Ribbon Analytics
RAN Congestion Management Solution

Mobile Market Dynamics

The growing popularity of mobile broadband is leading to a data traffic explosion, with industry studies projecting that mobile data traffic will be reaching 77.5 exabytes per month by 2022. This growth is attributed to new mobile broadband subscriptions that continue to increase as a result of higher access speeds, innovative subscriber plans (shared data, hotspot and unlimited talk & text), embedded mobile radios and the availability of multimedia consuming and producing smartphones such as Apple® IOSTM and Android™ - based vendors.

Mobile Network Operator Challenges

Mobile Network Operators (MNOs) are facing congestion and overutilized network components driven primarily by the proliferation of data-intensive smartphones and the overall shift from wireline access to mobile broadband. Operators are struggling to align their capacity planning with erratic mobile traffic patterns, surging mobile data consumption, and fierce competition.

Ribbon Analytics' RAN Congestion Management Solution provides a set of intelligent interfaces for proactively monitoring and controlling today's mobile heterogeneous networks (HetNets) to boost capacity and deliver a superior subscriber experience. This solution detects changes in utilization and network congestion at the sector level and sends real-time notifications to the appropriate network element to selectively manage the changes. This real-time, subscriber and location-aware approach minimizes the actions taken, optimizes network utilization and delivers the best experience across all services including voice, video, SMS/MMS, and broadband applications.

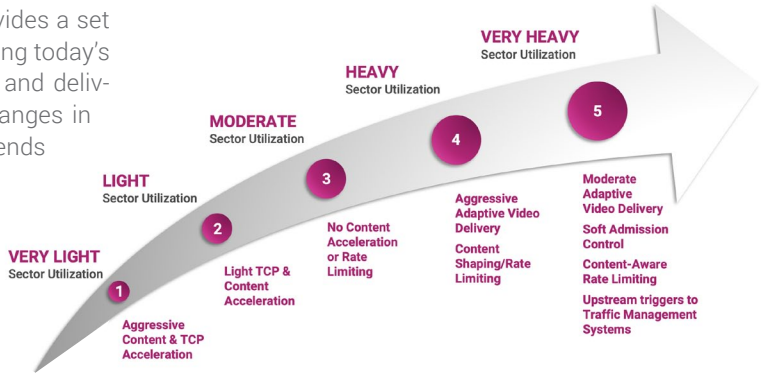

Figure 1. Ribbon Analytics' RAN Congestion Management Policies Optimize Content Delivery

Ribbon Analytics' Multi-Level Congestion Management Approach empowers operators with the full control to define incremental policy actions for each congestion level. Ribbon Analytics maximizes the capabilities of the existing infrastructure and provides the most efficient and effective method for handling the onset and abatement of congestion (Figure 1).

Use Case: Network Optimization

Since the launch of the first smartphones, mobile operators have been struggling to manage the exponential growth of mobile data in the RAN, transport, and core network. Nowhere is this growth more apparent than in subscriber consumption of video content, especially as it is being provided by OTT services, which demand megabit speeds to deliver HD quality content.

To maintain the best possible subscriber experience during peak network times, mobile operators have turned to inline optimization platforms in the Gi LAN. These solutions aim to reduce the aggregate downstream bandwidth by rate limiting, compressing, transcoding, and applying adaptive video streaming techniques.

This centralized approach allows operators to optimize only the desired applications (e.g. video) while passing other application data through untouched.

Unfortunately, this broad sweeping approach means all traffic of a particular application or content type is optimized regardless of network state. Operators are forced to scale Gi optimization platforms to the busiest network peaks. The continued expansion of 4G/LTE capacities and rollout of additional spectrum enables subscribers to consume more content, which intensifies the problem by requiring a proportional expansion of the Gi optimization platforms to manage peak network loads.

Ribbon Analytics' RAN Congestion Management Solution delivers actionable intelligence through real-time notifications (e.g. Diameter Gx, HTTP), allowing selective optimization of mobile content via the PCRF (Policy Charging and Rules Function) or directly to the enforcement points only when the network is busiest.

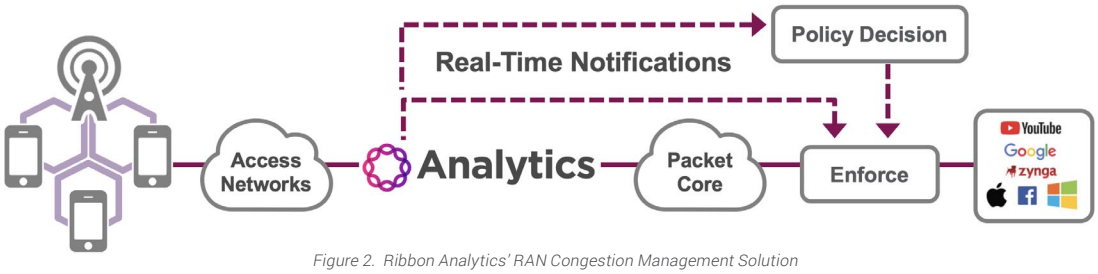

Figure 2. Ribbon Analytics' RAN Congestion Management Solution

Accurate detection of sector network congestion

- Models congestion by considering all contributing factors, including offered load, number of active voice and data subscribers QoS, and RAN and application-level feedback.
- Auto-learns and adjusts models based on network-wide and sector trends.
- Exposes configurable policies and controls to tailor the solution to the network and specific goals of the operator.

Efficient notification of network congestion

- Triggers alerts when network conditions change, allowing the external policy and enforcement elements to react in a timely manner.
- Identifies candidate traffic by determining which subscribers are using a disproportionate amount of network resources at the time of congestion.
- Communicates supplemental attributes (IP, IMSI, etc.) and metrics to facilitate a seamless integration in the packet core, avoiding additional integration points such as HSS and PGW.

Effective reporting on the impact of congestion across all mobile dimensions

Reporting that provides the necessary visibility between congestion detection events and corresponding metrics. This gives operators unprecedented visibility into the closed-loop feedback in action, helping address the following questions:

- Is a sector frequently congested or dropping calls?
- What types of traffic are driving sector conditions?
- How do I maximize subscriber QoE across each congestion level?

Ribbon Analytics' RAN intelligence maximizes the efficiency of operator-deployed assets, empowering operators to address RAN Congestion in real-time.

Operator Benefits

- CAPEX saving realized by:
  - Slowing down or deferring capacity expansion of RAN elements, mobile optimization infrastructure, and intermediary network elements.
  - Increasing network efficiency by avoiding costly retransmissions at the protocol and application levels.
  - Managing spectrum transitions between network technologies.

- OPEX saving realized by:
  - Delivering the highest possible subscriber QoE and averting negative mobile subscriber experience, which results in churn.
  - Providing a precise understanding of network trending, growth patterns, and efficiencies to proactively manage performance and optimization.

Ribbon Analytics in Action

The following figures demonstrate the proven impact of installing the Ribbon Analytics Solution in a real-world operator network.

The first example reflects an individual sector, between the hours of 3:00-6:00 PM, without Ribbon's Solution installed in the network. Starting at 4:00 PM, the aggregate bandwidth and average congestion level frequently spikes into the orange band area, indicating heavy congestion and "bursty" throughput in the sector. During this time, the network is less efficient due to retransmissions, which extends radio resource usage and ultimately lowers subscriber QoE (Figure 3).

Inserting Ribbon Analytics into the network transforms the sector from an over-utilized, severely congested series of events to an efficiently utilized, less congested sector that provides significantly better QoE for all subscribers, as noted by fewer events in the orange band area (Figure 4).

Reducing high congestion levels results in measurable QoE improvements for subscribers. For example, reducing the congestion level from 5 to 4 reduces the TCP time-to-first-byte for 80% of the sessions by as much as half a second on average. Similarly, lowering the congestion level from 4 to 3 reduces the time-to-first-byte for 80% of the sessions by as much as 250 msecs on average. Underutilized network periods, when congestion levels are at 1 and 2, are ideal for accelerating content delivery (Figure 5).

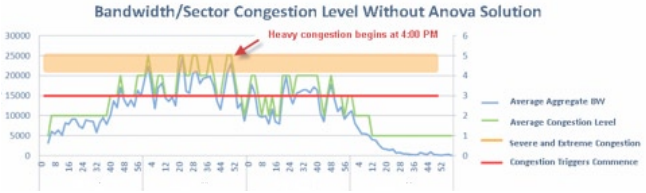

Figure 3. Sector Congestion without Ribbon Analytics

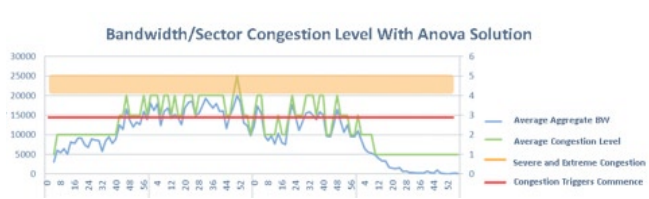

Figure 4. Sector Congestion Reduced by Ribbon Analytics' Solution

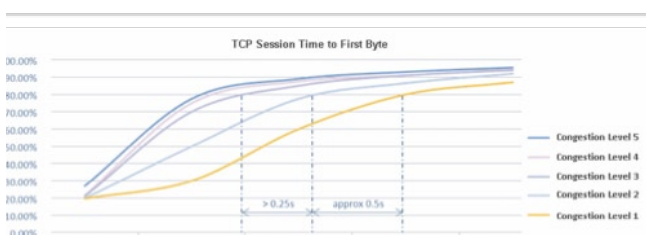

Figure 5. Ribbon Analytics' RAN Congestion Management Solution

"Ribbon Analytics brings together both RAN analytics and SON with its REACH solution. One of the key highlights of REACH is that it works across multiple radio access technologies--3G, 4G, and Wi-Fi. The solution is also content aware and can help in matching up the best access network to help ensure end-user quality of experience when viewing that content."

Darryl Schoolar, Principal Analyst of Wireless Infrastructure, Ovum

Solving Real-World Problems

Ribbon Analytics Solutions are currently deployed worldwide and focus on network optimization and management, WiFi-offload, content-aware SON, and mobile security protection.

Contact Us Contact us to learn more about Ribbon solutions.