



Intelligent Asset Monitoring

Intelligence across the asset network is the key to innovation, customer centricity, and operational efficiency in an era of internet-connected devices

As industries gradually move away from age-related maintenance schedules and visual inspections, they are investing in new technologies including remote asset tracking and monitoring, preventive maintenance, condition-based monitoring, and predictive maintenance to drive efficiencies and cut costs. In addition to addressing operational efficiency in asset management, asset intensive companies are also focusing on value creation through customer-centric operations and new revenue streams.

Today's industry assets for manufacturing, energy & utilities, construction, transportation & logistics, smart cities, aerospace and defense are diverse, complex, and often spread over large areas. Maintaining these assets and

identifying weak points before failure is a major challenge—and failure or unavailability of critical assets may lead to delayed operations, monetary losses, and poor customer service.

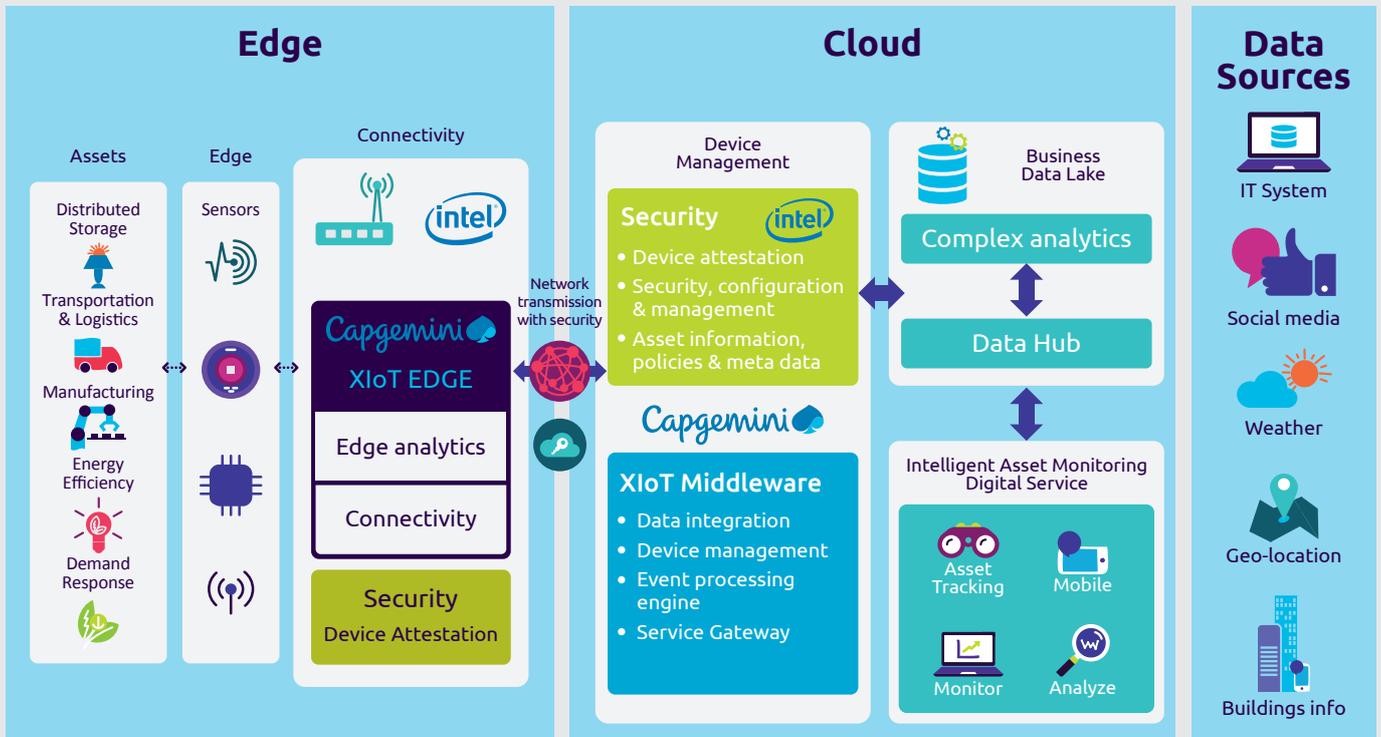
The Internet of Things (IoT) is expanding the boundaries of managing a network of connected grid assets. IoT-enabled asset management enhances areas of asset maintenance, field operations, outage management, and planning through the continuous, real-time monitoring and reporting of critical assets. A single, cloud-based repository to store and analyze data from various operational and business applications, created through the use of IoT sensors and third party sources will significantly change the monitoring and management of mission-critical assets.

An IoT-based solution unlocks hidden potential by tracking mission-critical assets while preventing failures

Capgemini has partnered with Intel to develop an end-to-end solution for tracking the asset lifecycle that will reduce expensive preventive maintenance, offline outages, and resource-intensive costs.

The open, XIoT-based solution captures different types of data from different types of sensors, business applications and IoT devices to monitor the globally dispersed asset network. In aggregate, these devices provide instant snapshots of asset health and performance by collecting information such as condition, age, location, vibration, flow rates, pressure, temperature, and other operational characteristics. The integrated system monitors critical assets such as power quality units, static compensators, transformers, and critical mobile units in power

Figure 1: Intelligent Asset Monitoring is built on the world class secured XIoT platform foundation



plants as well as assets for additional utility infrastructure, manufacturing, industrial, transportation and logistics, construction, defense, automotive, healthcare, aviation, pharmaceutical / biotechnology companies. Tracking data from “hundreds of conditions” is used to detect deviation from normal conditions to trigger an alert for an investigation. The closer the alert timing is to real time, the quicker an investigation is triggered, preventing potential failures, eliminating workforce hazards, and minimizing physical damage.

This solution provides significant benefits to asset heavy companies by:

- Reducing costs in field and plant operations by improving availability and reliability
- Minimizing financial and safety risks by avoiding equipment failure and providing enhanced asset performance
- Enhancing competitiveness by implementing intelligent, long-term asset strategies covering

asset planning, asset resilience and asset creation

- Capitalizing on market opportunities while exploring new revenue streams and commercial models through real-time insight into connected, mission-critical assets across the business network

Jumpstart your journey into the intelligent management of mission-critical assets across your business network

The Capgemini XIoT platform as illustrated in Figure 1, leverages Intel® architecture and Intel® IoT gateways that live at the edge of the end-customer network. The IoT gateways connect sensors embedded in critical assets to the public cloud, which hosts the Capgemini XIoT platform and the critical asset tracking application. The solution analyzes and integrates the data sent from each asset before recommending precise 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

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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. Intel security components implemented in the hardware makes it extremely difficult to tamper with. It handles 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.

- 6. 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.
- 7. 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.
- 8. 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.
- 9. Integrated Pricing Model:** The XIoT platform bundles hardware, IoT applications, and systems integration services and 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.
- 10. Value-added Digital Services:** The Intelligent Asset Monitoring solution features more than just the XIoT platform advantages. It offers end-to-end cloud-connected digital services that help fully integrate disparate systems across IT/OT areas.
- 11. 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 asset optimization. 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.



Commercial Electricity Generation Client Success

French Nuclear Operator EDF deployed the XIoT platform to enable smarter, safer monitoring and maintenance for two nuclear plants. They are considering extending the solution beyond just reactor maintenance routines to plant-wide tracking for other high value assets and tools. Focused on EDF's safety and efficiency requirements, Capgemini created an asset tracking system that increases asset availability and operational efficiency. Previously, EDF had no remote system for monitoring the location of essential mobile air supply safety units, and regular maintenance relied on paper-based records or off-line handling systems. These manual methods led to time wasted on sourcing units for work crews. Now, EDF's maintenance teams can immediately view the location and status of every single unit in an area spanning three floors, with each floor measuring 1000m². Replacing the paper-based record-keeping system has increased the efficiency of daily inspections, as maintenance personnel now know each unit's exact location and working status.

Pharmaceutical and Biotechnology Client Success

A fluid monitoring system manufacturer working in the pharmaceutical and biotechnology industries wanted to better communicate and interact with distributors and all end customers via wireless connectivity and internal visibility into its laboratory pipette ecosystem usage. The client desired to keep in touch with end customers, refine maintenance management and wanted to provide new tools and laboratory process services. Using Micro Data and the Capgemini Smart Services XIoT platform to monitor and deploy services for Pharmaceuticals and Biotech, the manufacturer was able to...

- Better connect with and serve its customers
- Better track and plan for maintenance needs
- Enable a new service delivery system for new capabilities

About Capgemini

A global leader in consulting, technology services and digital transformation, Capgemini is at the forefront of innovation to address the entire breadth of clients' opportunities in the evolving world of cloud, digital and platforms. Building on its strong 50-year heritage and deep industry-specific expertise, Capgemini enables organizations to realize their business ambitions through an array of services from strategy to operations. Capgemini is driven by the conviction that the business value of technology comes from and through people. It is a multicultural company of 200,000 team members in over 40 countries. The Group reported 2017 global revenues of EUR 12.8 billion.

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