Eclipse IoT: Building the Internet of Things with Open Source

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Eclipse IoT is an open source community aimed at building and promoting open source software, open standards & open collaboration models needed to create an Open Internet of Things.
Eclipse IoT Community

2.2 million lines of code
29* projects
210+ developers
110K monthly visitors

* and counting!
Our members
Eclipse IoT...

from building blocks ... to stacks
Characteristics of Open IoT Stacks

- loosely coupled
- modular
- platform-independent
- based on open standards
- API
Role & Characteristics

DEVICE
- constrained
- low-power
- specialized

GATEWAY / SMART OBJECT
- connectivity
- messaging
- edge computing

CLOUD PLATFORM
- scale out
- integration
- data analytics
The 3 IoT Software Stacks

**SECURITY**

**ONTOMOIES**

**TOOLS & SDKs**

**CONSTRAINED DEVICES**
- Communication
  - Field protocols
  - IoT protocols
- Hardware Abstraction Layer (HAL)
- OS / RTOS
- Remote Management

**GATEWAYS AND SMART DEVICES**
- Application Enablement
- Event Management, Analytics & UI
- Data Management
- Device Management
- Device Registry

**IOT CLOUD PLATFORM**
- OS / PaaS
- Remote Management
  - Connectivity
    - Field protocols
    - IoT protocols
  - Network Management
  - Application Runtime
  - Data Management & Messaging
OS Stack for IoT Devices

Wakaam

- C implementation of OMA LWM2M
- Portable on any POSIX-compliant system

paho

- C implementation of MQTT 3.1.1
- < 2,000 lines of C ANSI code

edje

- JAVA API for MCUs
- "Android for IoT"
OS Stack for IoT Gateways

- Native support for MQTT
- Serial, RS-485, BLE, MODBUS, OPC-UA, CAN Bus, ...
- NAT, firewall, modem configuration, ...
- Remote Management over MQTT
- OSGi implementation

Remote Management

- Connectivity
  - Field protocols
  - IoT protocols
- Network Management
- Application Runtime
- Data Management & Messaging

GATEWAYS AND SMART DEVICES
OS Stack for IoT Cloud Platform

**An Integration Platform for IoT Services**

- REST API
- Abstract the actual communication protocols via “protocol adapters”
- NoSQL data store

**Deploy on:**

- IOT CLOUD PLATFORM
- CLOUD FOUNDARY

**OS Stack for IoT Cloud Platform**

- Connectivity
  - Message Routing
  - Application Enablement
- Event Management, Analytics & UI
- Data Management
- Device Management
- Device Registry
- OS / PaaS
OS Stack for IoT Cloud

- OMA LWM2M implementation in Java built on top of Eclipse Californium (CoAP)
- Manage software upgrade campaigns independently of the actual DM protocol
Eclipse Hono provides a uniform API for interacting with millions of devices connected to the cloud via arbitrary protocols.

Example:
Eclipse Ditto

Mediator between IoT Devices and the state of their Digital Twins

Addresses core aspects of the “Digital Twin” metaphor to understand and manage industrial and consumer IoT scenarios by bringing back simplicity to IoT developers.

- Finding and selecting sets of Digital Twins
- Search on meta data and state data
- Device-as-a-Service
- Higher level API to work with individual devices
- Organize Digital Twin Populations
- Differ between reported and desired state of devices
- Support for synchronization and publishing of state changes
- Digital Twin State Management
Eclipse Vorto

Vorto at a glance

Vorto

Device Manufacturer

IoT Tool Set

Meta Information Model

Platform Vendor

Platform specific Code Generator

Solution Developer

Information Model Repository

Device

Java

C++
80 teams

$20K+ in prizes

http://iot.eclipse.org/open-iot-challenge
Virtual IoT Meetup

- Bi-weekly webinars with IoT experts
- 1,200 members

http://www.meetup.com/Virtual-IoT
March 21 - 23, 2017
San Jose Convention Center
Devoxx US 2017 Highlights
MARCH 21-23, 2017
SAN JOSE CONVENTION CENTER

• 200+ TECHNICAL TALKS
• 1000+ ATTENDEES EXPECTED
• CALL FOR PAPERS OPEN NOW - CLOSES OCTOBER 11
• STEPHAN JANSSEN IS PROGRAM CHAIR
• SIGNIFICANT COMMUNITY INVOLVEMENT – SILICON VALLEY JUG, SF JUG, ...
• PLANS INCLUDE DEVOXX4KIDS, COMMUNITY DAY, HACKERGARTEN

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Thank you!

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