

# RCRWireless

INTELLIGENCE ON ALL THINGS WIRELESS

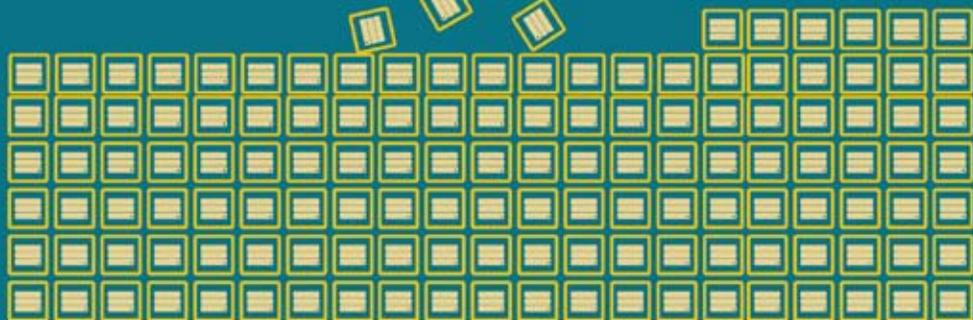


## BONUS SUPPLIER GUIDE

18 TELECOM SOFTWARE  
COMPANIES

34 CONSULTANTS

35 ANALYSTS



## Implications and applications of real-time and 'fast' big data analytics

By Kelly Hill

SEPTEMBER 2015

Report Sponsor:

GUAVUS

EXFO

ACCEDIAN  
NETWORKS

Featured Analyst:

OVUM

Big data is big news in telecom and IT, and is expected both to grow as a market and to revolutionize how telecom operators – among others – do business.

A recent Accenture survey showed 90% of business leaders expect big data to dramatically change how they do business, putting it on the same level as that of the development of the Internet. Frost & Sullivan has named big data a “mega trend” that will have a global impact and predicts the overall big data market will reach \$122 billion in revenue by 2020.

The use of big data in telecom is still fragmented. Executive-level leaders such as chief data officers have, largely, not emerged at this point in most telecom organizations. Departmental projects and use cases still dominate how operators pursue big data. The underlying data management and “plumbing” systems – the architectures and appliances through which massive amounts of data are collected from massive next-generation networks, millions of devices, operating support and business support systems – are still being funded and put in place.

Still, according to Christina Giraud, global lead for big data with SAP Telecom, real-time and fast data are increasingly the focus of how telcos want their data served up. As use cases have developed, she said, “we have started with data insights, and now we’re speeding up

the analytics and the decision process and finally providing for real automation of business decisions.”

The element of time is a crucial consideration as it frequently impacts the costs of a big data implementation. Does a specific use-case call for real-time information? Is “fast data” good enough, or is the necessary information most useful if it is collated over time and triggered at just the right moment – and how do you know?

This report explores major trends in four areas where big data use is taking off in telecom: network performance and optimization; network security; customer experience management; and marketing/monetization. We also look at the organizational impacts of big data on the telecom’s business.

### **Network performance and optimization**

A carrier’s network is its business, and the major source of capital and operating expenditures. So it comes as no surprise that telcos are trying to get a better handle on network planning, predicting network problems and adjusting network resources by utilizing big data.

Use cases fall into two broad categories in terms of time:

1. Real-time monitoring: Typically focused on performance and problem areas, least-cost routing, detecting

and troubleshooting outages and congestion.

2. Pattern insights gathered over time, often for network planning and investment purposes.

Anssi Tauriainen, director of the Aito business unit of EXFO (EXFO acquired analytics company Aito last year; Tauriainen was Aito’s CEO), said that complexity of networks and services means data has to be pulled from a variety of sources. In voice over LTE, Tauriainen said insight into the customer experience comes from analyzing the signaling on the control plane, IP packets in the user plane as well as tapping into the IP multimedia subsystem network to understand the quality of service being provided: combining data from three sources in order to understand, in real time, the performance of a single service.

Longer-term use cases for network planning and upgrades can involve detailed analysis of a combination of customer and network data, and correlating the two. Matthew Roberts, marketing director of Amdocs, said an operator could, for example, look at the market of Chicago and break it down into cell sites that are generating \$200 in average revenue per user per month and figure out if high-value customers in a particular cell are having a high number of dropped calls – pointing to a need to upgrade or

troubleshoot at the site.

Machine learning also plays into network site maintenance, Roberts said, so that predictive elements can come to the fore in prioritizing infrastructure investments. Key questions include: What are the components that make up the network in a particular area? How old are they? And not just how old are they, but which ones, based on the overall track record of equipment repair and replacement, are the most likely to fail soon and should be preemptively replaced?

There are four major trends that are expected to drive the use of network-related analytics:

**The Internet of Things:** The rapid growth of the “Internet of Things” and wearable devices has begun. Cisco Systems found that in 2014, there were nearly 109 million wearables added to networks, resulting in about 15 petabytes of data traffic per month. Gartner expects the number of connected “things” will reach 4.9 billion this year, up 30% from last year, and reach 25 billion by 2020. Amy O’Connor, big data evangelist for Cloudera, expects the IoT trend will really start to hit operations within the next 18 months, and that operators have a chance to play a bigger role in IoT than simply providing connectivity if they can leverage the value of analytics.

Shira Levine, research director for

service enablement and subscriber intelligence at Infonetics Research, said that she is beginning to hear data brokering conversations morph into how operators can derive information from big data and analytics to support an IoT offering. Wireless operators, according to Jefferson Wang, senior partner at IBB Consulting, could look to their networks to provide more business-to-business analytics data and services data analytics for the connected car and the “post-smartphone era” of IoT that offer new revenue streams.

**Small cells:** Small cells complicate network visibility not just in terms of proliferation of network sites, but also in that it will become less common for a single cell to handle an entire user session. The view of network interactions will only grow more complicated with carrier aggregation, small cells handling some traffic (such as data, for example) but not others, or multiple cells interacting with a device to provide capacity and speed.

“Analytics has to be able to synthesize data from multiple access points as well as multiple backhaul links into one central view of what is happening, what that user’s experience is,” said Scott Sumner, VP of solutions development and marketing at Accedian Networks. “At the same time, the cost per

end point that you can use to get to that kind of visibility is incredibly reduced,” because small cell-related prices must be kept low.

**SDN/NFV:** The desire to transition swiftly to software-defined networking and network functions virtualization only deepens the need for real-time, accurate analytics and machine-learning – if operators truly want flexible network that scale in and out and move resources as necessary, automation becomes key. Analytics will be a huge part of making automated networks actually work, according to Chantel Cary, analyst for Ovum’s telecom operators and IT practice.

“You don’t want to react necessarily in real-time – at the latest, you want to be able to react in real-time. You would prefer to work in the future, being able to predict certain things, certain events, where there’s going to be congestion – and leverage big data to support that, so you can move assets and control assets virtually, using SDN,” Cary said.

Tauriainen said analytics will be crucial in virtualized environment in order to know what instance of a server is supporting customers who are having issues and then tap into that data to figure out what the problem is.

Will SDN/NFV turn out to be the catalyst that truly pushes self-organizing network features into the



# The End-to-End Network Performance Experts

Visit  
[Accedian.com/perform](http://Accedian.com/perform)  
to learn more



**ACCEDIAN**  
Experience • Performance

network? Perhaps. Jane Rygaard, head of CEM, Core and OSS marketing at Nokia Networks said the company has been seeing more large-scale deployments of SON features, and that those are some of the most analytics-heavy network implementations.

**5G:** The industry also has “5G” to look forward to, with the potential for very high frequency bands with unusual propagation characteristics compared to typical cellular spectrum, and ever more complicated layers of technology interacting with one another.

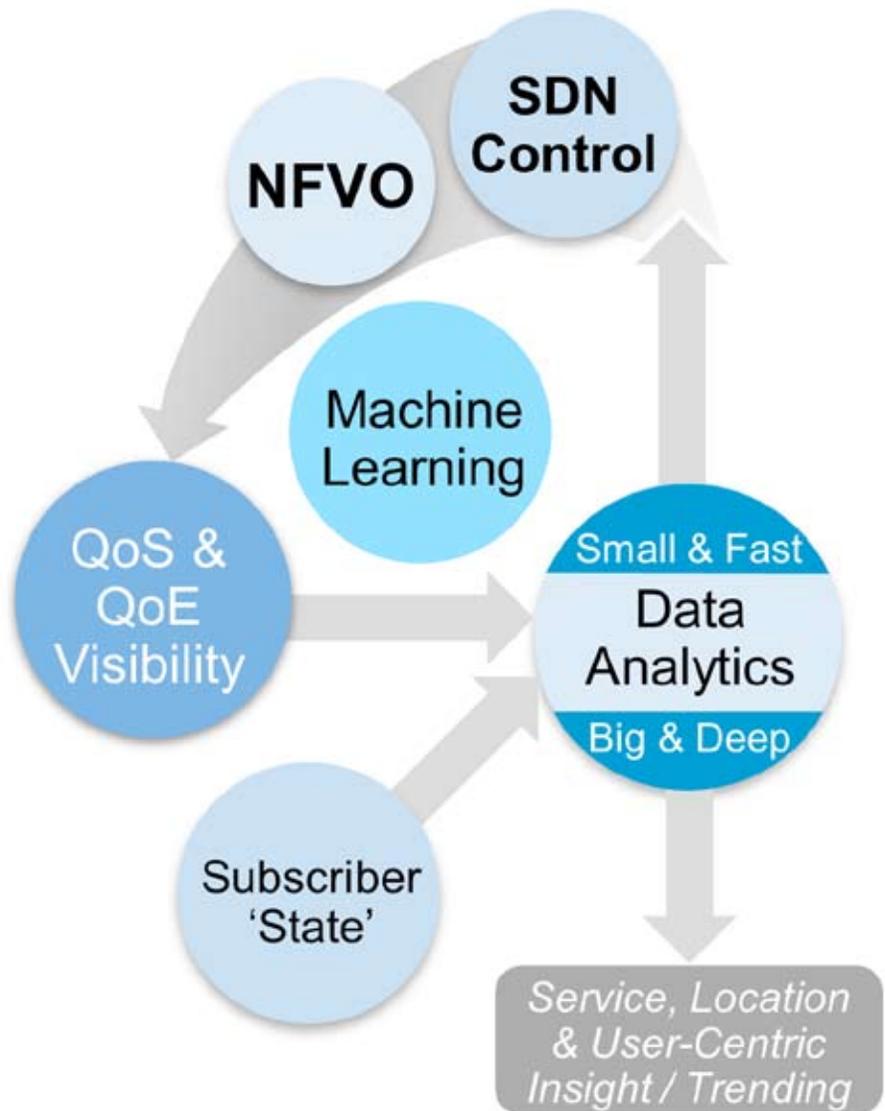
“I think the industry has to come to the awareness that analytics must be the foundation for the network,” Sumner said. “If you don’t have this, you’re not going to be able to run a network within a few years – with IoT, with 5G, with a hundred times more devices and a thousand times more traffic. ... If you don’t have analytics in your network, you’re not going to survive in 5G.”

There are also two significant barriers that limit operators’ information and intelligence: 1) the increasing amount of content that is encrypted, and 2) the amount of traffic offloaded to Wi-Fi, where visibility is frequently lost.

Then there is the issue of increasing amounts of content being encrypted and the impact on network and service visibility. Much can be inferred from the

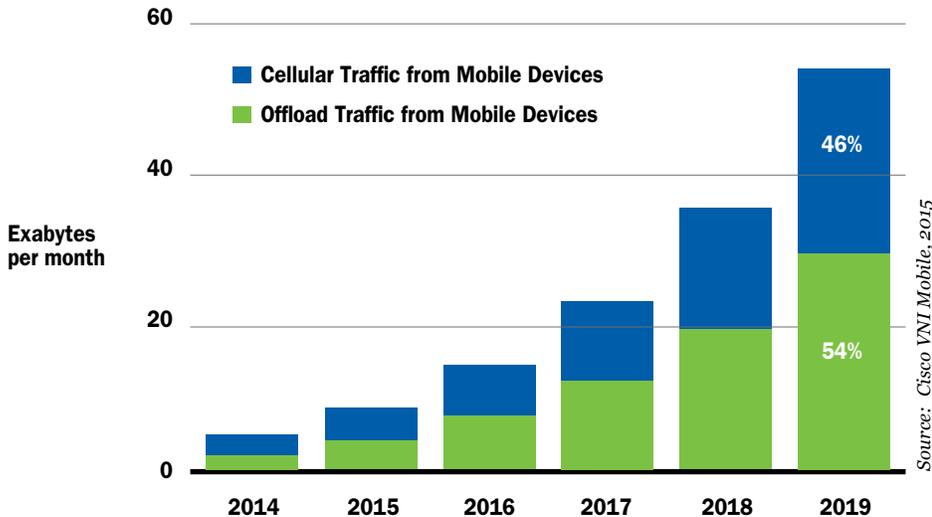
fact that a user is visiting YouTube and consuming a significant stream of data, and the behavior of information streams rather than knowing what, exactly, is inside them may be of more interest to

an operator. Paul Gowans, marketing director at Viavi Solutions, noted not all applications and content are encrypted end-to-end, so operators may be able to pick up information at various network



Source: Accedian Networks

### By 2019, 54% of total mobile data traffic will be offloaded



Offload pertains to traffic from dual mode devices (excluding laptops) over Wi-Fi/small cell networks.

points that can enhance visibility.

On the Wi-Fi front, Cisco reports 46% of mobile data traffic was offloaded to Wi-Fi or femtocells last year, and that by 2016, more traffic will be offloaded to Wi-Fi than is handled by the cellular network. A more recent Strategy Analytics report found that during the first half of this year, smartphone users consumed 9.7 gigabytes of data per month and only 17% was generated on cellular networks – potentially, a lot of visibility lost. Data being carried by Wi-Fi over unlicensed spectrum typically means mobile operators are severely limited in what information they can capture.

MAC addresses do get picked up, said Satish Iyer, senior director of business strategy and marketing for Cisco, but the ability to correlate a specific device with a specific user is lost.

Lonnie Schilling, CEO of Birdstep Technologies, points out that one way around this issue is to collect analytics directly at the device level – essentially, turn at least a percentage of mobile devices on the network into probes that provide a more fluid, real-time and pervasive view of the cellular network performance as well as information about usage and heat maps for Wi-Fi.

“If it’s not being seen, it’s not being

understood, and the operator is going to struggle on how to provide better service and better quality of experience,” said Schilling.

### Customer experience management

Gartner found that 89% of companies expect to compete mostly on the basis of customer experience by 2016, and telecom is no exception – for however much the price wars continue to rage.

It should come as no surprise, then, that Cloudera’s O’Connor said customer experience management is the No. 1 use case at every telco company that she works with globally, as operators try to move toward the holy grail of a 360-degree view of their customers. Ovum’s Cary said operators are seeing so much competition from cable, broadband providers, over-the-top services such as Netflix and others that they are facing intense pressure to differentiate their services.

However, there is a certain amount of prioritizing that goes into improving customer experience. Not all customers have the same value to the operator and not all services generate revenues – particularly when it comes to OTT. Optimization, according to Yaniv Sulkes of Allot Communications, can mean different things based on usage patterns among millennials, adults and

business customers.

“To say that I want to give everyone a terrific customer experience, whatever they do, is very difficult,” Sulkes said. “You should set the bar at a realistic level.”

For instance, he said, it may be very difficult for a mobile or even a fixed-line operator to optimize the experience for their heaviest YouTube users – and little return even if they do invest in optimizing the experience. But if an operator chooses less-demanding services to optimize (relying on analytics to understand the relative popularity of apps and services among their users), then that can be feasible.

However, there is also value in a deep and broad view of a customer profile that informs the “customer journey,” another current buzz phrase.

As EXFO’s Tauriainen described it, a subscriber analytics offering can look at how subscribers use a service, their experience, their device and what type of content they are accessing, and their location – profile building that is more valuable with depth of detail collected over time.

“If you’re looking at only the past 30 minutes, you can tell very little about the subscriber. The longer period you have, the better your view of the whole customer lifetime,” Ansi noted.

Network performance ties in deeply

with the customer experience. But, as Mike Flannagan, VP of data and analytics for Cisco points out, “there are a lot of factors that are now causing the customer experience to be impacted that the operators don’t have direct control over,” he said. “It’s no longer just about making phone calls, it’s about applications, and how they’re performing.”

A poorly written app may cause rapid battery drain, or slower overall smartphone performance – and a consumer is likely to blame network or tower interactions, and therefore their wireless operator when in reality the problem is an app that an operator has little to no control over but still has to deal with the customer fall-out.

Customer care is an area where real-time information and analytics can offer particular advantages. When a customer dials into a call center, the ability to not only have billing data but network data, to be able to identify a customer’s location and whether there are network disruptions in that area, gives a more complete view of the customer experience.

But Elisabeth Rainge, analyst at IDC, says customers have an assumption that operators have a broad, deep and real-time view of them that a carrier might not actually have.

“When a customer calls a call center of a telco or cable company, there’s

an assumption that it’s a big company, they should know what services you subscribe to – but that’s really only starting to come now,” Rainge said, especially as carriers become ever-larger businesses that combine wireline, wireless, satellite and various content services. “In recent years, we’ve had a lot of blocking and tackling to bring together the data that customers expect service providers to have, and to have on-hand. I think that’s still a place where CSPs are investing.”

O’Connor said visibility across multiple fronts can be leveraged here. Was a customer just on the Web portal clicking through pages related to de-bugging a specific problem prior to calling in to the call center? Did they post in a carrier discussion forum on a particular topic? And when that call comes in, can customer service agents have a near-real-time view of those interactions so that they have some idea of the customer’s problem – or better yet, can that data be pulled together and a self-help solution proactively offered that heads off an expensive call center interaction?

Analytics can also be a way to ensure high-value customers feel that they are valued and their service personalized. Ari Banerjee, senior director of strategy for Netcracker, notes that in order

to identify those customers, data such as customer lifetime value, customer profiles and billing data need to be correlated with network data. Operators don't necessarily want to make all of their customers the same deals on roaming or boosted video speeds, he added, but analytics-based intelligence can help them better parse which customers to target for increased satisfaction and less propensity to churn.

Operators want to leverage social media data as well, but there are varying approaches and levels of success. Social media "listening" platforms can give a broad sense of customer sentiment, but being able to correlate individual social media comments with actual customers often runs up against authentication and privacy limitations.

Flannagan offered the example of preventing customer bill shock – a particularly negative experience for customers. If a carrier has built up a picture of a user's texting and data consumption usage over time and then five days into a billing cycle realizes that the customer is using 10 times their average usage, it makes sense to check in with that customer to make sure they are aware of the data usage before it impacts the bill.

"It drives the customer experience in a better direction – they appreciate the fact that you're paying attention,"

Flannagan said. And, he added, it creates an opportunity for a conversation that starts out as taking care of the customer and can then transition into an upsell opportunity.

"It's a way to reach out to the customer that doesn't start off sounding like a sales call," Flannagan said.

#### **Network security**

Traditional emphasis in network security has been on securing the perimeter of a network, using firewalls and intrusion prevention and designing systems to prevent attacks. But there are limitations on that approach, particularly in a "bring-your-own-device" environment, and analytics is being more commonly used to make security more intelligent.

"What we're beginning to see is the reality that you can't assume all attacks are coming from the outside," said Dan Joe Barry, VP of positioning for Napatech. "You can't just build a wall around your system and say you're good." Perimeter-based security, he said, can only deal with known ports and signatures, and that makes new or "zero-day" threats a particular challenge to detect.

BYOD is both an opportunity and a potential risk as far as security, he notes, as users can bring in their personal devices that may be infected with something that can spread to the corporate network.

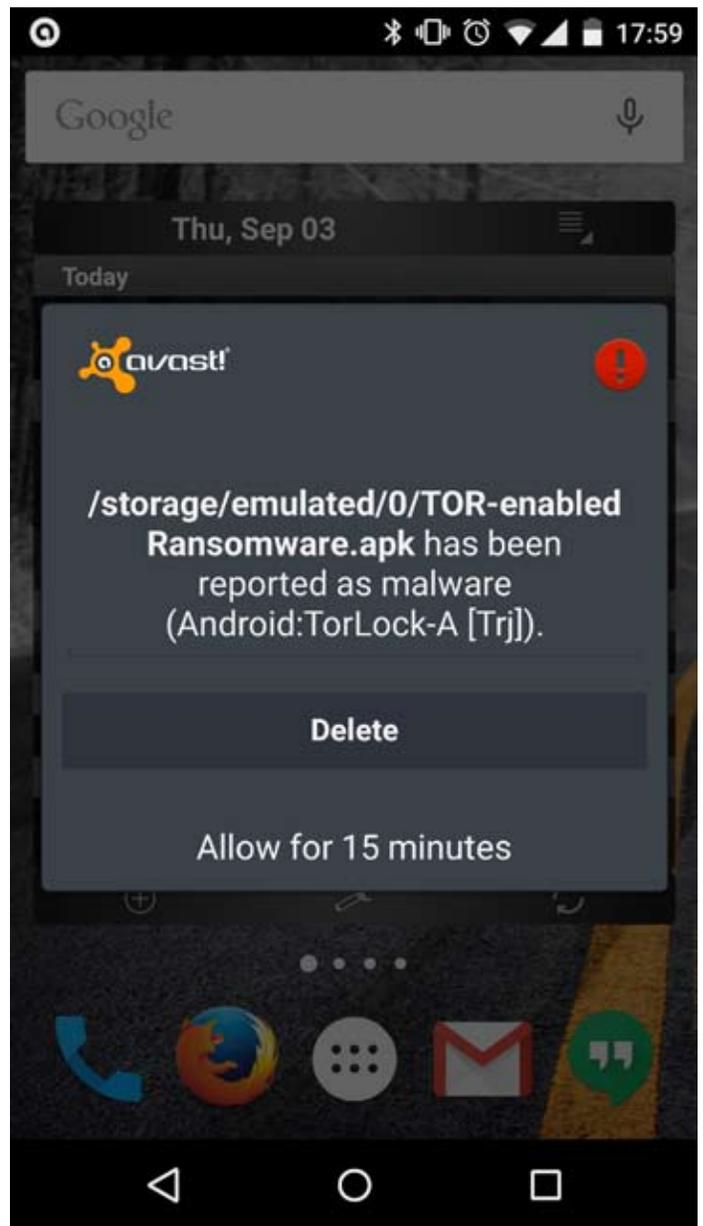
IT security teams, Barry said, "are beginning to say 'I have my perimeter defenses, but I can't rely on them. I need to complement that with some network information that will help me determine if something is going on or not.'" Such network information may include detecting patterns such as whether devices are sending out information when they normally would not, and whether two devices are communicating that typically would not. Having a baseline of what typical network behavior looks like, and then being able to detect abnormal behavior as soon as possible, is key. Even in "traditional" network breaches, the Verizon Data Breach Investigations Report for 2015 found that there is still a significant gap between how quickly an intrusion can be achieved and how long it takes for a threat to be detected.

The 2015 DBIR also emphasized that mobile is not a preferred vector in data breaches. That's not to say that a mobile user is completely safe, however – the DBIR looked at data from Verizon Wireless and found hundreds of thousands of mobile malware infections on Android devices, "most fitting squarely in the adware category," or adware that hogs resources and aggressively collects personal information from the device, often without a user's consent. The good news coming out of the DBIR was that 95% of

malware types showed up for less than a month, and four out of five didn't last longer than a week. The DBRI authors theorized that that could be because malware was "piggybacking on the short-lived popularity of legit games and apps."

Avast, which provides anti-virus software for platforms including PCs and mobile devices, said it takes

Avast, which provides anti-virus software for platforms including PCs and mobile devices, said it takes



Source: Avast

Avast's security software as it appears on a device.

about 14,000 samples per day and has a database of more than 2 million mobile malware instances that it uses in conjunction with analytics from its 230 million users around the world to assess malware threats. Avast is working with Qualcomm to address mobile malware with machine-learning-based behavioral analysis in Qualcomm's Snapdragon Smart Protect, which is expected to be available next year in consumer devices with the Snapdragon 802 processor. The feature is supposed to help "address zero-day attacks and differentiate between clean and malicious software applications," in order to reduce "data leakage" – when data gets collected and utilized by a third party without proper permissions. Gagan Singh, president of mobile at Avast, said the solution takes samples of data and looks at how different applications access different parts of a device, and leverages cloud-based machine learning to determine whether the behavior is normal or associated with malware.

Marina Zeigler, senior global communications manager for Avast, said malware has grown increasingly sophisticated and the blanket permissions that app developers ask for can leave consumers' information vulnerable. She said Avast has identified a number of apps that work like an ordinary game for

some period of time, then add unwanted advertising or access a user's contacts and personal information.

"One of those 'data leak' applications could have access to certain pieces of information that it really shouldn't have, and unbeknownst to the user, it can get access to that information and send it over the network," Zeigler said.

"Security and privacy are entwined in a very close way. It's hard to separate one from the other," Singh said.

Meanwhile, companies are trying to accommodate mobility while still keeping information secure. Hugh Thompson, CTO of security company Blue Coat, said his company is "seeing a massive move to what we call hybrid deployments of security," where some elements are deployed on premise and others are cloud-based, in order to support workforce mobility: not just the use of mobile devices, he noted, but the ability of workers to access their data from home and while traveling in a way that is safe rather than simply through the open Internet.

Queries on website access are just one of the examples of real-time security analytics at work. In real-time, Thompson said, there are a limited number of data points that can be checked in milliseconds, such as whether it has similar signatures to known malicious sites and when the domain was registered. Blue

Coat presents a basic rating of 1 through 10 reflecting how dangerous a site is, and if enough information can't be gathered fast enough, it informs the user that the site is unrated – which some companies block altogether. Meanwhile, a parallel process is kicked off that digs deeper into the site, including simulating user interactions and clock-forwarding to see if anything malicious is set to trigger at a future point. The process can take anywhere from 60 seconds to five minutes, Thompson said, and enables a rating to be established and presented on future queries.

While mobile is seen as a safe venue today, Thompson noted proofs-of-concept have been offered up that vulnerabilities could be exploited. He also pointed out that the very fact people feel safe on their mobile devices can mean riskier behavior than on a PC: since mobile sites often have pared-down content, a page with only a corporate logo asking for log-in information might not seem as suspicious on a smartphone as it would on a PC.

There are also a few signs that the threat landscape is beginning to change: in 2013, the first "ransomware" virus for Android was discovered. Android Defender claimed to be anti-virus software for mobile devices, but once downloaded would lock down the device interface

and make itself difficult to delete in order to get users to pay a license fee for a fake software fix, according to a recent Symantec report. In 2014, another piece of ransomware emerged that could actually encrypt files on the phone or set a phone PIN if none had been implemented, so that users couldn't access their own content. Symantec says it considers mobile ransomware in an experimental stage of development, but warns that may change, particularly as mobile payments become more widespread. The Verizon DBIR, for its part, recommends investment in network visibility so that if or when mobile becomes a more widely used threat vector, that companies and operators can move quickly.

### Marketing and monetization

Entwined closely with customer experience, the use of analytics for marketing and monetization seeks to leverage the data that telecom operators have in order to maximize their revenues.

"If you think about marketing technology in general, it's been very well utilized on the acquisition side across industries – but for customer base marketing, we find it's relatively unsophisticated, I would say," said Lara Albert, VP of global marketing for telecom analytics company Amplero.

"Real-time intelligence is definitely a

trend," said Mikko Jarva, CTO of Comptel's intelligent data unit, who added operators are interested in knowing more about their customers' social media engagement, notifications for customer service, and in general, having more context in order to both provide customer service and to make offers that have a better chance of being purchased by the customer.

Some of the Use cases include real-time marketing to increase uptake of services – offering service upgrades to customers who already have LTE, for instance; incenting customers who aren't using smartphones to upgrade; and getting customers to upgrade from low-end to high-end smartphones.

"If somebody is running out of data, or prepaid credits, they'll be interested in a re-charge offer at the right time: now, not the day after," said Jarva.

Arnab Chakraborty, managing director and global industry lead for advanced analytics at Accenture Digital, said he sees operators focused on trying to understand the omni-channel behavior of their customers to get a better view of customer context.

In real-time scenarios that can include situations such as detecting a high-value user has arrived at an international destination and making a usage bundle offer that could both keep the user consum-

ing some services, rather than turning off data access or only using hotel Wi-Fi, and also prevent bill shock at the end of the month.

Ravi Rao, COO for analytics operations at Infogix, said analytics can provide insight into human behavior not only by handling volumes of data far beyond human comprehension, but also discovering patterns among users "that just intuitively don't make sense, but are proven by the data." As an example, he said Infogix found via a predictive model that if a customer defaulted on one credit card payment their propensity to churn was higher – but a customer who was significantly behind or defaulting on their home mortgage was actually less likely to churn.

While talk of operators being able to monetize their data by making it available to third parties has been under discussion, concerns about privacy and regulation have been challenges in different parts of the world. Samir Marwaha, VP of product and portfolio for NetScout's Tektronix Communications, said he has seen examples of customers in Asia-Pacific markets providing information about international roamers to airlines who are seeking to target their marketing in specific countries to fill empty seats on flights.

IDC's Ränge said she sees the

conversation in that area changing, and that operators either don't have the data sets ready, or they would rather not be in the business of gathering data about their users with the intent to sell it. Anonymized aggregation of data is a more approachable topic, she notes, but operators still appear to be more interested in prioritizing how they themselves can utilize their data to either make money or save money, rather than how other verticals can do so for a price.

"If you take off the table the idea of making money off of it, how else can you act on it?" Rainge said. "Maybe you think about making money off of it in something related to better customer satisfaction, because you can improve the network or the customer care. That's reasonable."

The flip side of monetization is the use of data analytics for revenue assurance or fraud prevention. Infogix's Rao described a few real-life examples of wireless operators deploying at points-of-sale in order to deal with fraud. Using analytics that also leveraged publicly available information, Infogix was able to uncover in one instance that on a daily basis there was a group of 10 to 20 people who were applying for service, but were recorded as deceased. Thieves were using that personal information to walk away with

iPhones that they then sold online.

"Real-time is almost a necessity, because once that person leaves the store or completes the order online, they're going to get a device that puts the telco back at least a few hundred dollars," Rao noted.

Mobile can also be used as a key part of fraud detection for other industries. At the Mobile World Congress event in 2014, Syniverse and MasterCard announced a project to rely on the location of a customer's mobile device to help cross-check whether a transaction was legitimate or not, to both reduce fraud and reduce declines on legitimate transactions – which could reportedly query Syniverse's systems from the point of sale within 300 milliseconds. Visa has a newly available Mobile Location Confirmation product, achieved in partnership with mobile geo-location and identification company Finsphere, which provides analysis of a device holder's location data and matched with the transaction location in less than a millisecond, at the point of sale. The solution is expected to reduce Visa's customer card declines by up to 30%.

While monetizing broad customer data may be a tricky proposition, Samir Marwaha VP of product and portfolio for Netscout, said he has seen examples of customers in Asia-Pacific markets provide information about international

roamers to airlines who are seeking to target their marketing in specific countries to fill empty seats on flights.

Marwaha of NetScout said that when it comes to the enterprise, companies don't necessarily want to run their own networks – but they do desire data from those networks to gain insight on their own customers. This may mean developing a handful of top network KPIs and trends to track so that enterprises can leverage the intelligence within their own data.

In much the same way that analytics are sought for network planning, Chakraborty of Accenture says they are being used to help guide investments in marketing. He also said operators are using analytics on their own operations, trying to figure out where to put their marketing dollars for the greatest return on investment, and even in workforce management to schedule call centers based on forecasts of call volumes.

#### **Organizational implications of big data**

One of the frequent refrains across the industry is big data requires a shift in mindset and in corporate culture. Ultimately, though, the driving force behind big data is, as Bill Schmarzo of EMC<sup>2</sup> has put forth, about four "M"s: Make. Me. More. Money.

"The big data is not the point. It's the

supporting better business decisions,” said Barry of Napatech. He added that appliance vendors are all addressing this in different ways, and the desire for information has shifted from wanting to know about packet behavior to looking more at applications, building to performance management, and ultimately to predictive analytics.

Scott Berns, director of lifecycle management for Centurylink, said the company is using big data analytics as part of its transformation from a telecom company to more of an IT company-like approach to both its services as well as its own operations, and turning data into actionable intelligence.

“You have to have a very thoughtful process around how you build your overall information stack, as it related to consuming information to get started with big data analytics,” Berns said. What businesses should want to do, he said, is “push more information out to the people who can take action on it. Everything you do around data needs to be action-oriented.”

The concept of democratization of data is a hot one right now, Cisco’s Flannagan said. Traditionally, there were pretty high standards as to the rules in what people and applications had access to data warehouses. But now, different departments within

a company don’t want to wait for companywide data solutions to be implemented. Cisco acquired Composite Software in 2013 that does data virtualization – so that data can be replicated and have permissions set upon it so the original data set can’t stray too far or be corrupted.

People are open to collaboration and sharing their data, Flannagan added, as long as they can feel confident that it isn’t going to be shared inappropriately, or corrupted or manipulated in ways that change the raw data.

In one case of a North American telecom operator, Cary of Ovum said, the company’s IT department took the initiative in establishing a central data lake repository and leveraging Hadoop, but also made a point to seek out collaboration from other departments – they could store their data there in exchange for access to a short list of key information types.

One of the challenging aspects when it comes to melding data systems, according to Gabriele Di Piazza, senior vice president of marketing and product for Guavus, is simply dealing with the fact that a big data platform has to be able to ingest data that comes at it at in differing speeds: some real-time, some fast, some on a batch basis or needing to be linked

to more or less static customer records. He sees that as the new wave of big data analytics: dealing with customer and network information coming in from disparate sources at disparate speeds, but still being able to access the necessary information for use cases that originate in different parts of an operator’s business.

Digital transformation is also one of the key trends driving analytics, Cary added. She said operators are leaning heavily on their vendors for guidance on how to tackle big data and address specific use cases as well as the practical aspects of how to implement big data initiatives, but she also expects to see more offerings from vendors natively integrate some level of analytics.

Telcos used to have to market to the enterprise by targeting the company, not individuals within a company. Now, Berns said, they can access data that shows who the technology decision makers are, who are influencers within a business and get some level of insight into their motivations in order to make the right offers. That can include IP address mapping, understanding who is looking at various technologies and buying second- or third-party data to broaden the available insights.

Berns said Centurylink has a middle-

ware layer to deal with the fact many telecom companies are built through decades of acquisitions and mergers. The costs to change out all the related business infrastructure is one that most companies don't have the cash flow or capital to do, he added, especially while they are busy trying to get services out to customers. So middleware layers are doing much of the aggregation and consolidation of data into a more usable format.

"Storage is cheap. The process is hard," Berns said. "They had to have a new way of being able to figure out how to do the process that doesn't have 1985 servers bogging down the system."

Another change, Berns said, is companies are getting a better handle on how to deal with unstructured behavioral data such as how customers are interacting with a company's portal and website. If users aren't asked to authenticate themselves, he noted, then the company has no ability to see who they are. Put a simple authentication pop-up, though, and suddenly you have years of customer history data.

Maria Marino is director of product delivery and customer experience for CenturyLink and makes use of the data that Berns serves up. She said being able to access data reports that give insight on help desk trouble tickets,

billing, repair tickets and other customer information is helping the company move from reactive to proactive view of its customers.

"I can draw pretty good conclusions in terms of what's causing customer pain points that I can focus on," Marino said. "I'm not in the business of fixing everything and achieving perfection, but I can get a whole lot more bang for the buck when I invest people and resources in the fixing effort."

Accedian's Sumner says that operators who are successfully driving the use of analytics as the nervous system of their overall operations have taken innovative approaches such as pairing a CMO and CTO to figure out how best to leverage analytics on both the network and customer sides. At Amplero, Lara Albert says she sees marketing organizations becoming more involved with IT organizations in order to better understand and utilize big data and analytics.

"The companies that I've seen do this successfully made a massive corporate shift," Sumner said. "They used SDN and NFV as a disruptor, as a way to catalyze organizational change. They said, 'Well, this is a massive change in the network, a major shift, and we're going to use it as a break point to reorganize. It has to happen now, it's a good excuse and we're

going to do it.'"

In that case, perhaps it would be best for industry to consider four "As" for big data:

1. Adequate amounts – not simply all data or most data, but figuring out how much data and which types are necessary for a task, and being willing to let the rest go.
2. Actionable, meaning that mere numbers, scores and trends are translated into an action that can be taken.
3. Accessible to the people at all levels of the organization who are in the best position to take the necessary action.

#### Key takeaways:

Big data use cases often – but not always – call for real-time intelligence. The focus should be on making data accessible and actionable.

Analytics are becoming more central to telecom's core businesses of providing functional networks, caring for their customers and generating revenue.

The complexity of networks, explosion of IoT devices and applications and advent of 5G will make analytics-based automation crucial for operator success, both in maintaining their own businesses and in expanding their potential revenues sources. ((«»))



### **Accedian**

Accedian delivers exceptional end-to-end network performance visibility, for control over the best possible user experience. Accedian enables providers to maximize quality of service (QoS), overcome network complexities, and ensure unparalleled quality of experience (QoE). Accedian has been turning performance into a key competitive differentiator since 2005.

Accedian.com.

Twitter: @Accedian.

---



### **EXFO**

EXFO is a leading provider of next-generation test, service assurance and end-to-end quality of experience solutions for mobile and fixed network operators and equipment manufacturers in the global telecommunications industry.

Contact us at [isales@exfo.com](mailto:isales@exfo.com).

---



### **Guavus**

Guavus is a leading provider of big data analytics applications for operational intelligences. Some of the world's largest CSPs use Guavus analytics applications for next generation service assurance and customer experience management.

Contact info: [www.guavus.com](http://www.guavus.com)

[Info@guavus.com](mailto:Info@guavus.com)