

IoT Data: The Shift From Data Center To Edge

By: Susana Schwartz

[As written recently in The Economist](#), the world's most lucrative asset is no longer oil, but data.

Data is the currency of the 21st Century, and companies like Amazon, Google, Facebook, Apple, Microsoft and Tesla have replaced Big Oil as the most powerful companies in the world— the collective having control over much of the world's data and over much of the revenue to be made in the “data economy.”



“Ten years ago, the challenge was to collect the data, and Big Data became the means by which businesses could affordably collect the data they never had before. But now, CFOs are asking ‘what are we paying for? What is the value we can deliver with all of this data?’” notes Svetlana Sicular, research vice president at Gartner Group.

Analytics is the answer. “Not all IoT data is good data. It doesn't all have value, so analytics will help companies decide which data is worth keeping, which should be thrown away, and which should be used at the edge,” explains Sicular, noting that Big Data Analytics, artificial intelligence (AI) and machine learning (ML) are the sweet spots service providers and enterprises are considering for driving the most value out of their IoT initiatives. That value includes streamlining operations; automation; personalizing customer service; generating new revenue streams; and improving safety, security and monitoring.

As business leaders across all industries try to determine which data is most valuable to their end goals, they must first grasp the sheer volume, speed and complexity of the data they must manage in the IoT.

The advertisement is a dark blue rectangular box. At the top center is the 'gen-E' logo in white. Below the logo is the headline 'Monitoring NFV / SDN is complex' in white. Underneath the headline is a sub-headline: 'Eliminate surprises associated with virtualized networks by gaining visibility of real-time data across legacy & next gen networks.' In the center of the ad is a red button with white text that says 'Learn More About OpsCenter™'. Below the button is the website address 'www.gen-E.com'. At the bottom of the ad, there is a light grey bar with the text 'Click this ad for more information' and two small circular icons on either side.

If [Cisco estimates are any indication](#), there will be 500 billion devices connecting to the Internet by 2030, each device or “thing” possessing sensors and generating about two exabytes of data per day through constant communication and interaction. That data will be varied in type and in the protocols used, which will make rapid analysis and response (we're talking milliseconds) an enormous challenge.

After getting their heads around the impending deluge of data, CSPs and their customers must then determine which data and analytics capabilities should reside at the edge (where processing takes place), in the cloud, or in centralized data warehouses.

What the Shift from Data Center to 'Edge' Could Mean

It is likely that in fleet management, healthcare, manufacturing and other "high-value operations," analytics will shift from traditional data centers toward devices on the edge. [Some believe](#) the subsequent "distributed edge intelligence" may ultimately replace centralized cloud-based processing, especially in cases where it becomes too costly to find the processing power to analyze data coming from multifarious end points across complex and varied networks. Of course, the cloud will remain valuable for scenarios that place more importance on having centralized distribution, deployment and management of applications over the ability of machines and sensors to share information rapidly.

Billions of connected devices collecting data and communicating will certainly congest networks and cause latency. Think, for instance, of applications involving biomedical big data research. Today, mobile biomedical sensors and cloud computing are used for pervasive health monitoring, however, mobile cloud-based health monitoring has begun to hit a wall with network latency. A shift toward edge devices capable of conducting compute, storage and communication (as in fog computing scenarios) will possibly accelerate the discovery of early predictors and biomarkers in connected-health scenarios. "Manufacturers drowning in a torrent of data coming off of equipment like pumps or engines struggle to detect potential points of failure 24 hours *before* failures occur," explains Marcia Walker, manufacturing industry marketing consultant, SAS, which in April announced a Cisco-validated design for cloud analytics that is intended to move analysis closer to the edge, while preserving historical analysis, operational control and model development in the core data center.

"When you think of autonomous cars, airline engines, or pacemakers, it becomes obvious that the hundreds or thousands of variables that analytical models could communicate up to the cloud or over networks would cause load issues," says Walker.

It's in these scenarios that analytical modeling may move to the equipment level, at the edge, so that only data related to alarms and actions traverse networks. "It is the need for speed that is driving many of the business leaders, who swore they would never allow data out of their facilities, to realize they will actually need to," notes Walker.

It's also the need to empower people, as it will be people, and not "things," that determine success. Whether data scientists or traditional business users, there is a growing need to enable fast, intelligent decisions, whether their tasks relate to fleet management or monetization of mobile usage, or other factors critical to desired business outcomes.

To empower business users of various expertise and knowledge, business leaders need architecture that not only captures enormous amounts of IoT data from sensors — regardless of the protocols — but that also is extremely user friendly so that people of varied expertise can readily assign different levels of importance to distinct types of data. This would simplify efforts to isolate the data most important to specific business outcomes. The complexity of the architecture to enable that is serious enough that CSPs can help enterprises at a high level, or on a case-by-case basis, determine which applications require instantaneous analysis and response, and where it makes sense to move analytics and/or data to the edge (as opposed to the cloud or central data warehouse), and then to convert data into insight most valuable to the business user or data scientist.

In other words, as the IoT magnifies the need for fast, intelligent decisions, "edge data" analytics platforms will be coveted by any company looking to build new revenue streams or business models through the IoT. Platforms will be sought, and either the NEPs will dominate, or CSPs will find ways to partner, leverage and monetize what they have and what enterprises cannot do alone, at IoT scale.

For example, Cisco has worked with IBM to integrate IBM's Watson AI analytics into Cisco's edge

routers. And Israeli start-up Iguazio recently garnered attention in the press [with its \\$33 million in funding this summer](#) for its edge data analytics platform, as did startup MapR, which rolled out a new program for big data deployments.

Carpe Diem

While these platforms come into being, some CSPs are experimenting with how to partner in analytics, and in adtech and other areas of potential IoT growth and revenue. Verizon has been one of the more aggressive, evaluating how it can play an enablement role in the area of IoT analytics, becoming one of the investors in the aforementioned Iguazio real-time analytics platform through [Verizon Ventures](#) and launching at Mobile World Congress its [Exponent portfolio of carrier-focused digital service platforms](#). It is meant to facilitate an “enabler” role for Verizon in growth areas like big data, AI, IoT, cloud, internet and media services by helping resource-constrained service providers and enterprises cut development cycles and capital expenditures with an end-to-end platform that delivers modular point solutions tailored to individual use cases.

“Verizon is building its intellectual property and working with Open Source to ostensibly white label solutions already running within Verizon so that carriers in emerging markets like Malaysia and Japan can build IPTV, media and other services and begin to capitalize on insights gathered from IoT for personalized value-add services,” explains Gartner’s Sicular.

She notes that Verizon has recognized adtech as an area of possible growth in the IoT, building its Oath brand (the marriage of AOL and Yahoo) and partnering in new areas, as with its [Uplynk Video Streaming service](#), which has been integrated into Stadium Digital’s All Access Platform, a digital loyalty and fan engagement platform.

Through Oath, Verizon leverages big data technologies like Hadoop, Spark, and Kafka for enhancing mobile advertising and generating new revenues and furthering customer engagement. But advertising is just one of the verticals in which Verizon is building tailored apps through [IBM Big Data and Analytics](#).

AT&T has also been active in the area of [IoT analytics](#), combining its IoT solutions with IBM Cloud and Watson to create [AT&T IoT analytics capabilities](#), a collaboration that aims to help AT&T’s enterprise customers transform their industrial IoT data into analytic insights so they can take immediate action to improve business operations. By using AT&T’s IoT network and the IBM Watson Data Platform, AT&T’s IoT analytics solutions will ingest data from hundreds of “wells,” creating the models necessary with appropriate machine learning libraries and open-source technology to help predict potential failures or machine malfunctions. This will help enterprises detect anomalies in less time and with more accuracy.

T-Mobile is another that is looking at furthering its capabilities in the IoT. It [introduced two IoT Access packs](#) that make it easier and faster for enterprise customers to get IoT devices online. T-Mobile also continues to work on Category M and Narrowband IoT, and has partnered with Twilio, Sequans, and Novatel Wireless to expand its IoT capabilities.

Change of Mindset Necessary for CSPs in the IoT

The hope with each of these IoT-analytics driven approaches is to offset competition and declining growth in fixed and consumer-mobile services with IoT-enablement capabilities. If CSPs can build reliable and secure single-user networks that facilitate edge-to-cloud communications with minimal latency and optimal security, they can help enterprises in all verticals meet the expectations of their big data and analytics projects. The need is there, as evidenced by Gartner predictions that [60 percent of big data projects fail](#), namely because of a lack of skills and expertise to successfully deploy and run projects.

For telecom executives, this is a critical opportunity to redefine their roles as enablers in the IoT.

They can go beyond just offering enterprises software-driven, cloud-based platforms that help collect, manage and analyze large volumes of data at Web scale. If they modernize their operations, they can go to the next level and build entirely new business models around IoT analytics for their enterprise customers.

The metaphor Gartner's Sicular uses is that of a stealth aircraft "considered 'invisible' to radar, even though it is 'invisible' only to the most common frequencies of radar. In the IoT, CSPs have to modulate the frequency up and down, looking outside their normal range so they can be warned of the impending arrival of the next bomber," relates Sicular, referring to the next wave of disruptors in terms of business models. "In the IoT, new business models and innovations are occurring at lightning speed, so it's quite likely a bomber will appear out of nowhere and blow you to smithereens if you don't tune into a frequency other than that which you are comfortable."

It means CSPs should consider how big data and analytics in the IoT can transform what they can do for not only enterprise customers, but also other CSPs that are otherwise competitors. "Our CTO says 'data without analytics is value not yet realized,'" says Walker. "Data in and of itself has value, but CSPs can help companies determine where to invest in terms of adding value or adding cost. CSPs have a lot of potential 'value' flowing through their pipes, so helping enterprise customers turn data into revenue or into cost reductions would be an amazing opportunity."

As a manufacturing expert, Walker sees similarities between what manufacturing has gone through and what CSPs can now consider in the IoT. "We have large utility customers providing energy to large manufacturers, and for the utility the focus was all about uptime, reliability and keeping transmission lines open, much like CSPs that focus on their networks' speed and reliability." She notes that utilities have started looking at new ways to leverage sensors, IoT data and analytics to help their manufacturing customers automatically "shed load" in terms of equipment needs — even going so far as to work with competing utilities to tailor production schedules to peak and off-peak requirements of large manufacturers, accommodating big orders energy wise, and without having to buy more equipment. CSPs can accomplish the same if they educate themselves about the esoteric needs of different industries and customers and the ways in which using IoT data and analytics can enable them to solve problems for their customers, and the new ways in which they can monetize new capabilities.