

Intel Edison Demo Day, London

Getting Started With Intel Edison

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Intel Corporation (UK) Ltd.
28-Nov-2014



Agenda

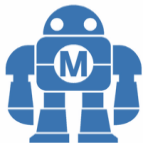
- Intel® Edison overview
- Development platforms
- Development environment
- Libmraa & UPM libraries
- Cloud Analytics overview

The Intel® Edison

- Development platform for IoT and Wearable computing.
- Designed for inventors, entrepreneurs, and consumer product designers to rapidly prototype.
- Packs a robust set of features into its small size, delivering great performance, durability, and a broad spectrum of I/O and software support.
- Versatile features help meet the needs of a wide range of customers.

The Intel® Edison Offering

Maker



Pro-Maker &
Entrepreneur



Consumer
IoT



Light Ind.
IoT



No extended temp or life

Hardware

Edison Module + Derivatives

Expansion Boards

Software

Yocto + Various Runtimes, IDE & Developer Tools

Cloud

Developer cloud solution and partner-based solutions for scale

Support

Managed on-line community, trouble ticketing, drawings, schematics, datasheets, code libraries, webinars, etc.

Ecosystem

ISVs, Incubators, Crowd Source funders & SIs

Intel® Edison module



Designed to be wireless, with compute performance and low power!

Board

- 22nm 2 core Intel® Atom™ Core™ @ 500MHz
- 1 Intel® Quark™ MCU @ 100MHz
- 35.5 × 25.0 × 3.9 mm
- 1 GB RAM (LPDDR3, 2ch @ 800 MT/s)
- 4 GB eMMC
- Wi-Fi (a/b/g/n) + BT 4.0 + antenna
- 40 GPIOs : UART, I2C, SPI, I2S, PWM, USB 2.0, SD card, clock out, GPIO

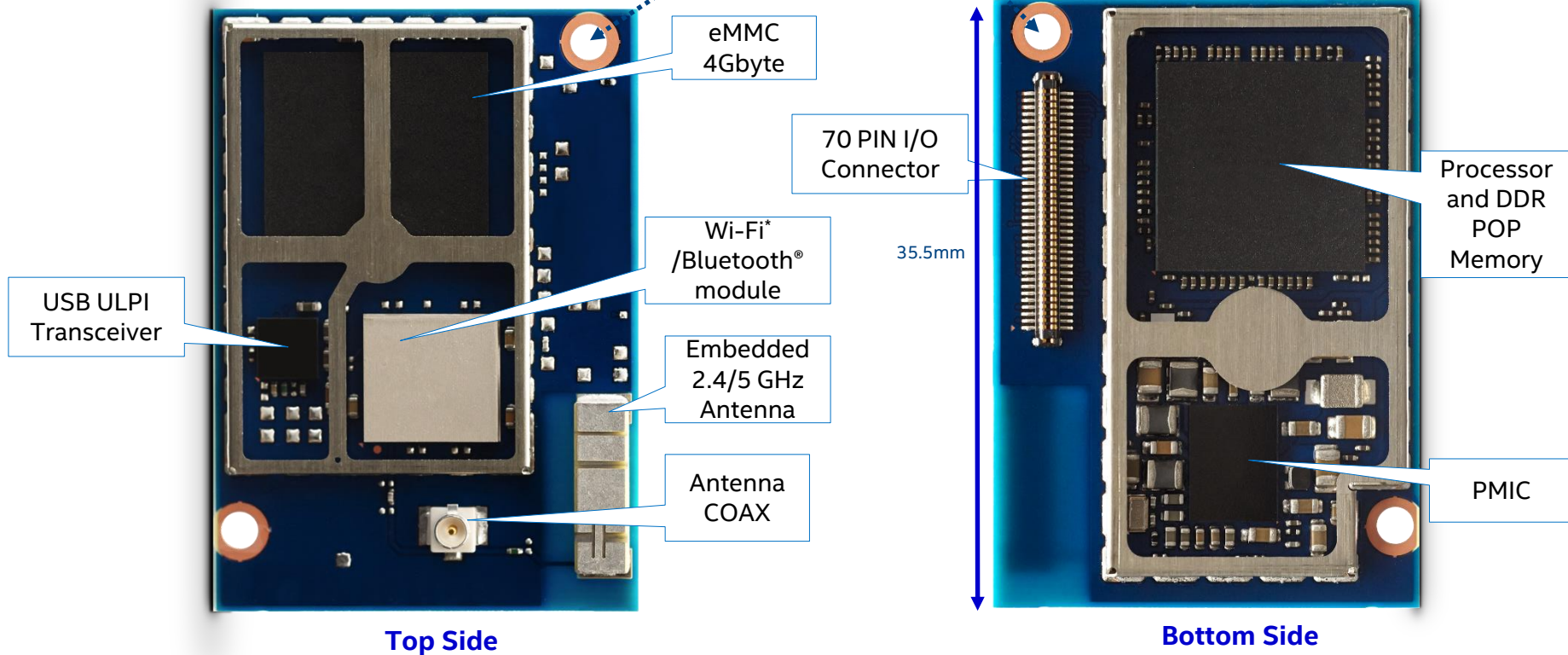
Software

- Default OS: Yocto* 1.6 Linux*
- Right now: 3.10.17 kernel
- OTA upgradable
- **libmraa**: IO abstraction layer
- **UPM** repository: sensor libraries

Intel® Edison - Inside



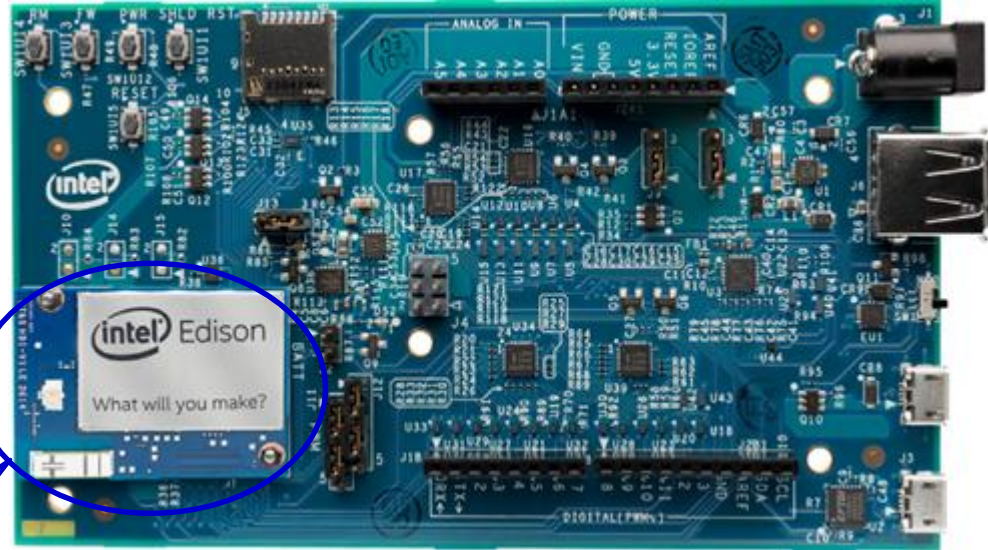
35.5 × 25.0 × 3.9 mm (1.4 × 1.0 × 0.15 inches) max



Intel® Edison Development Boards: Arduino* expansion

Board I/O: Compatible with Arduino* Uno (except only 4 PWM instead of 6 PWM)

- 20 digital I/O pins including 4 pins as PWM outputs
- 6 analog inputs
- 1 UART (RX/TX)
- 1 I2C
- 1 ICSP 6-pin header (SPI)
- Micro USB device connector
- Micro USB device (connected to UART)
- SD Card connector
- DC power jack (7V – 15V DC input)



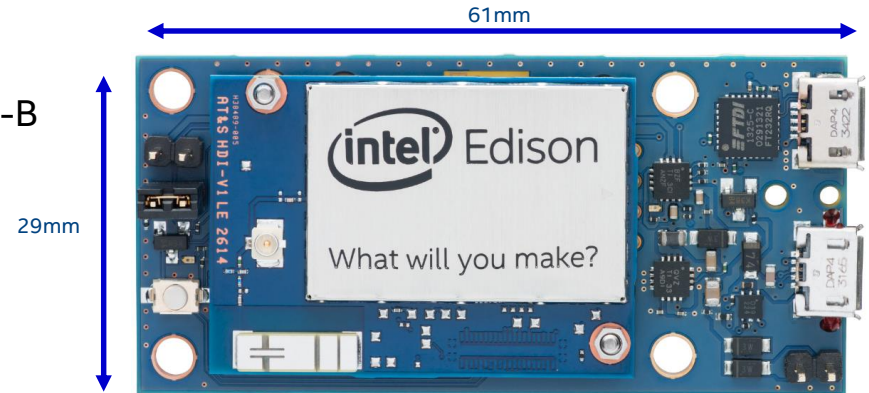
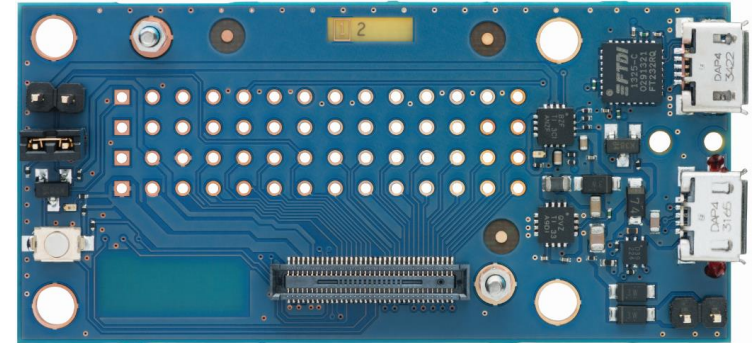
Board to board
Press-fit
connection
(Hirose DF40)

Intel® Edison Development Boards: Breakout board

61mm x 29mm x 12mm (2.4 x 1.1 x 0.5 inches)

Board I/O:

- Exposes native 1.8V I/O of the Edison module
- .1" grid I/O array of through-hole solder points
- USB OTG with USB Micro Type-AB connector
- USB OTG power switch
- Battery Charger
- USB to device UART bridge with USB Micro Type-B connector







Grove Starter Kit Plus - Intel® IoT Edition

- | | |
|----|-----------------------------------|
| 1 | Base Shield v2 |
| 2 | Grove - Buzzer V1.1 |
| 3 | Grove - Button |
| 4 | Grove-LED v1.3 |
| 5 | Grove - Sound Sensor_V1.2 |
| 6 | Grove - Rotary Angle Sensor |
| 7 | Grove-Touch Sensor |
| 8 | Grove - Smart Relay |
| 9 | Grove-Light Sensor |
| 10 | Grove - Temperature Sensor_V1.1 |
| 11 | 26AWG Grove Cable |
| 12 | Mini Servo |
| 13 | 9V to Barrel Jack Adapter - 126mm |
| 14 | DIP LED Blue-Blue |
| 15 | DIP LED Green-Green |
| 16 | DIP LED Red-Red |
| 11 | Grove - LCD RGB Backlight |



Intel® Edison Developer Options

Coming end 4Q
(subjected to change)

	Visual Programming	Arduino* Developer	Java script Developer	Embedded Developer	MCU Developer
Cloud	IoT Kit & Mashery*				
IDE	Wylidrin* Web 	Arduino* IDE Win */ Mac* 	Intel XDK Win*/ Mac*/ Linux* 	Eclipse* Win*/ Mac* / Linux* 	Win*/ Mac* / Linux*
Programming Language	Visual JavaScript / Python	Arduino* Sketch C++	HTML5/JavaScript (Node JS)	C/ C++/Python	C/C++
Tools/ Libraries	Wylidrin*	Arduino* Libraries	Intel XDK	ISS	MCU SDK
OS / Boot Image	Yocto Linux* 1.6				RTOS

Intel® IoT Developer Kit

A complete solution for creating IoT applications targeted for Intel® IoT platforms such as Intel® Galileo board and Intel® Edison board.

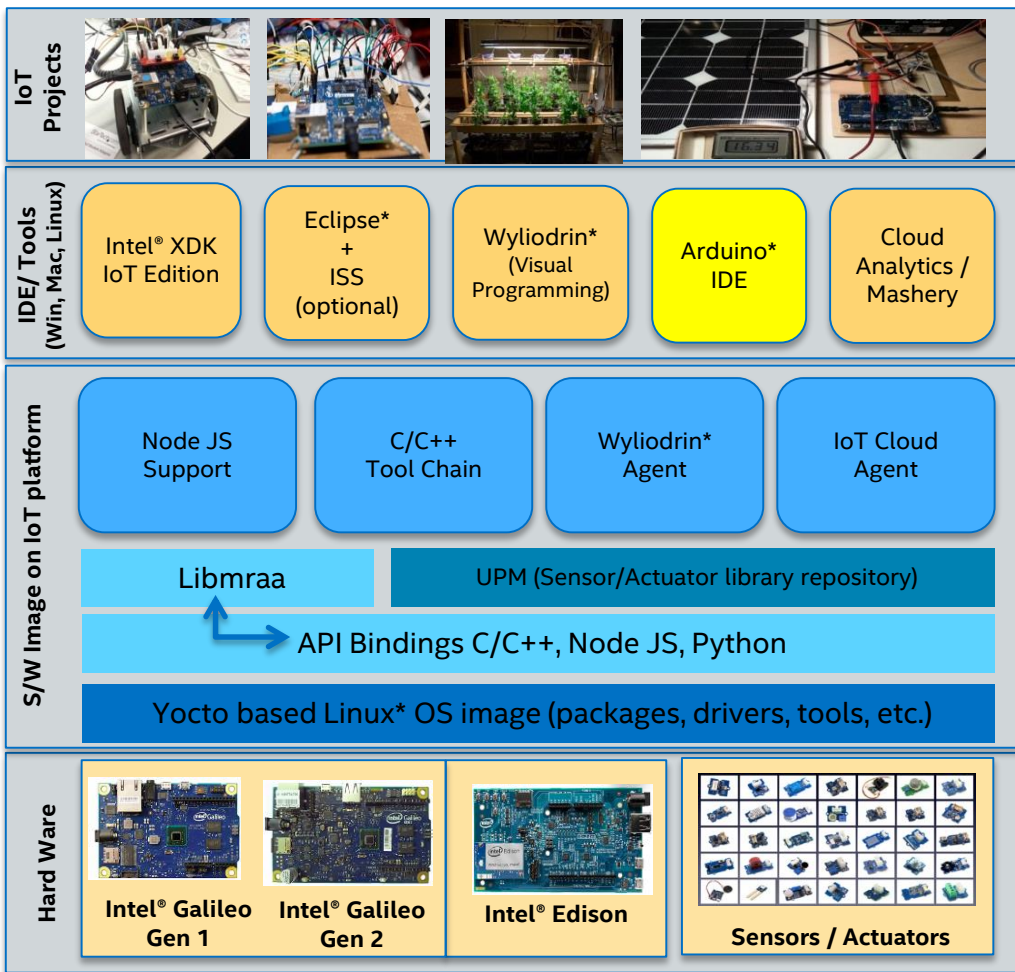
- Multiple IDEs (XDK, Eclipse, Wylodrin*, Arduino*)
- Cloud analytics & data management
- Mashery IoT Restful APIs

- Multiple Programming Languages (JavaScript, C/C++, Arduino* Sketches, Visual programming)

- APIs that shields H/W complexity (libmraa)
- Sensor libraries with API bindings (UPM)

- Open & Standard - Yocto Linux* based OS
- Supports full range of Linux tools and libraries

- Full x86 support (Scale from Intel® Quark™ SoC to Intel® Core™ processor)
- Intel® Galileo (Gen1/ Gen 2), Intel® Edison



Libmraa – Object API (Python)



```
from mraa import * # Import mraa library
x = Gpio(8) # Create a GPIO object for pin 8
x.dir(DIR_OUT) # Set GPIO direction to output
x.write(1) # Write to GPIO
x = "memory is not my problem!"
```

Libmraa – Object API (NodeJS)

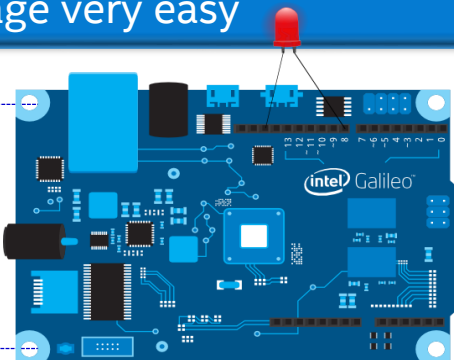


```
var m = require("mraa") # Import mraa module
var x = new m.Gpio(8) # Create a GPIO object
for pin 8
x.dir(m.DIR_OUT) # Set GPIO direction to output
x.write(1) # Write to GPIO
```

Libmraa / UPM : Makes GPIO & Sensors usage very easy

Libmraa C API

```
mraa_gpio_context gpio; // Pointer to GPIO context
gpio = mraa_gpio_init(8); // Create GPIO context for pin 8
mraa_gpio_dir(gpio, MAA_GPIO_OUT); // Set GPIO direction to output
mraa_gpio_write(gpio, 1); // Write to GPIO
mraa_gpio_close(gpio); // Close GPIO
```



Libmraa C++ API

```
Maa::Aio* a0;
a0 = new mraa::Aio(0); // Create AIO object for pin0
std::cout << a0->read() << std::endl;
```

UPM API

```
using namespace upm;
// instantiate an object GroveTemp on analog input 0
GroveTemp* sensor = new GroveTemp(0);
// print the value of the sensor in deg. centigrade
std::cout << sensor->value() << std::endl;
```



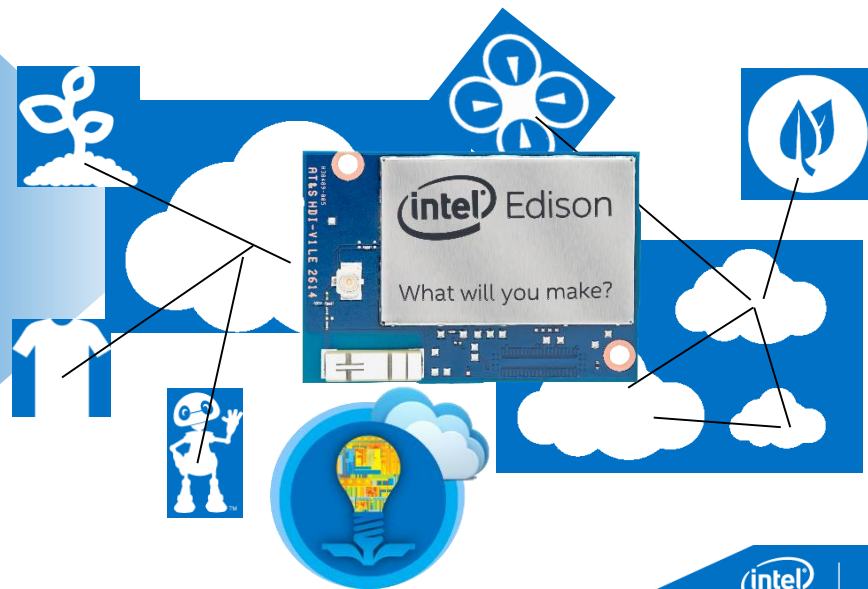
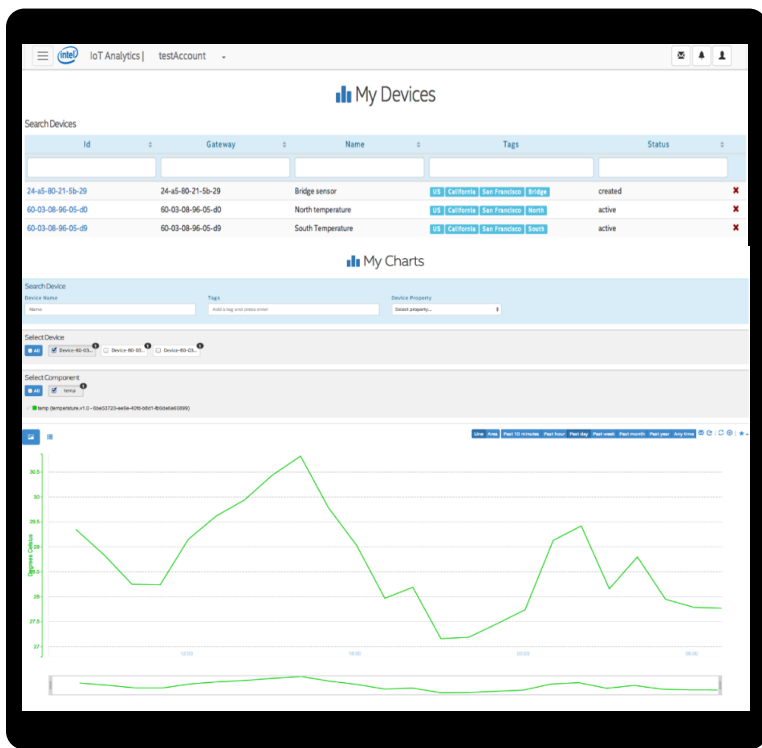
Intel® IoT Analytics - www.enableiot.com

- RESTful API
- iotkit-agent (UDP / TCP)

```
#!/usr/bin/env python
import socket
import sys
```

```
UDP_PORT = 41234
sock = socket.socket(socket.AF_INET, socket.SOCK_DGRAM)
```

```
sock.sendto('{"n":"' + component +
            '\", "v":"' + value + '"}', ('localhost', UDP_PORT))
```



Resources & Call to Action

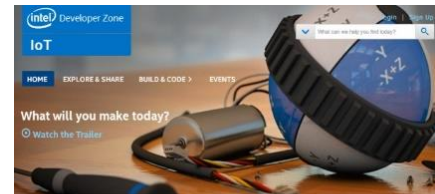
- Resources:

- Intel® Edison: <https://communities.intel.com/community/makers/edison>
- IoT Developer Zone Home: <https://software.intel.com/en-us/iot>
- libmraa: <https://github.com/intel-iot-devkit/mraa>
- UPM: <https://github.com/intel-iot-devkit/upm>



- Call to Action:

- Visit Intel® Developer Zone IOT and join the Community/Forums/Hackathons.
- Create/develop/run/deploy IoT apps with easy to use HW and SW using Intel® IoT Developer Kit.
- Participate in challenges like <http://makeitpro.intel.com/>, <https://makeit.intel.com/>



<http://software.intel.com/iot>



Get up and Running

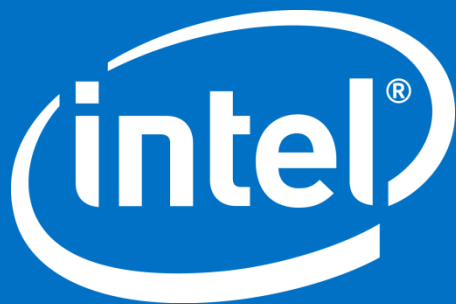


Get Hardware



Get Help

Intel® IoT Developer Kit makes software development easy on Intel® IoT / Wearable platforms!



Thanks!