Why DNS should be the naming service for IoT?
Some terminology

• **Identity**
  • Definable and recognizable (.e.g. My name is “Sandoche” )
  • Need not be unique and does not need to follow any particular “naming convention” (.e.g. Name could be “John Paul II” )

• **Identifier**
  • Unique way of identifying a physical or virtual object. Should follow a particular naming convention (e.g. Passport Number)

• **Addressing**
  • Unique way of identifying a physical or virtual object in the scope of communication
  • Need to follow a particular “naming convention” (E.g. Postal Address, IPv4/IPv6, MAC Address)

• **Naming Service**
  • Mapping the unique identifier to its appropriate unique service/information
Preamble with the Internet

Resolution

Identifiers

www.afnic.fr
balakrichenan@afnic.fr

Naming Service

DNS

Application

Provisioning (Hierarchical)

Naming Authority

Naming convention for the Identifiers

IETF
- Domain names, URI
Making the things identifiable in IoT
IoT applications – Example of a private naming Service

Identifier

MAC address Provisioning
- 00-17-4F-08-5D-69
- assigned to vendors by the IEEE
- assigned by the vendor from its block

Naming convention = EUI-48 and EUI-64

Resolution

Identifier

00-17-4F-08-5D-69

SaaS

Application
IoT SDOs and Alliances landscape

Source: AIOTI WG3 (IoT Standardisation) – Release 2.7
IoT - Consumer Industry provisioning

EPC Provisioning (Hierarchical)

Naming Authority

GS1 Prefix (Country Code)

Company Code

Product ID

Serial number
IoT - Consumer Industry without DNS

**Resolution**

Naming Convention = EPC

**Barcode**

- 0 12345 67890 5
  - Number System Character
  - Manufacturer Code
  - Product Code
  - 3 Guard Bars
  - Check Digit

**RFID**

- 01.0000389.000162.000169740
  - Header 8 bits
  - Company Code 28 bits
  - Product Code 24 bits
  - Serial Number 36 bits

**Naming Service**

GEPIR

**Application**

Extended Packaging

- Proxi Nutrition
- Proxi Environnement
- Liste de courses
- Proxi Allergènes
- Proxi Médicament

**Track & Trace**
Need = I(Internet)oT
IoT - Consumer Industry using DNS

Resolution
Naming Convention = EPC

RFID

Barcode

ONS

Application
Extended Packaging

Track & Trace

Naming Service
**IoT - Consumer Industry FQDN**

![Diagram showing the structure of an EPC code]

- **(EPC)**
  - 300 9345.678908.2343
  - Country code → Company code → Object ID → Product unique serial number

- **(URN)**
  - urn:epc:id:sgtin:3009345.678908.2343

- **(Domain Name)**
  - 678908.3009345.sgtin.id.onsepc.com
IoT - LPWAN Industry eco-system
Detailed view of the LoRa network

Gateway “A”
Operator “A”
Application Server “A”

Gateway “B”
Operator “B”
Application Server “B”

“A” Network
“B” Network
Portability issues in LoRaWAN

End-device

Home Network is Operator A

Gateway

But, the GW forwards the join request to Operator B

Operator A

Operator B

How does 'B' know the home network (i.e. operator ‘A’)?

Application
Possible solution for portability using DNS

Home Network is Operator A

But, the GW forwards the join request to Operator B

MAC.iotreg. IN CNAME Operator

FAB000000000007.iotreg.net. IN CNAME FAB00000000000007.Orange.rd.nic.fr.
FAB00000000000011.iotreg.net. IN CNAME FAB00000000000011.Orange.rd.nic.fr.
Naming service requirements for IoT

✓ Must be scalable
✓ Must work for legacy and new naming conventions
✓ Should work for hierarchical and flat identifiers
Naming service in different standard organisations

- Domain names (IETF) – DNS
- Electronic Product Code (GS1) – ONS which uses DNS
- Object Identifier (ISO, ITU-T) – ORS which uses DNS
- Digital Object Identifier (ISO) – For initial resolution uses DNS
Vision

DNS

- NFC
- Sensors
- Smart Cards
- 2D Codes
- RTLS
- Bar Code
- GPS
Merci !