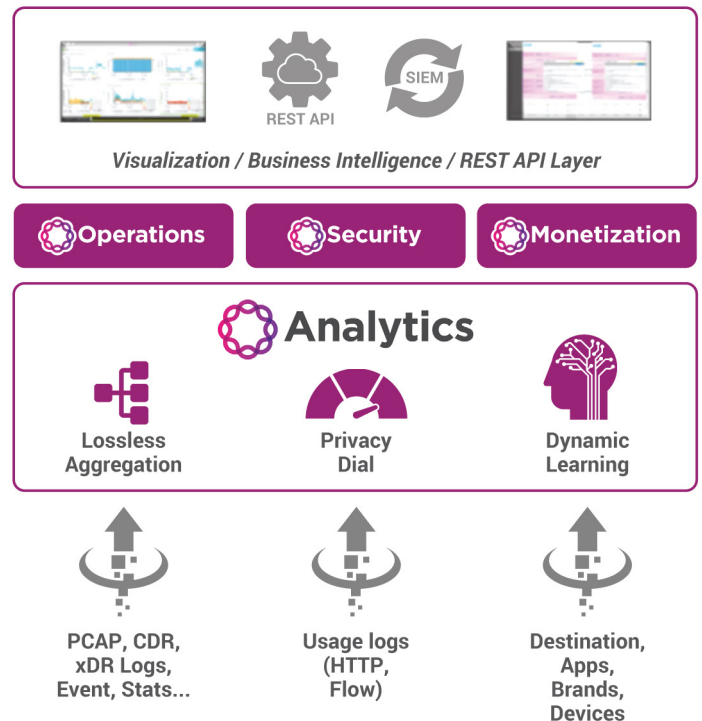
Ribbon Analytics delivers granular, real-time actionable analytics – right down to the packet level. It goes beyond bespoke solutions that focus on one category. It offers operators immediate and concrete competitive advantages including:

- Data that can be directly injected into big data analytic systems for modelling and real-time feedback. Ribbon delivers the data operators need to model use cases for congestion management challenges, security gaps, and real-time network selection
- A single data source that is pre-correlated, vendor agnostic, and time aligned
- Valuable insights into the subscriber experience, device performance and interoperability problems
- The capability to monitor sector, network-element, and inter-RAT network interactions
- Real-time KPIs for notifications
- The ability to deploy models to implement real-time, closed-loop analytics applications

RIBBON ANALYTICS PLATFORM

Ribbon Analytics uses a big-data, cloud native platform that underpins all of its applications and solutions. From fast-path content ingestion, to reporting, to API capabilities, the Ribbon Analytics platform is built for scalability, reliability, and performance - while allowing you to fully comply with privacy policies.

Ribbon Analytics enables visibility right down to the application, subscriber, device, and location level, allowing you to tap rich data stores that produce the necessary insights needed to develop, manage, and deploy highly innovative and responsive



services. Ribbon eliminates the multi-week data analysis period, providing immediately actionable intelligence that arms you with real-time, cross-correlated, time-aligned data across access technologies, services, protocols, applications and subscribers.

With Ribbon's Analytics solutions, you have ready access to data that enables educated decision making. Ribbon knows that you can't afford to waste time or money chasing the wrong problems. Ribbon Analytics helps you focus on what matters for your business, and your customers.

Contact Us  Contact us to learn more about Ribbon solutions.