Q1 2019 • VOLUME 9 • ISSUE 1

IoT now

HOW TO RUN AN IoT ENABLED BUSINESS

The IoT Now
Guide to IoT Acceleration

INTERVIEW

Ericsson IoT head steps on the accelerator to move IoT into the fast lane

PLUS: Inside Grundfos' industrial IoT-enabled project to transform from selling pumps to providing water management • Analysys Mason's Tom Rebbeck delves deeper into operators' IoT opportunities • Latest news online at **www.iot-now.com**

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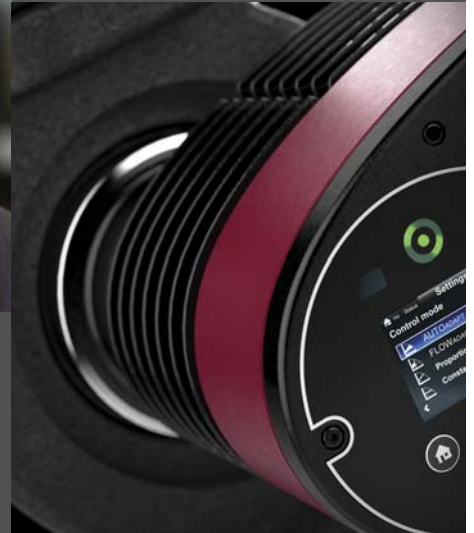The quest for easy.

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Cover sponsor: Ericsson enables communications service providers to capture the full value of connectivity. The company's portfolio spans networks, digital services, managed services, and emerging business and is designed to help our customers go digital, increase efficiency and find new revenue streams. Ericsson's investments in innovation have delivered the benefits of telephony and mobile broadband to billions of people around the world. **www.ericsson.com**

Communications service providers accelerate into hyperscale connectivity and enable ecosystem integration for IoT

As improved connectivity in the form of 5G, low power wide area networks (LPWAN), narrowband IoT (NB-IoT) and LoRa arrives, the Internet of Things (IoT) is preparing for hyperscale. However, the connectivity itself isn't the only barrier that is being overcome. Organisations and industries need to engage in building ecosystems to support a wider portfolio of applications within IoT. The complex and diverse needs of individual sectors need to be addressed alongside the bringing together of previously disparate siloes and this needs to happen at the same time as new rules for market participation are formulated. Every player needs to know what they have access to, who owns the data that is collected and how their contribution will be compensated. None of this is trivial, Jeff Travers, the head of IoT at Ericsson, tells George Malim, as he explains the capabilities of Ericsson's IoT Accelerator ▶

SPONSORED INTERVIEW

George Malim: What do you see as the primary challenges facing communications service providers (CSPs) and original equipment manufacturers (OEMs) as IoT goes global?

Jeff Travers: The first thing to do is take a step back and figure out what problems and opportunities organisations are trying to solve by connecting their products. Almost all big industries want to connect their products. At the same time, they want software-defined products and the ability to perform over-the-air (OTA) updates of their products. More and more today, a product's competitiveness lies in its software, not its hardware.

Companies that achieve this can then look to offer their products as services, opening up new business models and providing them with new avenues of potential growth. Car-makers, for example, could move from selling customers a new vehicle every few years to providing the vehicle plus associated services such as insurance and infotainment for a monthly fee. As industries explore as-a-service concepts and collect data for analysis and machine learning, there are substantial opportunities for CSPs to provide additional value to customers.

An immediate challenge that CSPs are well-placed to solve is how enterprises can take their services global. IoT connectivity today might start off by focusing on Wi-Fi or a local operator but the challenge is how to make it global. The first choice has been to look at cellular roaming but that's not available – or legal – in some markets so companies are then looking for other solutions. One approach could be to sign up several operators serving their various markets while making the connection with embedded SIM cards (eSIMs) or embedded universal integrated circuit cards (eUICC). This might get an enterprise to a multinational offering but it's not truly global.

GM: Which industries do you see leading the charge in IoT adoption?

JT: It's clear that the automotive industry has been among the earliest to market. Connected cars are now gaining traction and all manufacturers have advanced plans for highly connected cars. They are looking forward to autonomous cars and connectivity is a pre-requisite for those.

Other areas include smart utilities and connected industrial equipment. I see a lot of uptake for connected industrial equipment because it's a high value, large market which encompasses everything from power tools to water pumps. There's a lot of value to add to these by connecting them. Ericsson has a specific industrial focus on automotive, transport and advanced industries such as smart manufacturing and connected equipment. ▶

The first thing to do is take a step back and figure out what problems and opportunities organisations are trying to solve by connecting their products

GM: How do you see Ericsson's role in addressing the complex and fragmented IoT ecosystem?

JT: It's important to consider what creates fragmentation and whether things are inherently fragmented. Smartphones have one purpose, but industrial things can be high or low-end devices and that is determined by their cost, their connectivity requirements and their value to a business. That fragmentation will never go away but right now, substantial fragmentation is caused by devices that have very old chipsets. We see devices with hard-coded operating systems, for example.

We're tying device management and SIM management together along with network insights to measure performance, so we can ensure these capabilities work seamlessly across global markets

Fragmentation is made much worse by the fact that software programmers have to write code that is directly relevant to the specific device and that's not sustainable. We need scale in this industry but that's not where we are today. Smartphones have achieved their current market scale with a few operating systems and a few handset manufacturers. Once scale exists, it's easy for application developers to jump in and develop for the mass market. IoT is in the opposite situation right now because it's difficult for app developers to create applications profitably for what are still relatively niche deployments.

We are addressing this at a higher layer at the semantic addressing of the object. Instead of hard coding a security camera, the object needs to be able to communicate that it is a camera, so it can be told to pan left, for example. We're

putting a lot of work into the IPSO (internet protocol for smart objects) Alliance's smart chipsets standard to aid this. We've found a way to make device semantics interoperable and if this takes off, developers will find it very attractive to create applications for devices, not just smartphones.

GM: You've recently been rolling out the Ericsson IoT Accelerator unified IoT platform. What does the term mean to you and what does IoT Accelerator offer?

JT: IoT Accelerator is Ericsson's platform for addressing IoT. We're unifying the SIM connection or connectivity management together with device management which we believe go hand-in-hand. If you're connecting a water pump, for example, you need to activate the SIM, address the device and activate it so it can say this is device A and it belongs to customer X.

We're tying device management and SIM management together along with network insights to measure performance, so we can ensure these capabilities work seamlessly across global markets. This unified capability is a key requirement we are seeing from multinational corporations.

GM: Why have you chosen to go to market in this way?

JT: Many things are connected today – more than you'd imagine – but this is done in siloes and ▶

connects back to device management or the service provider's cloud. This type of connected product is fragmented and won't bring the cost down or enable better interoperability. Something more global that allows interconnection and enables us to connect siloes together is needed, subject to automation and pricing rules. Building a web of things is what's missing and that's what we want to participate in.

GM: What makes Ericsson IoT Accelerator stand out from other IoT platforms? What do you see as the main customer challenges that IoT Accelerator solves?

JT: IoT Accelerator will generate enormous value when these siloes can open up and start to release valuable data. Of course, data is only valuable when it's shared but there are only two ways to bring siloes together. One is to go through big back-end integration processes which are not scalable and the other is to get the systems to talk to each other.

We therefore need to get more interfaces to enable this such as LW-M2M. CSPs are starting to realise that this requires ecosystem thinking and willingness to partner with many parties. They're also recognising that they don't need to be the lead partner in order to participate and be successful.

The arrival of 5G is driving momentum and CSPs are obviously preparing their networks for this. However, industries need to prepare products that will benefit from 5G capabilities and are keen to increase their understanding of this. 5G isn't just for high-end applications. There are lower-end opportunities because 5G enables you to tailor the network according to the requirements of your devices. If companies can plug together 5G technology with a connected product and the software functions, as-a-service business models are enabled and companies can reinvent their businesses through digital transformation.

For us, a simple way of looking at IoT is, if the basic premise is let's connect our product and enable remote diagnostics, what happens next? Once the connected product is deployed, we want to mine massive amounts of data to generate insight that enables automated decisions to be taken via machine learning. Industries today are trying to figure out how to manage this data.

Scania trucks, for example, come with an offering of a number of apps that offer insights into truck performance or driver behaviour. These are provided by Scania's partners so this requires payment and settlement issues between the partners that enable this functionality to be addressed. This is not trivial task.

Of course, if you have multiple partners interacting, rules are required to control who has access to what and then, who owns the data. There are no simple answers but it's clear you need to have early discussions among the partners to make clear who does what and who has the right to what.

GM: Can you tell me more about how Ericsson works with the automotive industry and your connected vehicle offerings?

JT: The automotive industry is early out with connecting its products and Ericsson has introduced the Connected Vehicle Cloud (CVC) as a platform to enable telematic OTA updates of vehicles. In addition to the platform, there's an ecosystem of apps to be presented which will enable fleet owners to manage their fleet in real-time using cellular connectivity. It's our way of being application specific and managing vehicles.

GM: What is your approach to industrial IoT (IIoT)? Is there a specific way in which Ericsson addresses this market place?

JT: IIoT covers a number of dimensions. There are logistics flows in and out of factories which require specialised connectivity within the production one which can be highly diverse. There's also the issue of connectivity when the product is out in the field. Most commonly, people look at the manufacturing environment which is composed of companies that have enormously different needs.

Manufacturing environments are typically wired today but manufacturers have high interest in becoming wireless so, instead of having a fixed production line, they can have greater flexibility and reconfigure as required.

Another dimension is that a manufacturer might want to reduce the amount of software in the robots or equipment and put it in the cloud. This has the potential to lower the cost of the equipment and is more agile because more features can be updated OTA. However, in industrial environments great attention is placed on security and product confidentiality. As a consequence, there's a need for confidentiality and unique performance criteria in an individual factory.

The challenge is to address the common needs while taking account of the differences in each deployment. This might involve in-building or dedicated networks – in extreme cases there could be a fully-independent network within a factory which would be operated and maintained by the CSP. We see this as an extension of the CSP offering.

GM: How do you see all of this developing?

JT: Our focus is on enabling hyperscale connectivity with the required attributes at a sustainable cost. We see the need for IoT everywhere and for all industries to hook up their products. The challenge lies in how to do this at huge scale, globally and at the right price. Small projects will not work for us but as the scale comes, the opportunities and challenges change completely. Think back to how the smartphone industry took off with the arrival of the first iPhone. Suddenly, the market was one of billions and the app developers were keen to participate. ■

Manufacturing environments are typically wired today but manufacturers have high interest in becoming wireless

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Tom Rebbeck, Analysys Mason

Operators have IoT opportunities beyond connectivity, but should not underestimate the challenges

As operators are well aware, the value for connectivity is only a small fraction of the overall spend on IoT. Of a typical budget for an IoT project, connectivity only represents around 5-15% of total spend where a wide area wireless network is used - for example, LTE or NB-IoT - and often less when other types of connectivity are used, for example, Wi-Fi or Bluetooth. As operators are also aware, connectivity is often viewed as a commodity, writes Tom Rebbeck, the research director at Analysys Mason

An increasing percentage of contracts - up to 50% in some regions - are being awarded on a regional or global basis

While there are distinctions between operators, these can be hard to express, leading to strong price competition. Even when connection numbers are increasing by 30% year-on-year, connectivity revenue growth is typically half that number.

This leaves operators with a tricky problem. At a time when other parts of their businesses are, at best, growing slowly, IoT is a rapidly growing market opportunity which depends fundamentally on their infrastructure but from which they will only capture a small share. As we will detail below in **Figure 1**, operators have a number of options for IoT based on different combinations of:

• **Connectivity**. By this we mean wide area connectivity. Potential subcategories could include different types of connectivity technology, such as 3G, NB-IoT or LoRaWAN. The other dimension to consider is coverage – local, such as campus or citywide connectivity, national, regional or global. An increasing percentage of contracts - up to 50% in some regions - are being awarded on a regional or global basis, such as connectivity contracts for automotive OEMs or consumer electronics firms. We consider connectivity management to be an integral part of connectivity.

• **Horizontal capabilities**. These capabilities include device management, application enablement and other capabilities that are needed to build an IoT solution, such as security, but are not necessarily specific to a vertical market.

• **Selected vertical solutions**. These cover the solutions that an operator is selling to solve a specific problem in a vertical market. These could be solutions that will be integrated in other services, such as eCall services sold to an automotive OEM, solutions sold to other businesses, such as fleet tracking solutions or even direct to end consumers, such as pet trackers.

None of the options in Figure 1 is ideal as each has its own advantages and disadvantages, and these will weigh differently for each operator. For example, smaller operators may be less able to justify the risk of developing vertical solutions than the larger operators.

Taking each of the different options in turn:
• **No offering**: In this option, an operator simply plays no active role in the IoT market and in doing so avoids the risk and costs of pursuing this new market. The obvious disadvantage is ▶

Figure 1: Summary of the IoT opportunities for operators (not exhaustive)

Option	Connectivity	Offer Horizontal Capabilities	Selected vertical solutions
No offering	✗	✗	✗
Connectivity only	✓	✗	✗
Connectivity and horizontal solutions	✓	✓	✗
Connectivity and vertical solutions	✓	✓	✓
All services	✓	✓	✓

that the operator has no chance of upside from this new market. While this may not seem an attractive position, it is the default stance of many operators, especially challenger operators in small markets.

- **Connectivity only**. This option builds on an operator's core business and avoids the costs and risks of more advanced solutions, but of course limits the opportunity to connectivity revenue. Connectivity is likely to suffer from extreme price pressure and the market for simple connectivity solutions is being shaken by new offerings from the likes of **1NCE** and **Twilio**. It also requires investment to develop and sell IoT-specific connectivity packages. In particular, we expect IoT connectivity to be increasingly bought and controlled through automated platforms, rather than through negotiated contracts and manual intervention, which is ill-suited to the volumes and price points of IoT, especially LPWA solutions.

- **Connectivity and horizontal solutions**. The option looks attractive – it offers the opportunity to sell additional services but without the need to specialise or gain a deep understanding of a vertical market. In practice it is likely to be tricky – many different players are also offering horizontal solutions, not least **AWS** and **Microsoft** – so differentiation will be hard unless an operator can provide a compelling reason to bundle horizontal capabilities, like device management, with connectivity. The channel to market is also difficult – instead of having a clear target customer in mind it will be fighting for attention with any organisation trying to develop an IoT solution. Given the number of competing solutions for IoT, this will be challenging.

- **Connectivity and vertical solutions**. Vertical solutions are where the operators with the biggest IoT divisions, such as **Verizon** and **Vodafone**, appear to be having most success. Offering vertical solutions provides the greatest revenue opportunity, the chance to differentiate the offering and a clear set of potential customers. The downsides are the resources and expertise needed to develop industry specific solutions, and a higher level of risk. Even the largest of operators are limiting the number of vertical markets they try to target with solutions.

- **All services**. This option provides the greatest revenue potential, but also requires the greatest resource. Chinese, Korean and American operators – that is, large operators

with big domestic opportunity – are among the small number of operators aggressively pursuing this approach. For operators with the scale, funding and market position this strategy has some strong potential benefits – the horizontal capabilities should benefit from the learnings gained from providing vertical solutions. This approach also has significant risks given the likelihood of failure and costs involvement.

The selection of the right option will depend on the operator, its existing assets, willingness to take risks and to invest. There is no one single correct answer but some general rules apply:

- *Operators need a strong connectivity offering*. The operator will need a competitive connectivity offering if it is to even be in consideration for the other elements of a solution. This will likely mean offering a range of technologies, the ability to support global/ regional deals, transparent and low pricing, underpinned by a tightly controlled cost base.

- *Generic horizontal capabilities should only be offered with careful consideration*. AWS and Microsoft have massively increased their range of IoT services. Operators cannot hope to compete against the functions offered by these platforms - just as they cannot compete head on in the public cloud business. Operators may have a role offering these sort of horizontal capabilities if they can also provide some strong differentiators, such as tightly packaged connectivity and device management. Few operators will be able to offer these capabilities using internal resources; for most partnerships are essential.

- *Select a short list of vertical specific applications on which to focus – perhaps two or three initially*. IoT potentially impacts all vertical markets, but the markets that make the most use of wide area connectivity are likely to be the most attractive. Other factors will also play a role, such as national boundaries and any existing capabilities. Even offering a solution to a single vertical market involves many challenges – building a solution, understanding the channels and routes to market, developing the sales and marketing capabilities – none of which should be underestimated - but often are. A common mistake is to be too ambitious and create plans to launch many new services for many new markets when, instead of spreading resource thinly, effort should be targeted on two or three applications.

IoT potentially impacts all vertical markets, but the markets that make the most use of wide area connectivity are likely to be the most attractive

Fredrik Östbye, Grundfos

Grundfos, founded in 1945 in Denmark as a water pump manufacturer, has taken that notion of acting on data insights to heart

Industrial IoT allows Grundfos to transform from selling pumps to provide water management

The Internet of Things (IoT) was intended to gather and exchange data, and from it, immediately gain actionable insights, writes Karan Budhiraja, the director of global IoT marketing at Ericsson. With insights, companies can make better decisions that will lead to healthier bottom lines. In some cases, the data may indicate to a company when it needs to make deeper changes, like to an entire business model, if they want to remain competitive in the changing global market

Grundfos, founded in 1945 in Denmark as a water pump manufacturer, has taken that notion of acting on data insights to heart. Today, with advancements in cellular connectivity and the benefits of Industrial IoT (IIoT), it is transforming to offer a much broader service, including water management.

Grundfos' digital transformation

One example can be found in the benefits achieved by connecting Grundfos pumps and gaining data on performance, product health and lifecycle: by doing this, the company can take more responsibility for the functionality of its solutions. The insights gathered allow Grundfos to predict when pumps need repair or replacement before they fail and cause serious problems, an enormously valuable service for their customers. Furthermore, by combining insights from the pumps and other components in a water application, Grundfos is able to deliver system solutions.

The company knew it could not achieve this transformation alone. Specifically, with regards to advancements in cellular technology and ▶

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the promises of 5G on the horizon, Grundfos turned to Ericsson because of its deep knowledge to help it connect pumps and become an effective player in the global IoT ecosystem.

"We have been working closely as a team to find a setup for global connectivity and what technology to use in our pumps," said Fredrik Östbye, the group vice president and head of digital transformation at Grundfos. "I see Ericsson and Grundfos working very closely as strategic partners in the ecosystem of our smart pump to get access to the best connectivity solutions and create future solutions together."

The future of business

Grundfos deployed Ericsson's IoT Connectivity Management solution to control and track all its devices and networked assets at a local, regional and global level through one unified and intuitive device connection platform. In addition to providing a single interface to the global mobile network, the platform also helped with asset management.

The data collected will be turned into actionable insights that immediately deliver value to the customer. For example, predictive analytics can determine not only when a pump may need to be replaced, but it can also show how to optimise the flow and delivery of water. These capabilities also put Grundfos into a position where it can sell pumps and their maintenance as a service.
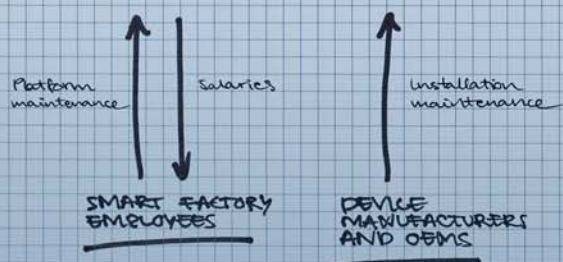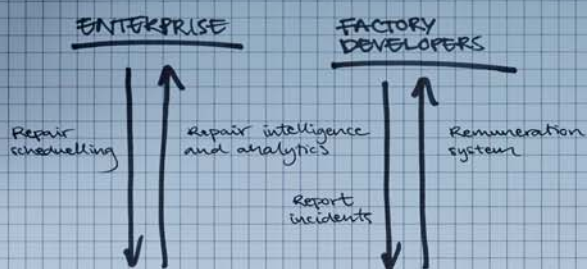
Grundfos' expertise and role in local water management will grow along with the continued rise of smart buildings and cities. As one of the largest providers of pumps and systems in the world, the company will be a key player in the establishment of smart water networks and related critical infrastructure. ▪

We mean business with Ericsson IoT Accelerator. That's why it unites connectivity and device management in one platform, letting you onboard devices at scale in no time. The biggest question will be what you're going to connect next.

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