IoT security: defending the IoT from chip to cloud

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IoT security landscape – threats and risks

Unprecedented needs due to device scope and diversity

- Man-in-the-Middle
- Password Compromise
- Code Modification
- Key Compromise
Threat models today

- Hardware Identification
- Software Integrity
IoT Device Security Needs

Common IoT Device Security Needs and the Attacks They Protect Against
Challenges of device-cloud authentication and attestation

- How do you securely and cost effectively provision a unique device ID?
- How do you securely validate the device and the cloud?
- How do you securely and cost effectively provision credentials for applications?
- How do you periodically revalidate?
Software based device security

- Data-at-Rest Protection
- Data-in-Transit Protection
- Device-Cloud Authentication & Attestation
- Application Authentication, Permissions and Roles
- Firmware Upgrade and Lifecycle Management
Hardware based device security

- Data at Rest
- Data in Transit
- Protection
- Firmware Upgrade and Lifecycle Management
- Device-Cloud Authentication & Attestation
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Verification of chip attestation

Encryption

Hardware Root of Trust

Software Integrity
Qualcomm® wireless edge services (WES)
Set of trusted services rooted in hardware for IoT cloud users and service providers

Qualcomm WES cloud platform

Qualcomm WES chipsets

Designed to support trusted comprehensive connectivity and computing

Encryption

Device attestation and connection integrity
Edge-cloud integration at scale
Zero touch device life cycle management

Qualcomm wireless edge services is a product of Qualcomm Technologies, Inc.
IoT is delivering results – a few Microsoft IoT success stories

By analyzing driving trends on its own patrol fleet, RAC has reduced its accident rate by 25%, and reduced fuel usage by 20% - reporting annual savings of $1.8 million.

Improves access to production and supply chain data worldwide, reducing downtime costs by as much as $300,000 per day.

Tetra Pak’s IoT business results show down-time cut down by up to 48 hours for each packaging line saving up to 30,000 Euros for customers.

Chillers restart 9x faster than unconnected equipment, avoiding more than $300,000 in hourly downtime costs.

Ensuring the licorice extruders on Twizzler’s production line are performing at peak optimization, saving over $500K/year on licorice alone.

“Finning’s IoT solution has enabled customers to quickly solve business problems from a dashboard, transport more than 1 million additional tons of cargo via machine learning, reduce fuel consumption by reducing idling by 17%, and increase ROI and competitiveness for the long term.”

By telling farmers such things as when to irrigate, how to control diseases and where to fight pests, agroNET provides an action plan to maximize efficiency. This solution has seen yield increases of 30% due to data & machine learning informed irrigation decisions and reductions in water use by 20%.

Gathers data from sensors and systems to create valuable business intelligence and reduce downtime by 50%.

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Cutting fuel usage by 1 percent could save $250,000 per plane per year.

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Simplifying IoT – Microsoft’s approach

Easier to build secure, scalable solutions from device to cloud
Easier to provision devices at scale
Easier to manage devices at scale
Easier to find insights from your IoT devices
Easier to infuse devices with intelligence
Easier to benefit from IoT
Comprehensive set of capabilities for IoT solutions

- **Microsoft IoT Central IoT SaaS**
- **Microsoft Connected Field Service Field Service SaaS**

**IoT Solutions (SaaS)**

**IoT Solutions (PaaS)**

**PaaS Services & Device Support**

- Azure IoT Device SDK
- Certified Devices Azure Certified for IoT
- Security Program for Azure IoT
- Windows 10 IoT Core
- Azure IoT Edge
- Azure IoT Hub
- Azure IoT Hub Device Provisioning Service
- Remote Monitoring
- Predictive Maintenance
- Connected factory
- Azure IoT Suite
- Azure Stream Analytics
- Azure HD Insight Spark, Storm, Kafka
- Azure Time Series Insights
- Azure Event Hubs
- Azure Machine Learning
- Azure Data Lake Analytics
- Cosmos DB
- Azure Data Lake
- Microsoft Flow
- Microsoft Power BI
- Azure Logic Apps
- Azure Active Directory
- Notification Hubs
- Azure Monitor
- Azure Websites
- Device Support
- Edge Support
- IoT Services
- Data & Analytics Services
- Visualization & Integration Services

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IoT Security with Microsoft IoT

Securing end-to-end IoT infrastructure – from cloud to device

Designed for hardware-based security for IoT devices

Security diligence with Security Program for Azure IoT

Driving standards for IoT security at IIC, TCG and other standard bodies

Azure covers 54 compliance offerings

Azure has the deepest and most comprehensive compliance coverage in the industry
End-to-end device to cloud security requires collaboration. HW and SW offers the most comprehensive path to securing IoT devices.

- Secure device provisioning at scale
- Support for variety of hardware security models (IoT devices and Edge)
- Security monitoring and protection through Azure Security Center
- Cloud infrastructure with the most compliance offerings

Microsoft Azure IoT
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Qualcomm
- QWES for hardware based chip attestation
- Secure boot, debug
- Qualcomm® Trusted Execution Environment (QTEE)
- Storage security
- Hardware Crypto

Qualcomm Trusted Execution Environment is a product of Qualcomm Technologies, Inc.
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