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## Red Hat's Darrell Jordan-Smith:

open source powers the network edge

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# Red Hat: Open innovation and 5G empower industries at the network edge with hybrid cloud

**2**019 has seen a glut of 5G launches globally, with operators targeting consumers with the ultrafast speeds next generation technology promises. 4G transformed how we use mobile devices and powered the smartphone boom that started in the latter end of the 3G era. While 5G promises to build upon that success, Red Hat maintains it is the enterprise sector where the possibilities of high speed and low latency at the edge of the network will drive use cases that we are only just beginning to contemplate. Smart cities, autonomous vehicles, smart energy and intelligent financial services are a few examples of how 5G will change the way society operates in the same way LTE changed what consumers could do with their phones.

What unites this disparate group of use cases is the sheer volume of data they will generate and the complexity of processing it. In their

search for efficiencies and desire for new applications, companies will want to process these huge amounts of data at very low latencies. Edge computing will satisfy those demands.

Darrell Jordan-Smith is VP for Vertical Industries and Global Accounts at Red Hat and says 5G, coupled with edge computing, will enable these applications and efficiencies at an unprecedented level. The company has broadened its 'verticalised' business approach from telecommunications and financial services, which generate a large amount of the company's revenue, to areas spanning automotive, energy, healthcare, manufacturing and retail.

## Transformative nature

The new use cases in each industry reveal the transformative nature of 5G. The energy sector will be able to use 5G to change how it operates, make itself more efficient and bring new solutions to consumers.

Jordan-Smith explains: “Take oil fields as an example – it’s about how you connect sensors to predict a leak or even a faulty machine. When pumping oil out of the ground, a machine that isn’t working could be costing a business tens of thousands of dollars per hour”.

Preventative maintenance extends to other areas including the mining sector, where the massive trucks transferring materials from a mine could block roadways if they break down. 5G and edge computing will guarantee faster communication speeds, ensuring companies have real time data not only to check vehicles are not being overloaded but also to inform them of how their fleets are performing. Elsewhere, wellbores can stretch to thousands of feet below ground level. Edge computing brings computation and data processing much closer to where it is needed significantly improving response times.

Predictive maintenance will also be critical to the manufacturers of the future, with edge computing processing data transmitted from the assembly line or elsewhere on the factory floor in real time. 5G and edge computing will underpin further innovations in Industry 4.0 as factories take increasing advantage of automation, whether it’s connected logistics, assembly and/or product handling. Edge computing coupled with artificial intelligence (AI), such as machine learning (ML), can proactively discover and solve problems before they occur.

Jordan-Smith says: “In Europe today for example, corporations and factories in particular, are starting to buy 5G technologies and provide fibre links into the core network in order to provide access to low latency, high speed wireless capabilities.”

### Exciting automotive

Automotive is another exciting area as vehicles evolve towards becoming a data centre on four wheels, building on the self-driving and self-park-

ing capabilities the likes of Tesla offer today. Ambulances will also be transformed by 5G and edge computing, with remote diagnoses through in-vehicle scans and real-time video helping paramedics provide a greater level of treatment while a patient is on their way to hospital and administering optimal treatment upon arrival – saving valuable minutes and costs.

### Gaming, security and travel

Surprisingly, gaming is emerging as a popular edge use case, as reducing latency ensures greater satisfaction levels for participants. Various forms of AI have been in use in games for decades – for example, as Jordan-Smith explains, “virtual adversaries generated by the game itself are powered by AI, and provide a superior gaming experience for human participants”.

Edge computing also contributes to security, by reducing the need for data to travel across the network to various cloud providers and data centre resources. “As a result, more is accomplished close to the device and user, which reduces the overall attack vector,” he notes.

Within airports, edge computing will further transform security. Facial recognition software is already in place in many airports, speeding up the security process more than fingerprint systems. But Jordan-Smith says with consumer opt-ins, airport operators could take advantage of a lot more passenger data: “[Within a security context] you can look at detailed facial features in 3D, such as which direction the eyes are looking, or the unique gait and stride of an individual. You could provide enhanced services outside of that capability”.

An example of this could be wider airport logistics, with 5G providing real-time tracking of every vehicle operating across an airport, delivering fuel and labour efficiencies. “But in order to do that, the compute





and storage of that information must be super-low latency, almost real time. A lot of that compute will have to happen in the actual building itself and only the necessary information will be transported back to the main data centre at very high speeds where a database may interrogate a particular facial feature,” according to Jordan-Smith.

### Jetting ahead

Transforming security even extends to the military. In May 2019, Red Hat announced it was working with Lockheed Martin to deploy its agile and adaptive open source architecture enabling the jet manufacturer to deploy new capabilities to its F22 jets much faster. Jordan-Smith says, “The ‘warplane’ could download applications using OpenShift in real time to run them in the aircraft, mirroring a certain set of circumstances the jet is experiencing in the battlefield. It can determine if certain threats are imminent within a specific battlefield environment providing the pilot with real-time mission critical options and directing the attention accordingly.

“In very many different industries the edge will have a considerable impact on how people and businesses interact with the network. We’re putting intelligence closer to the edge of the network and we’re provid-

ing services with very low latencies at the edge of the network in order to facilitate those capabilities and those interactions.”

Red Hat is already preparing for the opportunities these verticals will bring by building what it calls “verticalised selling units”, specialising in a market that has the greatest opportunity. For example, its automotive unit in Europe has expanded into North America. Europe also boasts a manufacturing and energy-selling unit, while North America has established ones for healthcare and retail. Red Hat’s ability to talk the customers’ language means it can quickly establish their pain points and discuss how the edge can transform their businesses in different ways.

### Edge of tomorrow

In October 2019, graphics chip manufacturer NVIDIA announced it was using Red Hat’s OpenShift container platform, which manages multi-cloud and hybrid cloud deployments, on its EGX edge computing platform. OpenShift plays a crucial role in NVIDIA’s Aerial 5G software developer kit, enabling the likes of AI and ML, smart cities and smart factories through managing and automating the chip manufacturer’s 5G radio access network.

Jordan-Smith says, “[NVIDIA’s] developers as well as their clients can write applications that run on Nvidia micro-processing technology. These field-programmable gate arrays and GPUs are being sold to car manufacturers, retail companies as well as oil and gas companies.

“You can easily see how OpenShift can be used by NVIDIA as the main platform that brings an operating system to the micro-processing technology but also the tools to develop some of those applications that will run at the edge of the network.”

Red Hat is now part of IBM’s Hybrid Cloud division after its \$34 billion takeover was completed in late 2019. Jordan-Smith identifies the edge as Red Hat’s focus, armed with the additional clout of its new owners and giving it greater resources to further target verticals. He says, “We’re going to invest our energy and resources into defining the edge opportunity at Red Hat. And we [IBM/Red Hat] are making some significant investments in this area because the edge really is the hybrid-cloud environment that companies are gravitating towards.

“In terms of hyperscale, a lot of the hyperscalers are driving to the edge of the network as is IBM with IBM Cloud Private. This is going to be a big area for the company and you will see thought leadership on this topic from senior executives at MWC in Barcelona in 2020.”

Additionally, Red Hat is seeking to drive continued network transformation by enabling operators to target customers of their own with 5G solutions. Red Hat’s OpenShift Container Platform will play a critical role in handling 5G workloads at the edge. Jordan-Smith explains, “5G’s underlying architecture is built on containers. It neatly fits into our OpenShift technology and all the work and innovation we are doing around that. Open source communities are engaging and embracing our contributions that make low latency use cases a reality.”

### The hybrid journey

By offering hybrid cloud at the network edge, Red Hat will merge its telco and enterprise opportunities, not only driving success at the service providers who will deploy and run these open clouds, but also the companies who will ultimately build and use the applications. The telco and enterprise industries are at the start of what Red Hat describes as a five-step journey.





The first step is evolving network architecture using Network Functions Virtualisation (NFV) towards the Kubernetes open-source platform that automates container operations. Red Hat is one of the largest deployers of the cloud computing platform OpenStack for telcos, with more than 150 NFV deployments globally. Jordan-Smith says, “This puts us in a great position to start positioning containers with existing customers as we evolve the NFV journey to Kubernetes.”

However, he stresses that the OpenShift Container Platform isn’t just Kubernetes; it offers a full developer environment, allowing enterprises to transform their methods of application development. This is the second phase – enabling companies to do continuous integration and continuous delivery (CI/CD) and DevOps.

He continues, “A lot of the conversations with telcos, banks and other enterprises is actually helping them shift from a traditional waterfall developer environment to an agile developer environment, leveraging OpenShift capabilities and reshaping and remodelling existing applications to become cloud-native. Red Hat wants to provide the best possible developer experience that can be deployed over a microservices environment that is able to run not just in a multi-cloud but a hybrid cloud.”

The third phase is where intelligence can be provided at the edge of the network, by developing AI, the Internet of Things and integration platforms. Jordan-Smith says this is an evolution of the Tesla use case described above, where a car is effectively a data centre on wheels that can self-drive and self-park. As AI evolves, these features will only become richer and not just within vehicles. They will improve customer experience and provide a whole new dimension to product differentiation for the automobile industry.

Jordan-Smith describes phase four – deploying automated operations with integrated AI – as a huge opportunity. He says, “Managing all of

the networking and all of the routing capabilities is going to take place across a massive network with the number of connected devices in billions. You can certainly see the huge growth potential with sensors and the AI and telemetry data that will be connected.”

The final stage of this journey is supporting intelligent edge services, delivering different use cases for different verticals. Bringing the discussion back to one of Red Hat’s core businesses, Jordan-Smith says banking is an example of where 5G could identify and deliver consumer opportunities in future. For example, instead of sending a threatening letter to a bank customer who does not pay their mortgage on time, a bank could use analytics to tailor a conversation with them, creating an opportunity to sell a new, more relevant product and developing a higher level of customer satisfaction which in turn delivers more revenue to the bank.

#### New vertical use cases

This focus on innovative new use cases across a wide range of diverse verticals is a pivot away from Red Hat’s historic identity as a horizontal platform player. Jordan-Smith says the company is best placed to take advantage of the appetite for open source, adding, “From a market perspective, we are pushing against a set of open doors in an area where there is considerable innovation. And where there is a high level of interest and intrigue, in terms of what is possible, that really ignites what the market calls the fourth industrial revolution.

“For Industry 4.0, Red Hat is right at the centre and well-positioned to be able to facilitate a lot of that innovation with an extensive ecosystem and considerable developer capabilities, all built and based on open source principles.”

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# Open innovation connects industries

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