IOT CYBERSECURITY FROM EDGE-TO-CLOUD: BUILD HIGHLY SECURED CONNECTED DEVICES WITH NXP AND MICROSOFT AZURE SPHERE

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SECURE CONNECTIONS FOR A SMARTER WORLD

PUBLIC

AGENDA

- Summary of the recent announcement
- Cybersecurity for IoT
- Properties of highly secured devices
- How does i.MX 8ULP-CS processor work with Azure Sphere
- Use cases for the i.MX 8ULP-CS & i.MX 9 processors

NXP INTRODUCES ITS FIRST CLOUD-SECURED, MICROSOFT AZURE SPHERE-CERTIFIED PROCESSOR FAMILY

First cloud-secured crossover applications processor, the i.MX 8ULP-CS with Azure Sphere

Plans to build additional Azure Sphere-certified processors as part of the NXP i.MX 9 series

Importance of Cybersecurity in IoT

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What happens when you connect a device to the internet?

“The internet is this cauldron of evil.”

Dr. James Mickens, Harvard University

CYBERATTACKS PUT BUSINESSES AT RISK

Devices bricked or held for ransom

Devices are used for malicious purposes

Data & IP theft

Data polluted & compromised

Devices used to attack networks

The cost of IoT attacks

Stolen IP & other highly valuable data

Compromised regulatory status or certifications

Brand impact (loss of trust)

Recovery costs

Financial and legal responsibility

Downtime

Security forensics

MIRAI BOTNET ATTACK

- Everyday devices are used to launch an attack that takes down the internet for a day
- 100k devices
- Exploited a well-known weakness
- No early detection, no remote update

EXPECTATIONS ARE INCREASING WITH AWARENESS

Consumers

65% of consumers wouldn't purchase a smart device from a brand that has experienced a security breach.

74% of consumers would pay more for a smart device that had additional security.

93% of consumers believe that manufacturers need to do more to secure smart devices.

According to Greenberg research 2019

Enterprise Customers

97% of enterprises call out security as a concern when adopting IoT.[1]

Enterprise customers would purchase 70% more devices if security concerns were mitigated.[2]

Enterprise customers are willing to pay 22% more for IoT cybersecurity.[2]

1 IoT Signals 2020
2 Bain & Co. 2018

Government Action

In the USA, several bills have been introduced in Congress, with two passed in California (SB-327) and Oregon (HB2395).

In Europe, upcoming EU Cybersecurity Act with three security assurance levels will become basis for regulation—*basic*, *substantial*, *high.*

ETSI EN 303 645, with 13 security requirements, with increasing adoption globally (e.g. Singapore, Finland, UK).

WHAT WE HEAR FROM CUSTOMERS ABOUT THE CHALLENGES OF SECURING IOT

Manufacturing

While in the factory or in the supply chain, ICs and devices are subject to malware injection, counterfeiting, key capture, overproduction, and the creation of security backdoors.

Operations

Once in the field, ICs and devices are susceptible to a wide range of logical attacks and physical attacks, including malware injection, theft of unencrypted data, and malicious software updates, as well as reverse engineering.

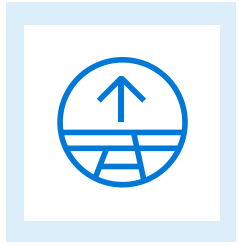
Maintenance

While this capability is key to maintaining device security, the upgrade process must be totally secure to prevent loading of malware/unauthorized SW.

THE 7 PROPERTIES OF HIGHLY SECURED DEVICES

Hardware Root of Trust

Is your device's identity and software integrity secured by hardware?



Defense in Depth

Does your device remain protected even if some security mechanism is defeated?

Small Trusted Computing Base

Is your device's security-enforcement code protected from bugs in application code?

Dynamic Compartments

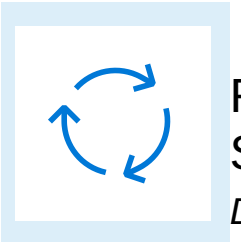
Can your device's security improve after deployment?

Certificate-Based Authentication

Does your device authenticate itself with certificates?

Error Reporting

Does your device report back errors to give you in-field awareness?



Renewable Security

Does your device software update automatically?

AZURE SPHERE

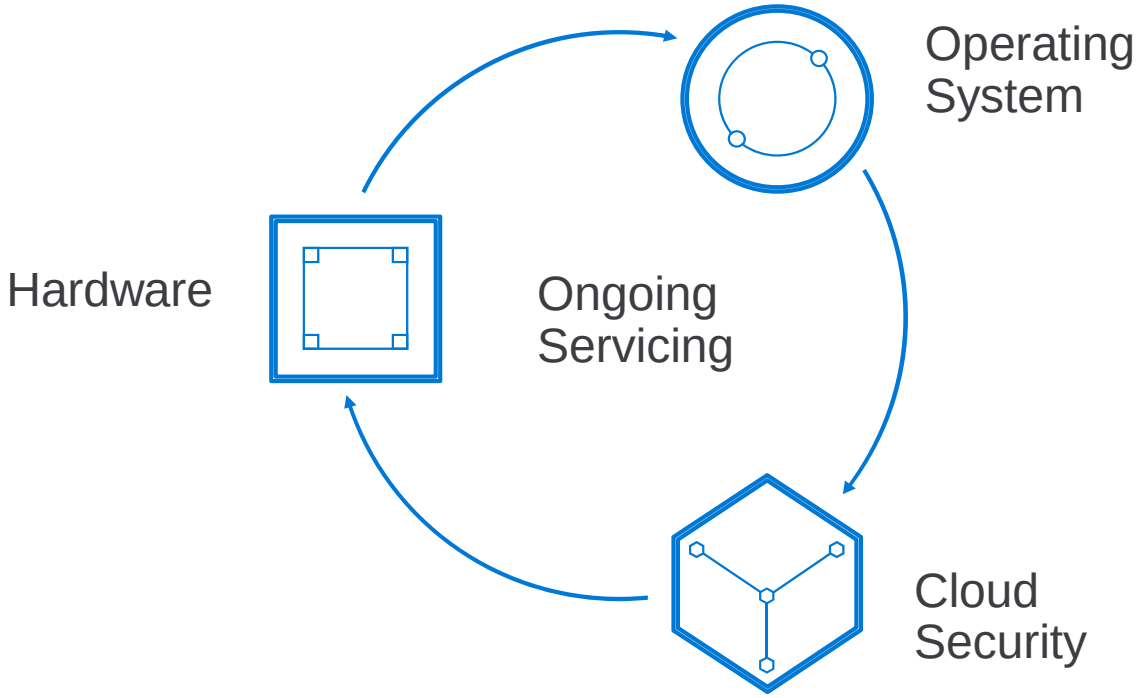
An end-to-end solution for securely connecting existing equipment and to create new IoT devices with built-in security.

Integrated hardware, software, and cloud services work seamlessly together and deliver active security by default.

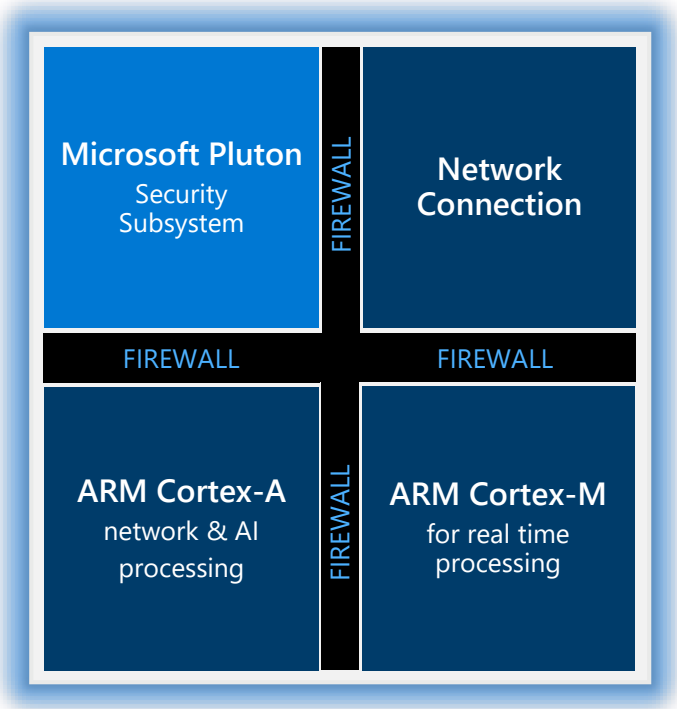
Ongoing security and OS updates from Microsoft keep your devices secured over time.

Defense in depth provides multiple layers of protection to help guard devices against and respond to threats.

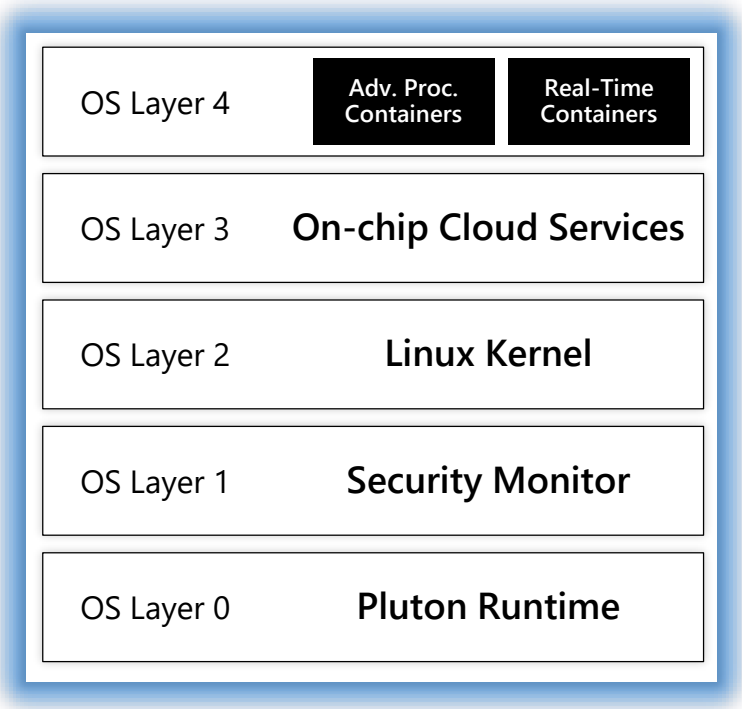
Implementation options allow you to secure existing equipment and build security into new IoT devices.



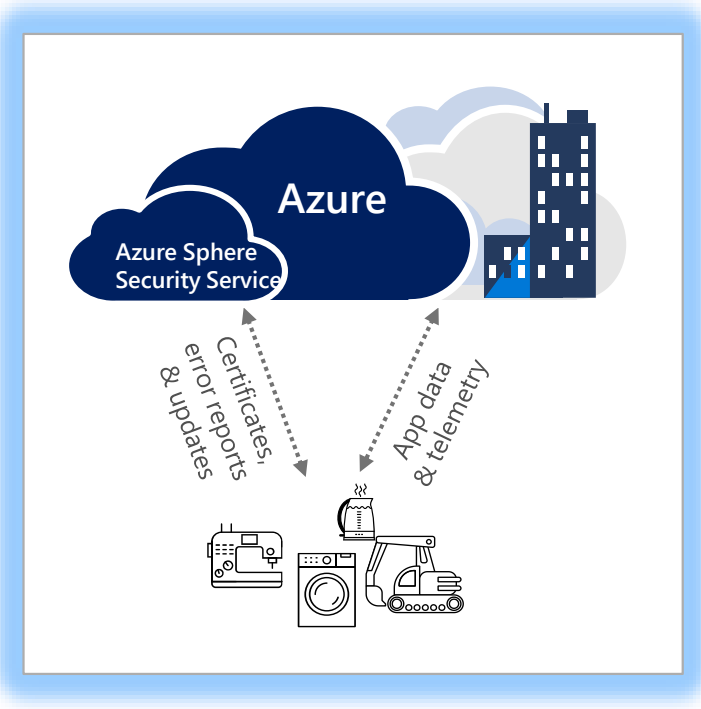
Azure Sphere certified chips



The Azure Sphere Operating System



The Azure Sphere Security Service



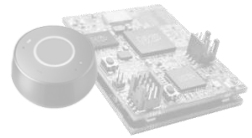
AZURE SPHERE & NXP i.MX 8ULP-CS OVERVIEW

Hardware

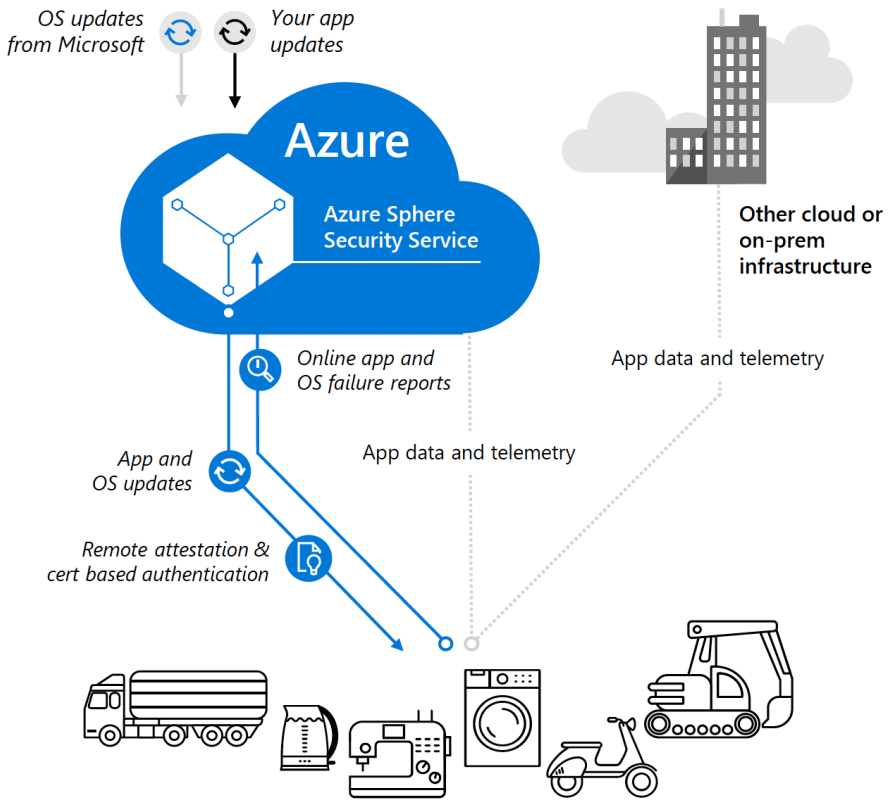
- i.MX 8ULP-CS processor
- Microsoft Pluton Enabled EdgeLock™ Secure Enclave
- Root of Trust established at NXP

Operating System

- Managed OS for users
- Built off existing technology
- Secure boot ROM code based; Keys fused at NXP

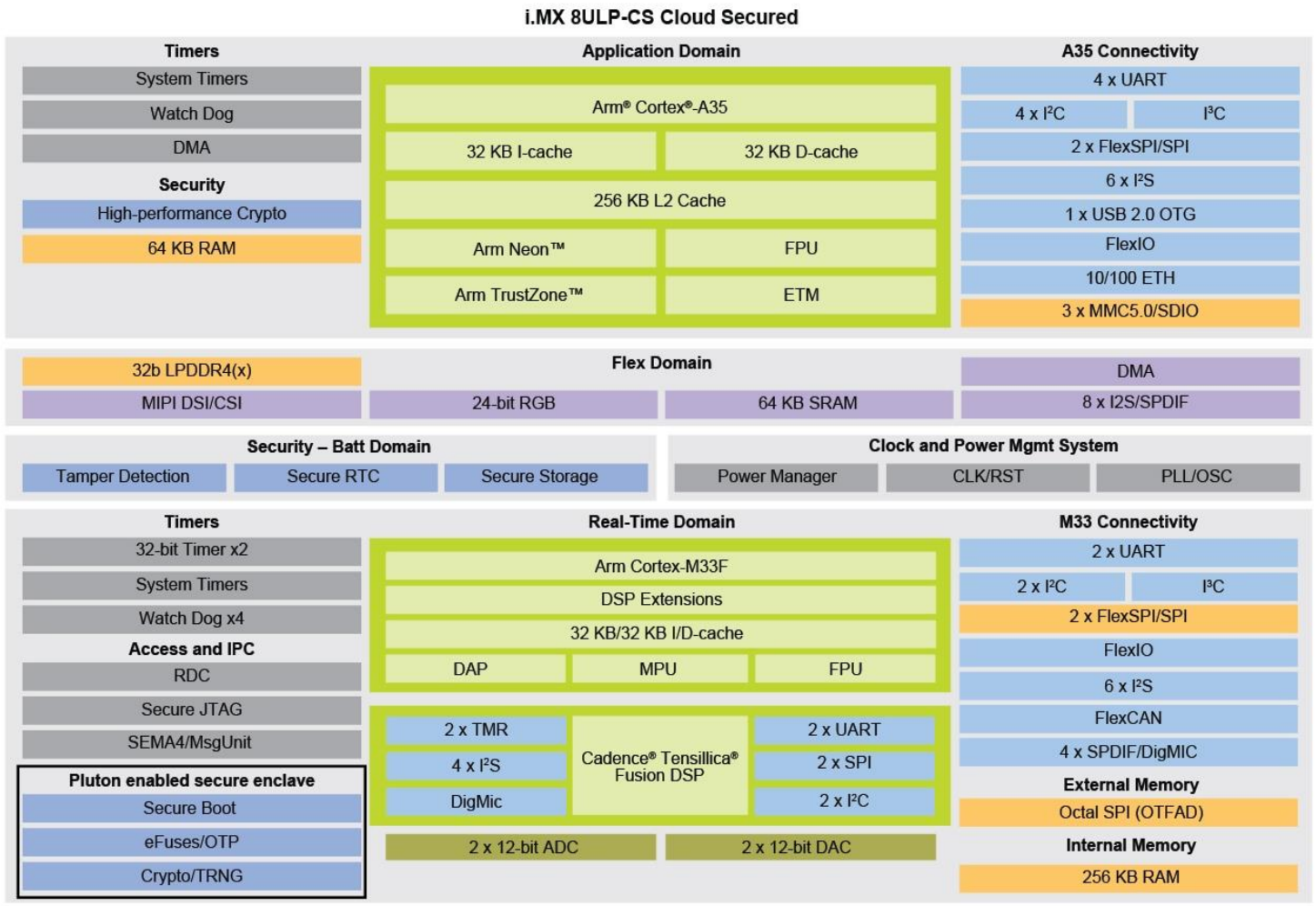


MANAGED SECURITY SERVICE TO PROVIDE UPDATES



- Fully managed OTA service by Microsoft for OS components updates and on demand user application update
- Users use Microsoft frontend to interact with device
- Azure Sphere Service is agnostic to your cloud provider
- Microsoft provides constant updates for the lifetime of the chip

OVERVIEW ON i.MX 8ULP APPLICATION PROCESSOR



SPECIFICATIONS:

CPU

Arm Cortex-A35 @ 1.0 GHz

Arm Cortex-M33 @ 240Mhz

Fusion DSP @200MHz

Packaging

9.4x9.4mm^2 , 15x15mm^2

Temp Range

-40^{o}C to 105^{o}C

Connectivity

10/100 ETH

CAN Bus

External Memory

SPI-NAND

LPDDR4

SPI NOR

Use Cases for i.MX 8ULP-CS

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i.MX 8ULP-CS & i.MX 9 USE CASES

Contact Us!

If you are interested to share insights and discuss how Azure Sphere and i.MX 8ULP-CS could shape your next generation IoT products.

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