The Power of the DragonBoard™ 410c
Enabled by IBM Watson IoT
Agenda

• Arrow Overview
• DragonBoard™ 410c Overview
• Connecting the DragonBoard to Watson IoT Platform
  – IoT Stack Overview
• Demo
  – The hardware
  – The Software
Arrow’s Heritage

Founded in 1935

Twitter Symbol
ARW (NYSE)
Web Site
www.arrow.com
2014 Sales
$22.4 billion
Global Components
$14.5 billion
ECS
$8.5 billion

Employees
17,000
Locations
Global network of more than 460 locations in 58 countries and territories
Headquarters
Englewood, Colorado
Customers
100,000
Fortune 500 Rank
138

We understand the world of people who think five years out. People who figure out how new technologies, new supply chains, and new talent will work in the not-so-distant future.

We are an intellectual force for dreamers, a practical resource for builders, a springboard for ideas.
Arrow Overview

We provide products and services along the entire product lifecycle:

- Design support
- Financial services
- Supply Chain
- Logistics
- Marketing
- Value Recovery
- Data Analytics Services
- Device Services
IoT Emerging Markets Group:

• Small team of enthusiasts
• Targeting the Maker movement and startups.

Mission statement: “Arrow is the preferred source for everything that Makers need to turn projects into products.”
From Project to Product

- **Makers**
  - Access to software and hardware tools for prototypes
  - Demo projects
  - Tutorials
  - Forums

- **Start-ups**
  - Prototyping tools
  - Small scale manufacturing
  - Platforms for development

- **Small Companies**
  - Supply chain
  - Access to engineering and manufacturing services
  - Hardware and software product purchasing

- **Large Companies**
  - Classic Arrow customer
DragonBoard™ 410c
Overview
Arrow DragonBoard™ 410c Community Board
Powerful computing capabilities and rich feature set in a credit card sized package

$75 USD

- Built on Snapdragon APQ8016 (64-bit ARM)
- Open Platform Specification from 96 Boards
- Integrated WiFi, BT, and GPS
- Android / Linux / Windows 10 Support
- Arduino compatibility through mezzanine boards
Arrow DragonBoard™ 410c Details

**Powerful processing and multimedia capabilities**

Snapdragon 410 Processor
- Quad-core ARM Cortex A53
- Adreno 306 400MHz PC-class graphics
- Power management and audio codec

**Memory and storage**

1GB LPDDR3, 8GB eMMC
Micro SD card slot

**A wide array of expansion capability**

- One 40 pin low-speed (LS) expansion connector
- One 60 pin high-speed (HS) expansion connector
- Optional Analog expansion connector
  - E.g. Stereo headset/line-out, speaker and analog line-in

**Integrated connectivity**

Wi-Fi, BT, GPS, FM

Full HDMI
USB

Five Years Out
Arrow DragonBoard™ 410c Details

The ideal platform for a wide spectrum of projects/products:

• Home automation
• Robotics
• Drones
• Display solutions

• IoT applications
• Education
• Fun…
From Evaluation to Commercialization

Evaluate & prototype
• DragonBoard™ 410c by Arrow Electronics

Commercialize with SOMs / SBCs
• Intrinsyc Open-Q 410 SOM
• eInfochips ERAGON 410
• Inforce 6309 Micro SBC
• Variscite coming soon
Connecting the **DragonBoard™ 410c** to the IBM Watson IoT Platform
Architectural overview

• **IBM Watson IoT platform:**
  – Acts as a message broker
  – End point for Device Data
  – Starting point for Data Analysis

• **Device:**
  – Runs communication stack (MQTT-client)
  – Sends data

• **Application:**
  – Goes through the IBM Watson IoT platform to monitor and control the device.
IBM Watson IoT Platform

Two ways to connect a device/app to the IBM IoT Platform service:

- Via MQTT
- Via HTTP
IBM Watson IoT Platform

**Mqtt:**

- Message Queue Telemetry transport
- Basic Publish/Subscribe pattern
- Message body formatted in:
  - Text, JSON, XML, BIN
- IBM offers MQTT-Client that abstracts some of the communication details (topics, etc/…)
- IBM-C-Client based on [Eclipse Paho project](https://eclipse.org/paho/)

- IBM MQTT client available in several languages
  - Java,
  - c/c++
  - Noded.JS
  - C#
  - Etc
IBM Watson IoT Platform

**HTTP (limited beta):**
- Classic Post, Get, Put, Delete requests
- Not our focus here
IBM Watson IoT Platform

**MQTT Client API:**
- Connect
- Publish
- Subscribe
- Disconnect

**HTTP Client API:**
- Post,
- Get,
- Put,
- Delete

API documentation: [link](#)
MQTT client example: (C/C++)

#include "iotfclient.h"
Iotfclient client;

Initialize:
rc = initialize(&client,"quickstart","iotsample","001122334455",NULL,NULL);
rc = initialize(&client,"orgid","type","id","token","authtoken");

Connect:
rc = connectiotf(&client);

Publish:
char *payload = "{"dl": {"temp": 34 }}
rc = publishEvent("status","json", "{"dl": {"temp": 34 }}", QOS0);

Disconnect:
rc = disconnect();
IBM Watson IoT Platform

**Play:**
using the Quickstart service

**Try:**
using free 30Day trial

**Buy:**
pay per usage

Connect your device to an open endpoint and view it’s data on the IoT Explore Dashboard

Create your own organization and deploy your own IoT sample app… for free!

Deploy apps that use IBM’s real-time and REST APIs to communicate with your devices and consume the data you’ve set them up to collect

Get started now: [Explore IoT](#)
Demo: The Hardware

**DragonBoard™ 410c:**
- Based on Linaro’s open platform Specification 96 Boards
- Quad-core ARM Cortex A53 processor
- Adreno 306 400MHz PC-class graphics
- Integrated WiFi, BT, and GPS
- Android / Linux / Windows 10 IoTCore Support
Demo: The Hardware

SeeedStudio-96Boards Sensor Mezzanine card:
• Compatible with 96Boards open platform specification
Demo: The Hardware

Seeed Studio-Grove Sensor System:

- Digital light sensor (101020030)

http://www.seeedstudio.com/wiki/Grove_System
Demo: The Software

MRAA library:
• open source hardware abstraction Library to simplify IO-interfacing on GNU/Linux based development platforms

https://github.com/intel-iot-devkit/mraa

UPM library:
• Open source library that abstracts the grove sensor system and uses MRAA

https://github.com/intel-iot-devkit/upm
Demo: The Software

**MQTT-client: iotf-embeddedc**

- *MQTT* client for the IBM Watson Internet of Things Platform service
- Based on paho embedded MQTT client

**Available in the following languages:**

- Java
- C#
- C/C++
- Node.JS
- Python
- Etc..

[https://github.com/ibm-messaging/iotf-embeddedc](https://github.com/ibm-messaging/iotf-embeddedc)
Demo-action
Step 1: Power up your device

1. Connect Light-Sensor to the I2C port
2. Connect the Monitor to the HDMI port
3. Connect the Mouse/Keyboard dongle to the USB port
4. Mount the Sensor-Mezzanine-card on the DragonBoard™ 410c
5. Connect the Power supply (last)
Step 1: Power up your device

After the device has booted up, establish a network connection:

• Select the wireless icon in the lower right corner of the screen
• Select the Seminar network
• Provide the network password
Step2: Start the demo

- Click the DB410c-demo Icon on the desktop:

- This will start the demo application

- Note the DeviceID shown on the application window, you will need it in the next step:
Step 3: Visualize the data

- Click the IBM IoT Explore Icon on the desktop:

- This will open a Web browser and open the IBM Explore IoT site:
Step 3: Visualize the data

- Select your Hardware platform: DragonBoard™ 410c
Step 3: Visualize the data

• Enter your DeviceID you noted during step 2
Step3: Visualize the data

- View live data from your Arrow DragonBoard™ 410c
• You can find the IBM recipe to this demo here: https://developer.ibm.com/recipes/tutorials/connecting-arrows-ibm-iot-starter-kit-to-ibm-watson-iot/

• You can download the source code for this demo here: https://github.com/ArrowElectronics/ibm-iot-starter-kit
Join the DragonBoard™ 410c community today

developer.qualcomm.com

www.96boards.org

www.arrow.com/dragonboard410c
Thank you!

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