



DELL: POWERFUL FLEXIBILITY FOR THE IOT EDGE

ABSTRACT

Dell Edge Gateway 5000 Series represents a blending of exceptional compute power and flexibility for Internet of Things deployments, offering service providers the ability to support smart, rapid IoT enablement within the enterprise and value-added services..

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The Internet of Things is poised to revolutionize both telecom and information technology. IoT will place unprecedented demands on wired and wireless networks both in terms of the sheer number of connected devices and the volume, variety and velocity of the data those devices generate.

BI Intelligence predicts that there will be 34 billion devices connected to the Internet by 2020. Most of those (around 24 billion) are expected to be IoT devices, and the remaining 10 billion will be traditional computing devices such as tablets, smartphones and smart watches. Enterprises and governments are expected to be the top two adopters of IoT technologies as they seek to lower operational costs, increase productivity and/or expand to new markets.

IoT represents exciting possibilities. More than ever, IoT will draw enterprise IT departments into closer relationships with network service providers to enable and support their IoT endeavors.

For service providers, the business case for IoT isn't simply about adding new connections. The new business model for IoT will focus on value-added services that generate new revenue sources. Many of those opportunities will be based on big data analytics capabilities that derive new value from sensor networks and other industrial devices across verticals that include manufacturing, utilities, healthcare and others.

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Vodafone recently conducted its fourth annual Internet of Things Barometer survey, which found that:

- 74% of respondents in the Americas view IoT as critical for the future success of their businesses
- 55% of IoT adopters reported that their revenues grew by more than 20% following IoT deployment
- IoT now accounts for 24% of the average IT budget

Ultimately, IoT is about bringing information technology to operations technology: IT to OT. Those two threads are inextricably tied to successfully leveraging IoT, by harnessing both connectivity and computing power for intelligent solutions.

CONNECTIVITY + COMPUTE = IOT

A successful IoT system will depend on the ability to bring analytics to the edge in order to make the right decision in the right place, on the right timescale. Existing mobile network and cloud infrastructure can't cope with the data volume and speed that will be needed to support billions of new IoT devices. While some devices and services will be based on the traditional machine-to-machine communication scenarios with small amounts of data and wide latitude on latency requirements, others will be data-intensive and have extremely low-latency requirements.

When it comes to big data, it often won't make sense to push all IoT-related data to the cloud for processing. That is likely to be impractical due to the cost of and/or network impacts of such traffic, or the latency that would be added by doing so.

Major industry groups recognize that mobile edge computing (MEC) will be a crucial component of new services for IoT and other business segments. ETSI categorizes MEC as "bringing cloud-computing capabilities and an IT service environment to the edge of the mobile network." Core Analysis has predicted that MEC will be part of the fabric of 5G networks and that MEC equipment will account for up to 20% of a network when fully deployed. As a founding member of the OpenFog Consortium, Dell supports public-private efforts to solve the bandwidth, latency and communications challenges that accompany IoT so that computing resources, storage and control are distributed across networks to enable IoT and other advanced network and technology concepts.

Dell's decades of IT expertise inform this approach to enabling the digital enterprise and making IoT more easily and quickly deployable. Through Dell's technology portfolio and services, it brings tools to make IoT workable for IT, while helping mobile operators utilize Dell's hardware and software platform to bring scale, speed and cost-effectiveness to IoT deployment support.

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Dell also believes that technology specialists such as independent software vendors and system integrators are critical to advancing successful IoT implementations, and it has assembled an extensive IoT Solutions Partner ecosystem to support service providers, including SAP, Nokia, Microsoft, and VMware and more.

DELL'S 5000 SERIES: ENABLING FAST, SMART IOT DEPLOYMENTS

Dell's strategy for IoT encompasses three key areas:

- Architect IoT for analytics, because data-based intelligence is the lifeblood of services.
- A holistic approach to security. Network edge devices can be a security weak point, which IT managers recognize. Dell's strategy for IoT is to ensure security from device to gateway to data center to cloud.
- Supporting choice and flexibility in implementation through partners so that clients can customize according to their needs, with a foundation of high-quality computing resources. Dell also brings a pragmatic approach so that customers can leverage devices and data that they have already invested in, leading to faster return on investment.

Within that strategy, Dell Edge Gateway 5000 series opens up a host of new possibilities for intelligent IoT deployments. Purpose-built for IoT, it provides a flexible hardware and software platform that leverages Dell's extensive expertise in ruggedized PCs and easily attaches to walls or DIN rails in industrial environments. The 5000 series gateway is built to ensure stable functionality in challenging edge environments: no fans, no moving parts, and a strong capacity for heat absorption without impacts to performance. It is designed to run 24/7 to meet the needs of always-on IoT devices, and the 5100 Series supports operating temperatures from -30°C to 70°C.

Customizable and interoperable, Dell Edge Gateways support three different operating systems and flexible IT management. They can aggregate and normalize virtually any data source ranging from protocols such as Modbus and CANbus, to wireless mesh technologies like ZigBee. Analytics can be performed at the edge, in the data center or in the cloud and incorporate other data sources for richer business insights.

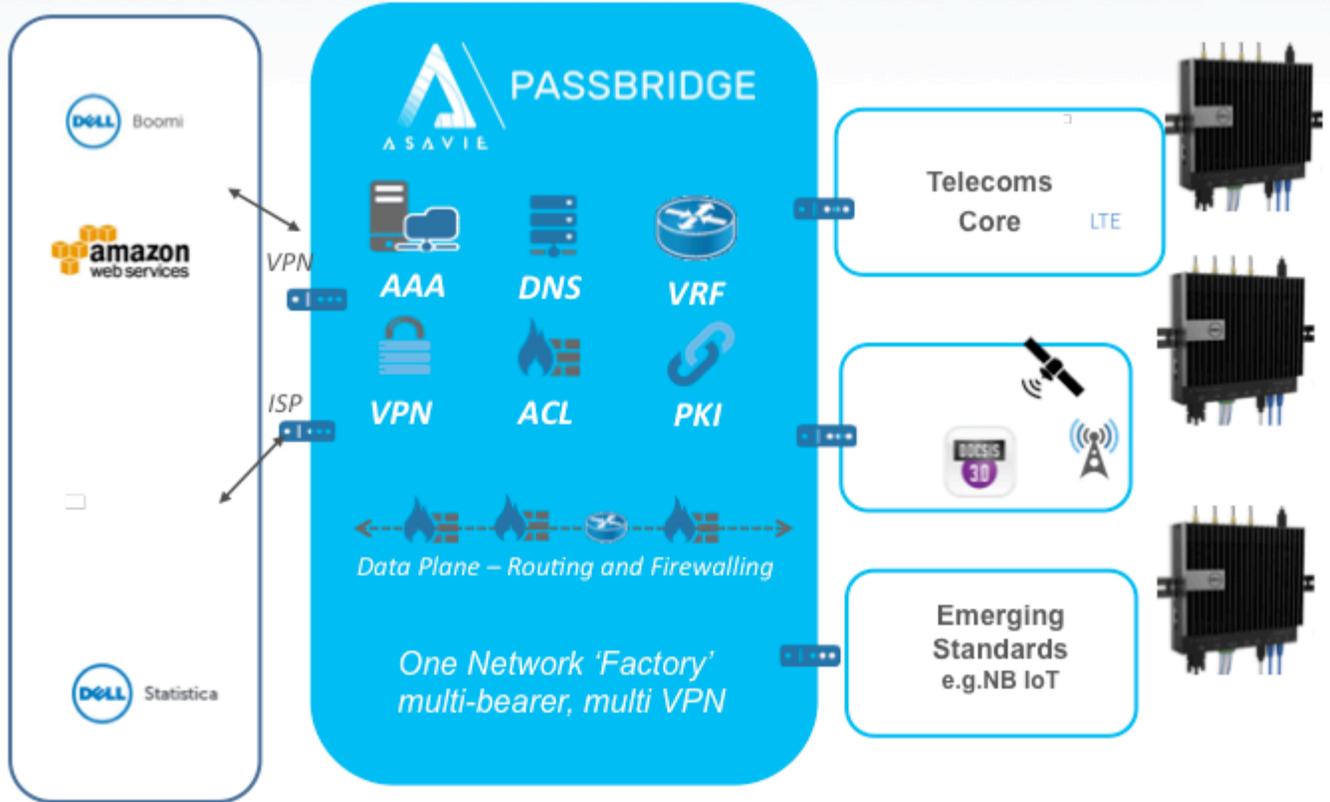
Dell Edge Gateway has been used in utility microgrid control and monitoring; to provide secure, open development platforms for smart building automation; and for real-time security surveillance with Wi-Fi and cellular network access capabilities.

CASE STUDY: ENABLING IOT

In Dell's IoT lab in Limerick, Ireland, the Dell Edge Gateway was used to achieve fast provisioning of new IoT devices in collaboration with Vodafone and IoT enablement company Asavie.

As an IoT Registered Partner for Dell, Asavie brings its expertise in IoT deployment to Dell customers and represents the innovative collaboration that Dell fosters with its partner program. Asavie works with more than 20 leading mobile operators and enables more than 20,000 end-user enterprises of all sizes to scale smart, connected IoT projects. Combined with the Dell Edge Gateway, Asavie's PassBridge™ cloud-hosted platform and Asavie IoT Connect self-service web application for connecting IoT devices using cellular communications provide a path to rapid deployment and end-to-end control of network connectivity for IoT projects.

The power of the combined offering from Dell and Asavie gave Vodafone a simple, rapidly achieved solution to the business challenge of end-customer scalability within its IoT operations.



Asavie PassBridge™ – IoT Connectivity Architecture

Vodafone expects IoT to become one of its primary businesses in the coming years and has invested accordingly in testbeds, acquisitions and partnerships ranging from cellular to narrow-band IoT connectivity. In the context of vehicle data, the operator realized that it could better utilize its network assets by capturing the information from IoT endpoints that was already flowing across its infrastructure and turning that information into new, hosted services.

In order to do that, Vodafone needed an edge device that was more than just a network termination point: it needed a mobile edge computing tool that would support data capture, pre-processing and basic decision-making based on existing policies, as well as remote control. It also had to implement a solution that would support rapid provisioning. One of the greatest challenges for bringing on new IoT customers is the amount of customization that goes into building and connecting an Access Point Name (APN) gateway between the mobile network and the customer's network, with services built in and accompanying Service Level Agreements. That process typically takes several months and can mean that a service provider like Vodafone requires a minimum number of SIMs to be connected – leading to an operator missing out on smaller customers. Such gateways can also run afoul of firewalls and IT governance: IT departments are often reluctant to bring IoT devices within corporate networks due to security concerns. In particular, it's a challenge to provide core network access for the gateway that can work around firewalls yet still provide a secure environment for transfer of the data to the cloud.

In the Limerick lab, Dell's 5000 series gateway was the touchpoint for solving the problem of rapid APN provisioning. Vodafone's team installed a 3G SIM card that essentially provided a virtual private network connection to the gateway and routed traffic over the mobile network to the cloud. Asavie contributed its Asavie IoT Connect solution™, part of Asavie PassBridge™, which establishes a private APN and offers SIM management capabilities with no minimum number of connections. The self-service web application from Asavie enables a network to be set up between IoT devices without a custom IT build or complex integration, in just a few clicks. By leveraging this combination of solutions centered on Dell's gateway, the partners achieved a working solution within a few hours that provided secure, scalable connectivity. It solved the problem of integration with corporate networks by relying on mobility for handling the data captured by the IoT gateway. The solution can be enabled with 2G or LTE connectivity depending on data demands of a particular

application. Since it is SIM-based, the solution can easily be spun up or down without the long timeline of traditional interconnection that can hinder innovative IoT efforts – and it enables Vodafone to support smaller IoT customers and pilot projects that the company would otherwise miss out on.

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This is just one of example of the innovative solutions that Dell is helping operators design and implement in order to serve the IoT market.

CONCLUSION

The IoT represents a sea change in not only the number and type of connected devices, but also the network architectures needed to support and monetize such deployments. In particular, the ability to add edge computing resources will present new, value-added service opportunities. Success for service providers and enterprise in an IoT world will require flexible, scalable and cost-effective solutions that bring computing power to the edge of the network and support rapid, efficient problem-solving. Dell's expertise in IT, combined with its innovative IoT labs and partner network, position the company to best assist service providers in designing, implementing and capitalizing on IoT deployments.

For more information on Dell's 5000 Series gateway and IoT resources for the telecom industry, contact:

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