

Avnet IoTConnect® Platform

Simplify the complex with an enterprise platform

MM.DD.YYYY Presenter's Name (optional)

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The unique challenges of an IoT project

Immense value doesn't come without complexity – luckily, you don't have to go on the journey alone.

Identifying and scoping project needs

IoT projects bring **more complexity and require more stakeholders** than traditional projects.

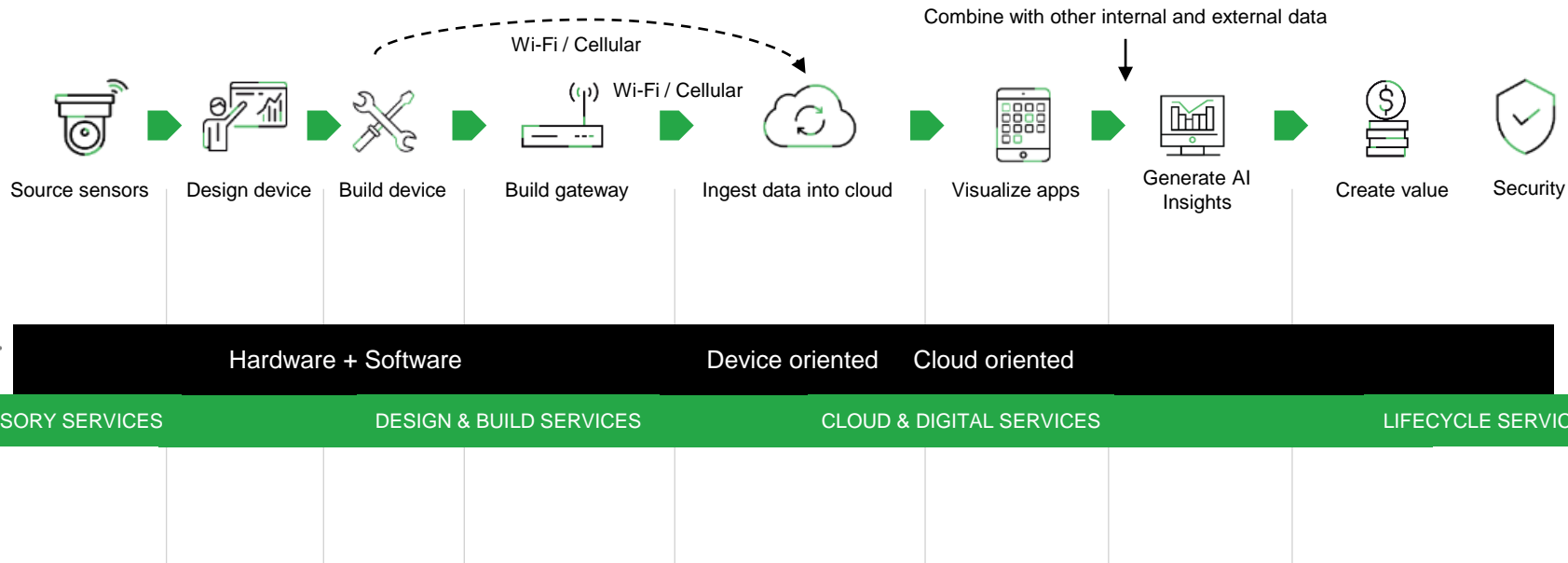
Bridging the gap from OT to IT

Securely connecting devices and integrating system data to get to valuable insights requires **unique capabilities**.

Navigate the complex IoT ecosystem

Bringing together the right technologies to implement an IoT project can **require 5-7 different vendors**.

A partner that brings it all together



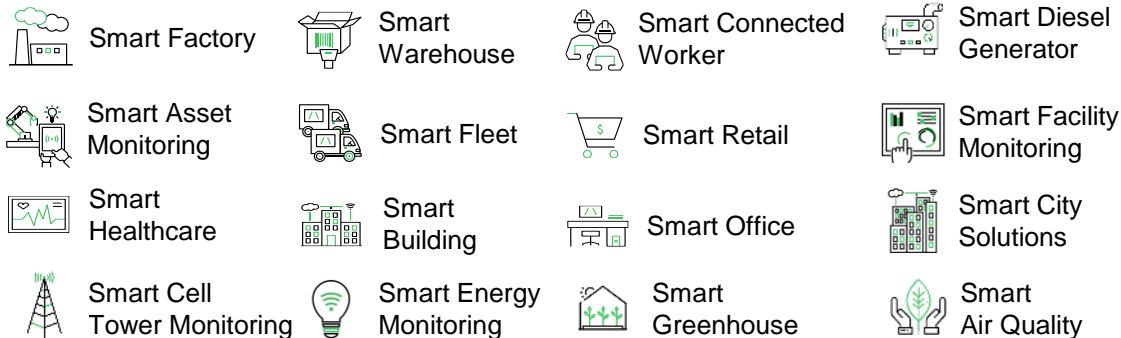
End-to-end capabilities to help you realize business outcomes from your IoT initiatives faster.

An IoT platform that simplifies the complex

One platform for collaborative development and management of end-to-end IoT solutions, connecting devices to software applications, analytics and AI services to generate maximum business value.

/IOTCONNECT[®]
Platform

Secure middleware
Powered by Microsoft Azure IoT Suite



Pre-built solution accelerator SaaS applications



AI data services

- Predictive Maintenance
- Recommendation Engines
- Customer Loyalty and Retention
- Inventory Management
- Fraud Analytics
- Healthcare Analytics
- Sentiment Analysis
- Sales Forecasting



Valuable insights

Accelerating your IoT journey to value

IoTConnect Platform is a **middleware IoT platform** that leverages Azure IoT Suite, which provides **infrastructure** such as storage, compute & **microservices** such as stream units, data services, AI services

Connects, controls and manages devices in collecting device data in the cloud

Devices to **data**

Analyzes collected data and runs AI / ML algorithms to derive meaningful insights

Data to **visuals**

Visualize generated insights through dashboards, mobile and web applications

Visuals to **action**

Provides real-time alerts based on criteria set for your unique business needs

An end-to-end solution for all your end-points

How it works

Devices, data, systems

- Devices and equipment
- Sensors and gateways
- Internal data systems (ERP, CRM, etc.)
- External data (social media, weather, traffic, APIs, etc.)

Business infrastructure

/IOTCONNECT[®] Platform

Secure platform built on Azure cloud services

- Multi-protocol connectivity
- Easy-to-use toolkit
- Hardware support
- Artificial intelligence
- Predictive analytics
- Data visualization

Pre-built smart applications

16+ solution accelerators that address common business challenges across various markets.

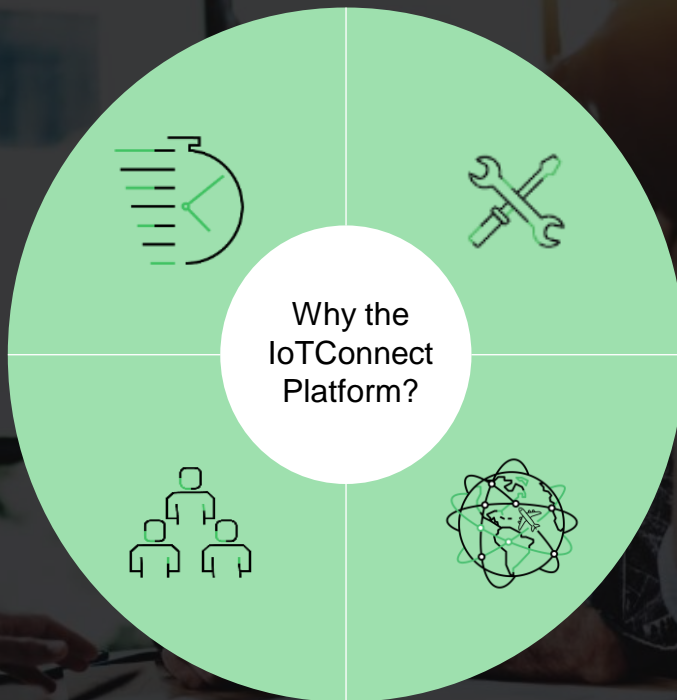
Ease of development and management

Time to Market

Pre-built solution accelerators enable faster deployment of IoT solutions

Integration Support

Support with implementation & integration with a wide range of legacy and new systems



Device Management

Ability to on-board, manage, monitor and roll-out OTA updates to devices

Flexible Deployment

Flexibility across multi-tenant, single tenant and customer's EA/CSP architectures

IoTConnect Platform elements

Powerful **tools and resources** to kick-start development and securely and simply manage solutions.

SDK BRIDGE

- Software that resides on the device that translates and communicates data and activity from native hardware to IoTConnect Cloud and Apps – secured, works with TLS.

IOTCONNECT CLOUD

- Deploys, manages, orchestrates logic, data ingestion / querying, storage, security, authentication.

SMART SDK/MOBILE APPS

- iOS and Android apps for smartphones and tablets.
- SDK framework and industry reference apps for speed to prototype, market and monetization.

SMART CONNECTIONS

- Integrates and interchanges data to on premise and other cloud environments, such as CRM, or ERP
- SDK framework providing standard framework and connections with common technology partners.

SMART PORTAL

- Web portal for device management, tenant management, user management, administration, health check, reporting
- SDK framework covering core functional

DATA VISUALIZATION

- Rich visual reporting framework based on known data relationships used throughout IoTConnect.
- Support for PowerBI, Tableau & legacy systems

Smart SDK/Mobile Apps

- Utilizing statistics and machine learning to discover and communicate meaningful patterns in data, find hidden trends and insights from devices and external data.

IoTConnect Platform Benefits

Secure connectivity and control

Easily connect and manage all your devices, data, people, and systems using a secure, cloud-based platform.

- **Securely connect** all your devices with support for multiple connectivity protocols and cross-device communication.
- **Easily register and pair legacy devices** to the platform without coding to get up and running fast.
- **Manage all devices, data, and applications** from one central portal.
- **Rely on the enterprise-grade security** of the Azure platform to encrypt sensitive data, protect devices from viruses and malware and secure network traffic.



Optimized operations

Lower your costs and increase productivity by making existing processes and infrastructure more efficient than ever before.

- **Minimize downtime and increase productivity** using real-time analytics and predictive maintenance to proactively monitor devices.
- **Reduce costs** by identifying and addressing issues early.
- **Quickly scale your computing power** up or down as your business needs change.
- **Jump-start development** of your IoT system with smart, market-ready connectivity solutions for 16 different verticals.



Data-driven insights

Use real-time analytics and artificial intelligence to gain deeper insights, make informed decisions, and drive innovation.

- **Harness the potential of data** collected by your IoT solution with real-time analytics and artificial intelligence capabilities powered by Microsoft Azure.
- **Integrate and analyze data from new and existing systems** to identify trends, optimize operations, better understand customers, and uncover new revenue sources.
- **Accelerate decision making and speed time to market** by giving stakeholders across the business access to real-time insights via customized, interactive dashboards.
- **Use live, interactive reports to monitor** and optimize device performance and improve processes over time.

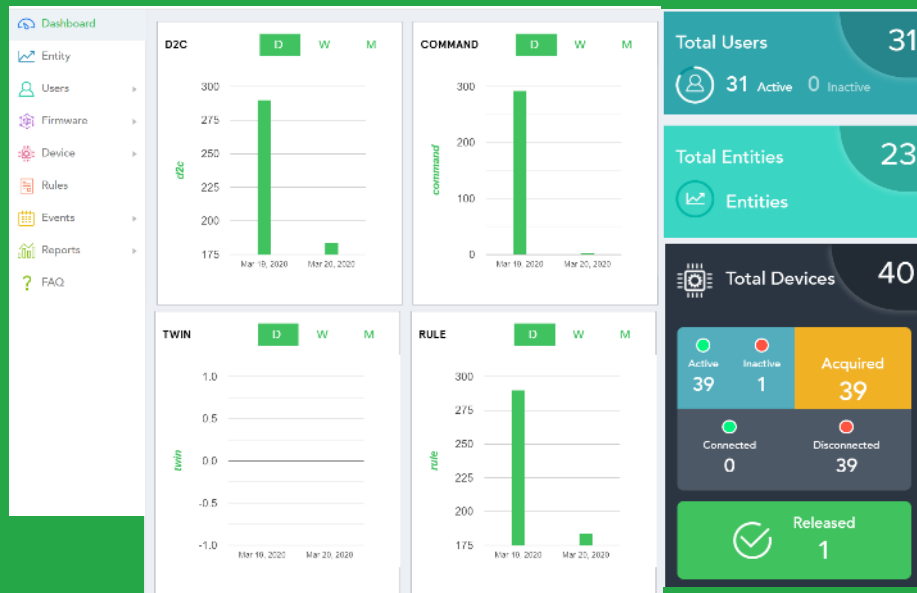


Inside the IoTConnect Platform

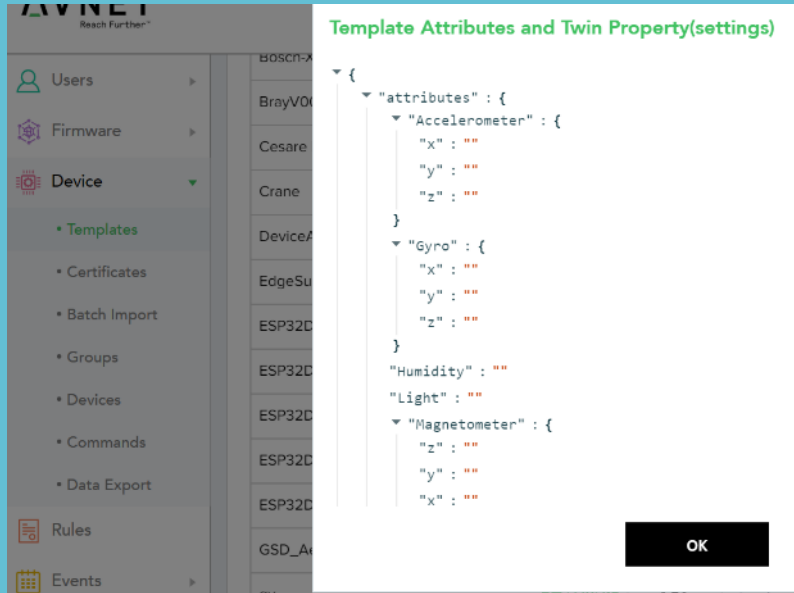
Smart portal

The central admin control panel provides:

- Dashboard display
- Health Status (instances, devices, entities)
- User & Role management
- Device Management
- Rules Engine
- Reports



Device management



The platform enables:

- Device Identity Management
- Connection & Configuration
- Device Templates
- Firmware (OTA) updates
- Device Group Management

Rules engine

The rules engine is used to:

- Model logic for IoT decisions
- Set criteria or “rules” for alerts
- Set sensor / device parameter thresholds
- Set priority
- Enable notifications

The screenshot shows the 'Rules' configuration page in a web application. The left sidebar contains a navigation menu with the following items: Dashboard, Entity, Users, Firmware, Device, Rules (highlighted), Events, Reports, FAQ, Resource, and Settings. The main content area is titled 'Rule Configuration' and includes the following fields and sections:

- Rule Name:** A text input field containing 'TempBLDG'.
- Template:** A dropdown menu showing 'SBLDG'.
- Severity levels:** A dropdown menu showing 'Critical'.
- Attribute:** A dropdown menu showing 'Temperature'.
- Condition:** A dropdown menu showing 'is greater than'.
- value:** A text input field containing '40'.
- Rule Applies On:** A section with two radio buttons: 'All Device of Selected Entity' (selected) and 'Selected Devices'. To the right of the first radio button is a dropdown menu showing '- ISS EMEA'. To the right of the second radio button is a checkbox labeled 'Include Device of Child Entities'.
- Notification Type:** A section with two columns of checkboxes. The first column contains 'DeviceCommand' (checked) and 'WebHook' (unchecked). The second column contains 'Email' (checked) and 'UI Alert' (checked). The third column contains 'Push' (checked) and 'MQTT' (checked). The fourth column contains a checkbox for 'SignalR' (unchecked).

SDKs



Language	Version	Release Note	Help	Download
 Java	2.0	<ul style="list-style-type: none">• Edge Support for smart device• Gateway Support• Offline Store data Support• Support Key and X.509 authentication	Help	Download
 python™	2.4	<ul style="list-style-type: none">• Support python versions 2.XX & 3.7• Support Key, TPM and X.509 authentication support• Edge Support for smart device• Gateway Support• Offline Store data Support	Help	Download
 node.js	2.2	<ul style="list-style-type: none">• Edge Support for smart device• Gateway Support• Offline Store data Support• Support Key and X.509 authentication	Help	Download
	2.2	<ul style="list-style-type: none">• OTA callback method with acknowledgement send to cloud• Edge device data with smart device only (not gateway Support)• Gateway Support• SDK never lost connection• Offline Store data Support• Support Key and X.509 authentication	Help	Download
 iOS	1.0	<ul style="list-style-type: none">• Smart device Support (not Gateway & Edge support)• Send telemetry and received commands• Support only Key based authentication	Help	Download

Software development kits:

- To enable easier and faster development on the IoTConnect Platform
- Available for a number of programming languages:
 - Python, Java, C#, C, iOS, Android, node JS



Security

Four ways in which the **IoTConnect Platform** ensures the highest form of security:

- Platform security
- Device security
- Data security
- Cloud security

1. Platform security

- Azure services that provide built-in protection at every step of deployment
- API communication is very secure using HTTPS along with OAuth token
- Secure HTTPS communication between microservices and user interface
- IDS based authentication that serves users from various Identity providers ranging from Auth0 to Custom IDP



2. Device security

Device identity:

Device identity includes assigning a unique identifier to each device that helps to determine the behavior of the device, the way it communicates with other devices and the kind of security measures you need to take for that device.

Authentication Methods : Three major factors that need to be ensured during authentication:

- The device is genuine
- It is running a genuine software
- It is working on behalf of a trusted user

Three device authentication methods used by IoTConnect to verify any device :

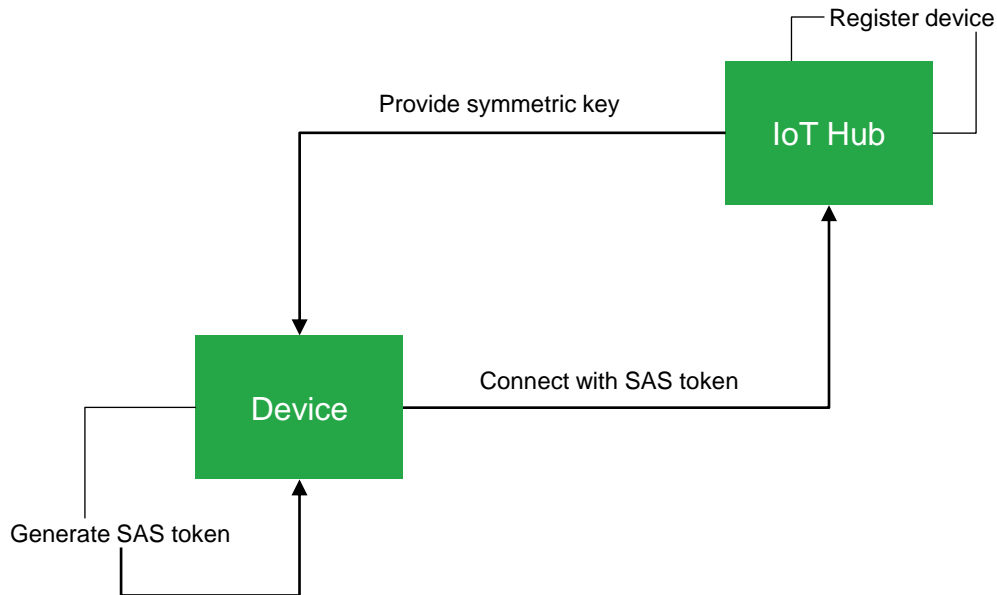
- Key-based device authentication
- X.509 certificates
- Trusted Platform Module (TPM)

2. Device security

Authentication Methods

Key-based authentication

- SAS tokens are generated using symmetric keys
- The device then uses this key to generate SAS tokens
- SAS tokens have a hashed signature used to verify the authenticity of these tokens
- Once the device is authenticated, these SAS tokens are used to connect to Azure IoT Hub and send messages.

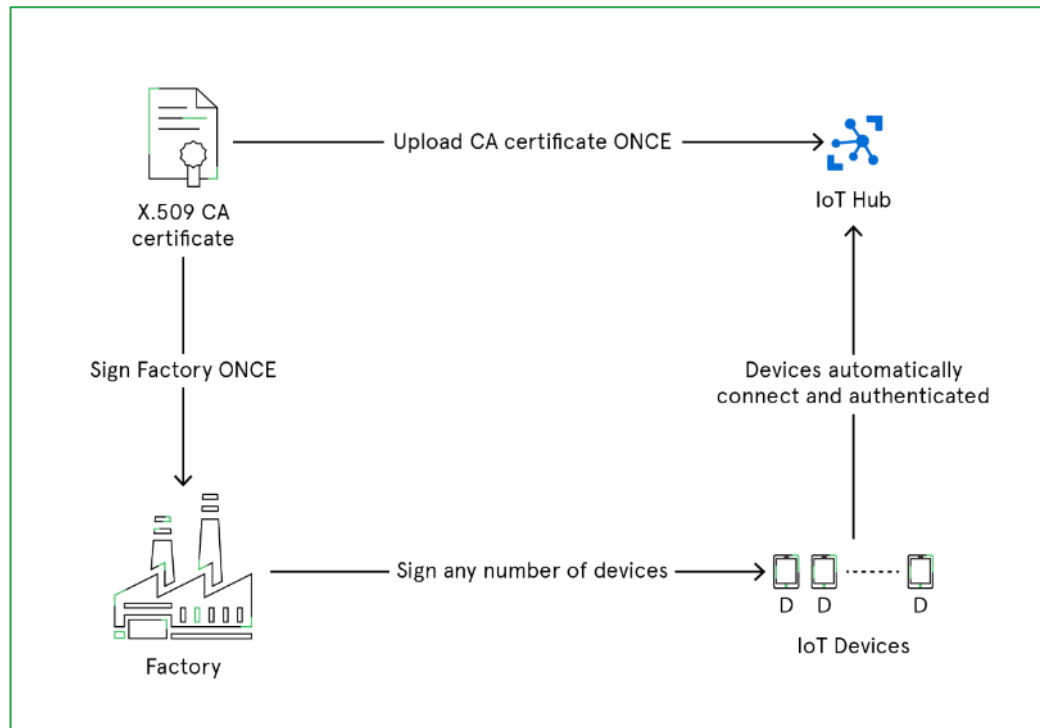


2. Device security

Authentication Methods

X.509 certificates

- X.509 certificate PKI is used to authenticate devices to IoT Hub and secure the IoT Hub endpoints.
- Register and upload X.509 certificates to IoT Hub for authentication of devices.
- Register the certificate just once, and then use it to connect and authenticate as many devices as you want.

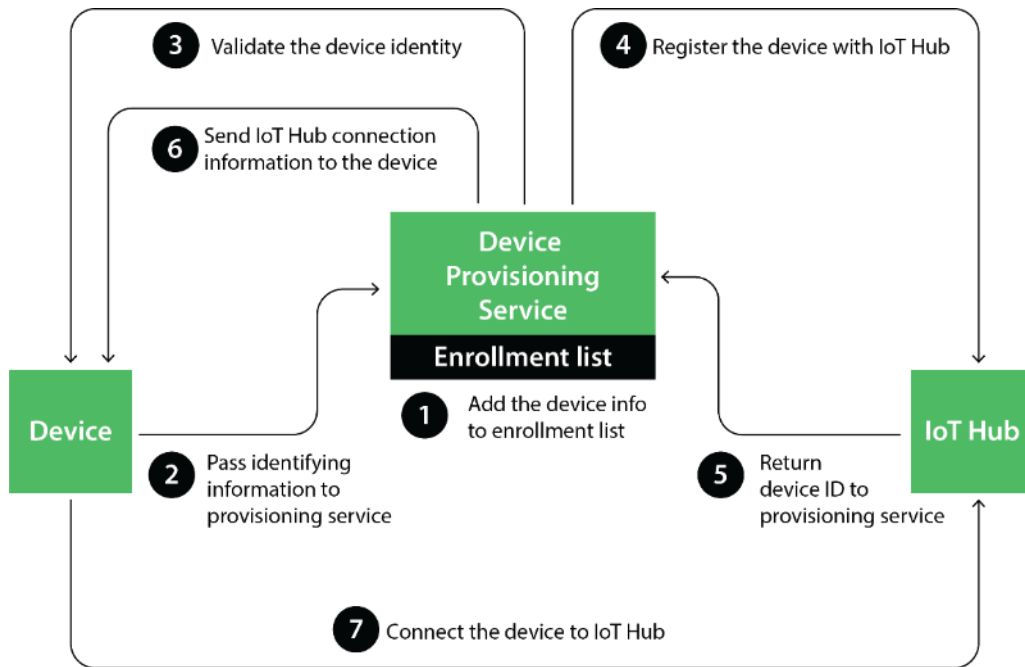


2. Device security

Authentication Methods

Trusted Platform Module (TPM)

Hardware security module (HSM) where a chip is injected into the motherboard of a device that stores cryptographic keys for authentication purpose.



3. Data security

Secure Communication

- Secured data transmission to avoid man-in-the-middle attacks and other types of intrusions
- Secured communication layer between the devices
- Secured IoT Hub with Transport Layer Security (TLS) protocol
- IoT Hubs do not initiate any inbound connections as all the connections are initiated by authenticated devices only.

- Data is encrypted whenever it is transmitted among the entities
- Helps to ensure that when data transfer takes place it cannot be misused by anyone

Encrypted Information

3. Data security

User authentication and authorization

- Authorization where the user rights are determined
- Provides easy access management, safeguarding data against any malevolent actions by unauthorized users.

- The cloud layer is where the data generated by the IoT devices is ingested, stored and analyzed
- Data encryption facility is available for data stored in the cloud
- Data is stored in Azure CosmosDB followed by strict security guidelines
- This makes the infrastructure highly secure with minimal chances of being compromised

Secure Cloud Layer

Cloud security

- Highly Secured Infrastructure
- Proactively Safeguard data
- 90+ Compliance offering including HIPPA, HDS & GDPR
- Uncompromising commitment to privacy
- 99.9% SLA guaranteed
- Worldwide availability through secured data centers

Why Azure Cloud?

- <https://azure.microsoft.com/en-in/overview/trusted-cloud/>
- <https://azure.microsoft.com/en-in/overview/trusted-cloud/compliance/>
- <https://www.microsoft.com/en-us/trust-center/privacy>
- <https://www.microsoft.com/en-us/trust-center/privacy/gdpr-overview>

Considerations

Build vs. Buy

Build

VS

Buy



Network Protocols

- Need development experience
- How to select the right network protocols

- Vendor has to meet industry standards
- Ensure compatibility as well as scalability



Network Security

- Security knowledge and compliance
- End-to-end security from device to applications

- Constantly updated security standards
- Ensure authorized access for users, devices and applications



Cloud Infrastructure

- Organizations need complete knowledge of setting up
- Knowledge of IaaS providers

- IoT platforms that are available on a SaaS basis
- Handle all the cloud requirements



Operational Maintenance

- Need expertise in building, supporting and extending platform capabilities
- Scaling needs in the long term

- You get 24/7/365 support
- Updates with new features as the technology continues to evolve

Next steps



Next steps

- Schedule a demo
- Get a full view of the solution dashboard and capabilities
- Learn more: avnet.com/IoT
- Watch: [IoTConnect Platform Video](#)



One partner to help accelerate your IoT strategy

Scope your plan

Identify the needs of your initiative from idea to value.

Build the solution

Tap into an enterprise platform and tech expertise.

Deliver real value

Connect your assets to insights and drive faster ROI.



Let's put innovative technology to work for your business.