

DESIGN AUTOMATION EMBEDDED SYSTEMS

FPGA - EMBEDDED - INTERNET OF THINGS - PCB TECHNOLOGIEËN

29 OKT ←
1931 CONGRESCEENTRUM
BRABANTHALLEN
DEN BOSCH

D&E
event
2014



RUTRONIK
ELECTRONICS WORLDWIDE

ADVANTECH

EmbCore

IOT the Last Miles



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Embedded IoT Solution

Embedded IoT Software



Remote Management



Security



OS

WIND RIVER

Intelligent Systems



RISC, x86-based Embedded Boards and Systems

Embedded IoT Gateway

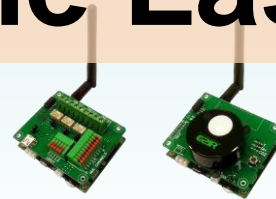


Ready-to-Go Solutions for IoT Edge & Gateway Drivers + Wireless Modules

Wireless Personal Area Network



WPAN Node



Environment Sensor Node
(CO2, Temp., Humidity, etc)

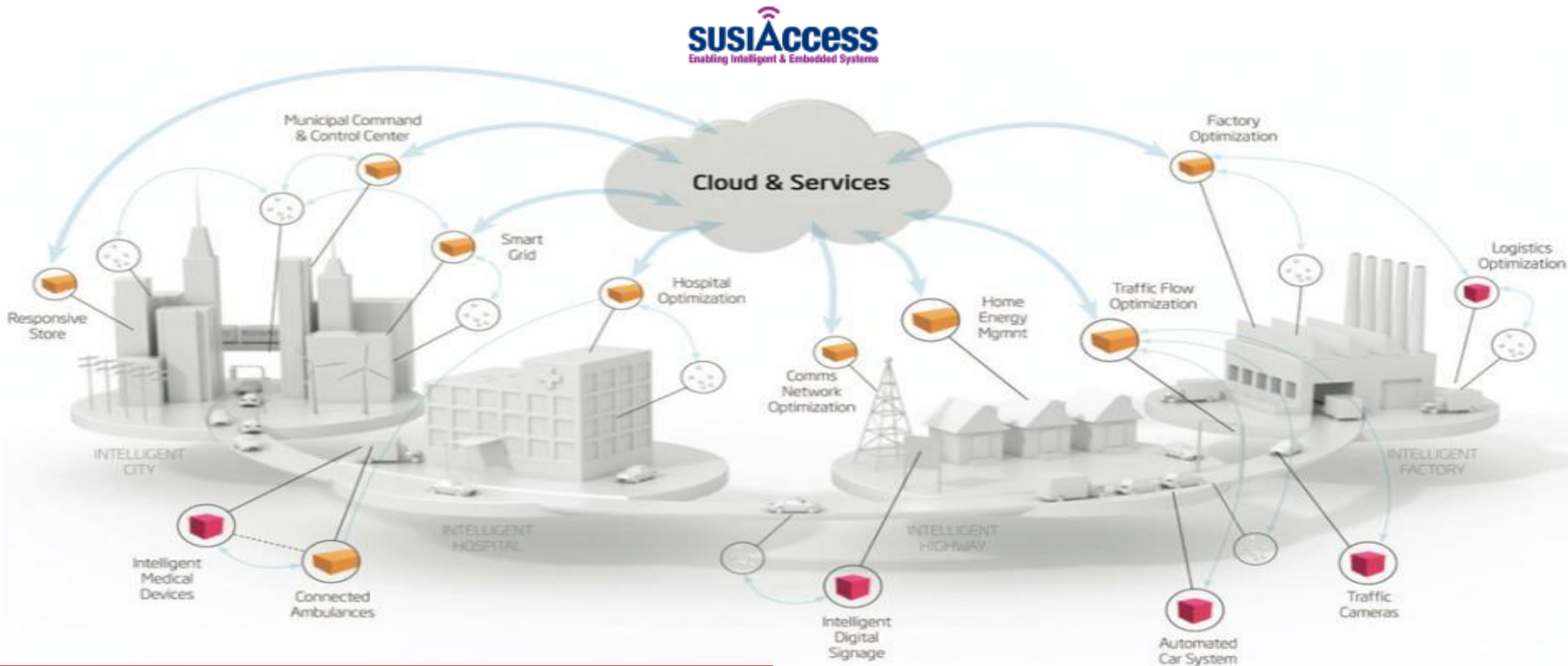


WPAN Gateway
(802.15.4e, Zigbee, etc)

The Last Miles

Technology vs Application

SUSIAccess
Enabling Intelligent & Embedded Systems



802.15.4e

Environment Monitoring
Structure Monitoring
Smart City, Road



BLE

Healthcare
RTLS



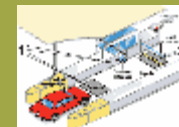
Low Power WiFi

Indoor Application
Factory/Home Automation



UHF RFID

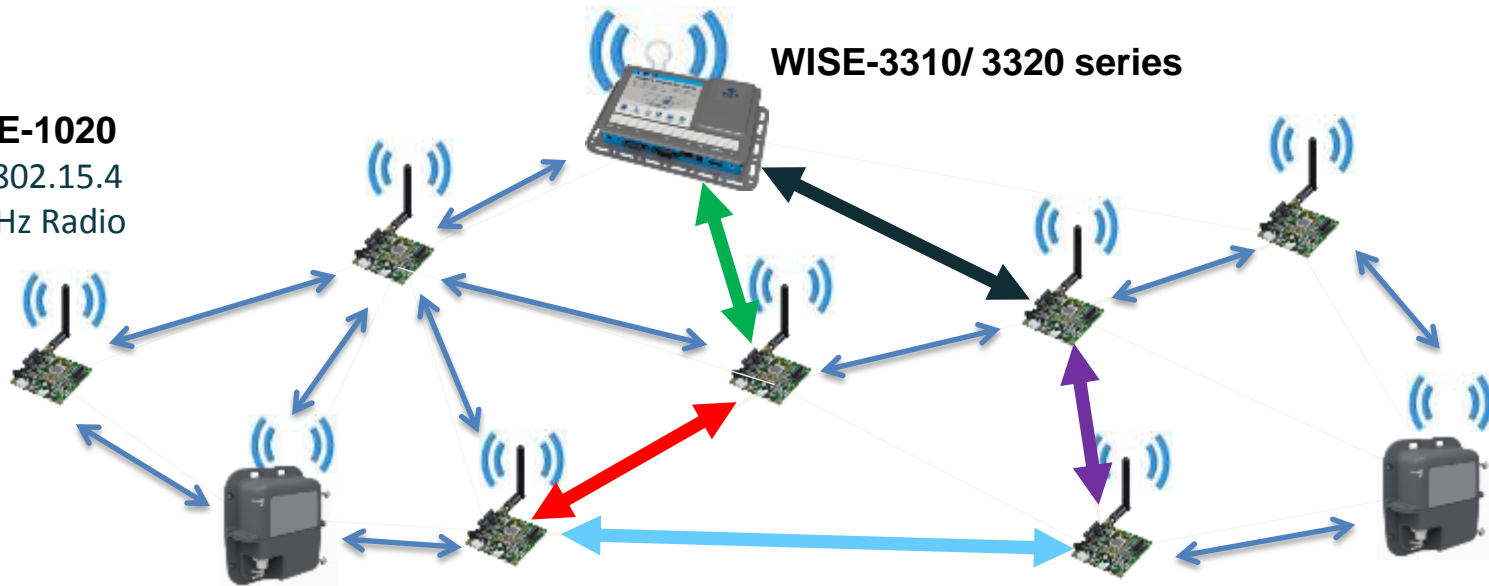
ETC
Retail, Yard Manage



WISE-1020

IEEE 802.15.4
2.4 GHz Radio

WISE-3310/ 3320 series



- **Time Synchronization**

- ✓ Duty cycling: 5-10 year battery life for every node

- **Channel hopping**

- ✓ Robust interference and multipath
- ✓ No self-interference

**10 years battery life means you can
put a sensor **ANYWHERE****

Mesh vs Star/ Tree Topology



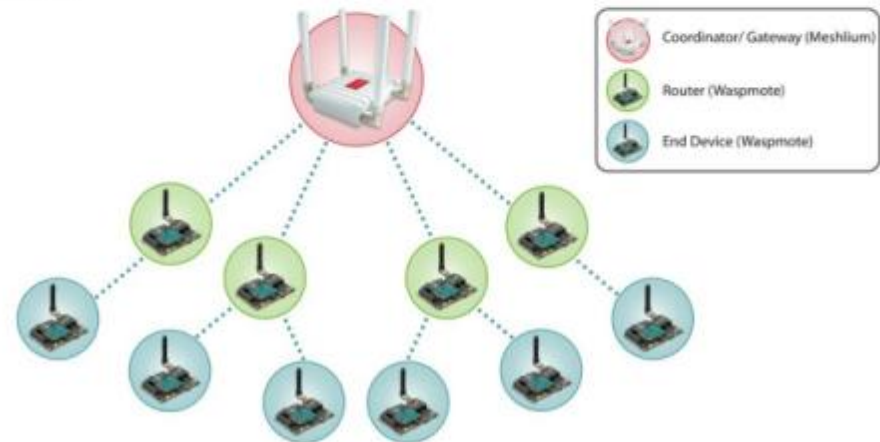
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Distance coverage
Weak links
Interference

The topologies in which these modules can be used are star and tree.

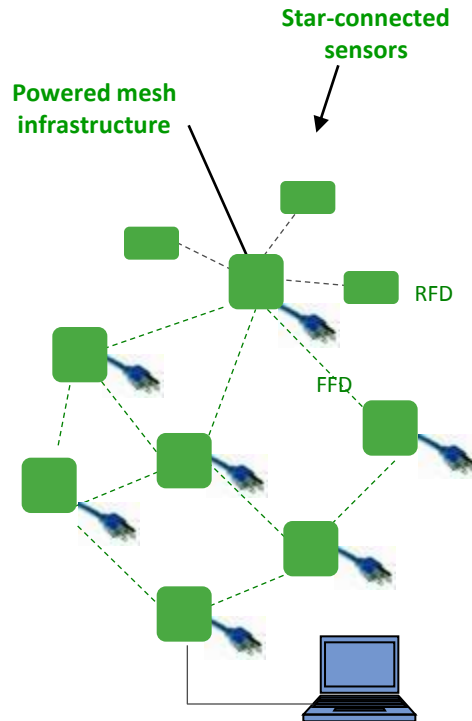


Figure: Star topology



SmartMesh vs ZigBee

ZigBee

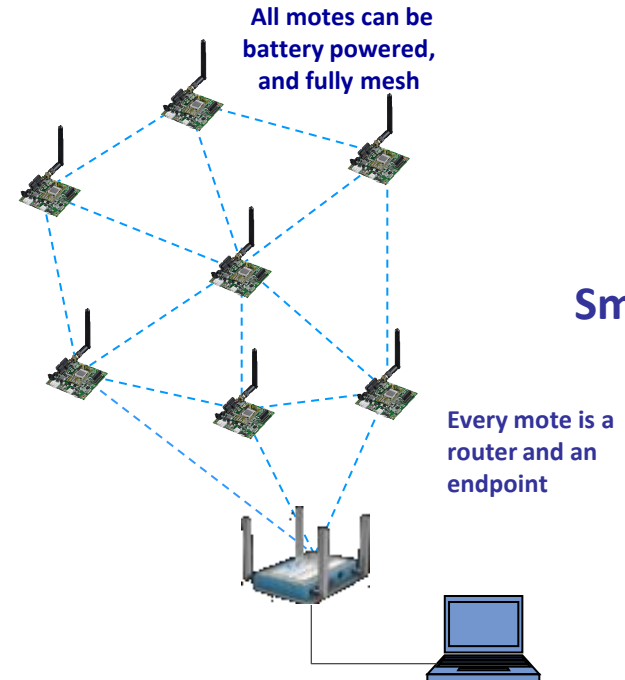


Line-powered routers

Single frequency, unmeshed links

Not reliably scalable

SmartMesh



Allows all nodes to be low power

Reliable

Scalable

What about security?

- Confidentiality
 - Data cannot be read by anyone but intended recipient
- Integrity
 - Message is exactly the message that was sent without additions, deletions, or modifications
- Authenticity
 - Source validation

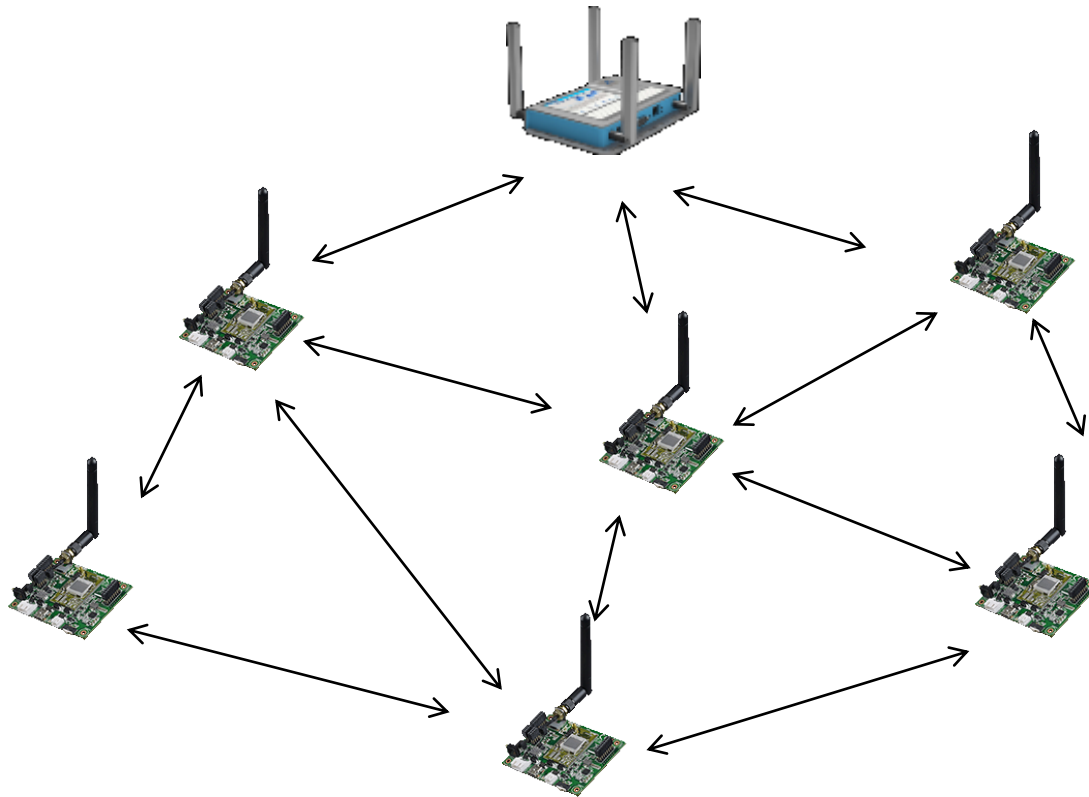
Node level security features to prevent reverse engineering

What could go wrong?

- Confidentiality
Thermostat – vacation settings
- Integrity
Temperature - part of message missing
- Authenticity (early Zigbee)
Interference with other nearby networks



Suitable application fit



- 5+ nodes per network to ensure mesh reliability
- Aggregate of max 36 packets/second per network
- 90B payload
- Latency (time from sending data to receiving data at app) approx 1s
- < 32 'hops' to gateway
- All nodes fixed in place

50m indoor
200m outdoor

Applications that do NOT fit

- High data rate
 - Surveillance video network
- Long-range
 - Sensors every 10km on a 500km pipeline
- Point-to-point
 - One sensor to gateway
- Fast motion
 - Status of racecars
- Low cost, consumer
 - Robot toys



SmartMesh Elevator Pitch

Mesh Wireless Network

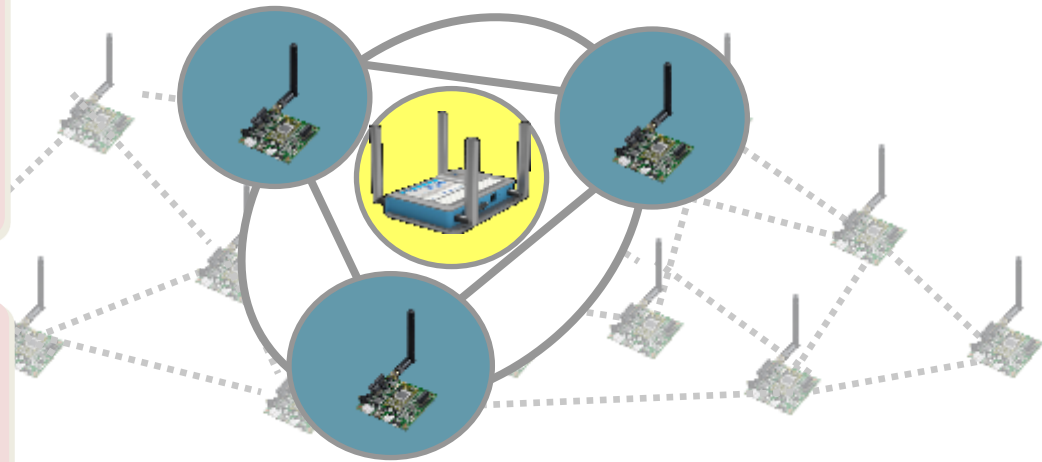
- >99.999% network reliability
- IEEE 802.15.4e, 2.4GHz
- Time Synchronized
- Channel Hopping

IP-base, 6LowPAN Compliant

- 6LowPAN Compliant
- Huge advantage of the TCP/IP adoption
- Robust network security

Powerful Management Platform

- Integrate ARM high-performance computing platform
- Adopt SUSIAccess management tool



Cloud Computing

Big Data provides useful information to enable versatile IoT services for building a smart city

Smart Transportation

Smart Building

Smart Automation

Smart Energy

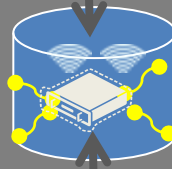
Characteristics of Each Layer



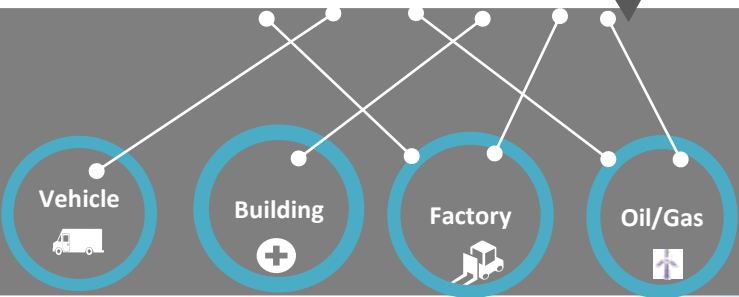
- Shared information through internet
- Innovative services based on Big Data



- High performance data processing
- Serviceability



- Low power
- Multiple connectivity
- Secured, remotely manageable



- Support multiple power source
- Low power
- Support WSN, RFID, Zigbee, SbuG, WiFi

Advantech Embedded Solutions

- Embedded systems & boards With high performance computing

- x86 & RISC based gateways
- SUSIAccess remote management

- High reliability mesh wireless network
- TI & Freescale technologies based

Intelligent Systems & Networking

manage, analyze, turn valuable data into analytics

IoT Gateways

share, filter, transport data from edge to cloud

Edge Sensors

aggregate data

Intel Gateway Solutions for IoT



Family of scalable gateway platforms: **Intel Atom**
Business and software licensing model

WIND RIVER



Integrated, validated solution with
Wind River IDP and McAfee Embedded Control
Enables seamless and secure data flow



Optimized solutions to meet various vertical markets
Hosts ecosystem apps and services

IoT: Addressing Critical Business Issues



Connectivity

- Connecting intelligent devices with legacy systems
- Big Data driving asset awareness and performance analysis
- Visibility into systems for condition monitoring and predictive maintenance



Security

- End-to-end security and reliability
- Privacy and availability for M2M and man-to-machine
- Secure lifecycle processes

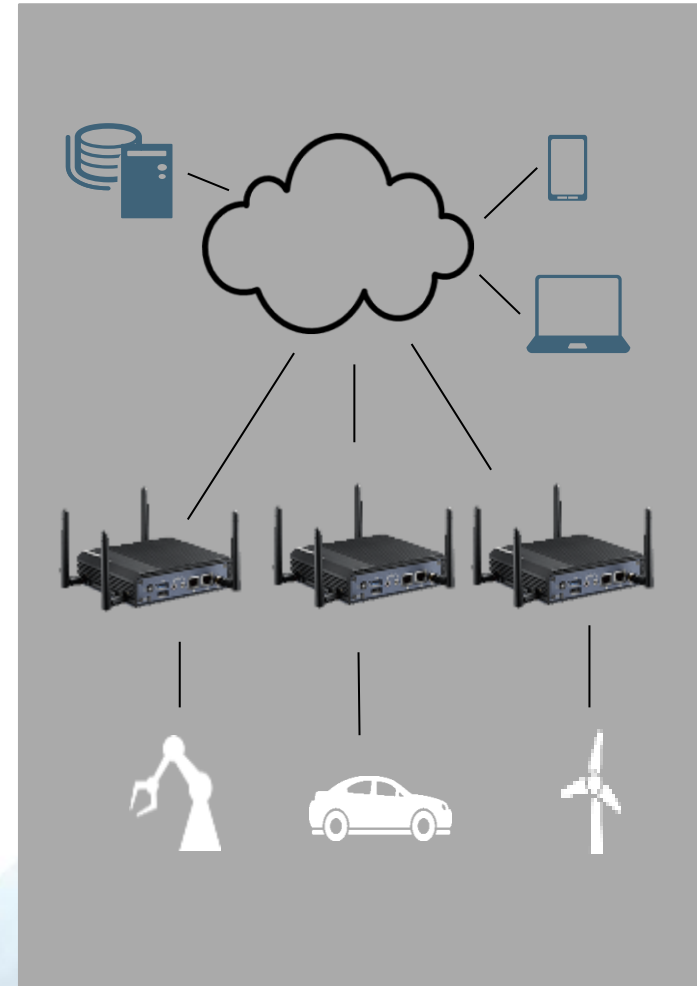


Manageability

- Managing intelligence end-to-end
- Improving uptime and quality of service
- Lowering OPEX with remote monitoring, analysis, and maintenance

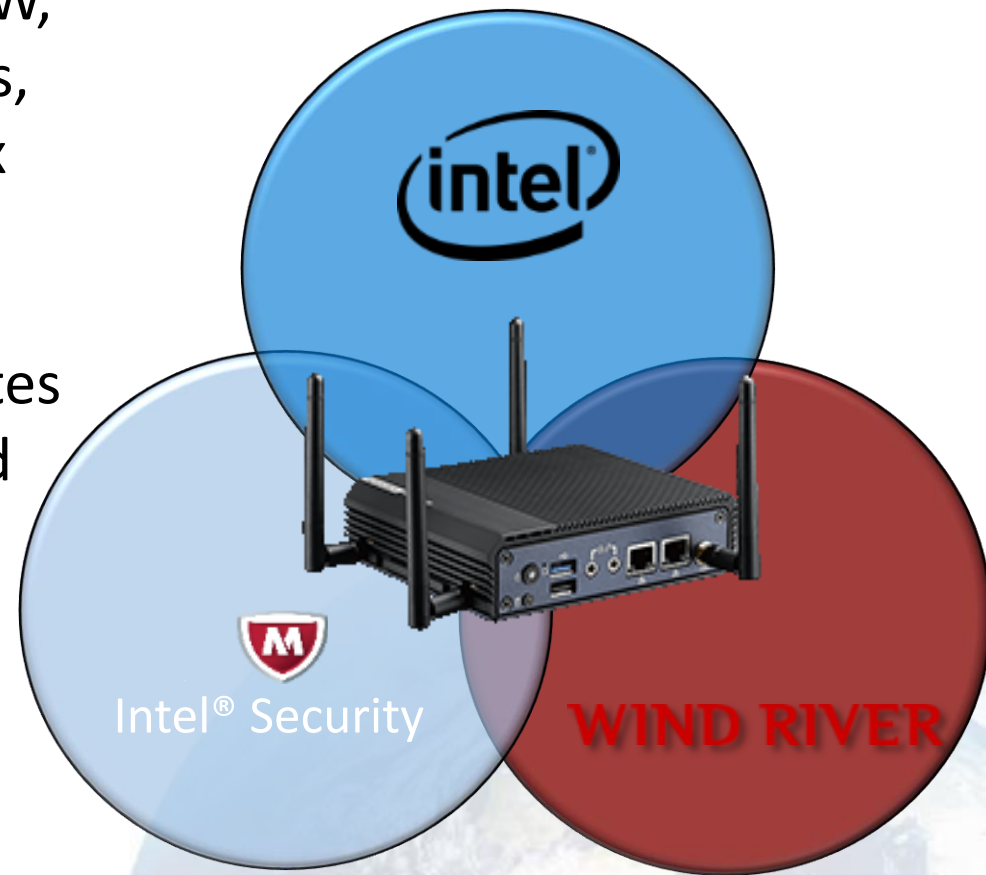
Intel Gateway Solutions for IoT Value Proposition

- Accelerates time-to-market by delivering integrated computing platforms (hardware and software)
- Enables customers to invest in their value-add capabilities instead of reinventing foundational building blocks
- Accelerates business value and growth for customers and partners



Intel IOT Gateway

- It is a Scalable Gateway solution for IoT (Not entry gateway)
- Integrated with foundational HW, SW, and security building blocks, including UTX-3115, WR IDP 2.x Macfee Emb. Ctrl, as well as Cellular Certificate.
- Securely connects and aggregates data from the edge to the cloud
- Simplifies the development process and deployment of IoT Gateway **Application**
- Delivers value by accelerating business transformation

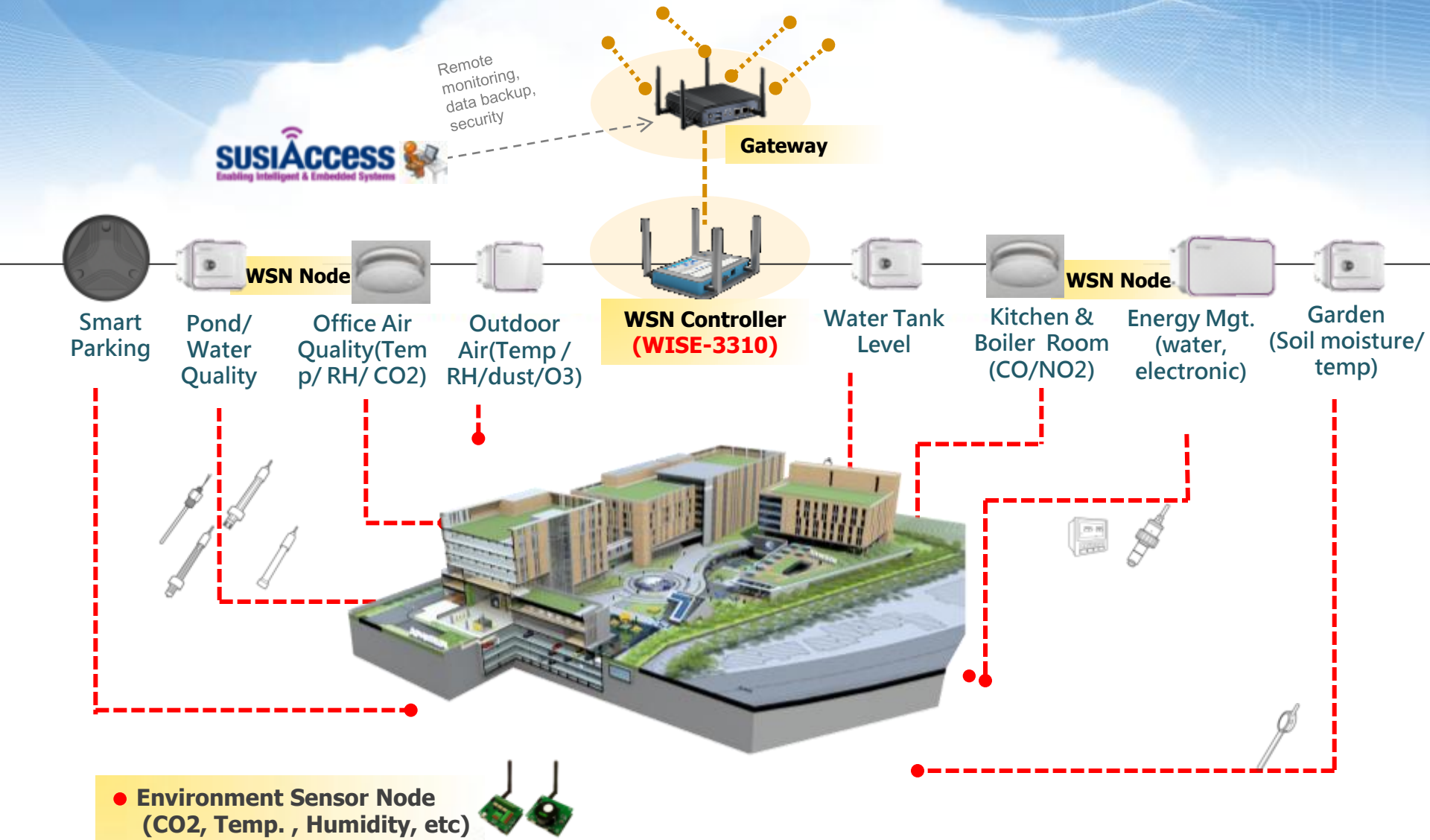


Testbed Plan

- **Advantech Plus Technology Center, A+TC, in Kunshan, China**
 - **200-Node testbed**
 - **Time for deployment: Q4 2014**
-
- **Advantech Embedded HQ in Linkuo, New Taipei City**
 - **100-Node testbed**
 - **Time for deployment: Q4 2014**



Advantech Linkou Office Building 100 Node Testbed





Thank You.

Intelligent Cities | Connected Devices | Integrated Services

驱动智慧城市创新 共建物联产业典范



SUSIAccess

Enabling Intelligent & Embedded Systems

*Remote Device Management
Embedded Security
Software Platform for Embedded Developers*

SUSI^{Access}

Enabling Intelligent & Embedded Systems

*Remote Device Management
Embedded Security
Software Platform for Embedded Developers*

System Monitoring



Device Monitoring

Device temperature, internet connection, CPU temperature, fan speed and voltage.



Automatic Alerts by Email/SMS

Administrators can get prompt notifications sent to their email inboxes or cell phones.

Remote Control



Remote KVM

Quick access to remotely located, embedded devices for device diagnostics and repair.



Power On/Off

Sets the power on /off schedule for remotely located devices.

Embedded Security



System Recovery

- Hot Backup
- Scheduled Backup
- One-Click Recovery

Powered by **Acronis**



System Protection

- White List Protection
- Warnings of any unauthorized activities

Powered by  **McAfee**



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