



Visible Things™ - IoT all inclusive

THE FULLY INTEGRATED EDGE TO ENTERPRISE IoT PLATFORM
BASED ON RENASAS SYNERGY™

The Avnet Silica – Edge to Enterprise IoT Platform

Visible Things simplifies the complexity of secure edge to enterprise IoT technology. It delivers a complete evaluation and reference platform to connect smart devices right through to the cloud and enterprise software. Avnet Silica supports an ever increasing range of sensors, connectivity, gateway and security technologies, together with cloud, analytics, mobile and enterprise integration services. We regularly add new features, provide updates and deliver training on our Visible Things platform.

Visible Things is delivered in the form of many different boards which can be taken depending on the functionality required. The very nature of IoT technology requires the features delivered by these boards to be pre-integrated and tested end to end wherever possible. This fundamental principle of Visible Things allows the users to concentrate on their applications to deliver the target IoT business outcomes.

This product brief aims to describe the features delivered and provide guidance to the most appropriate board or kit to use.

Key Features

- Sensor to server security layer on top of network security
- Quick evaluation of end application
- Highest degree of flexibility
- Reduces development time significantly - time saving
- Optimised power consumption
- Integrated and tested communication path from Edge to Enterprise
- Cloud ready

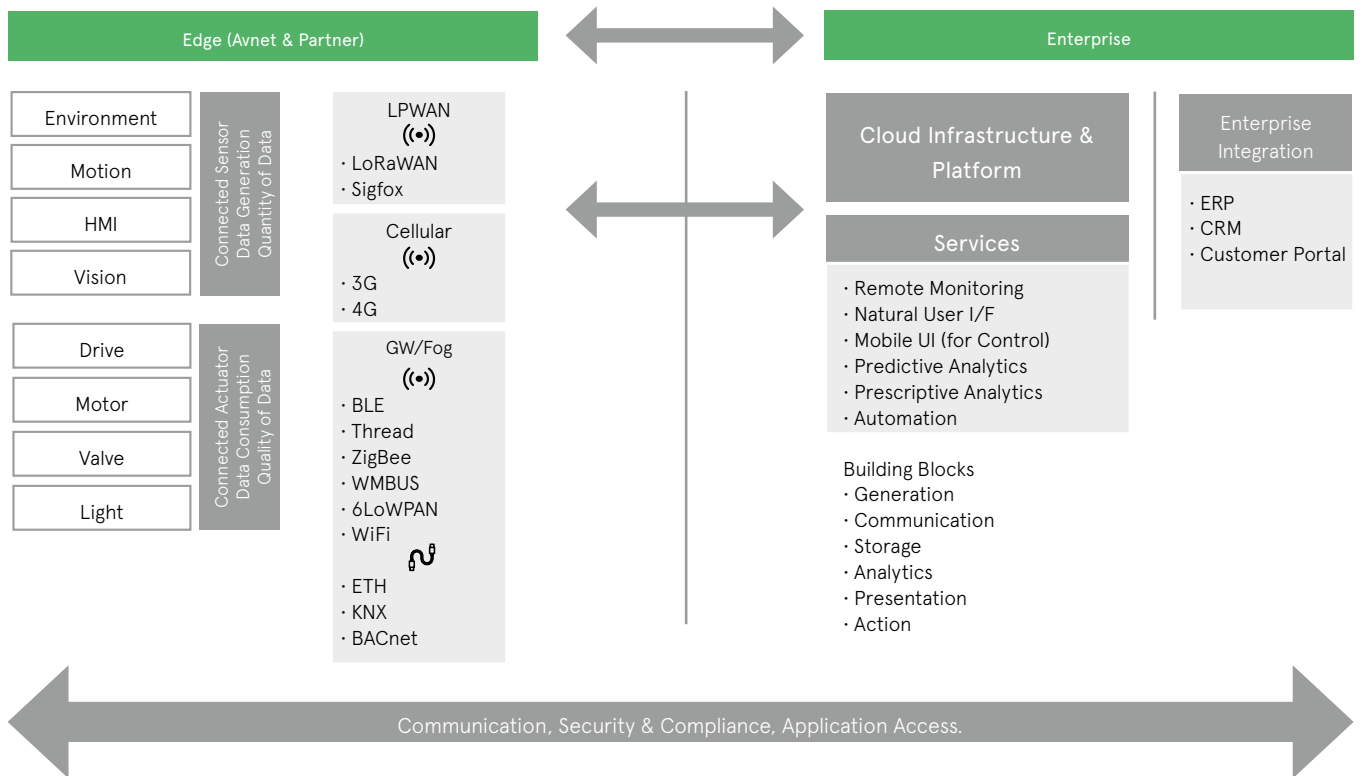
Examples of Target Applications

- Remote monitoring
- Predictive maintenance of motors and drives
- Room control in homes and buildings
- Lighting and shading (indoor & outdoor)
- Security and surveillance
- Home appliances
- Smart energy (metering & in home displays)
- Health care & infrastructure
- Industrial automation, inspection, drives monitoring, sensor hub



VT-SK-002-A01 Industrial Starter Kit

SCOPE OF THE VISIBLE THINGS PLATFORM



VISIBLE THINGS – FEATURES SUPPORTED

Sensors

- Connectivity
 - Bluetooth Smart
 - Sigfox
 - LoRaWAN
- Temperature
- Proximity/gesture
- Accelerometer
- Gyro
- Compass
- Humidity
- 3-Axis + temperature
- Pressure
- Ambient light
- Secure element

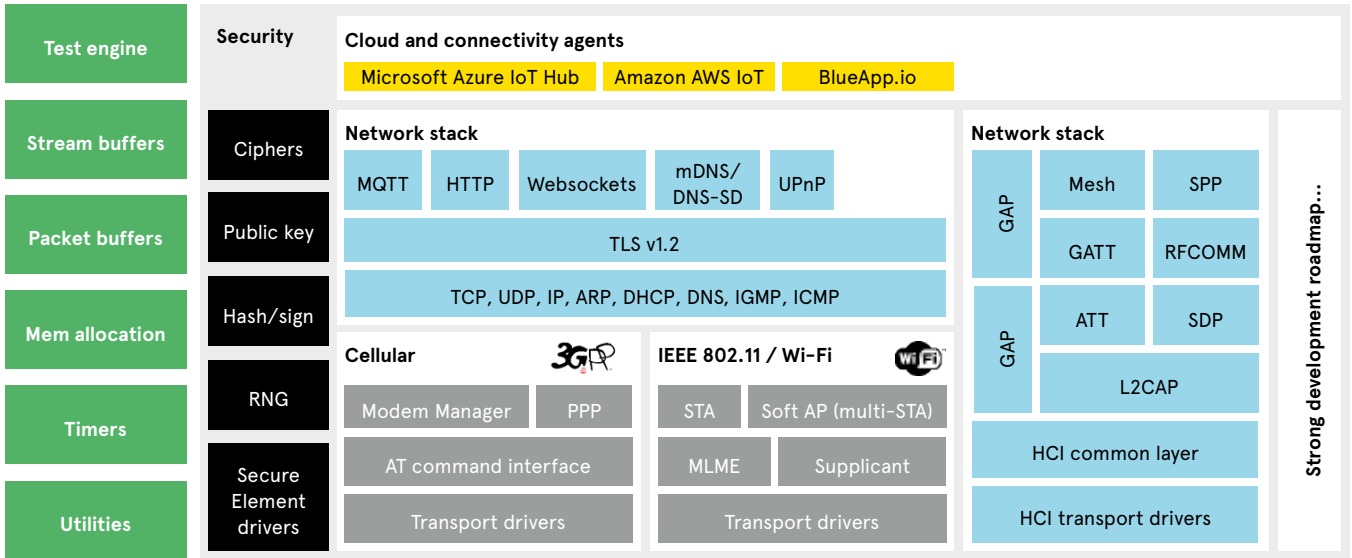
Gateway Functions

- Connectivity
 - Bluetooth
 - WiFi
 - 3G, 4G
 - LoRaWAN
 - Sigfox

- MCUs based on ARM Cortex™-M cores
- Camera module 1.26Mp
- 1x QVGA TFT display with touchscreen
- Audio – microphone and speaker
- NFC
- 1x PoE PD
- 2x Ethernet IEEE1588v2
- 2x USB (1x HS, 1x FS)
- 1x CAN 2.0B
- 32MB SPI flash
- 32MB SDRAM
- MicroSD card
- Secure element
- UbiquiOSTM gateway embedded software:

Ubiquios is an extremely small footprint embedded IoT stack which runs on Visible Things gateways. It manages all aspects of communication and security. It can run on bare metal (in the case of GW001), or within and RTOS (as in the case of GW002).

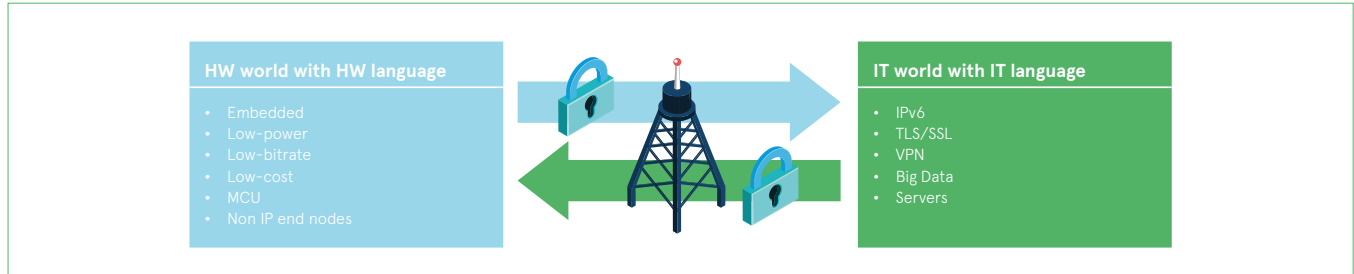
ubiquios™ IoT Communication Stack



SECURITY

A new security feature is added to starter kit 2 SK002. A secure element is added to the Bluetooth sensor node and the Gateway. Server side reference code is available, and the Ubiquitous stack manages the exchange of certificates between the sensor, gateway, and server. The result is an

additional end to end application security layer. It bridges the gap between expectations of enterprise IT security and the limitations of non IP based low power wireless sensor nodes.



CLOUD SERVICES

Demonstrator cloud platforms are built into the Visible Things starter kits. On top of this sits a whole range of services to develop a deployed solution.

- **Evaluation** – Visible Things cloud starter kit instances.
- **Manage** – Provision, deployment, and management of the cloud service.
- **Build** – Building the Software as a Service (SaaS) specific to customer application – mobile and cloud application development, device management, security, analytics.
- **Enterprise** – Integration of new cloud based and existing systems together – API architecture, industrial use case implementation, enterprise security.

BUILD SERVICES

Avnet Silica and eco system services capabilities to create specific solutions to business issues.

- Mobile and cloud application development
- Device management and end to end security
- Cognitive and predictive analytics
- Advanced visualisation
- Managed services

ENTERPRISE INTEGRATION

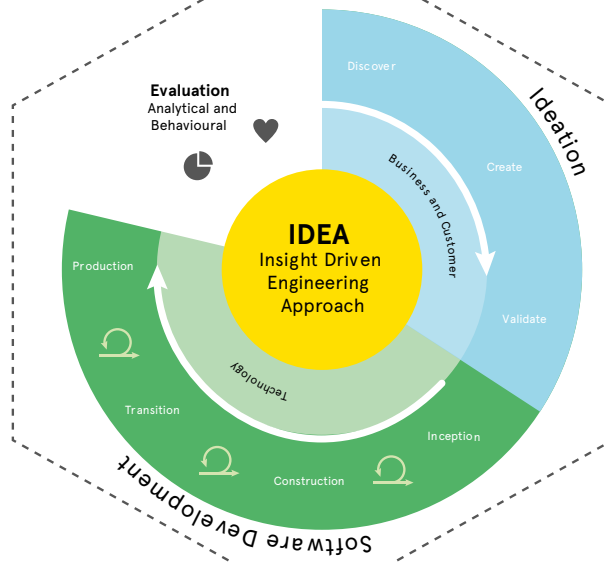
Transform clients business models bringing new and existing systems together by working with our services capabilities and partner eco system.

- API architecture
- Industry demonstrators – use cases
- Enterprise class security

Enterprise Integration
IoT Industry aligned solutions



Build
Avnet Value Added Services



Manage
Cloud Service



Edge
Connect and Secure



Visible Things with Renesas Synergy™

THE PERFECT IoT SOLUTION PLATFORM FOR INDUSTRIAL APPLICATIONS

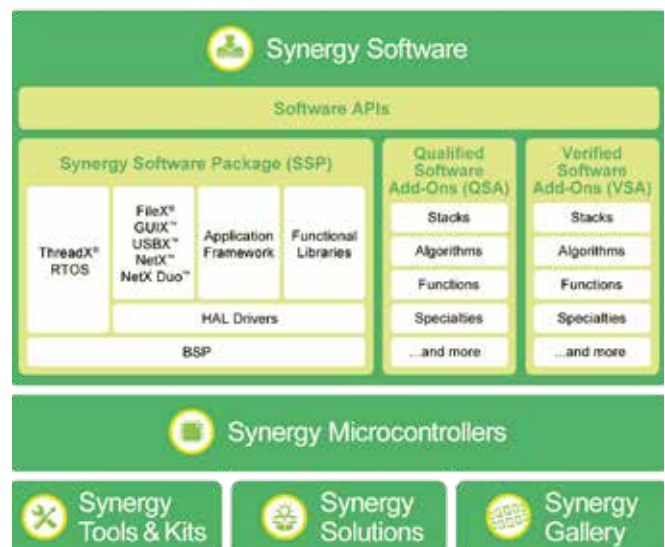
Avnet Silica's Visible Things Industrial starter kit provides a comprehensive edge to enterprise eco system based on the Renesas Synergy Platform, delivering a turn-key solution for many different applications where Renesas Synergy is used as the key element that can handle an outstanding range of connectivity tasks.

Design engineers face many challenges in the embedded system and growing IoT markets – acquiring and mastering new technologies, developing code for low-level system infrastructure, performing integration and test, meeting aggressive schedules – all while facing intense cost and resource pressures. A comprehensive embedded software platform is the answer to these challenges by freeing resources to develop differentiated products instead of creating and maintaining the common fundamental software functions used in many applications. Synergy is a truly complete, fully tested and qualified, systematically maintained and supported platform.

A comprehensive product that integrates software, a scalable family of microcontrollers plus a complete development environment including the TraceX® graphical events trace tool, debugger, compiler, configurators and smart manuals. You start your application development directly at the Application Program Interface (API) level.

THE RENESAS SYNERGY™ PLATFORM CONSISTS OF FIVE KEY ELEMENTS:

- Qualified commercial-grade software with a common API
- Scalable and compatible ARM Cortex-M based microcontrollers
- Intuitive professional development tools and kits
- Time-saving end-to-end solutions
- Click-through licensing plus a collection of specialized add-on software



VISIBLE THINGS DELIVERABLES

The Visible Things starter kits consist of a smart sensor with Bluetooth connectivity through to a gateway. The gateway then manages connectivity through the cloud services where sensor data can be visualised and managed with simple tools. A mobile app is delivered to the boards and also directly visualise sensor data.

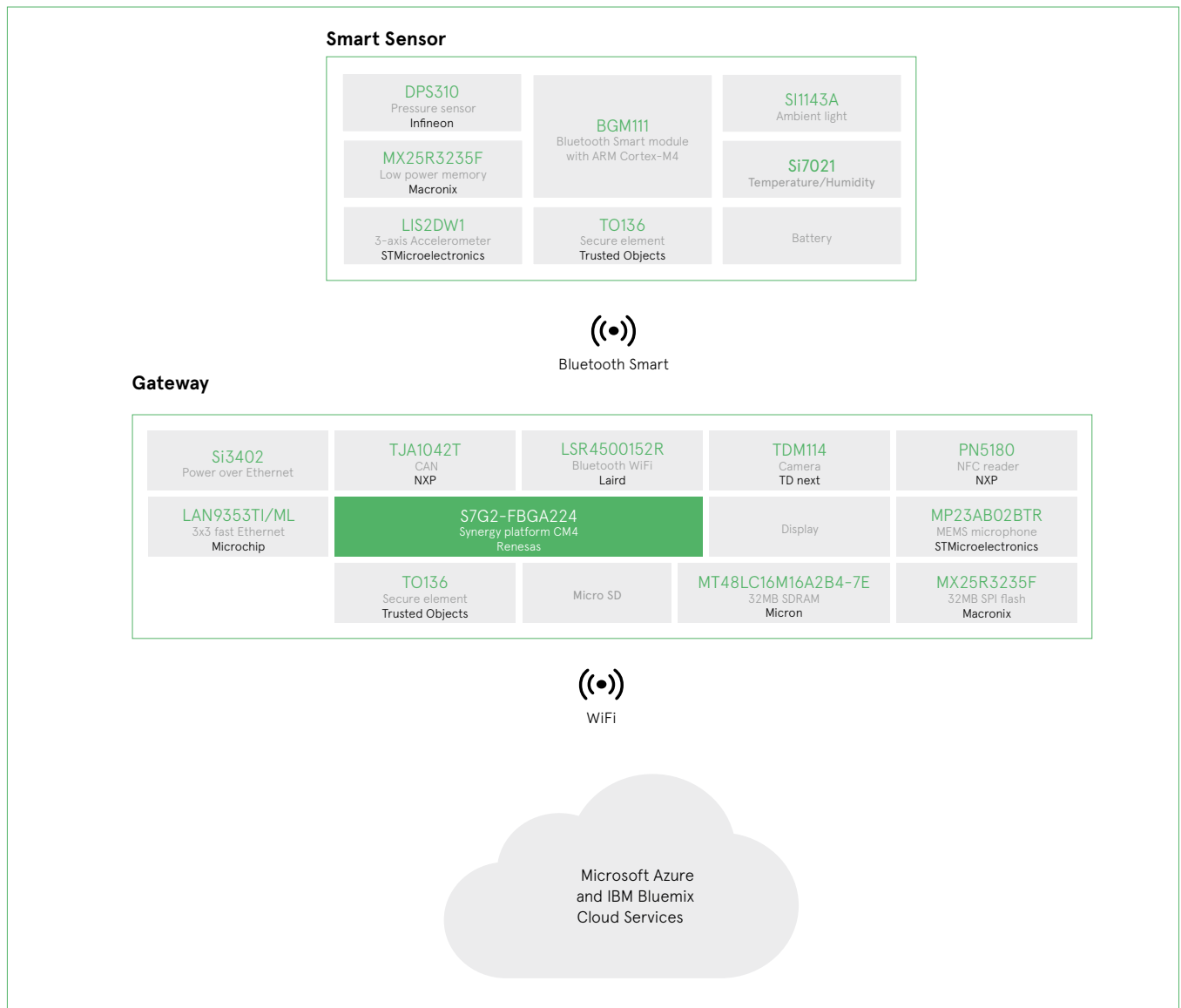
Both kits are designed to work together with quick start guides to quickly get up and running with a proof of concept. Technical documentation and design files are then available once development and integration of the technology into products starts.

Further smart sensors and PMODs are then available and described below to evaluate further connectivity such as GSM and LPWAN.

An Avnet mobile application for iOS and Android is provided for configuration of the devices locally and to support connections to the cloud service. The application is fully integrated with a quick start guide to make it easy to connect the system from edge to enterprise.

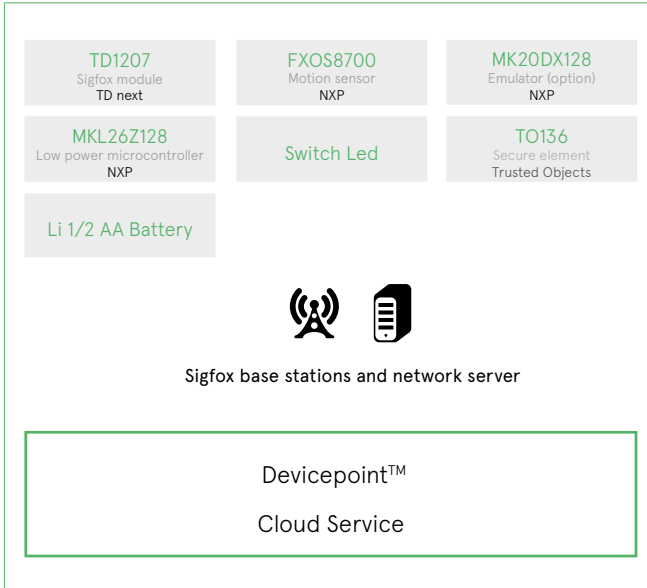
SK002 - INDUSTRIAL STARTER KIT

Industrial Gateway with Energy Harvesting Environmental Sensor

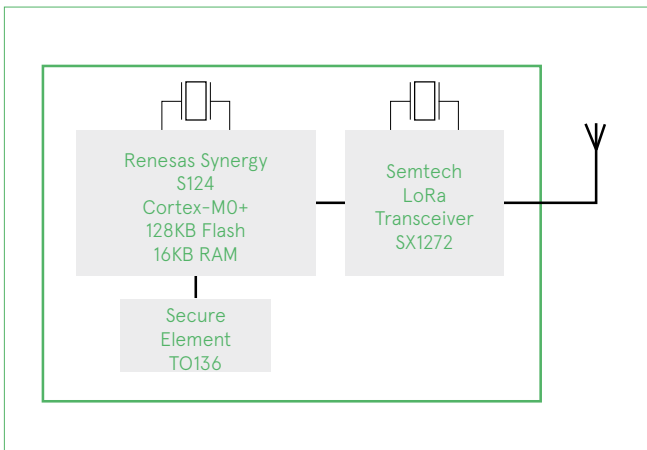


SIGFOX SMART SENSOR

The Sigfox Smart Sensor, together with local sensors, is managed by an NXP Cortex-M0 microcontroller. Messages are sent directly to a Sigfox server and then Devicepoint™ manages them into the cloud service.

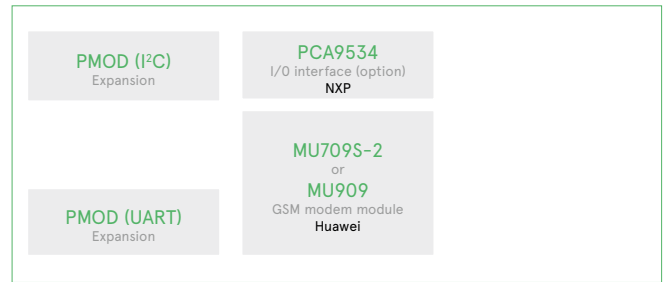


LoRaWAN PMOD



GSM PMOD

As an expansion to the gateway board a GSM PMOD is offered with embedded SIM and SIM connector options.



ORDER CODES

Part Number	Description	Comments
VT-SK-002-A01-LAI	Industrial starter kit	Includes: <ul style="list-style-type: none"> Industrial gateway Sensor board Power adapter
VT-SS-003-A	Sigfox Smart sensor	
PMOD-COM-003-A01	LoRaWAN PMOD	
PMOD-COM-019E-B01	3G PMOD	With eUICC and Vodaphone profile embedded

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