IS IT A SMART OR CONNECTED OR IOT PRODUCT?

IEEE - CNSV
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I will provide you with an overview of the Internet of Things and contrast it with, smart & connected

For IEEE-CNSV attendees only

Product Types

SMART

CONNECTED

INTERNET
System Overview

**Engineering view**

**Data Format**
- Binary, JSON, CBOR

**Application Layer**
- CoAP, MQTT, Wi-Fi, AMQP

**Transport Layer**
- UDP, TCP

**Internet Layer**
- IPv6/IPv4 Routing

**Network/Link Layer**
- IEEE 802.15.4, Wi-Fi, Physical Radio

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**Design view**

- Front end
  - User touch points
- Enabling Infrastructure
- Back end
  - Admin touch points

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**Business view**

1. Software-defined product
2. Hardware-defined product
3. Connected by a network fabric
4. Interfaced with external systems
5. Secured and private
System Overview

Business view

- Don't focus on the things, focus on value
- SDP is the value generator
- All other components support the SDP
- Supported by the science of cyber-physical systems

Building Your IoT Business

SOFTWARE-DEFINED PRODUCT
Software-defined Product

Overview

- Consists of a cyber model & product application
- Similar to SDN – abstracts the physical
- Simulation of non-physical functionality
- The added value of the IoT product

Value

Dry clothes as quickly as possible or for as cheap as possible while maintaining their integrity

- Value model
  - Time/energy = f (ventilation, heat, pricing)
  - Time/energy = f (fan speed, angular velocity, heater temperature, drum temperature, energy pricing)
- App
  - Interrogates model and actuates hardware-defined product
- Analytics
  - Build models linking pivot variables to results
  - Descriptive analytics to report on cost savings
  - Predictive analytics to estimate when clothes will be dried
Product Types

- SMART
- CONNECTED
- IOT

Building Your IoT Business

HARDWARE-DEFINED PRODUCT
Hardware-defined Product

Embedded system
- Stores and executes local app
- Manages communication with sensors in OT network

Connected sensors/actuators
- Sensors: DC energy is converted with an A/D converter
- Actuators: digital signal is converted with D/A converter
- Greenfield or Brownfield deployments

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Building Your IoT Business

NETWORK FABRIC

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Network Fabric

Overview
- Protocols
- Operational Technology (OT) network
- Information Technology (IT) network
- Backhaul
- Product cloud
- The IoT Platform

Network fabric

Protocols

1. MEDIA LAYER
   The interface that transmits data over the air. Commonly uses 802.15.4, Zigbee, ZWave, Bluetooth. Can also be Ygw4 or WiFi.

2. NETWORK LAYER
   The processing of the sensor data for transport over the network. Commonly uses Zigbee, 802.15.4, ZWave, Bluetooth. Protocols and hundreds of other older communication protocols.

3. APPLICATION LAYER
   The format of the data within the package for consumption by the appropriate service delivery. Commonly uses CoAP, AMQP, MQTT, XMPP, and DDS.

THE THREE NESTED LAYERS OF IOT NETWORKING
Network Fabric

Overview

- Protocols
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Building Your IoT Business

EXTERNAL SYSTEMS
External Systems

Analytics
External data
Business systems
IoT products
IoT Technology Evolution

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Free resources: www.iot-inc.com
My services: www.brucesinclair.net
My book will be published in June
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