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Industrial and Commercial Energy Management

Utilities are adding the Internet of Things (IoT) to leverage new digital technologies to disrupt and transform large scale energy management and related services.

Energy management innovations using the IoT drive next generation utility services to optimize energy consumption for industrial and commercial customers

The utility sector faces disruption unseen in the last 100 years. Apart from constantly balancing new financial challenges with higher operational costs, fundamental disruptions in energy systems are driving utilities to adopt new digital technologies, and focus on value creation through customer centric operations and new revenue streams. These disruptions include falling solar prices, falling battery prices, increases in corporate renewable energy purchases and a new community-based energy focus in a consumer driven world. In addition, competition from new non-traditional entrants is filling the energy space.

As a way to compete, utilities are adding the Internet of Things (IoT) to leverage new digital technologies to disrupt and transform large scale energy management and related services. IoT enables utility companies to have wider ranging real time insights into their operations and assets, and become more agile, flexible and efficient. It allows them to transform energy data into new services and helps ensure interoperability to seamlessly integrate all types of energy data via connected systems.

Utilities can create value by moving from selling electricity as a commodity to selling services to large industrial and commercial customers through use of various decentralization technologies. Distributed generation from renewable sources,

primarily solar systems, reduces demand during peak sunny hours. Distributed storage or battery systems are used during peak periods or as backups to flatten demand peaks and valleys. Energy efficiency devices and services help reduce energy usage and overall demand. Demand response technologies enable energy usage control during peak demand and high pricing periods.

The Internet of Things (IoT) pulls all of these energy optimization systems together.

Utilities have a strong interest in blending and managing decentralization technologies within the grid and optimizing their energy systems through IoT. Past investments in smart grid infrastructure provide the foundation to adopt and deploy these IoT innovations quickly and provide new revenue energy management services to their customers.

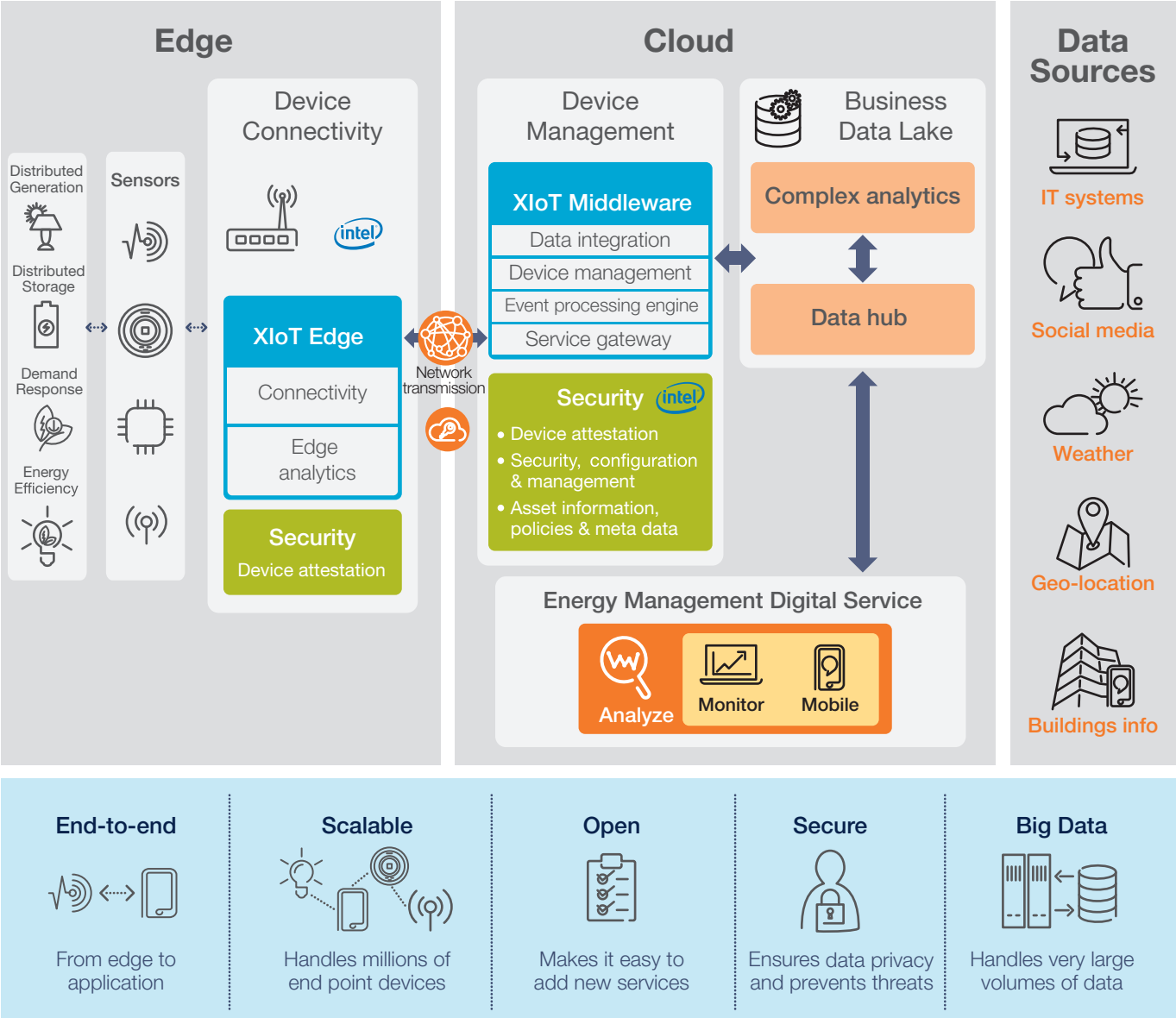
XIoT transactive energy solution integrates the ecosystem of decentralization technologies to provide value added energy services

To enable utilities to combine decentralization technologies and develop energy management services for their key customers, Capgemini has partnered with Intel to develop an end-to-end solution for industrial and commercial energy management.

The open XIoT-based solution captures different types of data from different types of sensors, business applications and IoT devices to provide a transactive energy platform that integrates and controls the ecosystem of disparate utility partners and decentralized energy sources. Harnessing the vast network of providers, the solution creates bundled energy management services in a cost-effective and reliable manner.

This solution provides significant benefits to utilities and their customers :

Figure 1: XIoT- World class secured IoT platform



- Provides holistic energy management services to customers by combining benefits from distributed generation, distributed storage, energy efficiency services and demand response programs.
- Enhances competitiveness by implementing flexible energy systems which can relieve pressure on electricity generation and reduce costs for utilities, utility partners and customers.
- Capitalizes on market opportunities, and enables new revenue streams or commercial models.
- Provides an open secure platform which can ingest sensor data from multiple devices and transport the information to any back-end analytical or business system.
- Provides Best in Class standards based Data Security from edge to cloud and delivers secure enterprise IoT, components pre-validated for interoperability, and an accreditation process.

Jumpstart your journey to intelligent energy management services

The Capgemini XIoT platform leverages Intel® architecture and Intel® IoT Gateways, which live at the edge of the network on end-customer premises. The IoT gateways connect the sensors embedded in decentralized technology components to the public cloud, which hosts the Capgemini XIoT platform and provides the basis for the transactive energy solution for utilities. The solution analyzes and integrates the data sent from each asset, before pushing recommended actions and insights.

Key components of the end-to-end solution include:

1. **Edge Devices:** IoT sensors monitor and track critical asset health and performance.
2. **Edge Gateways:** Intel® IoT gateways live at the edge of the network on the end customer's premises. The Intel IoT gateways provide pre-integrated, pre-validated hardware and software building blocks that connect and operate with both legacy and new systems, enabling seamless and secure data flow between edge devices and the cloud. This technology offers leading performance and security for intelligence at the edge.
3. **XIoT Edge for Device Connectivity:** The XIoT edge agent installed on the Intel® IoT gateways helps identify and provision sensors for data aggregation and transmission to XIoT Middleware. The XIoT edge supports a comprehensive set of communication protocols with over 100 plug-ins between heterogeneous devices.
4. **XIoT Middleware for Device Management:** Capgemini XIoT middleware is installed in the cloud or on site. It manages data flow from multiple gateways to enable device management and provisioning, firmware upgrades, fleet management, message management, health monitoring, and event processing. The connector library in the XIoT middleware drives data synchronization between systems.
5. **Cyber Security:** Intel security software is installed on each gateway and in the IoT middleware in the cloud, and is complemented by Intel security components built inside the hardware to prevent tampering. Together, the software and middleware handle device attestation, configuration and management, asset information, policies, and metadata. The end-to-end cyber security capabilities embedded across the network from end point devices to the cloud ensure the highest level of cybersecurity preparedness to tackle security breaches of any magnitude.

Partner with Capgemini and Intel to create higher value-add potential

The proven Capgemini XIoT solution with Intel technologies marks a new era in industrialization and innovation, providing organizations with the ability to automatically collect and analyze data from connected devices, sensors, machines, and people as well as take appropriate actions. The fully integrated combination of Intel's hardware, software, and security ecosystem with Capgemini's XIoT middleware and analytics capabilities provides a unique, business-case oriented, and secure end-to-end IoT platform solution, available "as-a-service" and ready for industrial deployment.

1. **Scalability, Agility, and Innovation:** The XIoT platform architecture is based on standardized and open IoT reference architectures. It is capable of connecting millions of assets across the globe. With a defined, repeatable foundation for device connectivity, edge-to-cloud data delivery, and reduced complexity, customers can scale and grow the solution for business agility and continue to innovate on a future-proof platform.
2. **Best-in-Class Data Security:** The XIoT is a security accredited IoT platform that provides end-to-end data security from edge devices to the cloud. Security is managed at each level in the architecture.
3. **Flexibility and Accelerated Time-to-Value:** The XIoT platform can host analytics from any source and provides purpose-built accelerators that overcome the barriers of cost and complexity to decrease the time-to-value. The XIoT platform offers flexibility to integrate third party components and choose from a myriad of major cloud service providers. The platform is modular to easily integrate separate components such as analytics or big data providers. XIoT can be deployed on a private, hybrid or public cloud.
4. **Integrated Pricing Model:** The XIoT platform bundles hardware, IoT applications, systems integration services and it is provided as a service with an end-to-end pricing model. Clients don't have to pay an up-front fee to access the platform.
5. **Value-added Digital Services:** Industrial and Commercial Energy Management solutions feature more than just the XIoT platform advantages. These solutions offer end-to-end cloud-connected digital services that help fully integrate disparate systems across IT/OT areas.
6. **End-to-end IoT services:** With our end-to-end IoT services, we guide you through every step of your journey to digital transformation excellence in energy management services. Our repertoire of services includes IoT strategy, innovation portfolio management, solution design and delivery, rapid concept and design prototyping, and global deployment. With Capgemini and Intel, you can be confident in choosing solutions that are efficient, security-accredited, and focused on driving business outcomes that keep you ahead of your competition.

About Capgemini Utilities Sector

Capgemini is a long-established leader in the energy space. Our 16,000 dedicated utilities consultants leverage the latest in social, mobile, analytics and cloud technology to transform your utility into an energy services company.

With our u2es Transformation program and Digital Utilities Transformation framework, we prepare today's utilities for tomorrow. Our Smart Energy Services practice manages millions of smart meters and has successfully helped deploy hundreds of millions of these meters around the world. We have extensive experience in deploying and managing end to end IoT services globally.

Contact Us:

Interested in learning more about making the Internet of Things work for you? Capgemini and Intel are ready to help you jumpstart the implementation of industrial and commercial energy management strategies for lasting competitive advantage. Get started with a workshop or a meeting today!

Thierry Batut
thierry.batut@capgemini.com

Joeri Van Geystelen
joeri.van.geystelen@capgemini.com

Rupak Patra
rupak.patra@capgemini.com

About Capgemini

With more than 190,000 people, Capgemini is present in over 40 countries and celebrates its 50th Anniversary year in 2017. A global leader in consulting, technology and outsourcing services, the Group reported 2016 global revenues of EUR 12.5 billion. Together with its clients, Capgemini creates and delivers business, technology and digital solutions that fit their needs, enabling them to achieve innovation and competitiveness. A deeply multicultural organization, Capgemini has developed its own way of working, the Collaborative Business Experience™, and draws on Rightshore®, its worldwide delivery model.

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