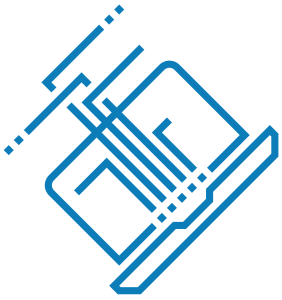
DELL EMC

BRINGING VIRTUAL PROBES AND ANALYTICS TOGETHER FOR THE NEXT-GENERATION MOBILE NETWORK



Telecom operators have started to implement Network Functions Virtualization (NFV) in their mobile core networks – the market is projected to grow from a base of $2.3 billion in 2015 to $15.6 billion in 2020[1]. Yet, the network monitoring and analytics functions are not being virtualized, limiting the value operators can extract from their new virtualized architectures.

And, physical probes cannot monitor these virtualized architectures, driving an urgent need for new network monitoring tools. At the same time, telecom operators need real-time analytics to deliver structured data sets and provide the necessary context for critical, top-line business decisions. The ability for different groups within telecom operators to access customizable network and user data analytics is key to differentiating and diversifying their services within a competitive market.

1 http://www.lightreading.com/nfv/nfv-elements/heavy-reading-mobile-nfv-leads-surge-to-$15b-market-by-2020/d/d-id/726108

DELL EMC

The Goal: Deploy an effective probe and monitoring strategy which gathers network data while simultaneously implementing a real-time data analytics solution, enabling operators to improve the customer experience, identify new revenue opportunities, lower support costs, and enhance network optimization and efficiency.

Over-the-top (OTT) competitors are continuing their rapid release of new and relevant services as they analyze the massive and exponentially growing amounts of data generated by mobile users. As just one snapshot – worldwide, telecom is losing $23 billion in SMS and $170 billion in voice revenue to OTTs[2]. To stay competitive in this fast changing environment, telecom operators need to quickly adopt new tools needed to both protect and grow their revenue streams.

Readiness for the Future of Telecom: Integrated Virtual Probe + Real-Time Intelligence

Affirmed Networks and Dell EMC have worked together to combine Affirmed Networks' Virtual Probe (vProbe) with Dell EMC's Real-Time Intelligence technologies, building a solution which provides telecom operators with unprecedented insight into network performance and customer behavior.

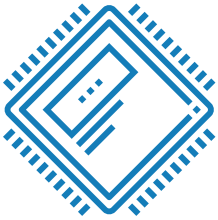
An industry first, Affirmed Networks has embedded probe/packet brokering functions into its virtual Evolved Packet Core (vEPC) and virtual WiFi Gateway. Co-locating the Evolved Packet Core (EPC) and probe/packet brokering functions makes it possible to probe geographically distributed Virtualized Network Functions (VNFs) in a scalable, cost-effective manner, reducing current probing costs by as much as 50 percent. Incorporating probes within each VNF instance ensures that when operators need to scale the VNF, the probes will dynamically scale with it, without loss of network visibility or performance impacts.

Operators can now take an "intelligence-first" approach to managing their core networks via intelligent data records (iEDRs) that provide a network-wide granular view of per flow and per subscriber information without needing to mirror the data. Unlike mirroring, creating and streaming these data records does not impact the VNF performance during probing. Streaming these records in real-time from the probe into the data analytics engine enables operators to eliminate data silos, rapidly develop valuable reporting tools, and make informed business decisions. The iEDRs provide a comprehensive view of the network – letting operators identify problems easily. And, operators only have to mirror five to 10 percent of the traffic to solve those problems, leading to significant cost and time savings.

These important advantages could not have been gained by simply "lifting and shifting" a traditional network appliance to run in a virtual environment. The Affirmed Networks and Dell EMC solution has been developed from the ground-up to fully leverage virtualization capabilities.

2 http://www.indjst.org/index.php/indjst/article/viewFile/62238/48529

DELL EMC



Serving the Telecom Operator of the Future

Adopting an "intelligence-first" approach to managing core networks empowers telecom operators to drive their organizations forward in three strategic goals: enhancing network performance; improving customer experience and retention; and rapidly pursuing new services and revenue opportunities.

Network Performance

Network quality of service (QoS), or understanding the network's ability to deliver the highest quality of service to customers, is critical in influencing the customer's perceived value of the network – which, in turn, strengthens an operator's ability to improve customer satisfaction and reduce churn.

With 45 percent of smartphone user churn due to network quality issues[3], telecom operators should follow these four steps to maintain revenue streams:

Capture: Ingest real-time data access events

- *Customer starts watching a YouTube video on their mobile device*

Enrich: Add customer profile and application usage data to access events

- *System determines if the customer is a VIP and how often they use YouTube*

Predict: Use rules to determine whether a customer's experience is less than the acceptable threshold

- *System assesses the performance of the YouTube application and its throughput*

Trigger: Generate real-time reports, take corrective actions, and/or automatically notify customers when network experience impacts are detected

- *If YouTube is not loading the video quickly enough, dynamically add throughput*

Using insight from the real-time intelligence software and iEDRs, operators can combine and analyze current and historical customer experience data to build a "Customer Care" dashboard. The dashboard provides call center teams with a data-driven view of the customer's network experiences over time – at any specific point in time – and gives operators insight into network QoS across all applications, customers, and geographies. This snapshot can also deliver a network service quality score at any point of time for video and data categories based on OTT apps along with providing breakdowns by customer, device, or topology to identify areas of improvement.

Real-Time Customer Successes[4]

Objective	Proof Point
Measure and improve QoS for top 10 percent of VIP customers	Made data-driven investment decisions in network upgrades that benefited VIP customers
Provide call center agents with "Customer Care" dashboard detailing customer experience and network QoS history	Decreased second level escalation support calls by 20 percent

Customer Experience and Retention

Operators who have not previously deployed a timely, automated process to fully understand customer data usage will find it nearly impossible to verify customer claims disputing data bills. With an average of 70,000 claims per carrier, per month about data usage – resulting in millions of dollars in customer refunds – telecom operators must have a better understanding of data usage breakdown.

3 A Value Based Approach to Improve Customer Experience, Wipro Council for Industry Research
4 Dell EMC RTI Use Cases

Using insight from the real-time intelligence software and iEDRs, operators can combine and analyze current and historical customer usage data to build a data dashboard and provide call center teams with a data-driven view customer usage. This particular dashboard can show the history of data usage for all customers along with unique customer actions for social media, video, software downloads, and email, leading to better decisions in the call center. In addition, telecom operators can provide new and more accurate and personalized insights to customers about their own usage.

Real-Time Customer Successes[5]

Objective	Proof Point
Reduce the number of calls about mobile data usage that escalate to second or third line support	Saved $7 million annually on a base of 10 million customers
Provide the call center team with a detailed customer data dashboard	Reduced call center traffic and saved $28 million in unnecessary data usage rebates
Proactively notify customers of excess data usage	Improved overall customer satisfaction, reduced call center claims, and increased rebate savings

New Services and Revenue Opportunities

Telecom operators are working to offer bundles to current customers based on data usage and bundle expiry – but more insightful information is needed to deliver differentiated offerings. For instance, how do operators effectively identify which "deals" will retain current customers and bring in new revenue opportunities? Referring to the previously described tenets of QoS, we suggest that operators should follow these four steps:

Capture: Ingest real-time customer events

- *Customer roams into an area with LTE coverage and initiates a data session*

Enrich: Organize events with reference data, determining qualifying customers

- *System identifies the customer type, area of access, usage history, etc. and attaches the cell ID coordinates*

Predict: Configure business rules to process and tag only customer events that qualify for an offer or benefit

- *System compares customer event to business rules – determines if the customer is eligible for a data offer or plan upgrade*

Trigger: In response to event triggers, generate custom or default offers to send to customers via SMS, push USSD, or mobile apps

- *Customer receives a data offer if their profile fits the business rules and if their cell ID coordinates intersect with previously determined geofence*

The real-time intelligence software provides insight on customer history, data usage, and other metrics to establish business rules and provide marketing teams with a data-driven view of the customer lifecycle. This improved knowledge leads to more targeted advertising and custom plan offers based on both historical and real-time customer data.

Real-Time Customer Successes[6]

Objective	Proof Point
Manage an ad campaign that matches customer preferences with proximity to retail locations	Gave customers an opt-in service that pushed real-time coupons to their mobile devices when they were near a favorite store
Identify dynamic segment of customers eligible for a data plan upgrade and send personalized offer in real-time	Increased conversion campaign results by 30 percent
Target customers with ARPU greater than $80 for a data plan upgrade	Increased data plan by $10 per month for 22 percent of target customers

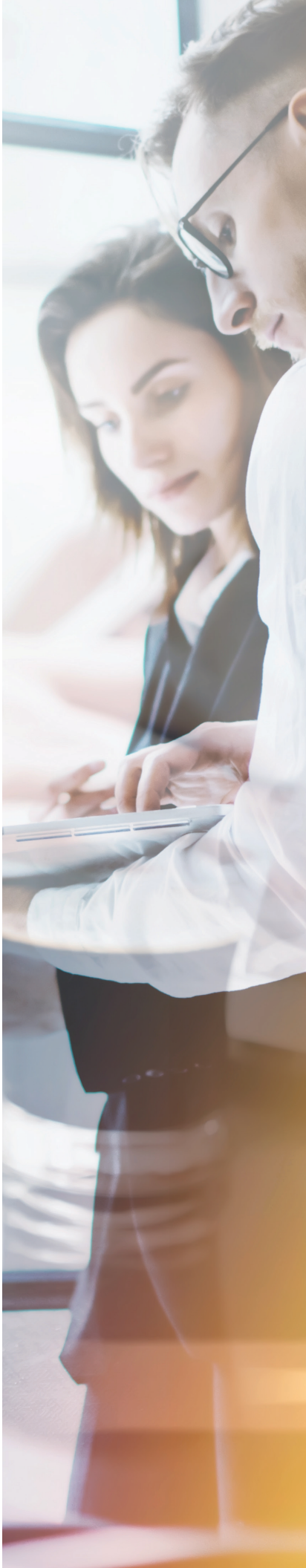
5 Dell EMC RTI Use Cases
6 Dell EMC RTI Use Cases

Stronger Together: Affirmed Networks & Dell EMC

Affirmed Networks and Dell EMC have joined forces to combine Affirmed Network's virtual probe technology with Dell EMC's Real-Time Intelligence:

- Delivers the industry's first integrated, virtual probe technology and real-time intelligence analytics platform solution for mobile networks
- Co-locates Evolved Packet Core (EPC) and probe/packet brokering functions, reducing current probe costs by as much as 50 percent
- Utilizes an intelligence-first approach providing real-time visibility of the entire network without the need to mirror the entire traffic
- Open access via APIs for rapid development of intelligence reporting tools

Begin your next-generation journey today. Easily probe virtualized network functions and gain real-time insights that can reduce customer churn, generate new service revenue, and drive a smarter network.



DELL EMC affirmed®