Arrow Electronics IoT Connectivity

Dave Murphy-IOT Technology Manager



V Five Years Out

By The Time You've Had Your Morning Coffee...

It's likely you've already interacted with Arrow at least FIVE times.

If it takes a charge or sends a signal, chances are Arrow was a part of building it.



From Sensor to Sunset





Arrow Core Competence in IoT Wireless



IoT Landscape – Wireless Protocols

Easy to become bewildered with the choice!



Need for Communications Protocols in IoT

- Interoperability of disparate systems
- Stops devices from interfering
- Ensure security
- Broaden ecosystem
- Have agreed-upon roadmaps for future upgrades



Wireless Technology and Protocols for the IoT

- Many existing and emerging protocols targeted at IoT and M2M applications
- Selecting the right communication technology and protocol is critical for success of the application
- Implementing wireless technologies takes considerable RF expertise and should not be underestimated
- Design criteria, cost, time to market and application requirements must be taken into consideration

Communications Technology and Protocol Options for IoT



Checklist for Selecting Wireless Protocol

Criteria	Consideration
Range	Distance from transmitter to receiver. Is it fixed or does it change?
Data rate	What is the required rate of data transmission? What type of data is being transmitted?
Cost	What is the total cost of ownership? How critical is time-to-market?
No. of nodes	How many transmitting and receiving devices for the system? Can new nodes be added with relative ease?
Duplex or Simplex	Does the application require one way (Simplex) or two way communication (Duplex)?
Network configuration	Point-to-point, star or mesh network?
Robustness of network	How critical is network reliability? Can the application afford dropped packets or missing data?
Potential interference	Will the system run in noisy environments where chances of interference are high? What level of robustness is required?
Environment	Is the application outdoors or indoors? What are the typical obstacles?
Power source	How will the transmitting and receiving devices be powered - AC or battery? What is expectation on battery life?
Regulatory issues	What certifications are required to operate for all regions that the device will operate in?
Size and space	Are there any size and space constraints?
Licensing fee	What are the licensing and royalty fees associated with the standard? Can the application afford them?
User type and experience	Who is the end user, and what type of experience do they require to operate the device?
Security	How critical is security in the application? What security features does the standard offer?
Regional or global	Will the device be deployed regionally or globally?

Wireless Protocols by Range



WDW

Technical Selection Criteria for Design







WDW

Wireless Suppliers



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Our attackers are no longer visible

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CONTROL

011000110

Esc

Tab

Caps

Ctrl

Shift

IoT Research - 3 Big Predictions

By 2020, more than half of major new business Processes and systems will incorporate some element of the Internet of Things

By 2020, a black market exceeding \$5 billion will exist to sell fake sensor and video data for enabling Criminal activity

By 2020, addressing compromises in IoT security will have increased security costs to 20 percent of the annual security budgets, up from less than one percent In 2015

Survey of Greatest IoT Security Concerns

Physically Unsecure Endpoints

Poor Authentication of IoT Endpoints

Unsecure Application Security Vulnerability within IoT Systems

Unsecured Network Between IoT Endpoints and Central Networks

Unsecure IoT Databases or Data Stores

Unsecure IoT Databases or Data Stores

Other

NNUW Corporate

End Nodes and Compliance Classes

	Class 0		Class 1		Class 2		Class 3
•	Very low-cost and	•	These to limited memory and	•	These devices support	•	These are high-end
	constrained devices like		processing capabilities, these		communication protocols		nodes or gateways
	low-power sensors.		devices communicate via		like HTTP and are less		that can run
•	Due to minimal memory		protocols such as CoAP		constrained.		protocols and
	and processing		(Constrained Application	•	They run on 32-bit		applications with no
	capabilities, they directly		Protocol).		MCUs or MPUs.		modifications.
	do not have IP-based	•	Examples include blood glucose	•	Examples include IP	•	They can operate on
	communication and use		meter or a thermostat based on		cameras, smart meters		an RTOS,
	gateways via low foot-		8/16-bit MCUs.		or high-end medical		Embedded Linux or
	print protocols like ZigBee	•	They could communicate with		devices.		full OSes
	and BLE.		other devices without the help of	•	They could operate on		
•	Devices don't support		gateways.		an RTOS or Embedded		
	RTOS	•	RTOS could be implemented in		Linux		
			these devices.				

Impact of a Security Breach

On multiser of		Security Objective				
Compliance Class	Description	Integrity	Availability	Confidentiality		
Class 0	Compromise to the data generated or level of control provided is likely to result in little discernible impact on an individual or organisation.	Basic	Basic	Basic		
Class 1	Compromise to the data generated or level of control provided is likely to result in only limited impact on an individual or organisation	Medium	Medium	Basic		
Class 2	In addition to class 1, the device resists attacks on availability that would have significant impact an individual or organisation, or impact many individuals, for example by limiting operations of an infrastructure to which it is connected	Medium	High	Medium		
Class 3	In addition to class 2, the device is designed to protect sensitive data including sensitive personal data	Medium	High	Medium		
Class 4	In addition to class 3, where the data generated or level of control provided or if a security breach occurs have the potential to affect critical infrastructure or cause personal injury.	High	High	High		

Arrow Security Strategy for Edge node designs

Industry Communication Protocols

Secure Data Storage

Tamper Detect

Secure over the air firmware upgrades

Reference Platforms

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BASE BOARD

- Microchip CPU Cortex M0+ USB Host
- Microchip Crypto Authentication
- Dynaflex 868Mhz Antenna
- Linear Power management
- Telit Sigfox Module
- Telit GPS with Embedded Antenna
- ST Sensors
- NXP NFC Ntag I2C
- TDK Bluetooth Low Energy

(ATSAMD21J18A-MU)
(ATSHA204A-MAHDA-T)
(915/2)
(LTC3526LEDC-LTC4413EDD-LTC1844ES5-LTC36)
(LE51-868 S)
(SE868-A)
(STLIS3DH-STLPS25H-STHTS221-VL6180XV0NR/1)
(NT3H1201FHK)
(SESU-PAN-T2541 by Texas CC2541)

FEATURES

- Telit Cloud management
- NFC Ntag I2C Ready interface/authentication
- BLE Setting Interface & fw upgrade
- GPS Localization
- Sensors (Proximity Humidity Temperature Axis)
- Arduino Form factor

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BASE BOARD

• Microchip CPU Cortex M0+ USB Host

- Microchip Crypto Authentication
- Dynaflex 868Mhz Antenna
- Linear Power management
- Microchip LoRA Module
- Telit GPS with Embedded Antenna
- Microchip Bluetooth Low Energy

(ATSAMD21J18A-MU)
(ATSHA204A-MAHDA-T)
(915/2)
(LTC3526LEDC-LTC4413EDD-LTC1844ES5)
(RN2483)
(SE868-A)
(RN48730)

Lion

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FEATURES

- Lora Tecnology enabled
- BLE Setting Interface & fw upgrade
- GPS Localization
- Arduino Form factor

The IoT Node – Sensor Enablement - ARIS

The ARIS Platform

- Hardware and Software Platform
- Motion detection 3–axis accelerometer
- Position and Movement 2-axis gyroscope
- Environmental Temp & Humidity
- Arduino Compatible layout

Please visit arrow.com/ARIS

Together with Renesas Electronics and their Synergy[™] platform, Arrow's ARIS offers a perfect solution for exploring and mastering the world of IoT Sensing

The IoT Node – Sensor Enablement - SenseAbility 2.0

SenseAbility 2.0

- High performance. Low power Multiple sensors
 - Magnetoresistive
 - humidity and temperature
 - flow and pressure sensors
- Bluetooth LE System on Chip
- Connectivity simplified Supports a variety of add-ons: e.g. LoRa, 802.11 and cellular

Arrow, Cypress and Honeywell have created a roadmap for building winning IoT-connected technology -SenseAbility 2.0, a Universal Wireless Sensor Solution (UWSS).

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Please visit our stand to discuss your requirements

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