How Communications Service Providers Can Benefit From Streaming Analytics
# Streaming Analytics: Why It’s Important

Communications Service Providers (CSPs) are constantly striving to deliver the best possible customer service to increase loyalty, reduce churn and generate more revenue. Many of them are shifting the goals of their traditional service assurance initiatives from a focus on optimizing their network equipment to a focus on improving their customers’ experience. Most CSPs have good low-level visibility into their networks, primarily through the deployment of probe-based technologies as well as their mediation, rating and charging platforms. However, customer-related information has remained fragmented across these platforms making it difficult for them to quickly extract intelligence that could positively impact a customer’s real-time experience on the network.

CSPs manage increasingly complex networks that consist of thousands of cell sites that handle billions of messages every day. They are tasked with delivering an increasingly complex set of services to millions of demanding customers. One of their biggest challenges lies in being able to collect, correlate and analyze this streaming Big Data in real-time so as to be able to proactively respond to situations that might present a revenue opportunity or impact a customer’s experience. Traditional business intelligence (BI) and data warehousing approaches that rely on persisting data and bulk analysis introduce far too much latency to be able to deliver insights in a timely manner. That’s where Vitria’s Operational Intelligence (OI) solution can help.

# Introducing Vitria Operational Intelligence For Streaming Analytics

Vitria OI helps CSPs capture and analyze customer interactions across the network in real-time. It combines and correlates customer profile, CRM, location, network and usage data to create a 360° subscriber-centric view of the information. It puts CSPs in a better position to identify and act on issues and trends that might impact a customer’s experience, ideally before the customer becomes aware of them. It also helps CSPs capitalize on opportunities to present relevant offers to their customers in real-time, thereby increasing revenues.

Vitria OI uses an event-driven architecture to tackle streaming Big Data, delivering real-time analytics that can help detect customer-affecting issues, even before they happen. It leverages an elastic architecture that scales to support the extreme event rates of the most demanding networks. It easily integrates with a CSP’s existing OSS infrastructure. Examples of data sources that it can tap into include data that resides in traditional data warehouses and other Big Data Analytics stores as well as live streaming data including network data, Web application data and IP address data, location-based data, device data, customer profile data, demographic data, billing data, usage data, as well as social media data.

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By correlating and analyzing these streams of data, Vitria OI provides CSPs with continuous, real-time operational intelligence that puts them in a better position to optimize their network operations, improve their customers' experience, engage in more targeted one-to-one marketing to increase loyalty and reduce churn, and proactively detect and prevent fraud.

**How CSPs Can Benefit From Streaming Data Analytics**

Here are some examples of how mobile network operators and other CSPs benefit from analyzing and acting on live, streaming data using Vitria OI:

**Real-Time Situational Awareness**

Traditional network-centric service assurance solutions cannot provide CSPs with insight into customer behavior or the impact of network performance on specific customers. As a result, their call centers can get overloaded as they attempt to resolve customer issues and meet service level agreements (SLAs) using historical data and reactive processes.
Vitria Operational Intelligence (OI) gives CSPs visibility into real-time customer data and real-time network data, together. It helps them predict and proactively identify, prioritize and resolve service quality alerts and issues, often before they impact the customer.

By using real-time customer data and real-time network data, Vitria OI can not only provide real-time problem diagnosis and root cause analysis to accurately locate the cause of service degradation issues but it can also pinpoint individual customers that are impacted by a specific issue. The result is a common operating picture that enables faster detection, analysis and response to service quality and delivery issues.

Vitria OI can correlate network and cell site performance issues with call failure rates to provide network operations teams with real-time insight that ranges from an aggregate view of network performance down to the specifics of an individual subscriber’s experience. It eliminates previous problems wherein customers knew about the problem before the network operator did. With Vitria OI, operations teams can access live, real-time dashboards that visualize performance and highlight problem hotspots across networks. They can set up watch points to monitor the worst performing cell sites.

When a cell tower starts to go down, it typically has a knock-on effect on the surrounding sites as they begin to cover for the one that is going down. Vitria OI can not only detect and help drill-down in to the cause of the original problem, but it can also automatically monitor adjacent cells for problems and raise alerts within an operator’s network management system when jeopardy thresholds are exceeded. Service providers can then take preemptive and automated action to deal with faults and potential customer issues, before incurring costs from customer support calls and escalations.

Streaming Analytics Benefits for CSPs

1. Real-time Situational Awareness
2. Real-time Customer Experience Monitoring
3. Real-time One-to-One Marketing
4. Real-time Fraud Detection and Prevention
5. Real-time Billing Analytics
6. M2M Monetization
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CSPs like the Multiple Systems Operators (MSOs) can also benefit from being able to monitor their broadband network data in real-time so as to quickly identify points of congestion and optimize their networks for better capacity management.

Real-Time Customer Experience Monitoring

CSPs are constantly looking for ways to deliver a much more personalized experience, especially to their VIP customers and high-value corporate accounts, in real-time. Some CSPs have set up special investigations teams to monitor the service levels that these important customers receive. For instance, is a mobile VIP customer receiving 3G coverage when 4G is available? Is cellular equipment about to fail in a highly sensitive area, such as an airport executive lounge? How can a CSP proactively alert specific customers to the impact of a potential service outage or network congestion and even trigger real-time offers to prevent them from churning?

Vitria OI can correlate cellular network events, equipment data, and customer data to present customer care managers with a 360° view of the experience of their VIP customers in real-time. It can automatically notify them when events such as dropped calls affect their VIP customers. They can then drill into when and where these problems occurred, and determine whether these customers experience repeated failures.

Monitor VIP customer experience in real-time with Vitria Operational Intelligence

The results can reflect the experience of a single customer, or be rolled up into VIP groups or high-value accounts. They can easily configure KPIs and alerts to proactively monitor individual experience and ensure that group-based service level agreements are being met. They can automatically kick off corrective processes when established thresholds are met or exceeded. With Vitria OI, these teams have real-time access to information on how individual customers experience services across a myriad of applications, devices and networks. They can quickly prioritize responses to those customers that are most likely to churn and provide them with a superior customer experience so as to entice them to stay.

“We need a holistic picture of each individual customer’s experience so that we can proactively identify and resolve service issues before they negatively impact our customer. In addition we will be seeking to leverage that insight to be able to offer a better service experience for our customers.”

- Dave Akeroyd, Lead Architect, Business and Operations Intelligence at O2

Increasingly, CSPs are looking to capitalize on the additional benefits of speed and performance from 4G LTE rollouts. Having the ability to determine when and where the network is most congested, from what types of traffic or Over-the-Top (OTT) application use, and who that impacts, in real-time, is critical. Vitria OI can help correlate network, cell site, device, usage and customer profile data in real-time, putting CSPs in a better position to proactively identify, prioritize and act on quality of service issues that might impact customers.
Real-Time, One-to-One Marketing

Marketing teams for CSPs are constantly looking for innovative ways to increase the relevance of the offers that they provide their customers. Real-time event-based marketing is a new way of engaging in one-to-one product marketing based on where specific customers have been, where they are, and where they are going. It relies on real-time analytics so as to be able to deliver immediate and relevant marketing offers, resulting in a win-win for both CSPs and their customers.

For instance, one mobile operator uses Vitria OI to determine when a customer is about to leave the U.K. to France on the Eurostar. By correlating customer movements over time along the set of cell sites that serve the Eurostar route, and by masking out other local train services along the same route, this mobile operator is able to predict which customers are about to leave the country and can then send them a targeted marketing offer – before they reach their destination and turn off data roaming.

CSPs can easily profile and categorize their customers based on various other attributes, including their location, the devices that they use, the apps that they consume, and their peak usage times. By being able to predict customer behavior in real-time using Vitria OI, marketers are better equipped to personalize offers and provide them with genuinely useful information, at the time that it is most relevant to them. For instance, they can easily track which applications are the most interesting to their customers, when they use them the most, and then use that contextual information to generate personalized offers that match their interests and profiles at the right time.

The growing number of pre-paid mobile users, especially in developing markets, previously posed a challenge to marketers as this meant that they had very little data on these customers by which they could upsell or cross-sell them. With Vitria OI, a platform that combines capabilities for streaming analytics and action, a mobile operator can trigger personalized offers that might help prevent a prepaid customer from churning. For instance, Vitria OI can correlate location information with usage data and text them a coupon when they are in close proximity to a retail store in the hope that it will encourage them to refill their account and remain a customer.
CSPs are also partnering with retailers, bill board operators, sports venues and other event producers using a fairly straight-forward revenue share model. By capitalizing on their ability to readily access and act on a customer’s profile and real-time location data, they can serve up personalized offers to customers on behalf of their partners. For instance, by correlating customer, device, demographic and location-based data in real-time, a mobile operator can determine when a customer is close to a retail partner’s store and then text the customer discount coupons for use in that store.

**Real-time Fraud Detection and Prevention**

Mobile spam is a growing problem for network operators, with the GSMA estimating that the proportion of spam messages is currently as high as 20% in some geographies. While the ultimate victims of spam are the operator’s customers, the growing levels of spam create a number of problems for operators. Revenue loss and leakage, wasted network bandwidth, and higher staffing and support costs all affect the bottom line, to say nothing of the negative impact on customer experience, potential increase in churn rates and the impact on the operator’s brand. In extreme cases, excessive fraudulent activity has resulted in government regulatory intervention.

Operators are therefore increasingly looking for flexible solutions that will allow them to keep up with and even stay one step ahead of the spammers and their increasingly sophisticated fraud strategies. Solutions must be able to detect spamming in real time so that fraudulent activity can be shut down as quickly as possible. Furthermore, it must be possible for the solution to process increasingly complex spam rule definitions as spamming behavior evolves.

Vitria OI provides operators with a high performance, scalable and flexible platform for anti-spam operations. Vitria OI’s stream processing engine allows for the processing of real-time network feeds so as to detect spam while it is being sent. Complex spam detection patterns can be defined and used against high-volume network events. Vitria OI correlates variables such as SMS rates, IMSIs and IMEIs used over time, location data and time of day information and so on to detect spam. Spam detection alerts and trends can be visualized in real-time dashboards, and automated spam management processes can be initiated to immediately deal with each spam case. Human workflow can also be used to incorporate the Anti-Spam Manager’s decisions in the response process.

**Real-time Billing Analytics**

In addition to exploiting low-level network events for real-time insights, CSPs are looking to use a familiar event source—billing data—in innovative ways to improve customer service and differentiate their products.

CSPs have typically managed their billing processes in a batch-oriented manner. However, they are beginning to recognize the value of analyzing billing data in real-time to provide their customers with the ability to dynamically manage their accounts and to entice them with relevant real-time offers based on their account usage.
For example, real-time billing analytics enables CSPs to launch products such as joint accounts, where a single account owner manages the account on behalf of several members. Vitria OI can provide account owners with the ability to monitor up-to-the-minute usage information. It can prompt them when one of their account members is close to their account limit and provide them with the opportunity to top up. Similar dynamic account monitoring capabilities can be used to make real-time offers based on mobile broadband usage. Real-time offers can be made based on usage over the last billing period or over longer periods, providing customers with offers for new products, top-ups and dynamically reduced tariffs based on usage.

**M2M Monetization**

CSPs are looking for ways to generate new revenue streams to supplement flat revenues from traditional products and one of the most promising areas for innovation is in machine-to-machine (M2M) applications.

With smart meter deployment accelerating in the utilities industry, smart meter reading is one of the key application areas for M2M. There are also opportunities for CSPs in mHealth, electronic payments, connected auto telematics, vending and enterprise asset management.

While the application areas for M2M are diverse, all M2M applications share a common set of core requirements:

1. The ability to collect large volumes of data from sensor-equipped devices
2. The ability to transmit the selected data over the network
3. Continuous, real-time assessment of the data
4. The ability to immediately respond to the insights derived from the data

Vitria OI provides precisely this set of capabilities. It allows a CSP to deploy multiple M2M initiatives on the same platform without the need to purchase multiple point-solutions.

**Complementing Hadoop And Other Offline Big Data Analytics**

CSPs continue to amass vast volumes of data. The most obvious source of this data is the network itself. The network control and user plane events amount to more than a billion events per day flowing through an operator’s network. In the past, this data was only used for low-level diagnostics. Other Big Data sources include billing data, M2M streams, and third-party sources. Next-generation services and service bundles also create valuable new event sources. In addition, sensors are being added to assets, utility networks and handsets to monitor usage and performance in real-time. Email and social networking in particular are creating huge amounts of unstructured text and the use of video is exploding, particularly over mobile.

Operators are storing more and more data about network performance and customer usage in order to tap into this valuable resource for customer and process insights. Using Big Data frameworks such as Hadoop, these large data sets provide an incredible opportunity for greater insight and intelligence on business operations. It helps CSPs monitor network performance, segment customers, personalize service offerings, conduct deeper analysis and improve decisions.
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However, this analysis is performed on Big Data ‘at rest’. By combining ‘at rest’ analytics with the streaming data analytics provided by Vitria OI, CSPs have a formidable set of tools with which to tame the data deluge from both Big Data ‘at rest’ and Big Data ‘in motion’. Vitria OI provides the ability to visualize real-time feeds and take real-time action on significant events. Where the same feeds are stored in a Big Data framework, Vitria OI can work alongside the Big Data store, providing the ability to replay past events, analyse those events for patterns, and compare past events with the current situation.

Using this combined approach, Sales and Marketing, for example, can understand personalized customer behaviour, creating marketing campaigns to an audience of one. Real-time insight enables the creation of novel location- and time-based service offerings. Product managers can create precise offer bundles based on an individual customer’s preferences, and the success of new product launches can be monitored in real time against a business plan and adjustments made on the fly. Promotions can be offered in geographies where service is proven to be reliable and not offered in poor coverage areas. Migration plans from legacy services and next generation product launches can be monitored and incentives offered dynamically to keep the migration plan on track.

Summary

Vitria OI provides CSPs with a way to tap in to live streams of data from a wide variety of sources and then correlate, analyze and derive insight that can be immediately acted upon to help them gain better situational awareness of network operations, improve their customer experience, engage in more personalized one-to-one marketing, and detect and prevent fraud – in real time. Once deployed, Vitria OI’s unified streaming analytics and action platform provides CSPs with continuous, real-time operational intelligence that benefits a wide variety of initiatives including those related to marketing, monetization, network, customer care and security programs.

Rather than procure numerous point solutions, we wanted a unified platform to deploy multiple customer experience initiatives across a variety of business units. Vitria Operational Intelligence offers a single user-friendly platform that identifies and addresses our most important customer-facing issues and will allow us to enhance our service experience.

- Dave Akeroyd, Lead Architect, Business and Operations Intelligence at O2