Oliot
Open Language for Internet of Things

CnO 2015
CLOUD & OSS Conference,2015

CLOUD&OSS Conference,2015 CLOUD OSS

GS1 EPCglobal

AUTO ID LABS

→ IoT 생태계 실현을 위한 오픈소스 기술과 전략 그리고 Oliot Open Source Project

Daeyoung Kim

May 13, 2015

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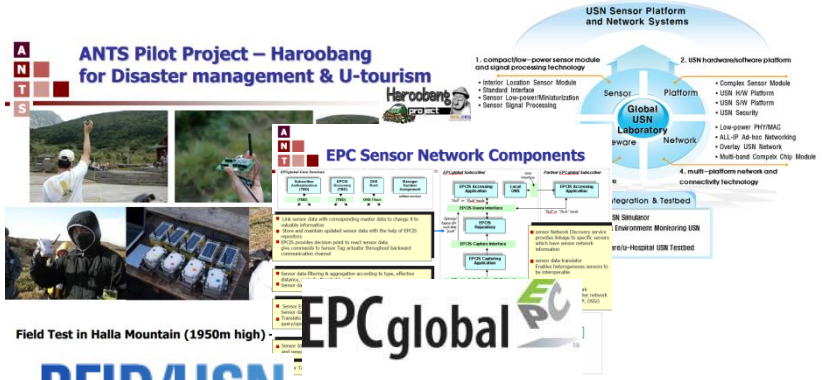
센터장, 사물인터넷 연구센터, KAIST

Professor, School of Computing, KAIST

- kimd@kaist.ac.kr, http://oliot.org, http://autoidlab.kaist.ac.kr, http://resl.kaist.ac.kr http://autoidlabs.org http://gs1.org

Experiences in RFID, Wireless Sensor Networks and Internet of Things



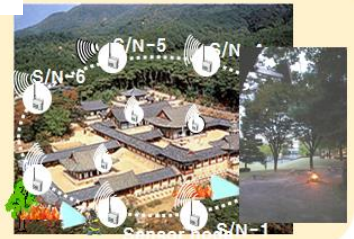
WSN · ANTS · RFID/USN · mc · SNAIL Sensor Networks for All Ip worLd · IERC European Research Cluster on the Internet of Things · IoT6 · Oliot Open Language for Internet of Things

1998 1999 2002 2003 2004 2005 2006 2007 2008 2009 2011 2013 2014

UF University of Florida · KAIST · SAMSUNG ADVANCED INSTITUTE OF TECHNOLOGY · AUTO-ID LABS · 과학기술부 국가지정연구실 National Research Lab. · MOTOROLA · iTRC 대학정보통신 연구센터협의회

Greenhouse Monitorin · SAMSUNG

Fire Monitoring (2006)



Flood Monitoring / Disaster Management (2007)

School Zone / ITS Applications (2008-2009)

KAIST

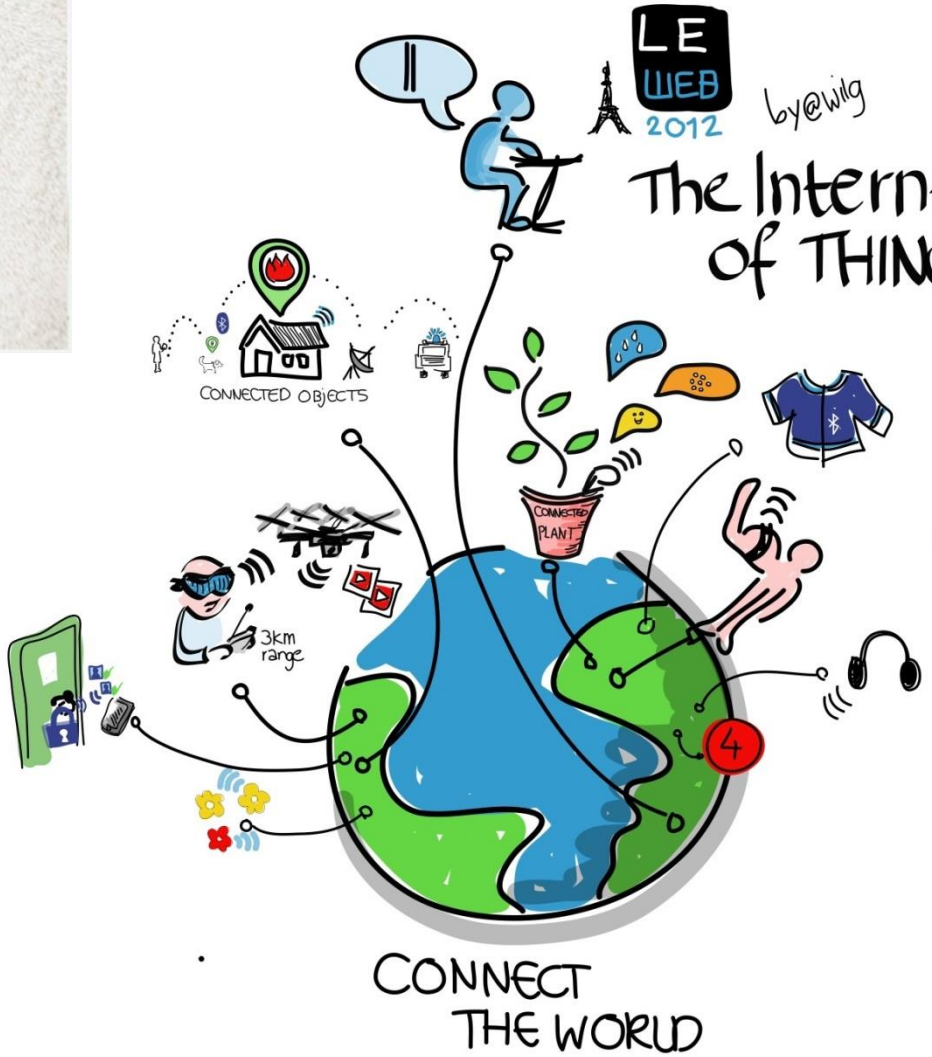
IoT research groups at KAIST

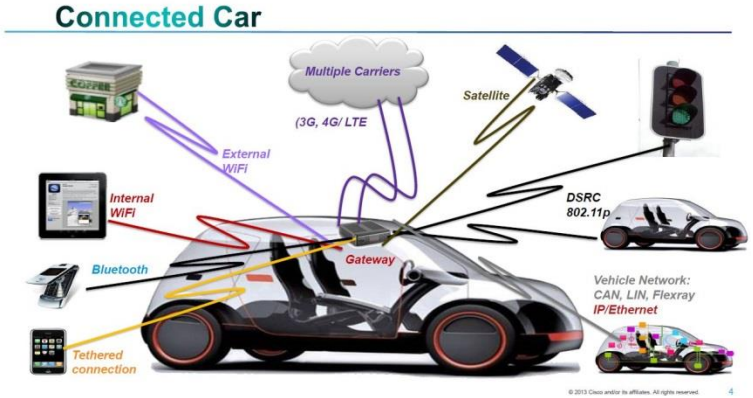
- **Auto-ID Labs, KAIST**
  - A leading global network of academic research laboratories in the field of RFID and IoT
  - Research Projects
    - Oliot: GS1 based IoT Platform
    - SNAIL: lightweight IPv6 (6LoWPAN) stack
    - SeaHaven: Visual IoT Platform
    - iGAP: IoT GPGPU Analytics Platform
  - Members
    - Prof. Daeyoung Kim
    - 1 Post Doctor, 13 Ph.D Students and 6 Master Students
    - >60 alumni in universities, companies, and research institute
  - http://autoidlab.kaist.ac.kr
  - http://resl.kaist.ac.kr

- **IoT Research Center in KI (KAIST Institute)**
  - IoT Research Center in KI is one of research organizations in KAIST, conducting interdisciplinary and integrated research to create Korea's new growth engine
  - Research Fields of IoT Research Center
    - Future device
    - Future communications
    - Vehicle/Construction-IT convergence
    - Knowledge Convergence
  - Members: Prof. Daeyoung Kim, 12, including research professors, senior researchers, and researchers
  - http://itc.kaist.ac.kr/xe/

(사물) 인터넷 [Internet of Things] 이란?

AUTO ID LABS



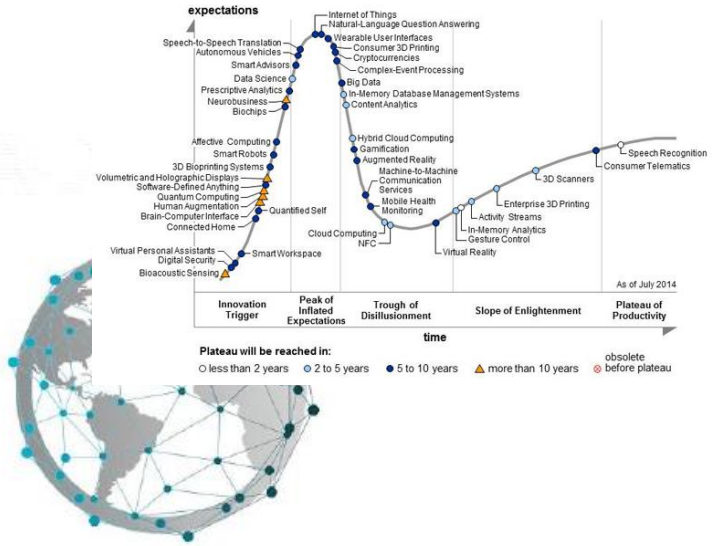


KAIST

Oliot
Open Language for Internet of Things

사물인터넷의 파~급~~효~~~과~~~~

AUTO ID LABS



PC

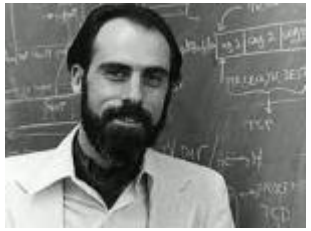
Internet

Mobile

Internet of Things

focus

A.I. ARTIFICIAL INTELLIGENCE



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IBM

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Open Language for Internet of Things

사물 인터넷 사회

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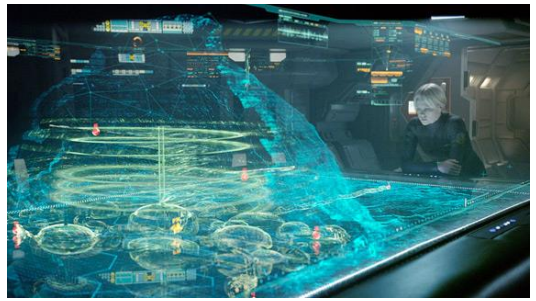


KAIST

Libelium Smart World

Air Pollution
Control of CO_2 emissions of factories, pollution emitted by cars and toxic gases generated in farms.

Forest Fire Detection
Monitoring of combustion gases and preemptive fire conditions to define alert zones.

Wine Quality Enhancing
Monitoring soil moisture and trunk diameter in vineyards to control the amount of sugar in grapes and grapevine health.

Offspring Care
Control of growing conditions of the offspring in animal farms to ensure its survival and health.

Sportsmen Care
Vital signs monitoring in high performance centers and fields.

Structural Health
Monitoring of vibrations and material conditions in buildings, bridges and historical monuments.

Quality of Shipment Conditions
Monitoring of vibrations, strokes, container openings or cold chain maintenance for insurance purposes.

Smartphones Detection
Detect iPhone and Android devices and in general any device which works with Wifi or Bluetooth interfaces.

Perimeter Access Control
Access control to restricted areas and detection of people in non-authorized areas.

Radiation Levels
Distributed measurement of radiation levels in nuclear power stations surroundings to generate leakage alerts.

Electromagnetic Levels
Measurement of the energy radiated by cell stations and and WiFi routers.

Traffic Congestion
Monitoring of vehicles and pedestrian affluence to optimize driving and walking routes.

Water Quality
Study of water suitability in rivers and the sea for fauna and eligibility for drinkable use.

Golf Courses
Selective irrigation in dry zones to reduce the water resources required in the green.

Smart Parking
Monitoring of parking spaces availability in the city.

Waste Management
Detection of rubbish levels in containers to optimize the trash collection routes.

Smart Roads
Warning messages and diversions according to climate conditions and unexpected events like accidents or traffic jams.

Smart Lighting
Intelligent and weather adaptive lighting in street lights.

Intelligent Shopping
Getting advices in the point of sale according to customer habits, preferences, presence of allergic components for them or expiring dates.

Noise Urban Maps
Sound monitoring in bar areas and centric zones in real time.

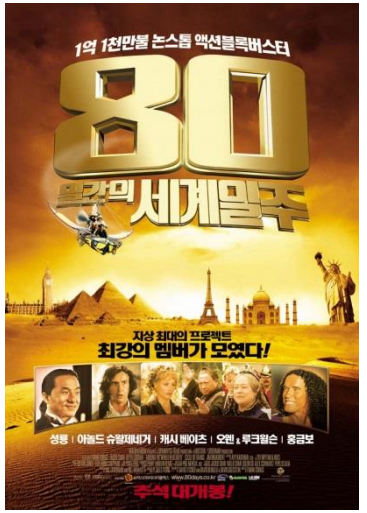
Water Leakages
Detection of liquid presence outside tanks and pressure variations along pipes.

Vehicle Auto-diagnosis
Information collection from CanBus to send real time alarms to emergencies or provide advice to drivers.

Item Location
Search of individual items in big surfaces like warehouses or harbours.

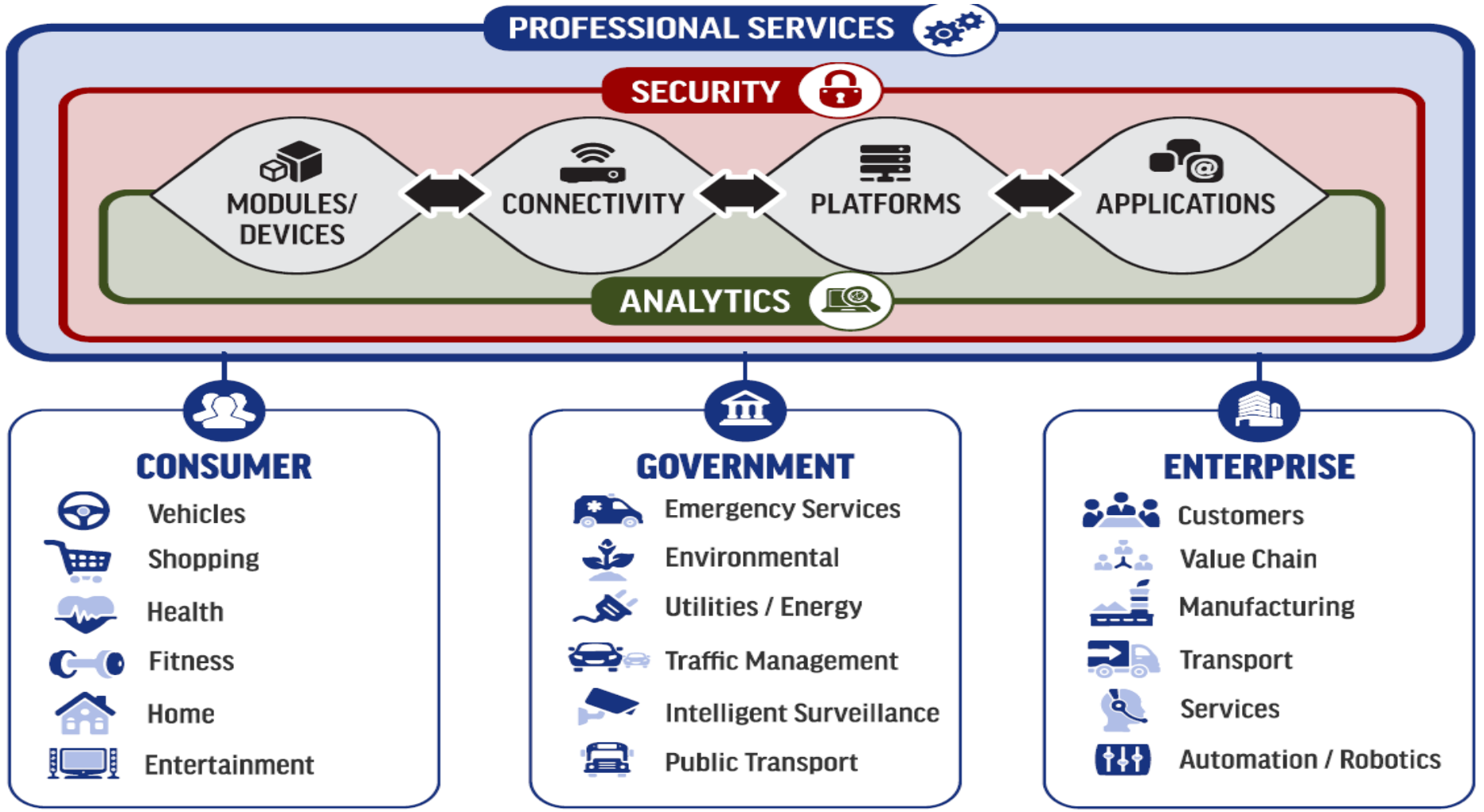
libelium
www.libelium.com

Passepartout



Oliot
Open Language for Internet of Things

사물 인터넷 생태계를 이루는 요소들



Source: IDC Worldwide IoT Market Forecast, May 2014

Hot 한 사물인터넷 표준과 기술들

AUTO ID LABS

ZigBee
Control your world

OPEN INTERCONNECT CONSORTIUM SM

HealthKit HomeKit

GS1 The global language of business

oneM2M

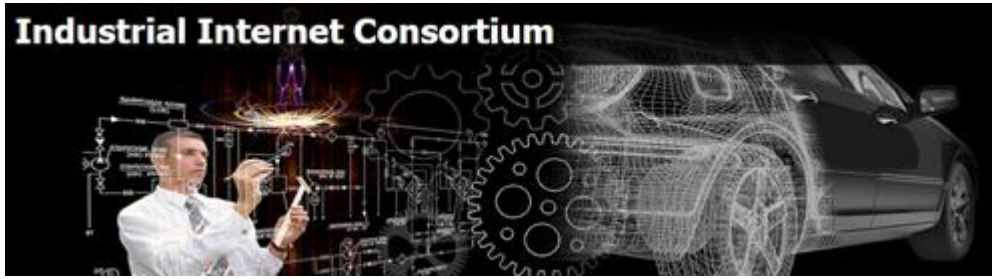
6LoWPAN
IPv6-based Low-power Wireless Personal Area Network

ALLSEEN ALLIANCE

http://m2m.eclipse.org

Google Fit

industrial internet CONSORTIUM



THREAD GROUP

ARM mbed

KAIST

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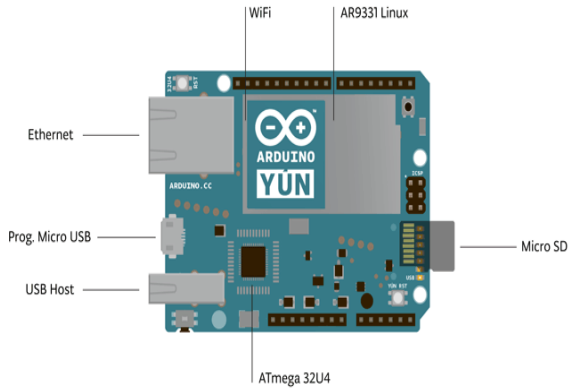
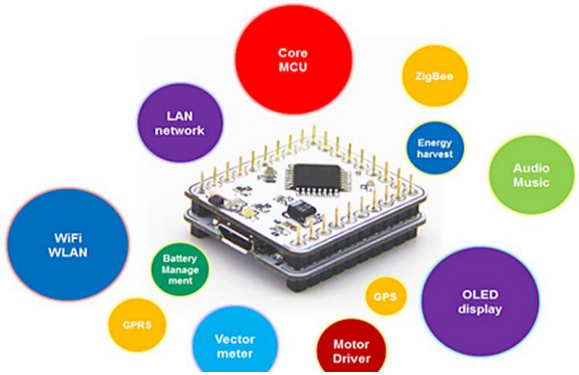
Open Language for Internet of Things

IoT 오픈소스 – 하드웨어

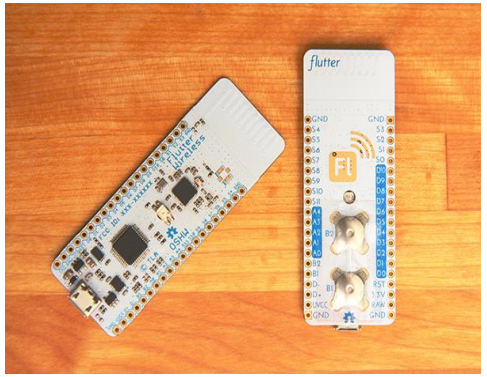
http://www.arduino.cc/en/Main/ArduinoBoardYun?from=Main.ArduinoYUN



http://beagleboard.org/

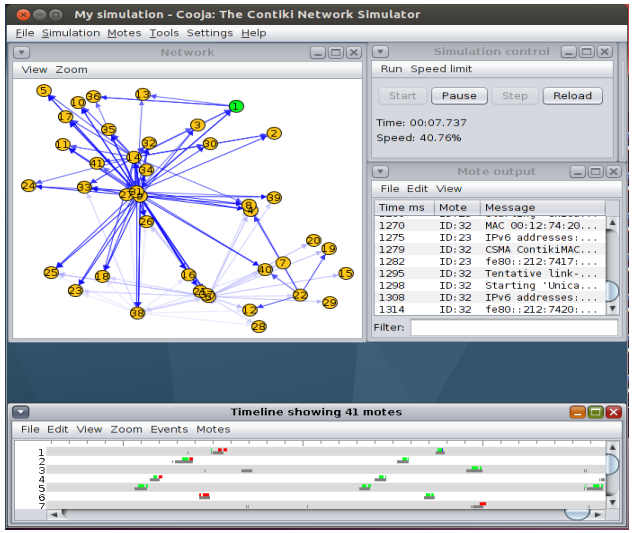


https://www.microduino.cc/

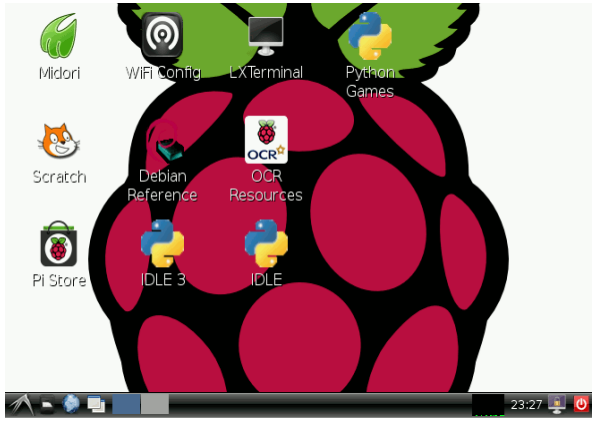


http://www.flutterwireless.com/

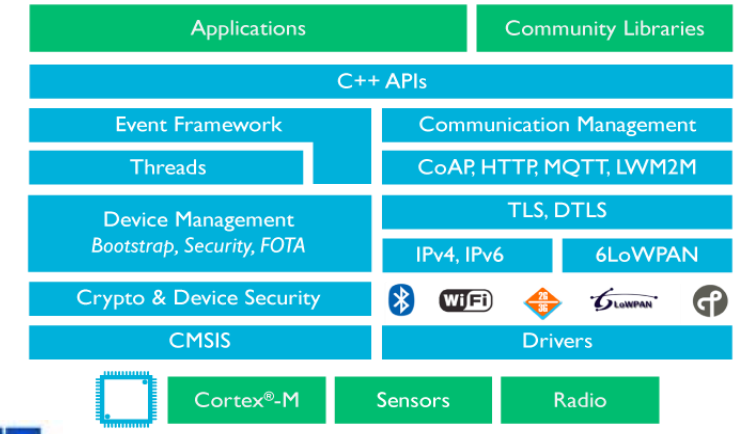
IoT 오픈소스 – 운영체제



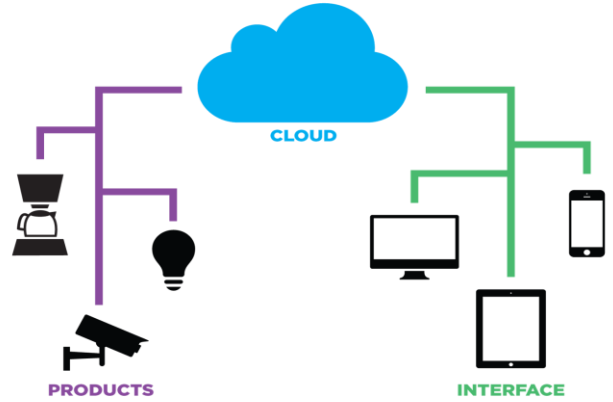
http://www.contiki-os.org/



http://raspbian.org/

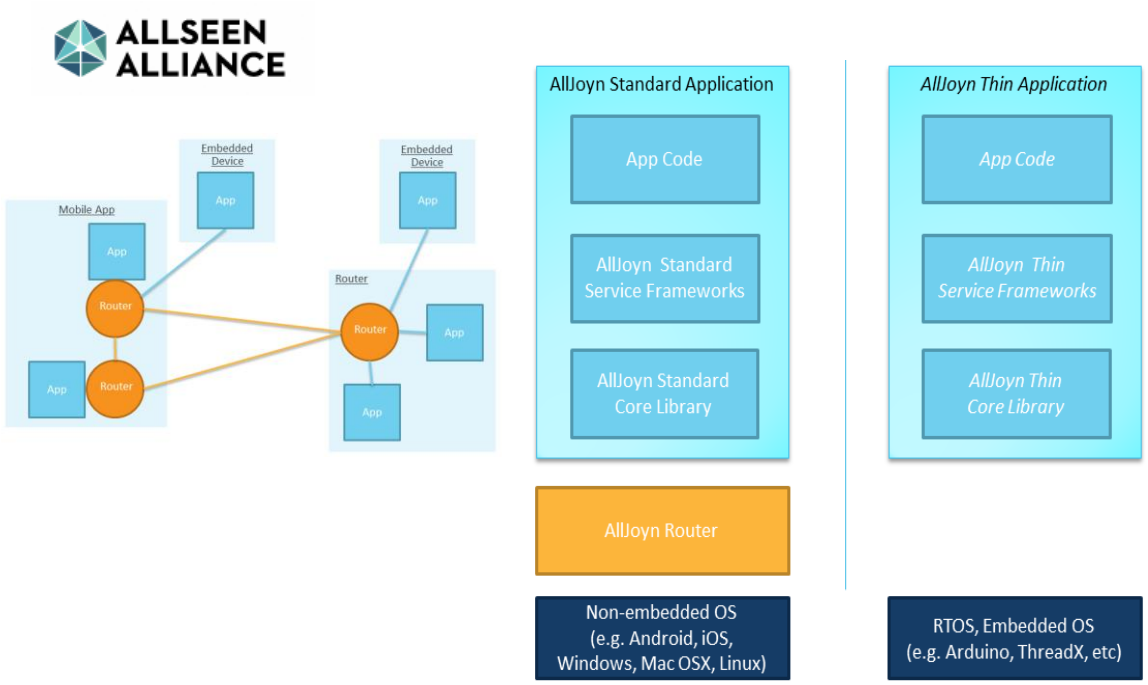


https://mbed.org/

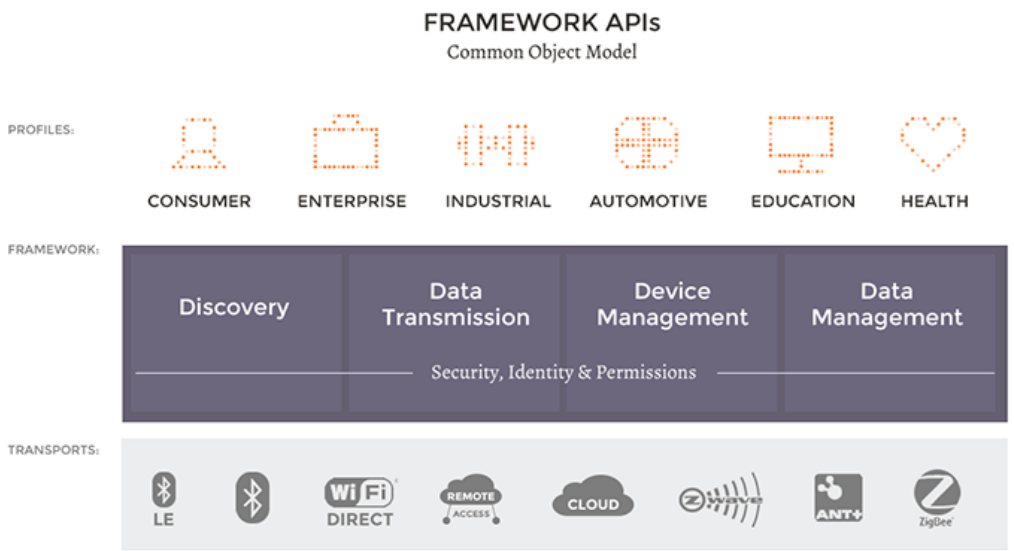


https://www.spark.io/

IoT 오픈소스 – 미들웨어 / 프레임워

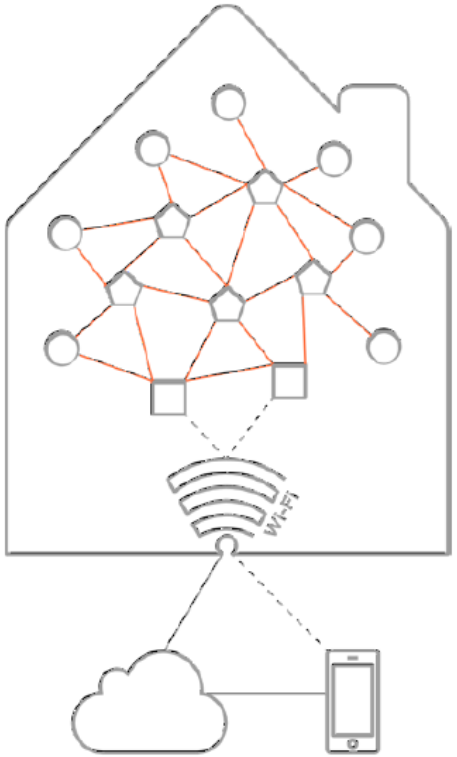


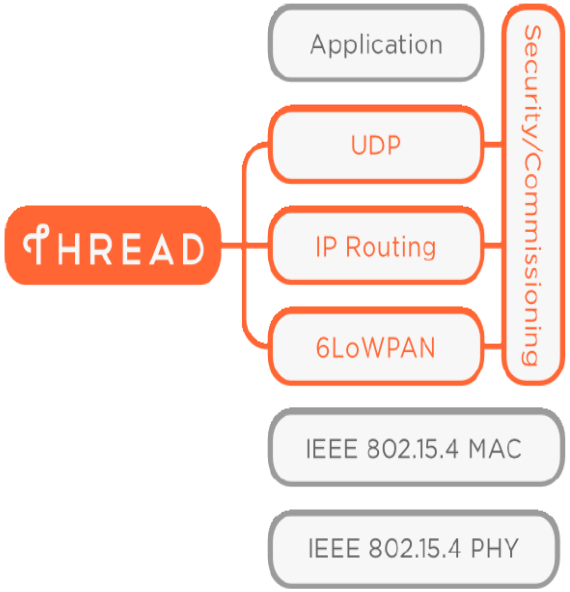
https://allseenalliance.org/

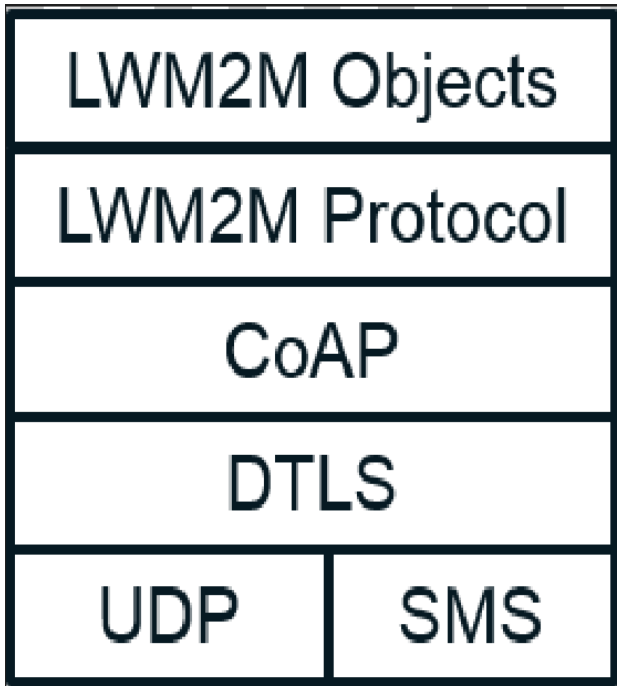


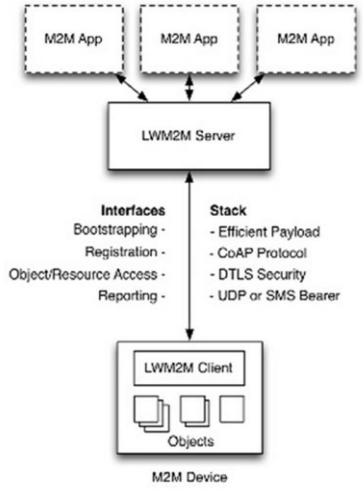
https://www.iotivity.org/

IoT 오픈소스 – 네트워크









http://threadgroup.org/

http://technical.openmobilealliance.org/Technical/technical-information/omna/lightweight-m2m-lwm2m-object-registry

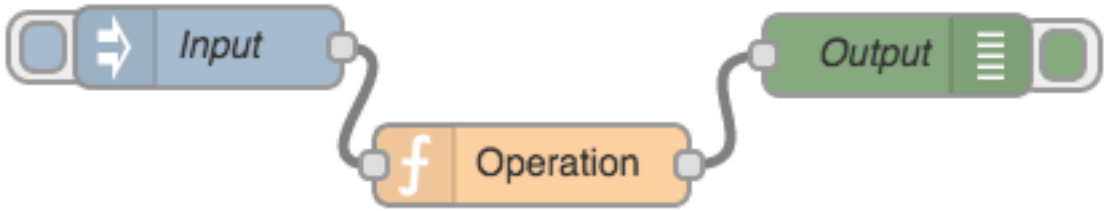
IoT 오픈소스 – 개발환경

AUTO ID LABS

iot eclipse.org

http://iot.eclipse.org/

Node-RED



http://nodered.org/

Oliot

사물인터넷에 다가가기 위한 전략

AUTO ID LABS

오픈 테스트베드

oneM2M

LoWPAN
IPv6-based Low-power Wireless Personal Area Network

http://m2m.eclipse.org

GS1 The global language of business

OPEN INTERCONNECT CONSORTIUM℠

OPEN INTERCONNECT CONSORTIUM℠

ALLSEEN ALLIANCE

HealthKit HomeKit

industrial internet CONSORTIUM

THREAD GROUP

GS1 The global language of business

oneM2M

SK telecom

kt

선택과 집중

Google Fit

ARM mbed

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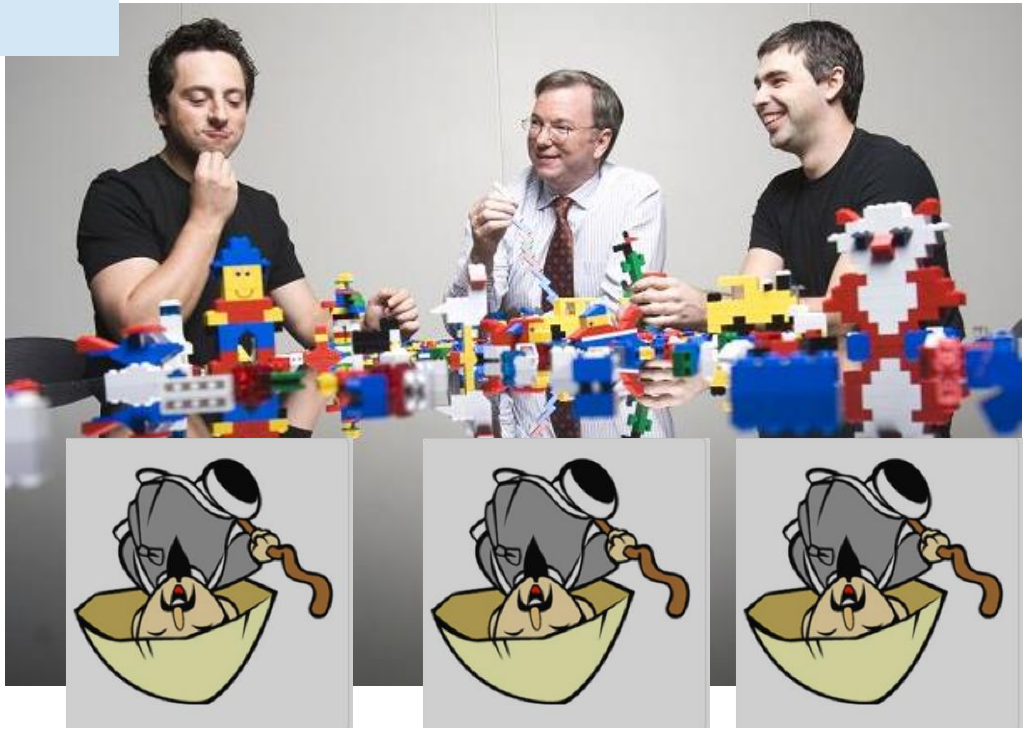
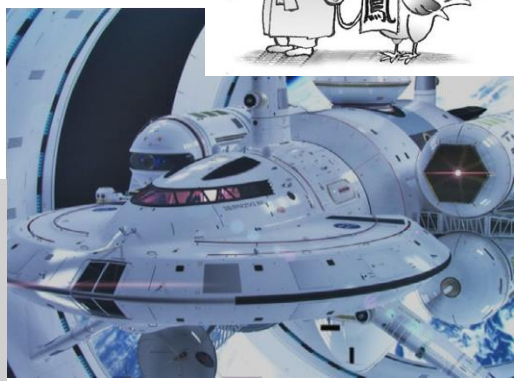
Open Language for Internet of Things

KAIST

사물인터넷에 다가가기 위한 나의 길? (대로,오솔길?)

봉이(鳳伊)





GS1 (International Non Profit Organization)

GS1 The global language of business

In 1999, the Internet of Things" was first coined by *Kevin Ashton* who cofounded the Auto-ID Center(Labs) at the MIT

AUTO-ID LABS

GS1 40 YEARS 1973 2013

GS1 The global language of business

OVERALL BENEFIT: Improving efficiency & visibility in supply and demand chains

GS1 SOLUTIONS & SERVICES USING GS1 STANDARDS
Solutions: POS / Inventory Management / Asset Management / Collaborative Planning / Traceability
Services: Global (GSMP, GEPIR, Global Registry, Training and Accreditation) & Local (e.g. Certification, Implementation, Training)

GS1 System - Integrated system of standards

GS1 BarCodes	GS1 eCom	GS1 GDSN	EPCglobal (Powered by GS1)
Global standards for automatic identification	Global standards for electronic business messaging	The environment for global data synchronisation	Global standards for RFID-based identification
Rapid and accurate, item, asset or location identification	Rapid, efficient & accurate business data exchange	Standardised, reliable data for effective business transactions	More accurate, immediate and cost-effective visibility of information

GS1 Identification Keys (e.g. GTIN, GLN, SSCC, GRAI, GIAI, GSRN, EPC) & Attribute Data (e.g. Best Before Date)

111 Member Organisations . . .
in 155 Countries . . .
with over 2,000,000 Members.

KAIST

Oliot Open Language for Internet of Things

Auto-ID Labs

- The Auto-ID Labs are an independent network of currently six academic research labs that research and develop new technologies for revolutionizing global commerce and providing previously un-realizable consumer benefits.

http://autoidlabs.org

AUTO-ID CENTER

Partnership between 100 global firms, including founders:
- Uniform Code Council
- EAN International
- Procter and Gamble
- Gillette

EPCglobal

Global:
- Standards Development
- Adoption
- Brand Management and Marketing
- Policies (Privacy, Intellectual Property)

EPCglobal US

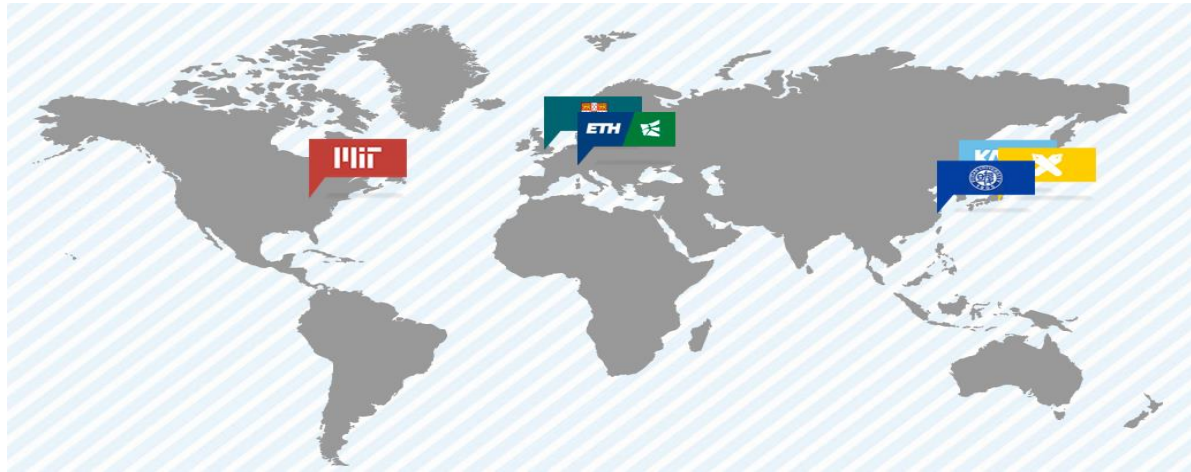
Local:
- Market Development
- Implementation Support
- Member Communication
- Member Support
- Training and Education

AUTO-ID LABS — Continued Research

Research Partner

GS1 The global language of business

Research → Commercialization



RESEARCH DIRECTORS

Business Processes and Applications	Massachusetts Institute of Technology, KAIST, Keio University, University of Cambridge, ETH Eidgenössische Technische Hochschule Zürich, University of St.Gallen
Software and Network	Massachusetts Institute of Technology, Keio University, KAIST
Hardware	Massachusetts Institute of Technology, KAIST, Fudan University

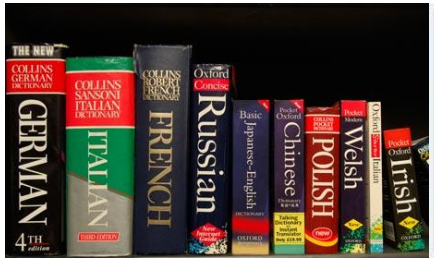
GS1 Philosophy and Internet of Things

The global language of ~~business~~

Humans and things

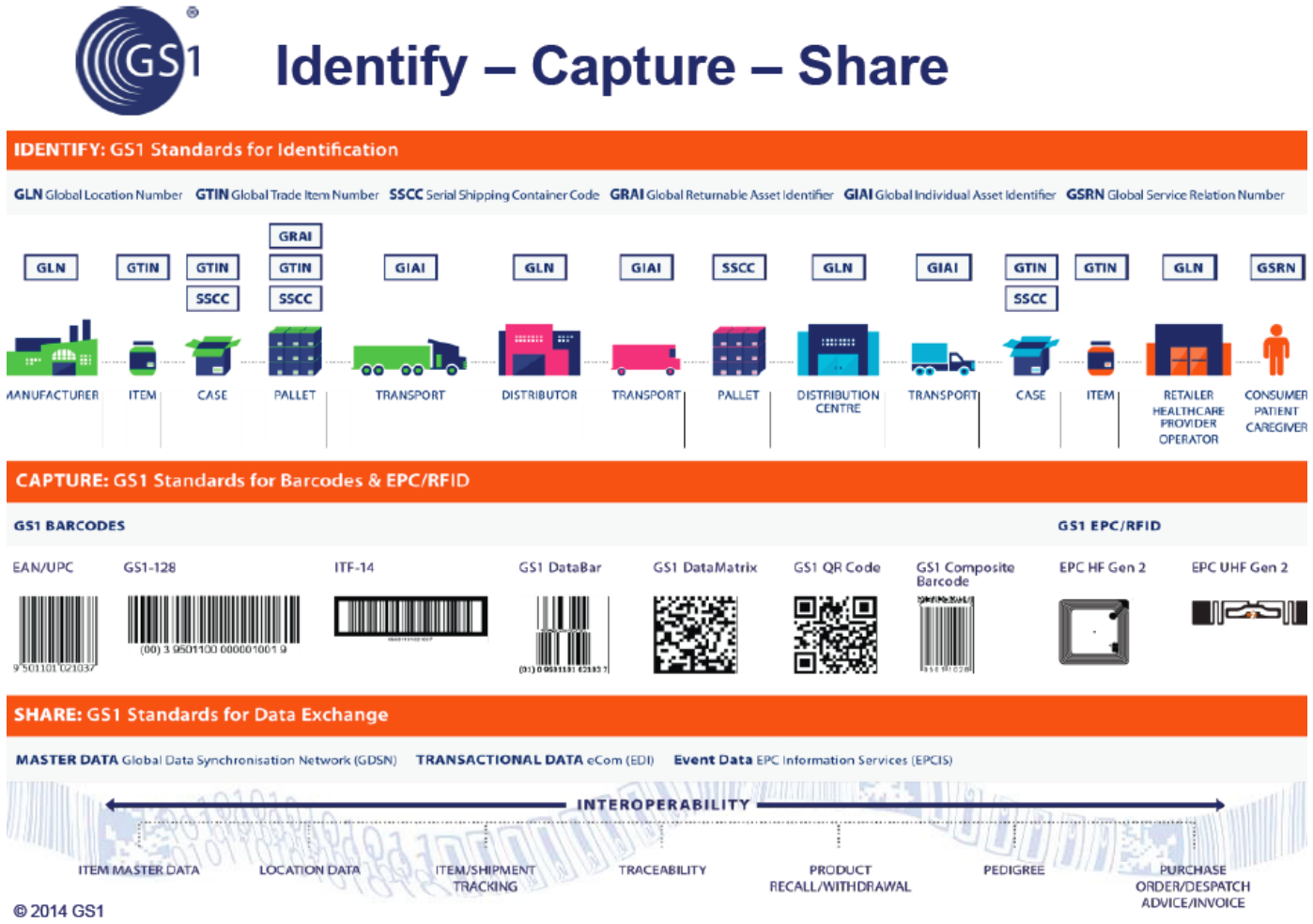
One Universal Language

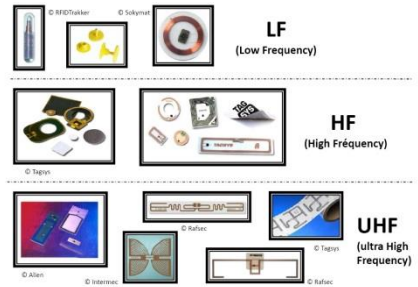
my opinion...

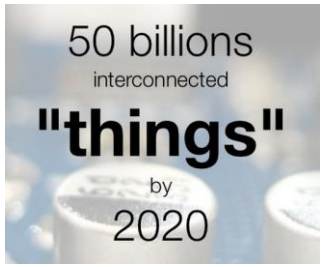


We remodel GS1 Architecture for IoT

AUTO ID LABS







OPEN INTERCONNECT CONSORTIUM℠

AllJoyn™

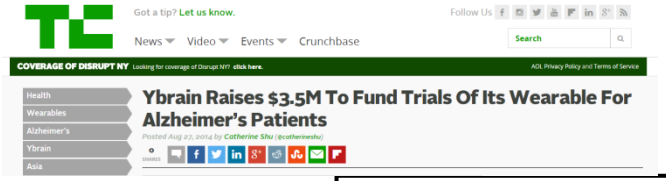
THREAD GROUP

oneM2M

oma Open Mobile Alliance For a Connected World

Oliot Open Language for Internet of Things

사물 생애 주기 관리를 통한 IoT 서비스



Yband

A nerve-stimulating headband as a medical device for AD and MCI treatments.

Oliot

Manufacturer EPC
(Device) Information service (EPCIS)

Device information (e.g., meta data, part/ component, test data)

Device log service

Device Log analysis

Device Log collector

UDI

Test automation application (TAA)

Manufacturing Sup port Application (MSA)

YBrain application

YBrain Mobile SDK

Production stage

After production

PCB test

Final test

UDI assignment

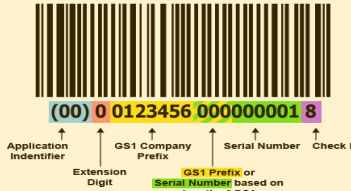
device usage log

system log

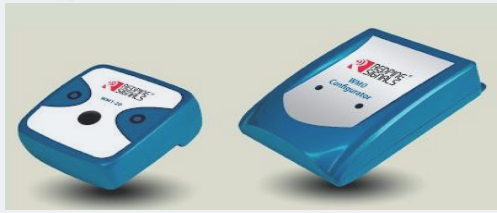
KAIST

Oliot
Open Language for Internet of Things

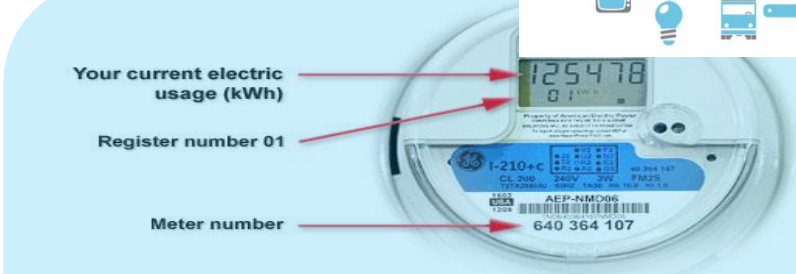
What are things?, but not limited

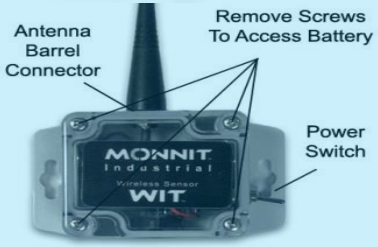


Passive Things



Active Things

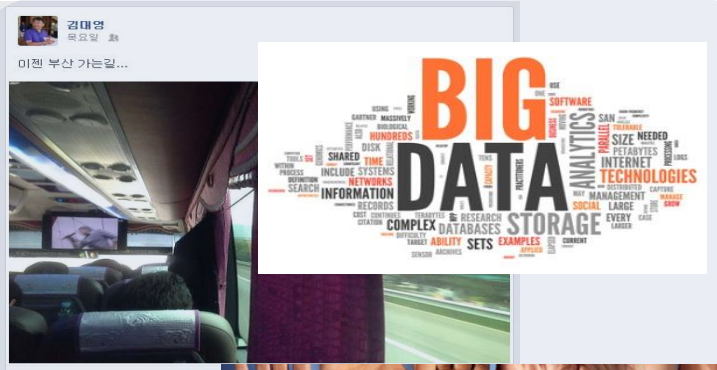




Wireless Sensors/Actuators

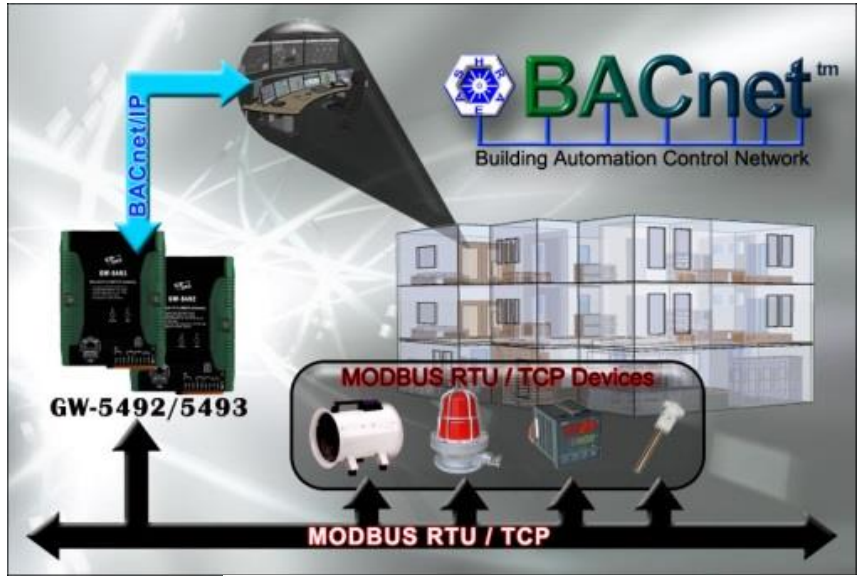
Smart Devices

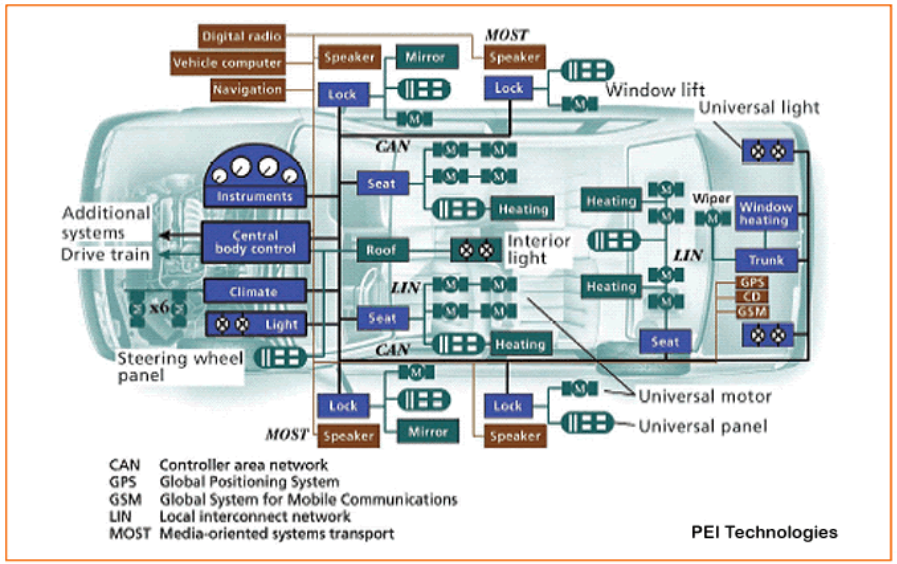
Consumer Electronics



KAIST

What are things?, but not limited





My Vision as a GS1 research partner

AUTO ID LABS

GS1

Oliot
Open Language for Internet of Things

Any third party Application/service

KAIST

Oliot
Open Language for Internet of Things

What Oliot stands for?

AUTO ID LABS

Finnish [edit]

(index ol)

Etymology [edit]

olla (*to exist*) + *-io*

Noun [edit]

olio

1. creature, being, thing
2. (*philosophy*) object
3. (*programming*) object

oliot

Finnish [edit]

Noun [edit]

oliot

1. *plural form of* **olio**

English [edit]

Etymology [edit]

From Spanish *olla* or Portuguese *olha*, both from Latin *olla* ("pot, jar").[1]

Noun [edit]

olio

1. A rich, thick, Spanish stew consisting of meat and vegetables.
2. A mixture or medley, a hotchpotch.
3. A collection of various musical, theatrical or other artistic works; a miscellany.
4. By extension of the above, Vaudeville or similar miscellaneous musical or theatrical entertainment skits presented between the main acts of minstrel or burlesque shows.

[transparent]

[white]

KAIST

Oliot

GS1/EPCglobal Standards
GS1 Keys

AUTO ID LABS

- GS1 Identification Keys (현재)
  - URI-convertible ID (GTIN, GLN, SSCC, GRAI, etc)
    - e.g., *urn:epc:id:sgtin:0614141.112345.400*

Companies
- GS1 Company Prefix
- Global Location Number (GLN)
- Electronic Product Code (EPC) Manager Number

Product
- Global Trade Item Number (GTIN)
- Serialized Global Trade Item Number (SGTIN)

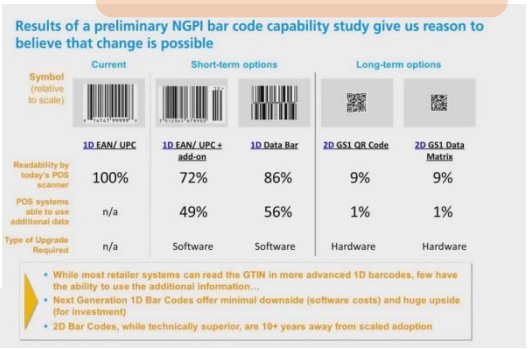
Services
- Global Service Relation Number (GSRN)
- Global Document Type Identifier (GDTI)

Location
- Global Location Number (GLN)
- Serialized Global Trade Item Number (SGTIN)

Pack, Case, Pallet
- Global Trade Item Number (GTIN)
- Serialized Global Trade Item Number (SGTIN)
- Serial Shipping Container Code (SSCC)

Assets
- Global Individual Asset Identifier (GIAI)
- Global Returnable Asset Identifier (GRAI)

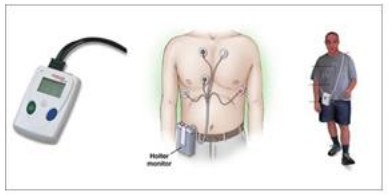
NGPI (표준화중)



IoT (표준선행연구)

Digital Coupon Management
(Serialized) Global Coupon Number (SGCN)

Component / Part Management
Component / Part Identifier (CPID)


ECG measurement device (GRAI)


Surgical tools (GIAI)


Membership ID (GSRN)

OPEN INTERCONNECT CONSORTIUM

KAIST

Oliot

GS1/EPCglobal Standards
Global Product Classification (GPC)

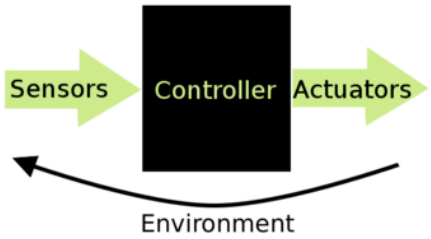
GPC Browser
The GPC browser allows you to browse all components (Segment, Family, Class, Brick and Attribute) of the current GPC schemas.

Language: English
Publication: GPC as at June 2014 (Latest publication)
Segment:
Family:
Class:
Search: Brick
Exact wording — Search

Expand All | Brick | Class | Family | Collapse All

- Segment: 70000000 - Arts/Crafts/Needlework
- Segment: 68000000 - Audio Visual/Photography
- Segment: 77000000 - Automotive
- Segment: 54000000 - Baby Care
- Segment: 53000000 - Beauty/Personal Care/Hygiene
- Segment: 83000000 - Building Products
- Segment: 74000000 - Camping
- Segment: 47000000 - Cleaning/Hygiene Products
- Segment: 67000000 - Clothing
- Segment: 66000000 - Communications
- Segment: 65000000 - Computing
- Segment: 58000000 - Cross Segment
- Segment: 78000000 - Electrical Supplies
- Segment: 50000000 - Food/Beverage/Tobacco
- Segment: 63000000 - Footwear
- Segment: 87000000 - Fuels/Gases
- Segment: 51000000 - Healthcare
- Segment: 72000000 - Home Appliances
  - Family: 72010000 - Major Domestic Appliances
    - Class: 72010600 - Kitchen Washing Appliances
    - Class: 72010300 - Major Cooking Appliances
    - Class: 72010500 - Major Laundry Appliances
    - Class: 72010700 - Major Water Dispensers
    - Class: 72010200 - Refrigerating/Freezing Appliances
      - Brick: 10003710 - Beverage Chillers Other
      - Brick: 10001940 - Coolers/Heaters
      - Brick: 10003698 - Freezers
      - Brick: 10001938 - Ice Makers
      - Brick: 10001941 - Refrigerating/Freezing Appliances Other
      - Brick: 10001942 - Refrigerating/Freezing Appliances Replac
      - Brick: 10003695 - Refrigerator/Freezers
      - Brick: 10003694 - Refrigerators

GPC for Smart Things?



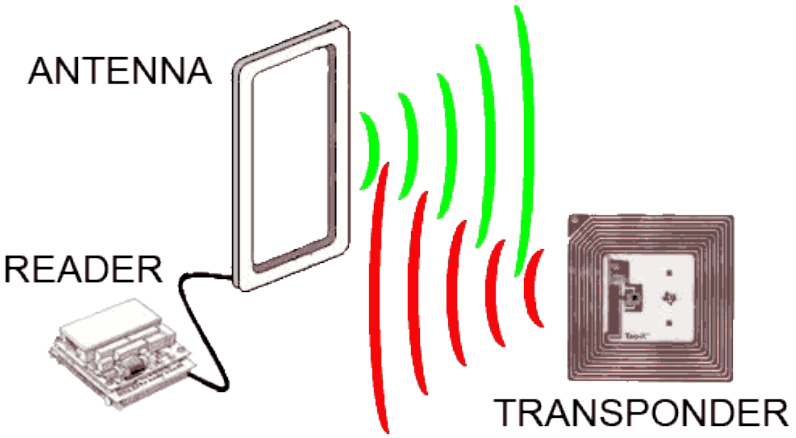
- Brick: 10003694 - Refrigerators
  - Definition: Includes any products that may be described/observed as an — Copy
  - Attribute: 20001529 - Energy Type
    - Definition: Indicates with reference to the product branding, labelling or — Copy
    - Value: 30008570 - ELECTRIC
    - Value: 30008571 - GAS
    - Value: 30002515 - UNCLASSIFIED
      - Definition: This term is used to describe those product attributes that are unable — Copy
    - Value: 30002518 - UNIDENTIFIED
      - Definition: This term is used to describe those product attributes that are — Copy
  - Attribute: 20001527 - Includes Built-in Ice Maker
    - Definition: Indicates with reference to the product branding, labelling or — Copy
    - Value: 30002960 - NO
    - Value: 30002515 - UNCLASSIFIED
      - Definition: This term is used to describe those product attributes that are unable — Copy
    - Value: 30002654 - YES
  - Attribute: 20001353 - Installation Type
    - Definition: Indicates, with reference to the product branding, labelling or — Copy
    - Value: 30007757 - BUILT-IN
    - Value: 30010514 - COUNTERTOP
    - Value: 30009198 - FREESTANDING
    - Value: 30009202 - INTEGRATED UNIT
    - Value: 30007608 - PORTABLE
      - Definition: This term is used to describe those products that the manufactures — Copy
    - Value: 30002515 - UNCLASSIFIED
      - Definition: This term is used to describe those product attributes that are unable — Copy
    - Value: 30002518 - UNIDENTIFIED
      - Definition: This term is used to describe those product attributes that are — Copy

http://www.gs1.org/1/productssolutions/gdsn/gpc/browser/index.html

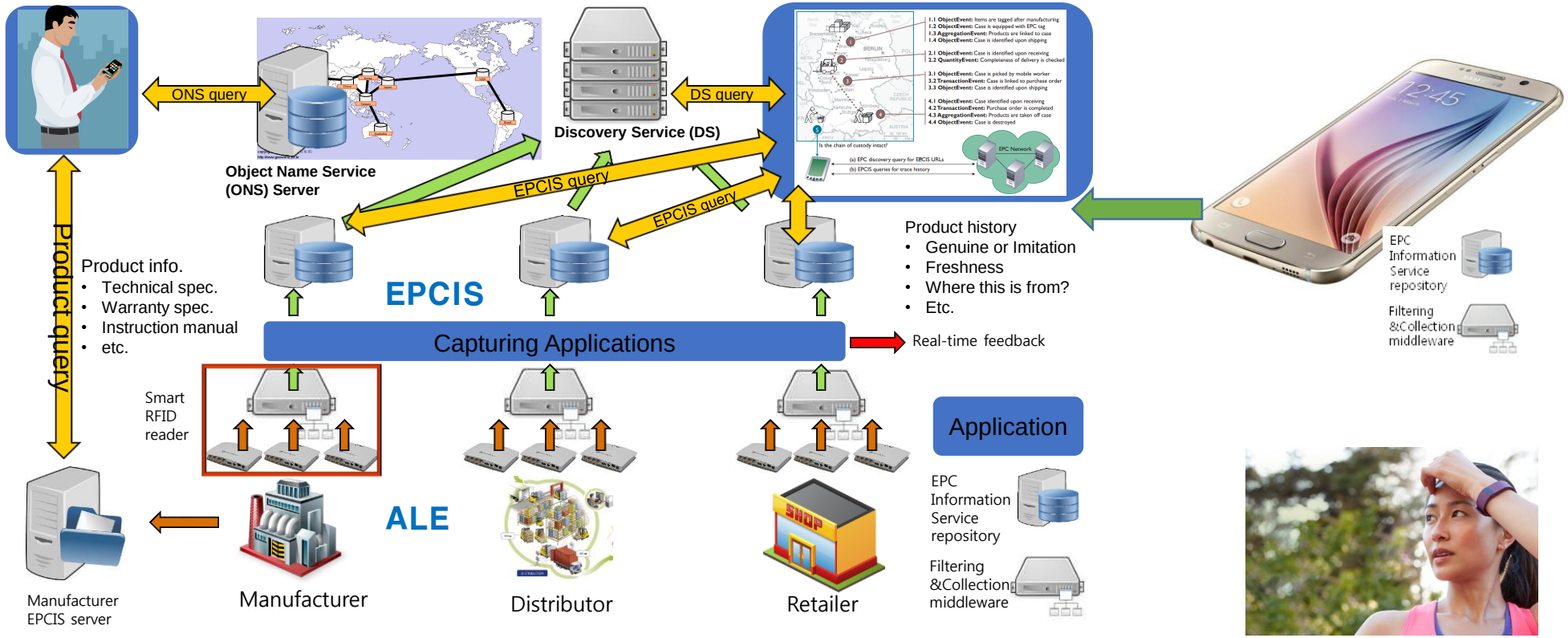
GS1/EPCglobal Standards
Electronic Product Code (EPC)

- EPC
  - universal identifier that provides a unique identity for any physical object

EPC Scheme	Tag Encodings	Corresponding GS1 Key	Typical Use
sgtin	sgtin-96 sgtin-198	GTIN key (plus added serial number)	Trade item
sscc	sscc-96	SSCC	Pallet load or other logistics unit load
sgln	sgln-96 sgln-195	GLN key (with or without additional extension)	Location
grai	grai-96 grai-170	GRAI (serial number mandatory)	Returnable/reusable asset
giai	giai-96 giai-202	GIAI	Fixed asset
gdti	gdti-96 gdti-113	GDTI (serial number mandatory)	Document
gsrn	gsrn-96	GSRN	Service relation (e.g., loyalty card)



GS1/EPCglobal Standards
GS1/EPCglobal Architectural Framework



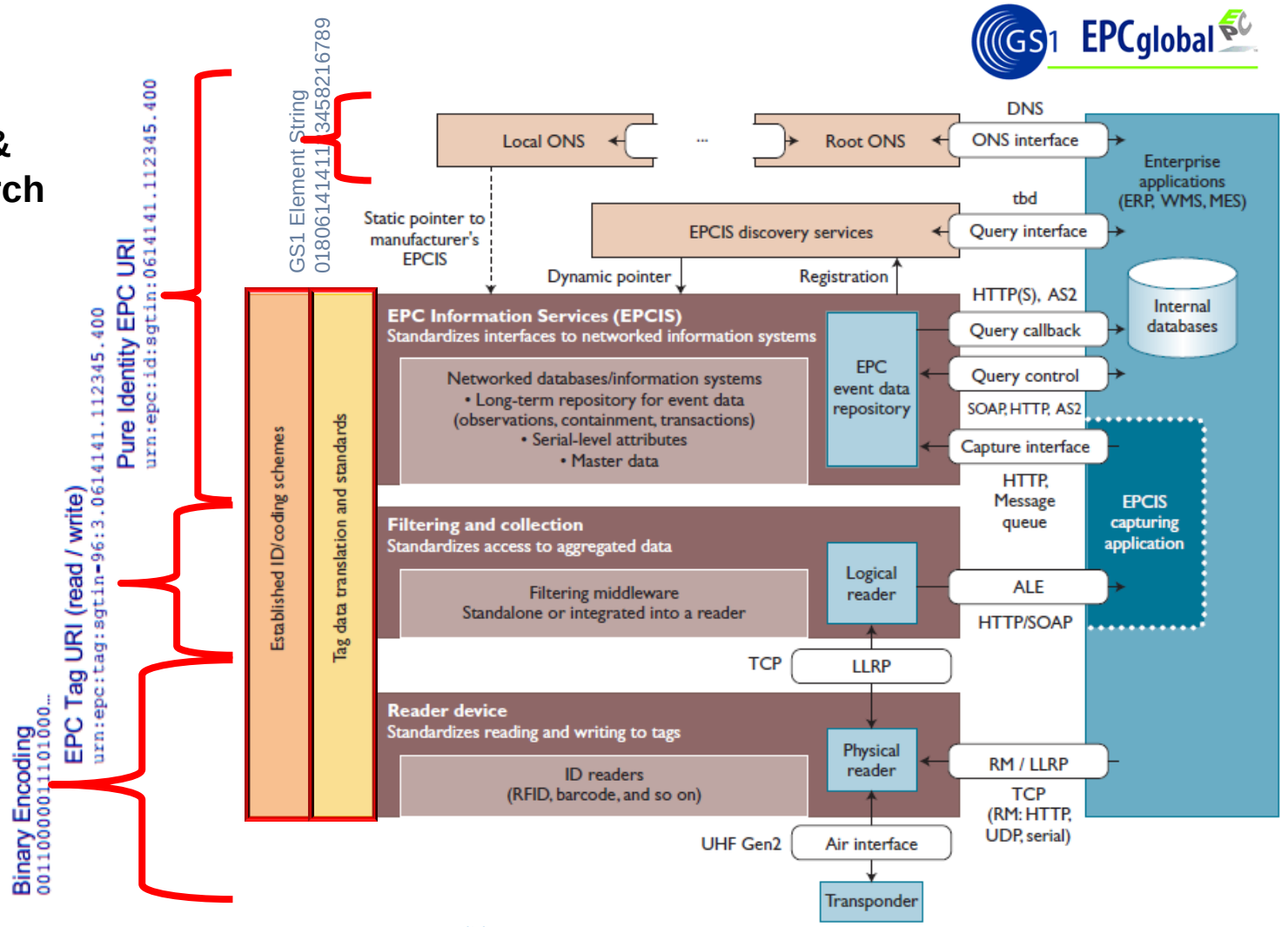
GS1/EPCglobal Standards
GS1/EPCglobal Architectural Framework

Item Discovery & Information search

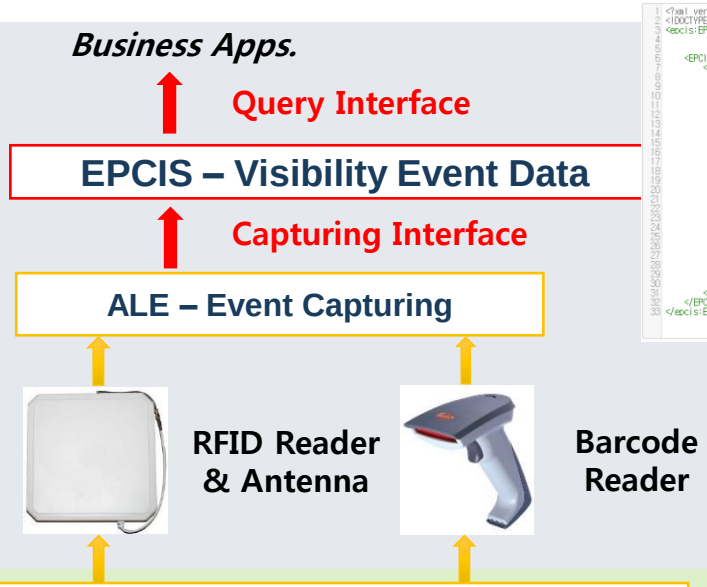
Data store and share

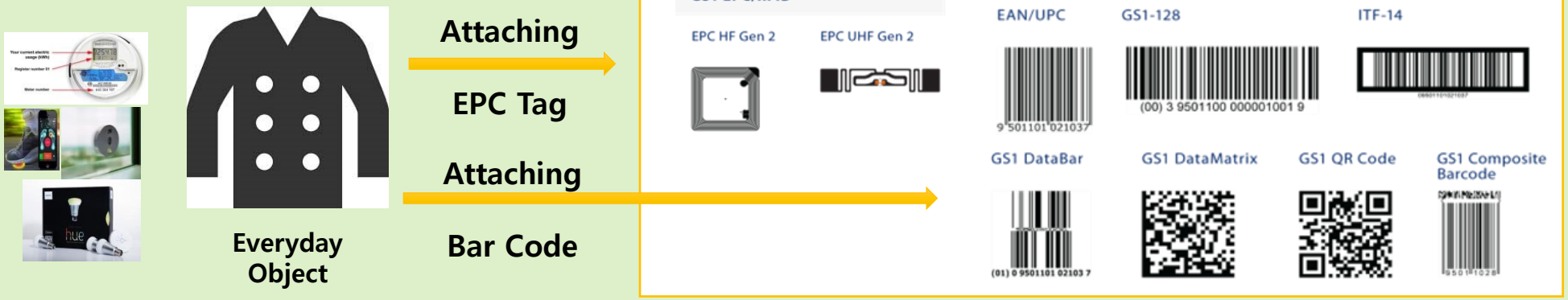
Data filtering & grouping

Identification & sensing

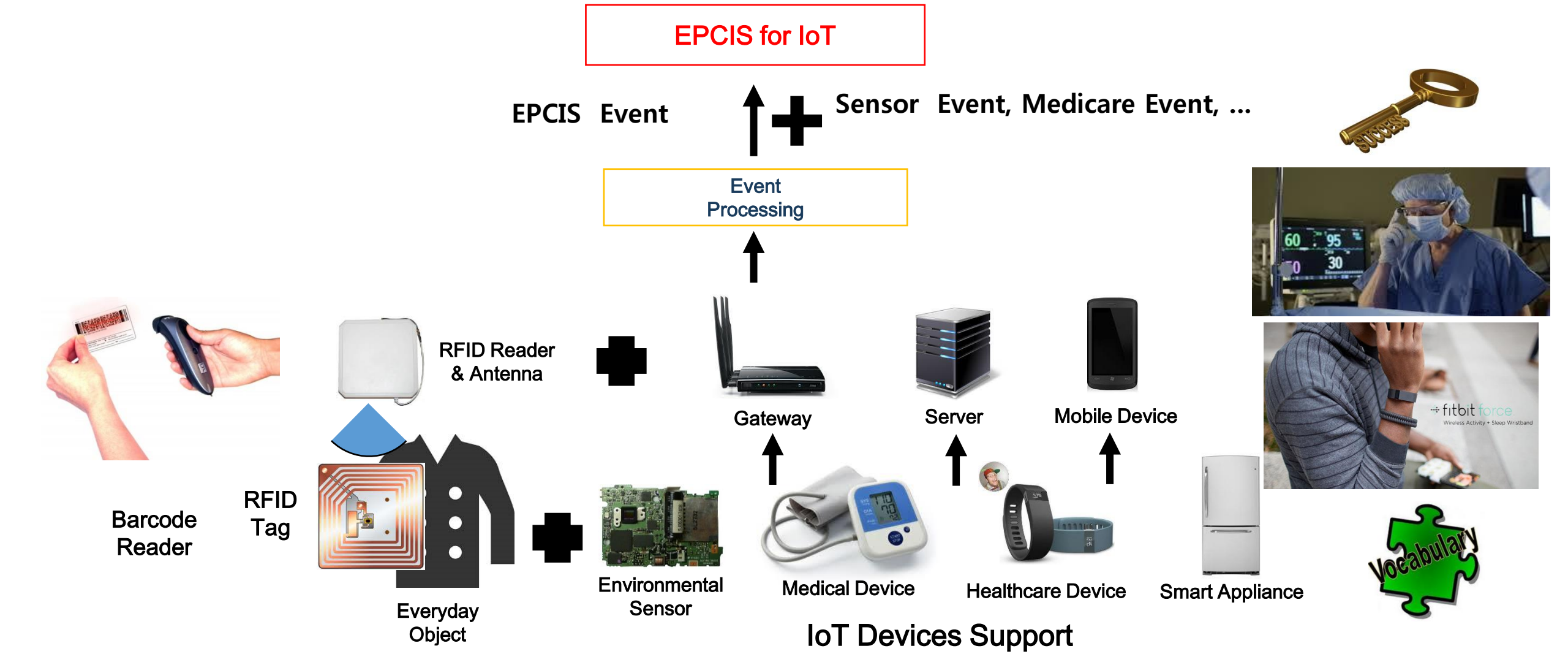


Eg.) Extending EPCIS (EPC Information Service) Internet of Things Global Data Repository

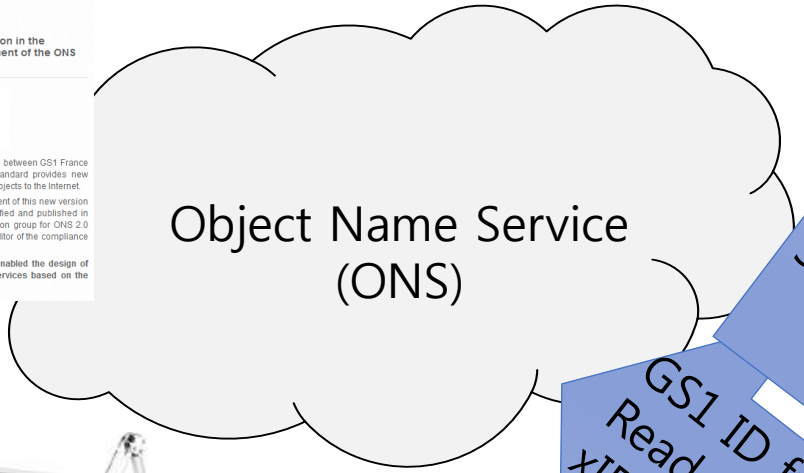


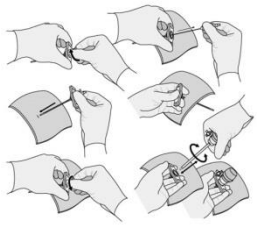


Eg.) Extending EPCIS (EPC Information Service) Internet of Things Global Data Repository



Eg.) Extending ONS (Object Naming Service) Internet of Things Service Discovery





Manual Service

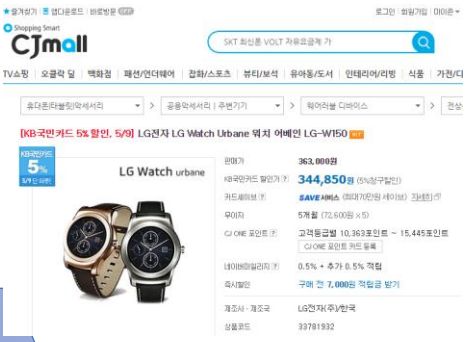
Service list

GS1 ID from Reader
xID from Smartphone

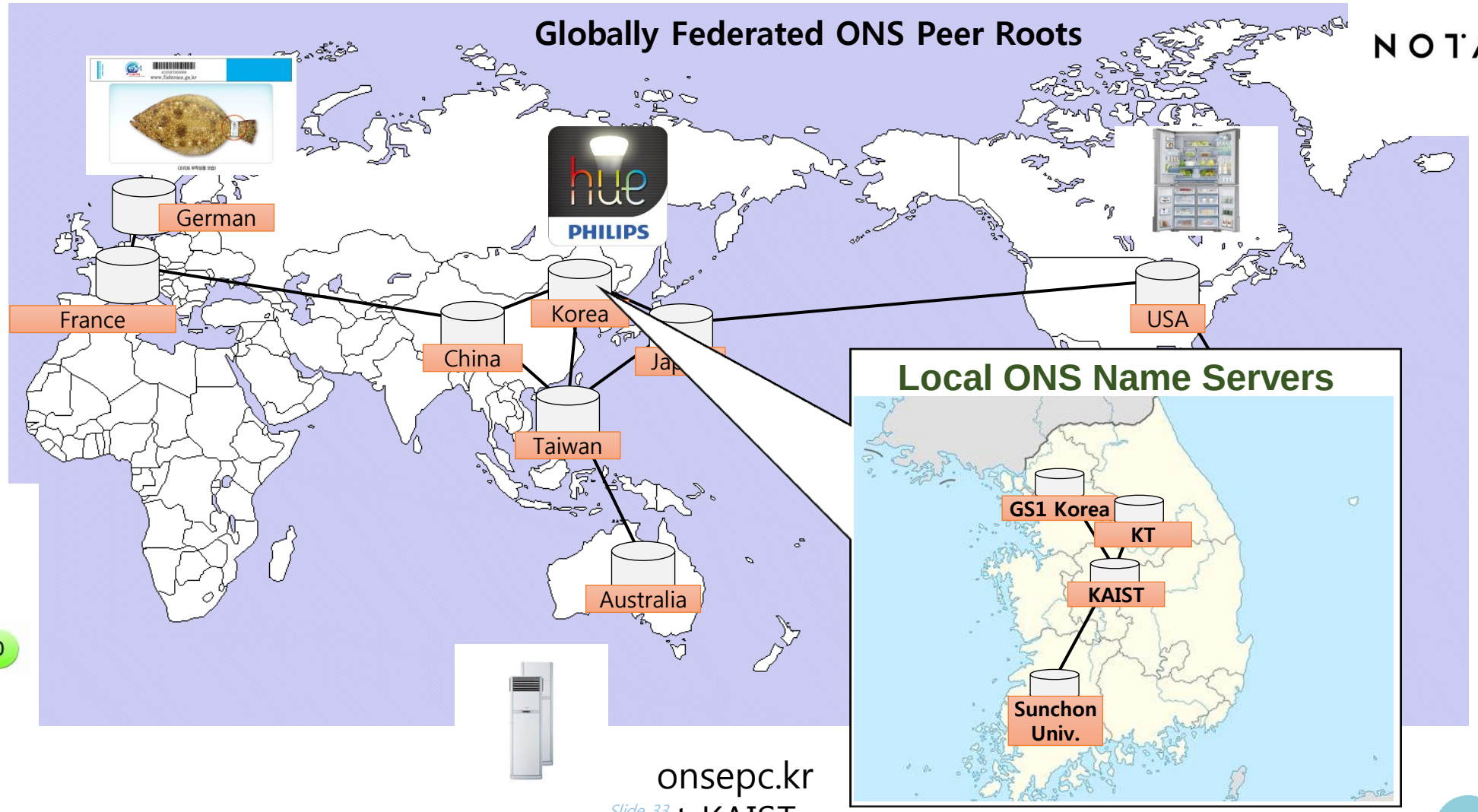
manual
shopping
epcis
...

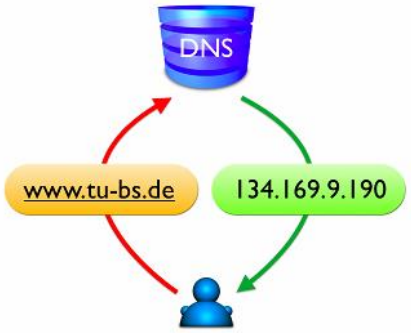
Service Access

Service Access



Testbed for Federated Object Naming Services

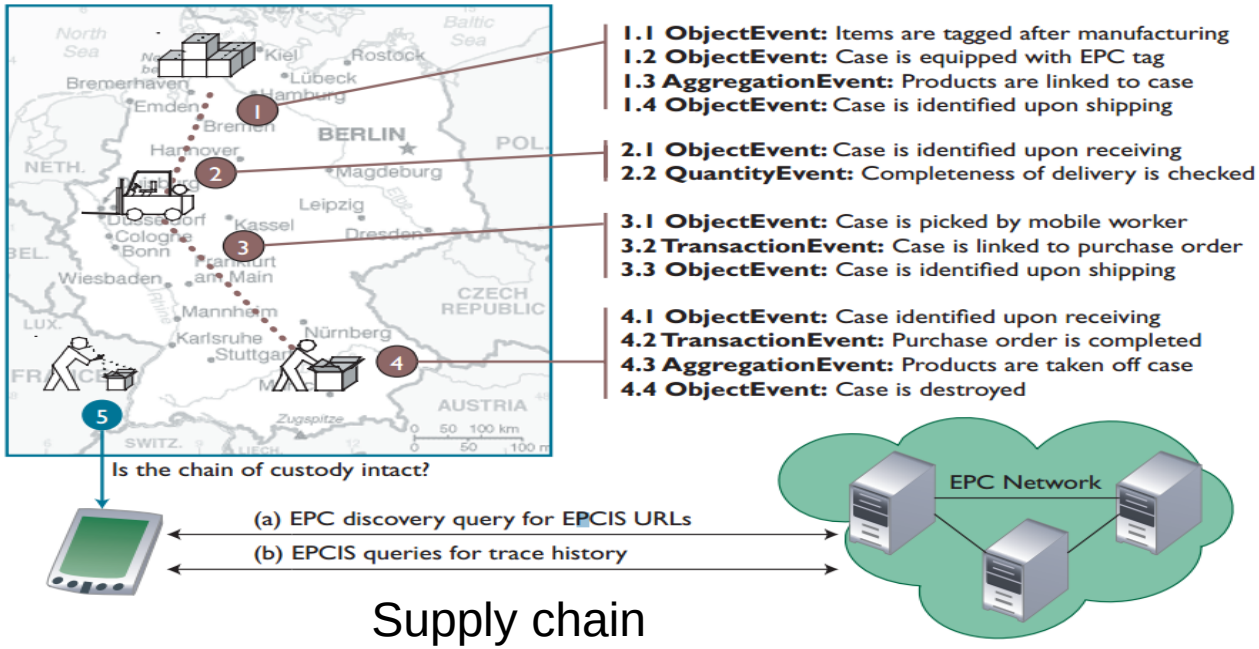




onsepc.kr at KAIST

Eg.) Discovery Services for the Internet of Things

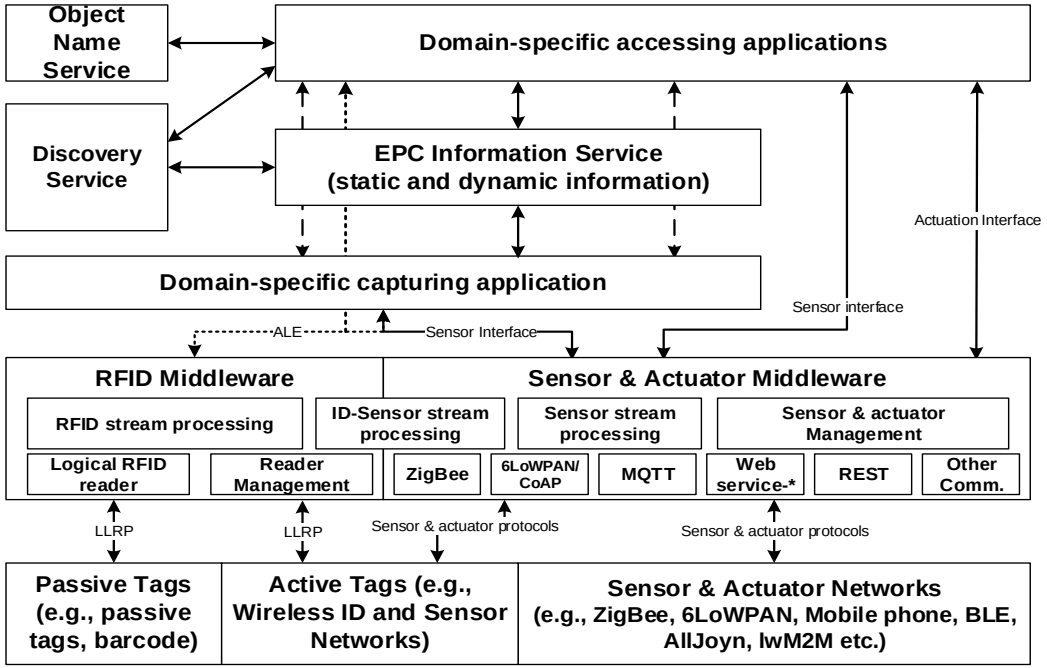
- Search for product history
- Search for retailer locations which sell the desired EPC products.



Supply chain

Discover Nearby EPCIS storing product/thing Information

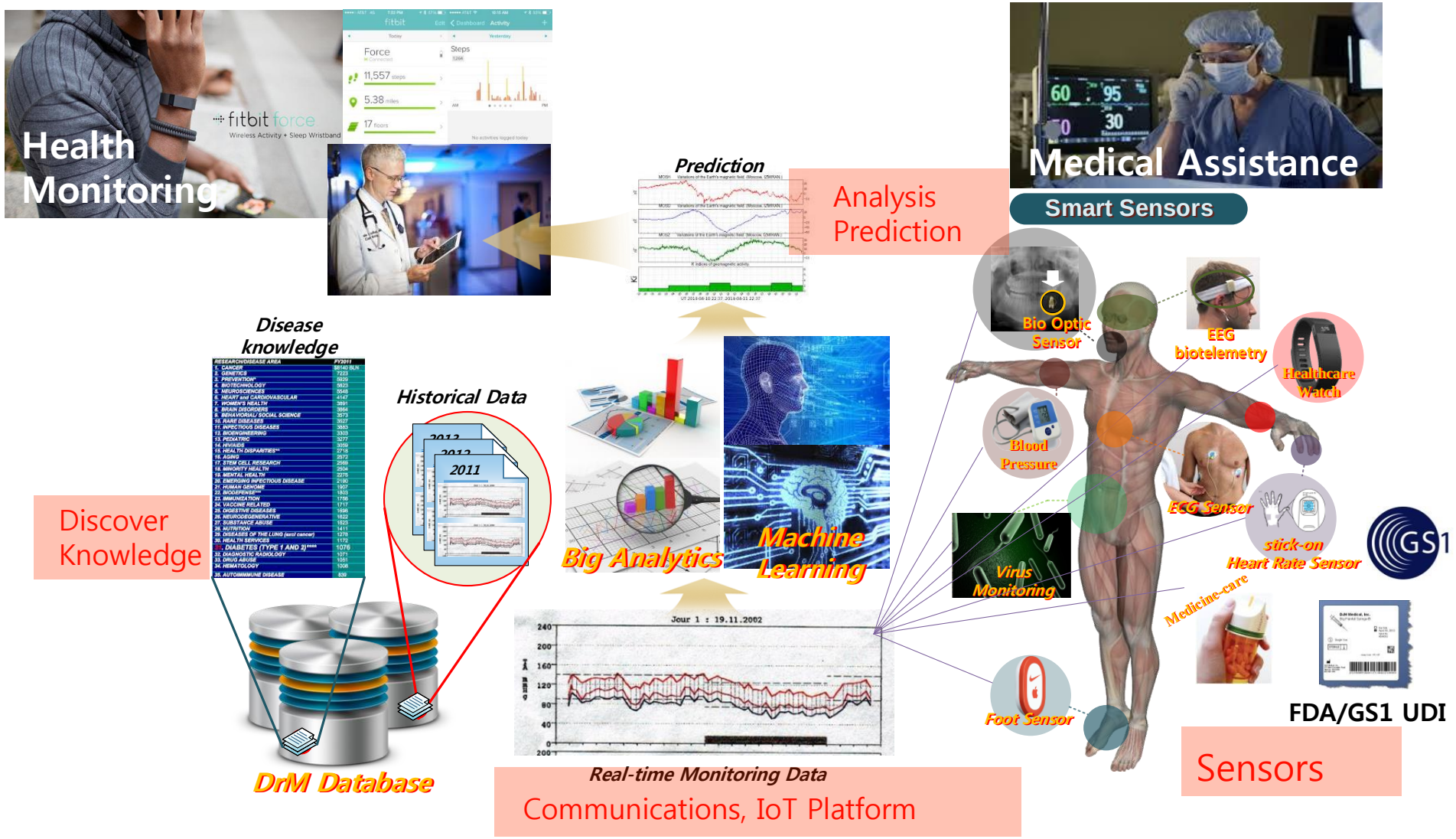
Open Language for the Internet of Things



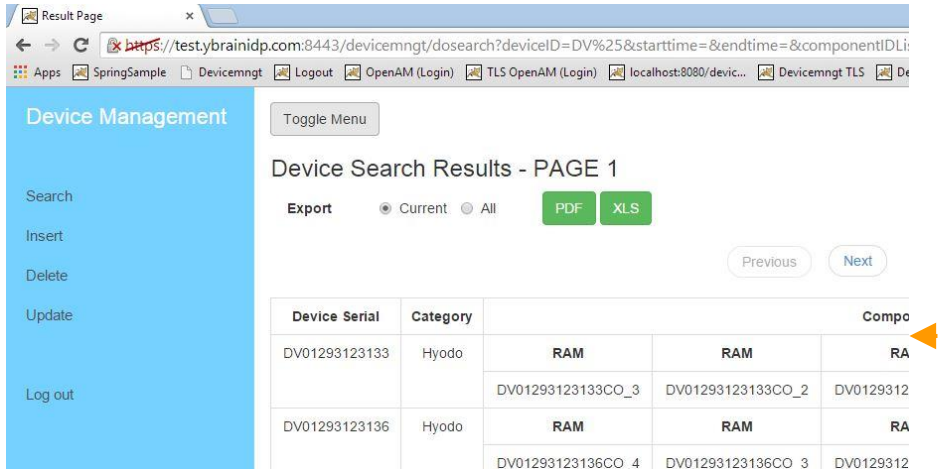
Open Language for IoT (Oliot) is an ID-based IoT framework.

- Based on GS1 standard ID (e.g., URI-convertible GTIN)
- Is to build a ID-based framework to identify, capture, control and share information about smart things

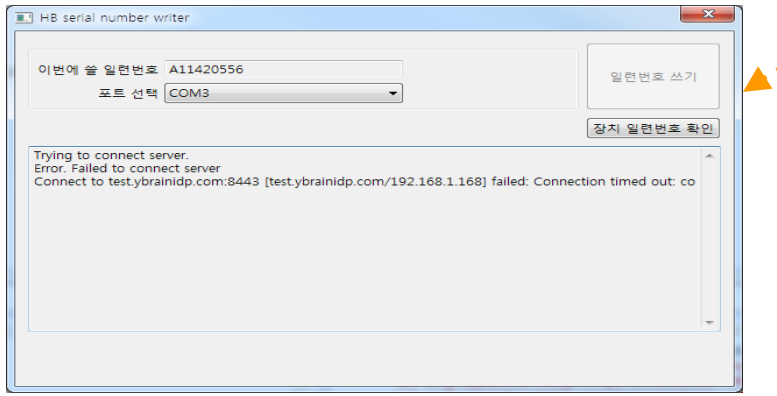
(CASE STUDY I) Healthcare Application - KAIST Dr. M Project (Season 2 Started)



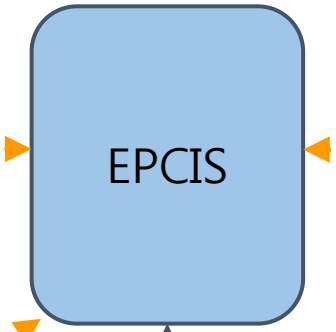
(CASE STUDY I) Healthcare Application - Ybrain's approach

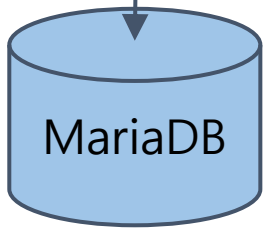


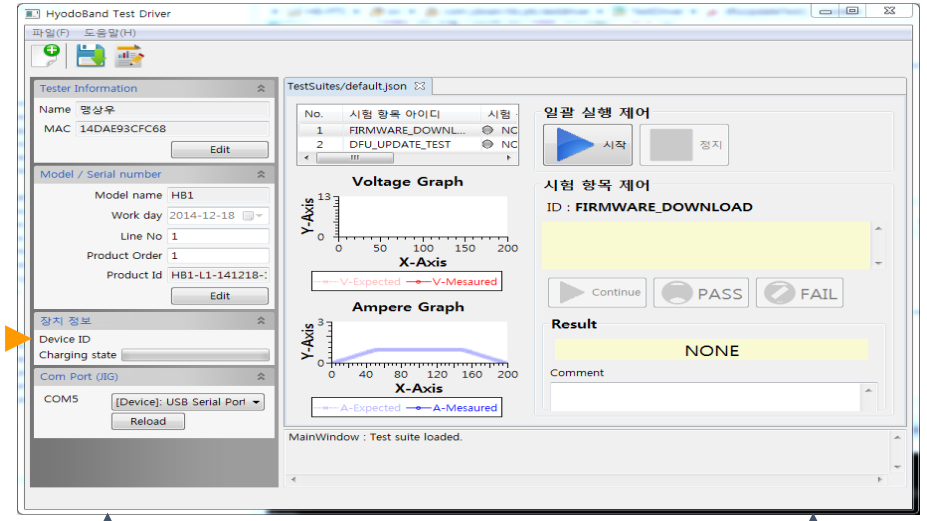
Web-based UI for device management



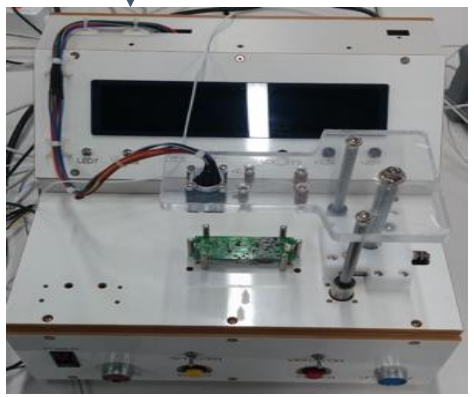
Manufacturing Support Application
(UDI assignment & device check)







Test Automation Software



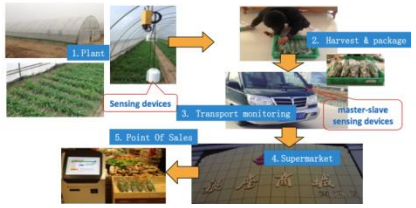
PCB test hardware

Measurement device

doctor M MOBILE HEALTHCARE INNOVATION

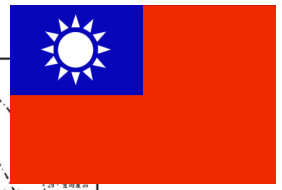
Showroom

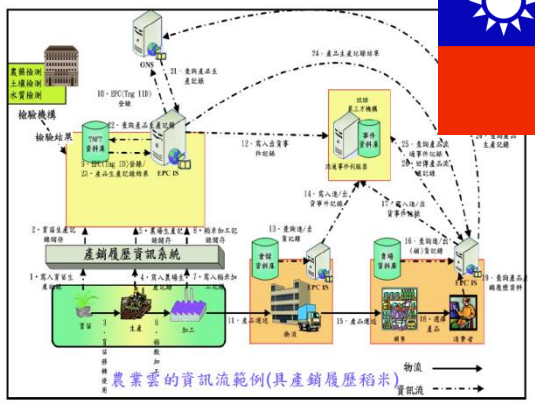
(CASE STUDY II) Smart Agriculture and Food Safety Systems Pilot Project

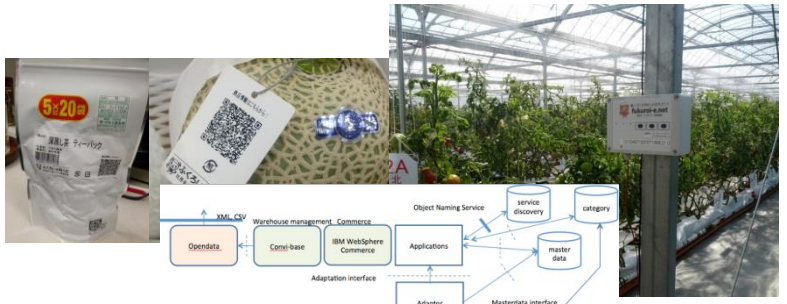


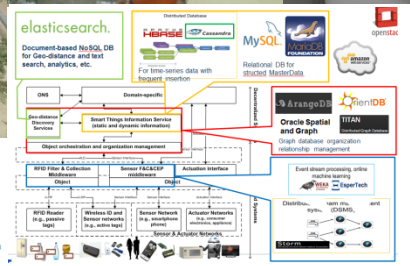
National Agriculture IoT project

- Title: agricultural IoT systems for food safety and quality
- Funded by the High-Tech Development Plan (863) of the Science and Technology (MOST), China.
- Objectives
  - Food safety and quality management
  - Core technologies development
  - Scalable platform and standards
  - Credible platform for government, B2B and end users
  - Business model
  - Pilot project in Shandong and Shanxi province
- Participants: >20 universities, institutes, and companies
- Duration: 2011.1.1-2013.12.31





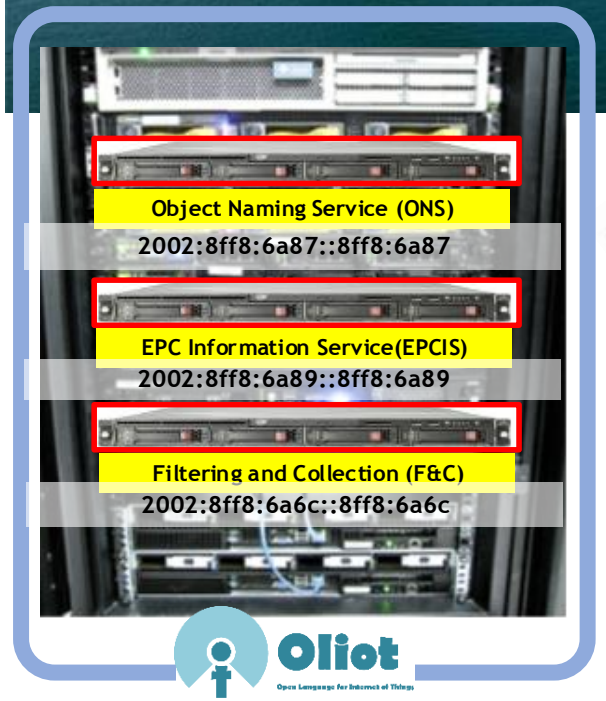




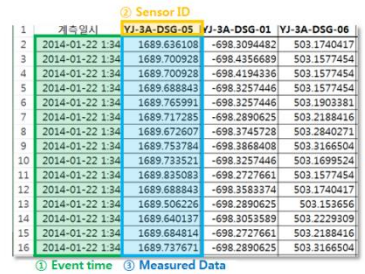
(CASE STUDY II) Smart Agriculture and Food Safety Systems Pilot Project

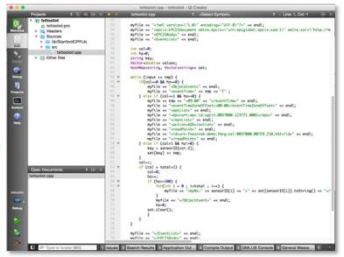
(CASE STUDY III) Bridge Management

Embedded Sensor Data



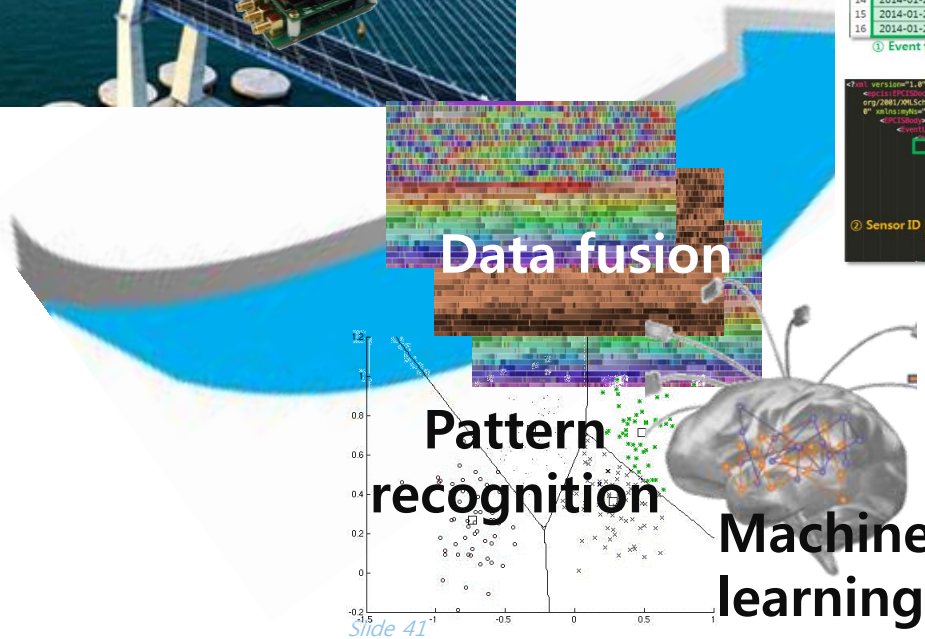
Stanford ENGINEERING
Civil & Environmental Engineering



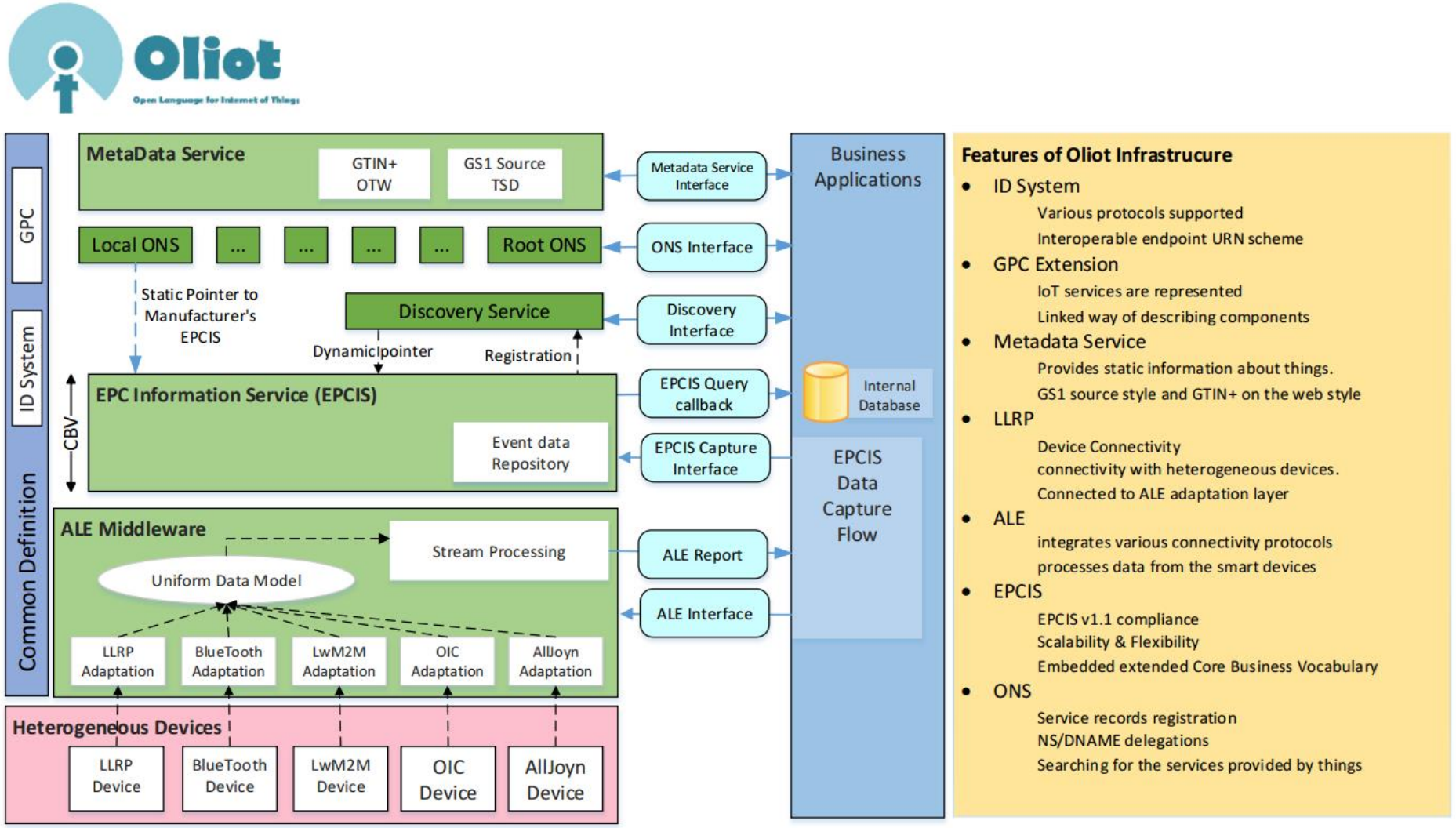


Raw data-to-Oliot Translator (.cpp)

Oliot-EPCIS Input File (.xml)



Oliot 2.0

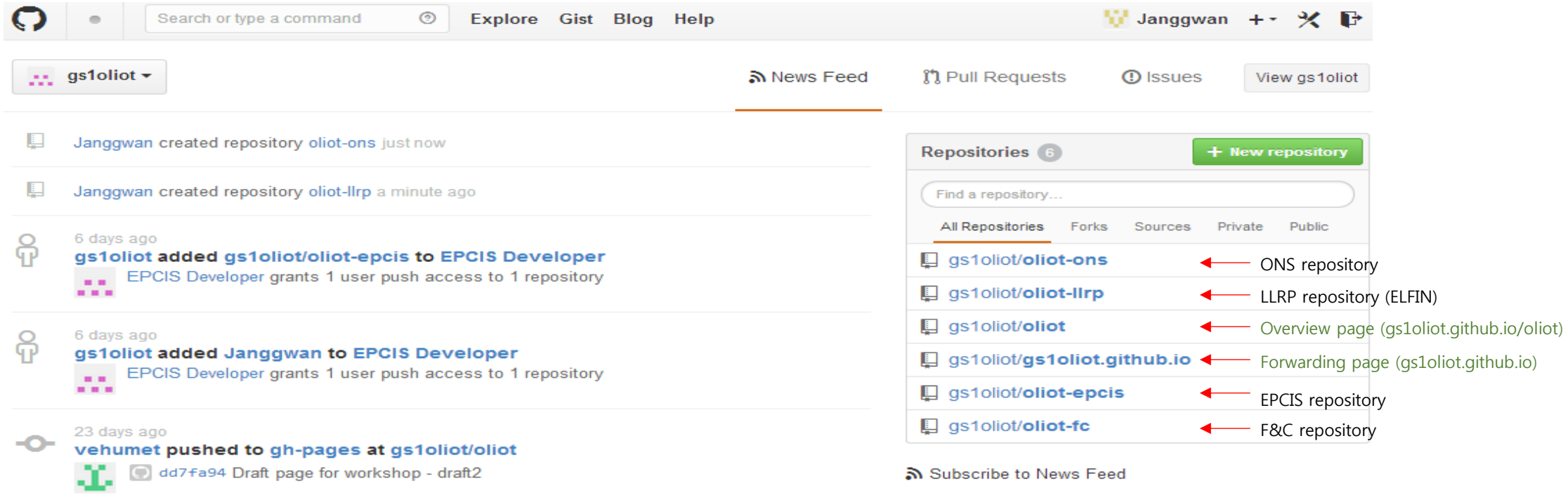


License (Oliot 1.0)

- Oliot-llrp (EPCglobal LLRP Implementation)
  - Apache License
- Oliot-fc (EPCglobal F&C Implementation)
  - GNU Lesser General Public License (LGPL, v2.1)
- Oliot-epcis (EPCglobal EPCIS Implementation)
  - GNU Lesser General Public License (LGPL, v2.1)
- Oliot-ons (EPCglobal ONS Implementation)
  - Apache License
- Apache
  - You can use the software for any purpose (distribute, modify, distribute modified version of S/W) without concern for royalties
- LGPL
  - As long as you don't modify the source code of Oliot, you don't need to open your proprietary software which is linking to Oliot

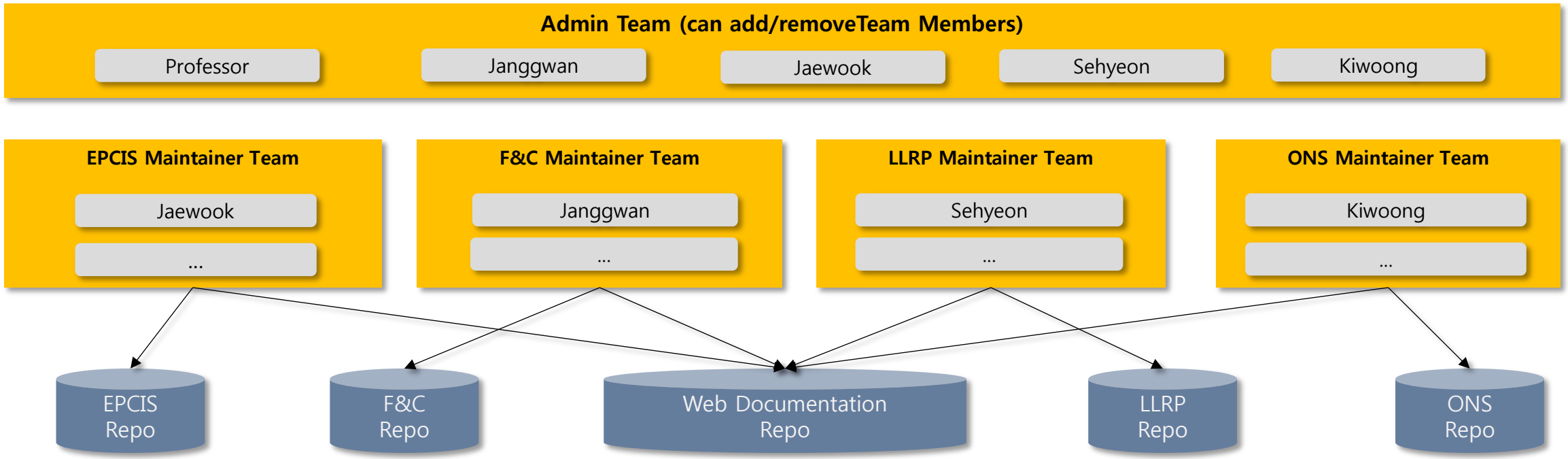
Github Organization “GS1Oliot”

- Repositories for ‘Oliot’ is powered by ‘Github’
- Oliot source code is maintained by a github organization ‘GS1Oliot’

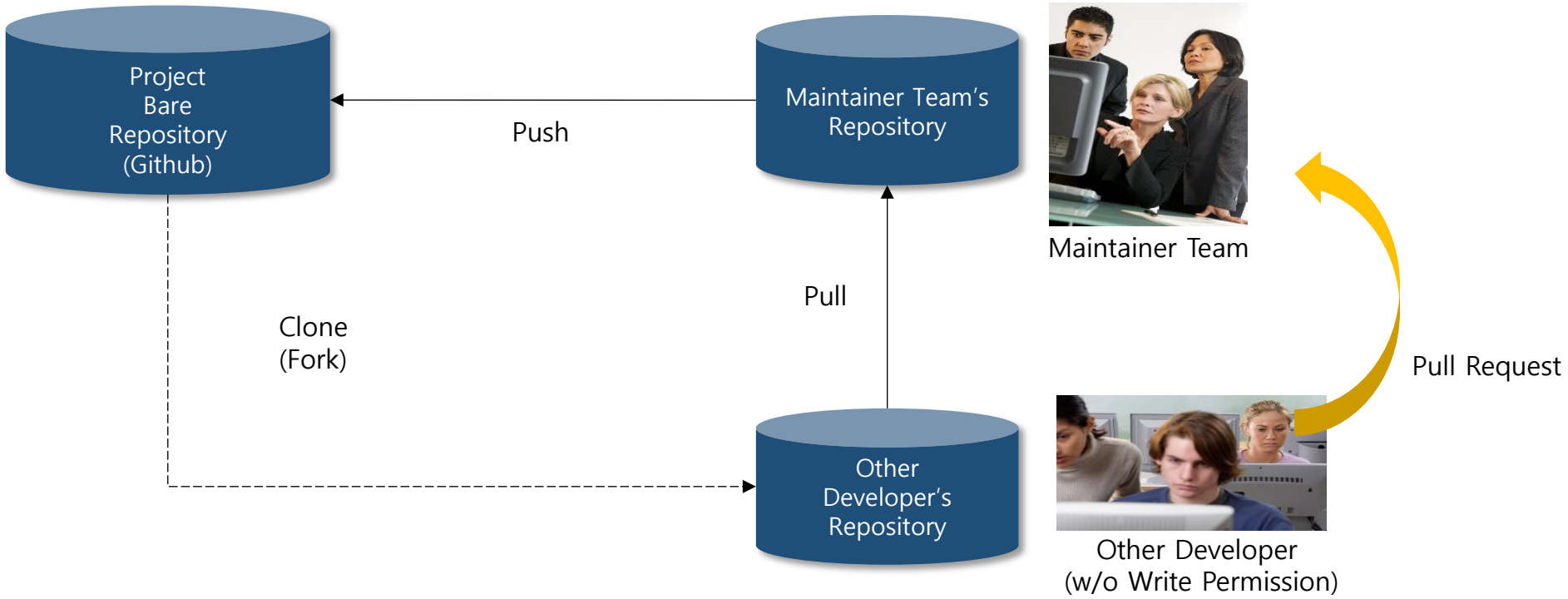


Teams in GS1Oliot

- GS1Oliot has
  - Admin Team: maintains memberships for other teams
  - Maintainer team: maintains source code for each module



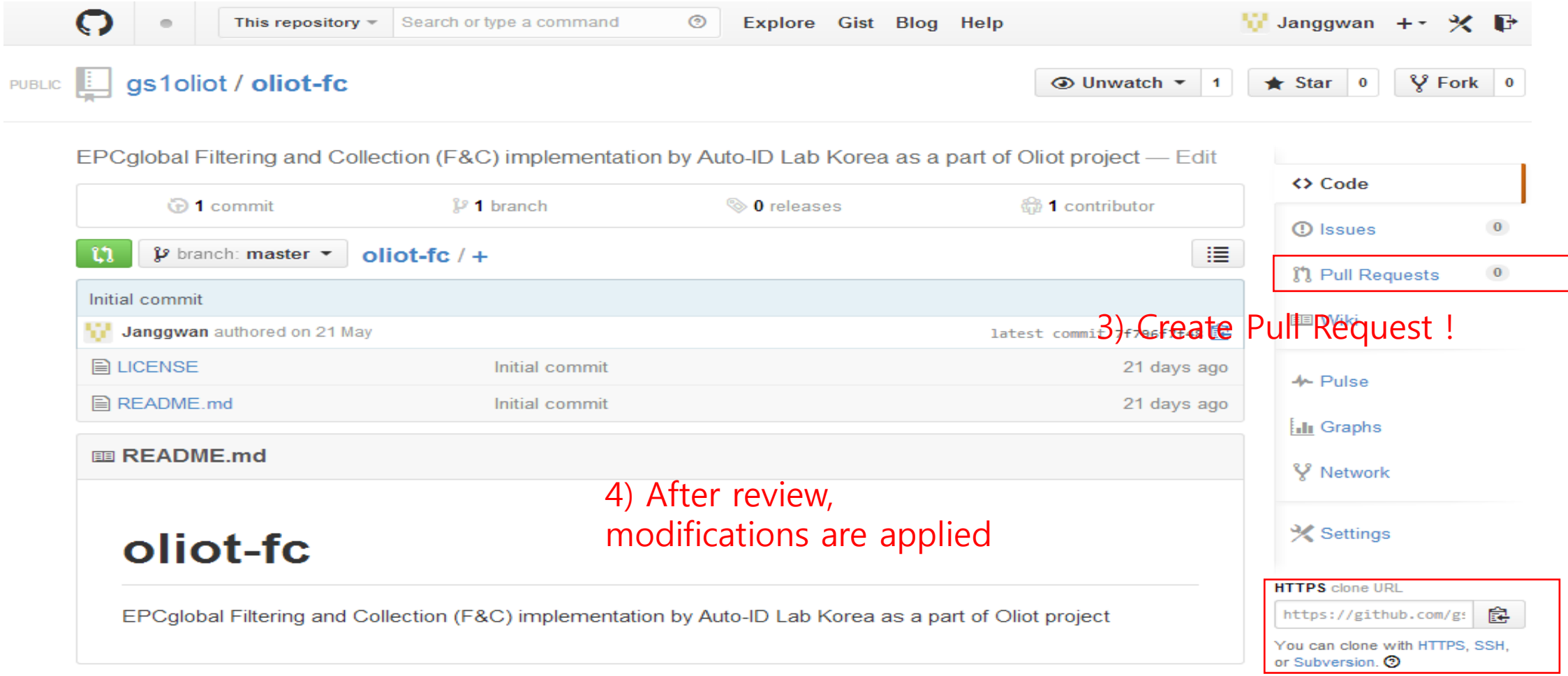
How do we participate in development?



Web Page for Oliot Project

- http://gs1oliot.github.io
- Overview Page for Oliot Project
- Provides
  - News
  - Links to Github Organization Page
  - Links to repositories

Oliot Project Repository Page



3) Create Pull Request !

4) After review, modifications are applied

2) Develop your code in your local repository!

1) Clone this repository with this URL !

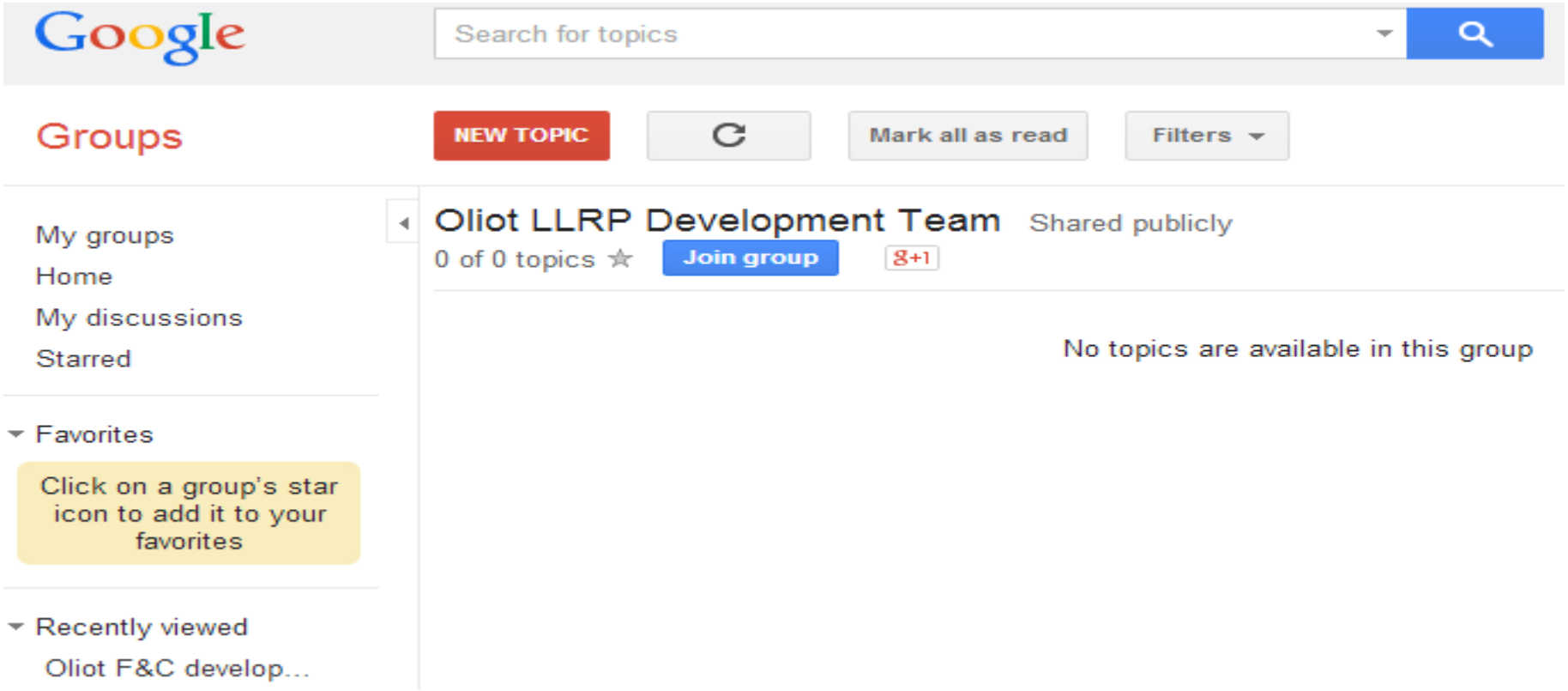
Mailing Lists

- Mailing lists are the open source community itself, feel free to join!
- You can view the archived mails in the following URL

- LLRP mailing list
  - oliot-llrp@resl.kaist.ac.kr
  - https://groups.google.com/a/resl.kaist.ac.kr/forum/#!forum/oliot-llrp
- F&C mailing list
  - oliot-fc@resl.kaist.ac.kr
  - https://groups.google.com/a/resl.kaist.ac.kr/forum/#!forum/oliot-fc
- EPCIS mailing list
  - oliot-epcis@resl.kaist.ac.kr
  - https://groups.google.com/a/resl.kaist.ac.kr/forum/#!forum/oliot-epcis
- ONS mailing list
  - oliot-ons@resl.kaist.ac.kr
  - https://groups.google.com/a/resl.kaist.ac.kr/forum/#!forum/oliot-ons

Mailing Lists

- You can join the mailing list by clicking ‘Join group’ button on the previous URL after logging in as any Google account



Mailing Lists with Related Projects

- If we manage our mailing list with that of specification working groups or other related open source project , it brings an advantage for our project to become popular

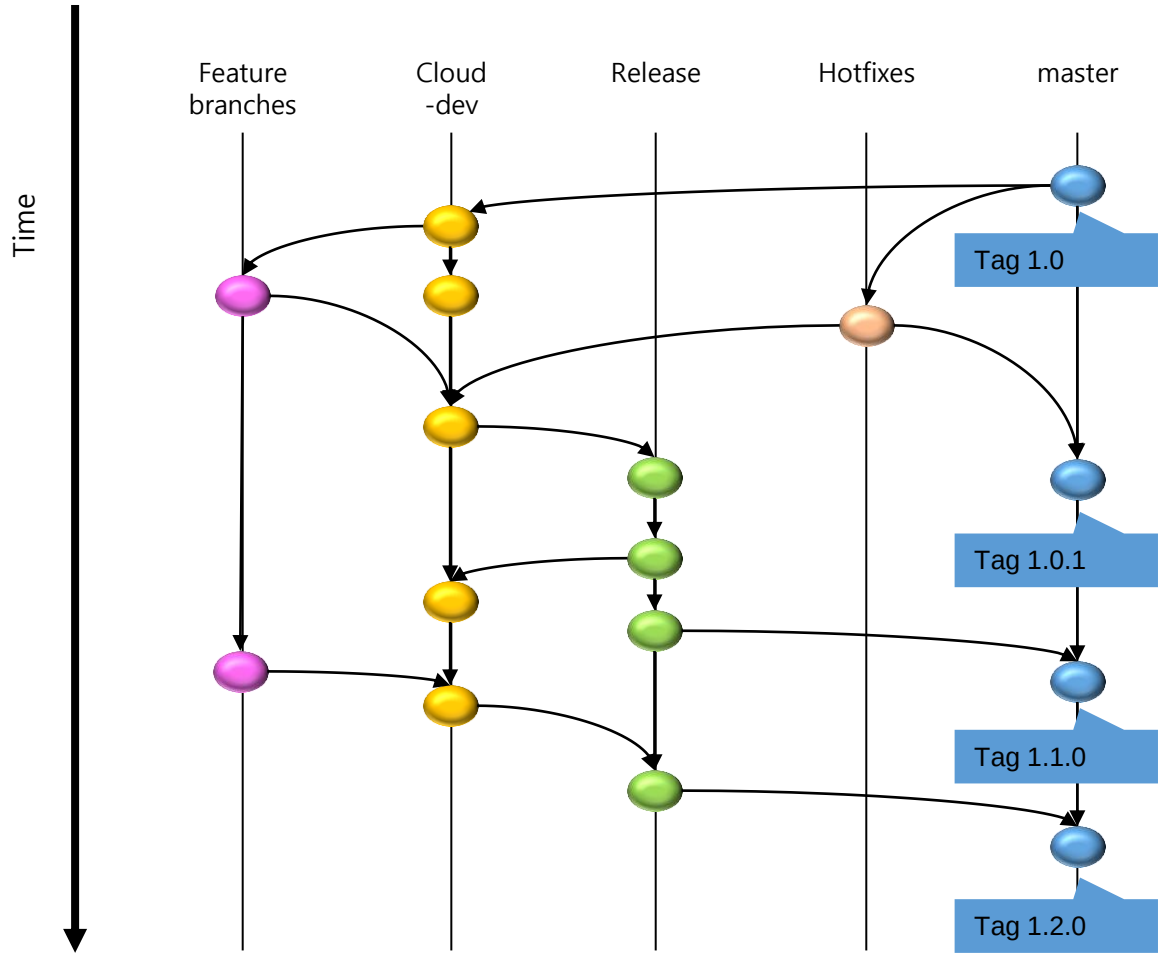
- LLRP Toolkit Project
  - http://sourceforge.net/p/llrp-toolkit/mailman/llrp-toolkit-devel/

- EPCIS and Core Vocabulary Working Group of GSMP
  - gsmpepcis1_1cbvmswg@community.gs1.org

GS1 GSMP: GS1 Global Standards Management Process

Branch Management

- Branch 'master'
  - Maintains source code, not used for workspace
  - Used to version release with git tag
- Branch 'release'
  - Hotfix and feature branches are merged in merge-window p eriod
- Branch 'hotfix'
  - For emergent patch after release
- Branch 'cloud-dev'
  - Used for cloud-specific feature
  - Integration of other features
  - Source of release branch
- Feature branches
  - Used for feature development
  - Manages independent branch for each feature
- Version Release
  - Release with git tag in master branch after branch 'release' i s merged to branch 'master'



Release

- July 7 2014 – oliot 1.0 (latest implementation of EPCglobal fra mework, run on any cloud and supporting mysql and cassand ra)
- 2Q 2015 – oliot 1.1 (provide EPCIS 1.1, strengthened to supp ort food industry)
- 2015 – oliot 2.0 (support internet of things, merging auto-id l ab, KAIST's Epc sensor network, STIS and more)

광고

We are hiring and inviting open source project experts!!!

Thank you!