

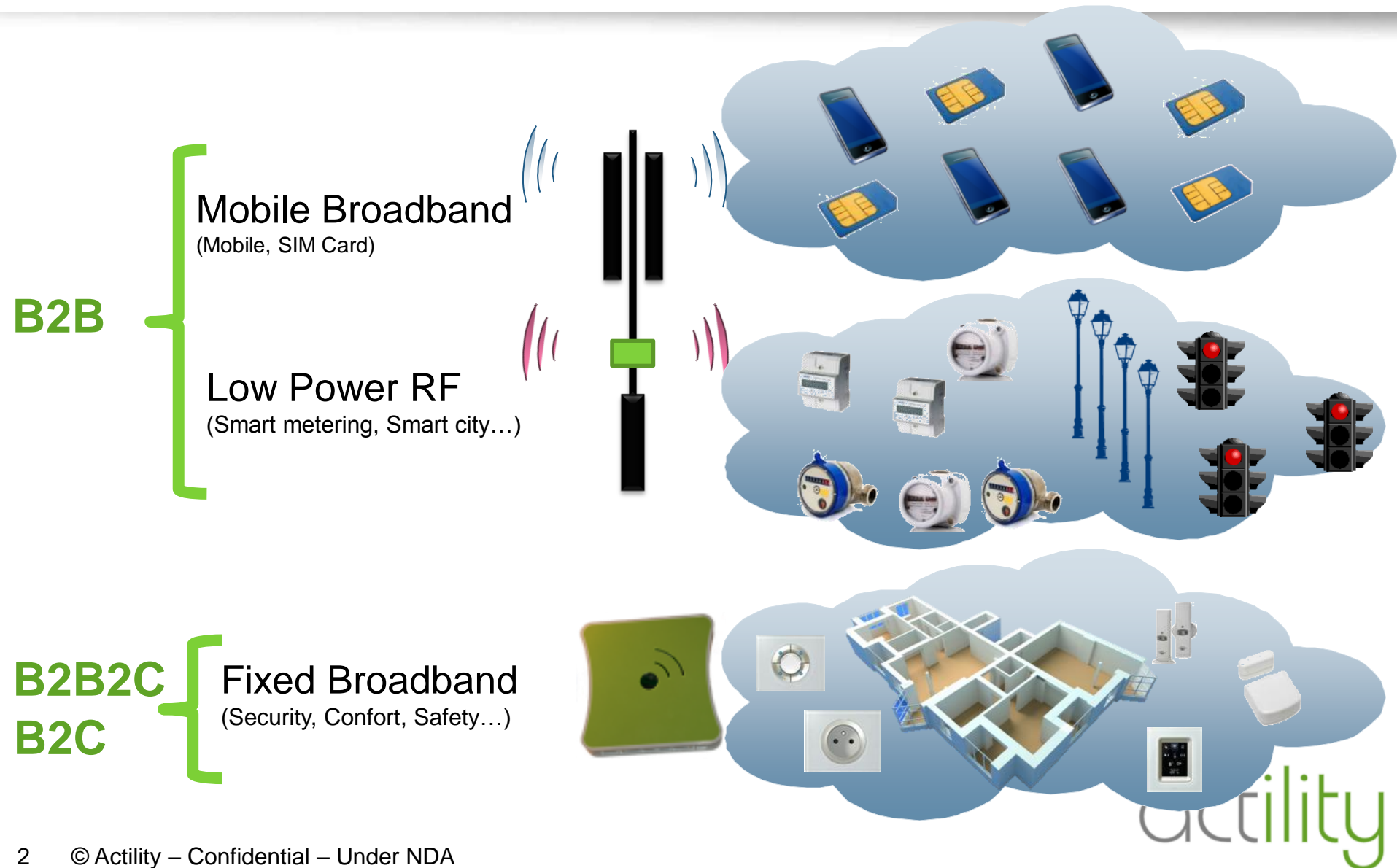
# actility



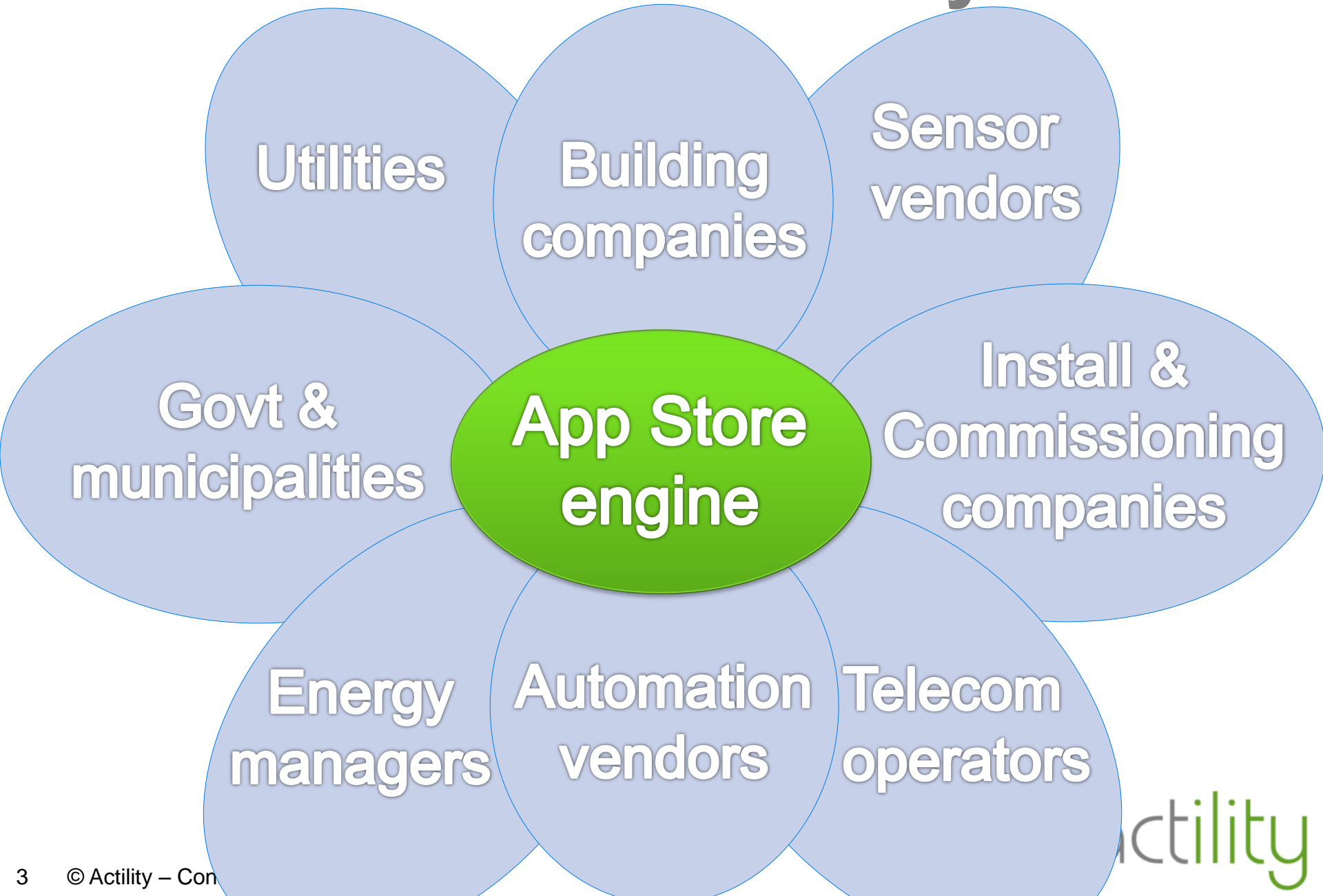
ETSI M2M

**The missing link for smart-home and smart-community ecosystems**

# Looking for a ubiquitous IoT platform



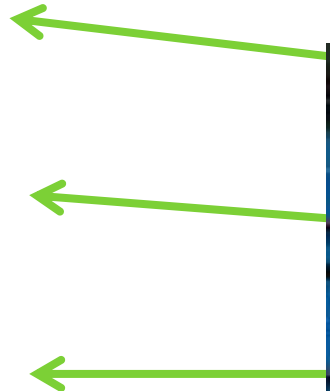
# ... to enable the ecosystem



# B2B use case : Demand response



# B2B use case : Energy performance



# B2B2C use case : Shadow metering

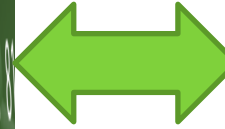
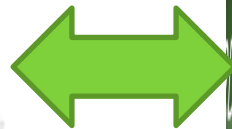
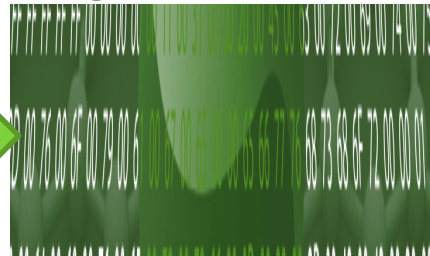


Meter(s)



Telco or utility « Box »

Big Data platform



Utility  
company

# B2C use case : Smart-Home



Safety



Security



Energy



LifeStyle

actility

# Smart-Home

# Shadow metering

# Demand response

# Energy performance



# ONE STANDARD !

actility



# What is needed ?

- ✓ **Network agnostic message routing**
- ✓ **Synchronous & Async communication**
- ✓ **Subscribe / Notify model**
- ✓ **Uniform data storage model**
- ✓ **Uniform, language independent API (REST)**
- ✓ **Security (shared infrastructure)**

# ETSI M2M infrastructure

## User premises



TR069 configuration servers



ETSI M2M NSC  
(Registration, NAT  
traversal, Routing,  
security, Storage)

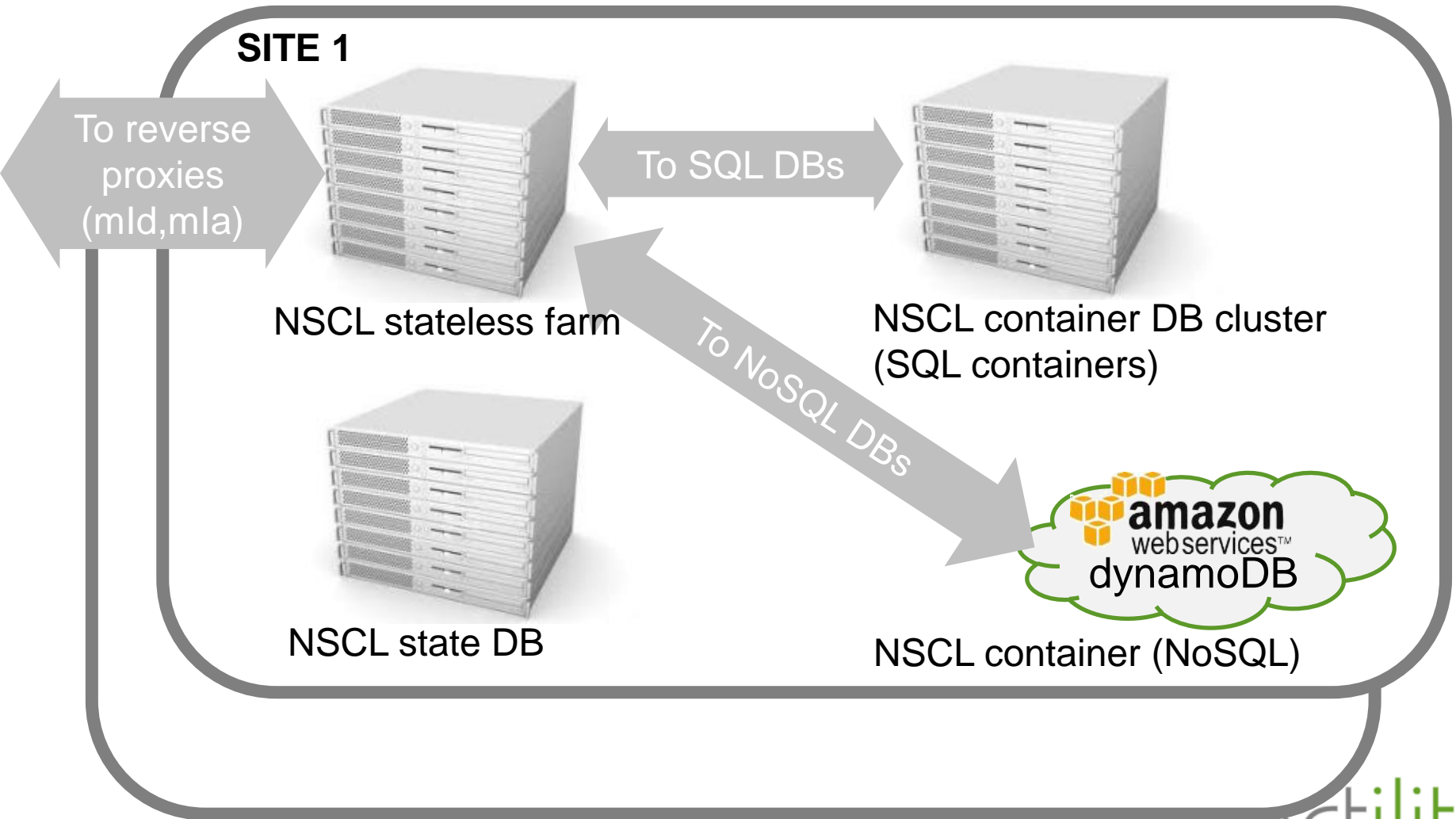
ETSI M2M  
mla



ETSI M2M Network  
Applications

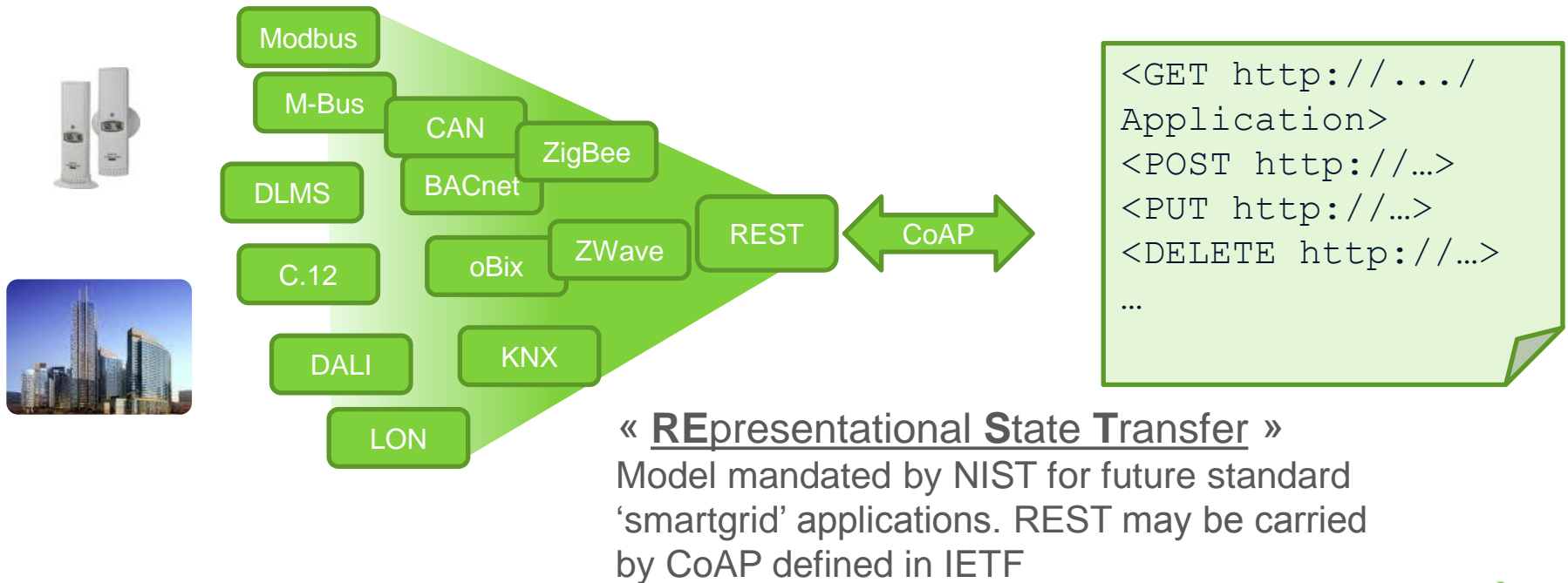


# Uniform storage API : Containers

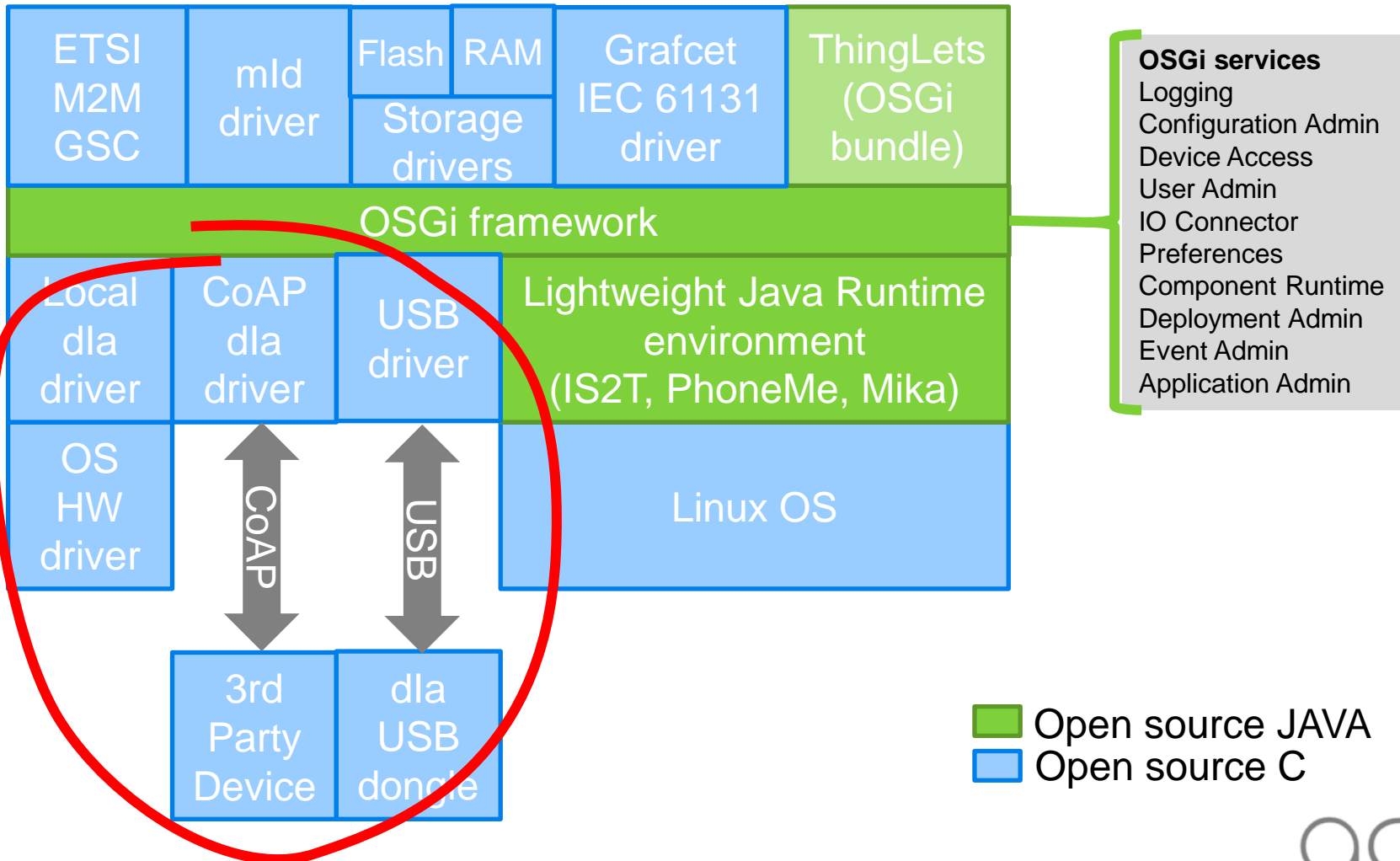


# REST : why is it so important ?

- REST : do everything with 4 verbs and 'documents'
- Extremely easy to understand and program



# Typical GSC architecture : drivers



# Integrating new features and protocols

Any feature or protocol interacts with the platform using REST over dla or mld

- ⦿ Protocol drivers (ZigBee, wMBUS, 6LowPAN, DECT ULE...):
  - ⦿ embedded in GW
  - ⦿ embedded in a dongle (dla dongles make it possible to add protocols without firmware updates)
  - ⦿ Embedded in any IP device (CoAP) : e.g. MyFox (dlo)
- ⦿ Rules engines & embedded logic:
  - ⦿ C code with dla (Grafcet/IEC 61131...)
  - ⦿ OSGI bundle with API

# Modular application framework

Using XML scripts

**PLCopen**  
*for efficiency in automation*

Using OSGi bundles

OSGi<sup>™</sup>  
Alliance

Using smart  
dongles

Using smart  
appliances

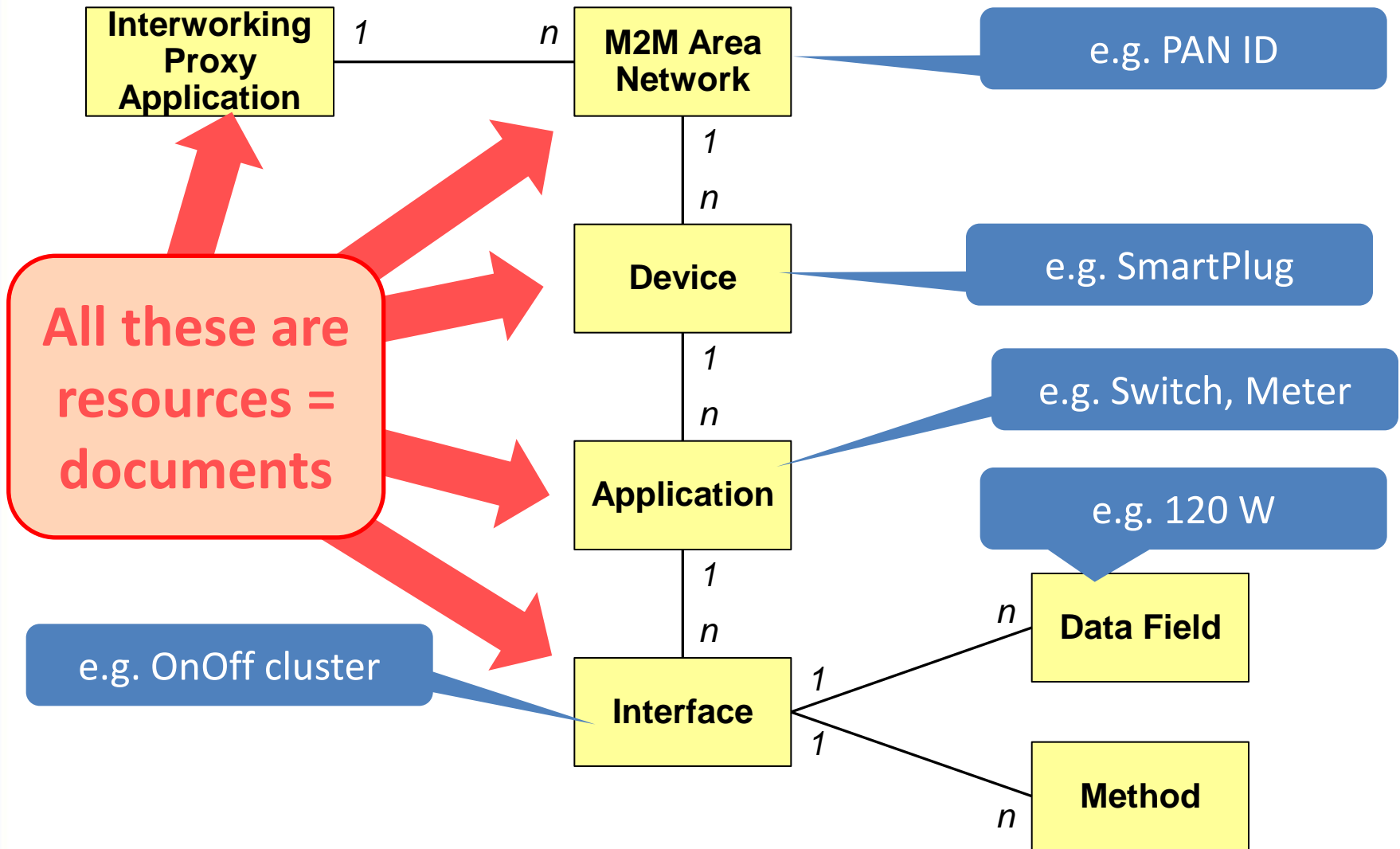
MyFox interface  
→ 3 weeks

Using any HTTP  
application server,  
any language  
(makes interfacing of  
existing applications easy)

Nagios interface  
→ 2 weeks

eeDomus interface  
→ 2 weeks

# Generic Area Network interworking model





# Area network representation : IPU



IPU :

```
<obj is="zigbee:InterworkingDescriptor" is="m2m:InterworkingDescriptor"
  xmlns="http://obix.org/ns/wsd/1.1"
  xmlns:m2m="http://uri/etsi.org/m2m/obix"
  xmlns:zigbee="http://uri/etsi.org/m2m/zigbee/obix">
  ...
</obj>
```

```
>>> HTTP GET
/gsc/applications/zgd0/containers/descriptor/contentInstances/last/content
```

```
<<< 200 OK
```

```
<obj>
  <str name="interworkingProxyID" val="Text for correlation purpose"/>
  <list name="supportedTechnologies">
    <obj>
      <enum name="anStandard" val="ZigBee_1_0"/>
      <enum name="anProfile" val="ZigBee_HA"/>
      <enum name="anPhysical" val="IEEE_802_15_4_2003_2_4GHz"/>
    </obj>
  </list>

  <list name="networks"/>
    <ref href="/gsc/applications/zbnw0/">
  </list>
</obj>
```

# Area network representation : NW



Network :

```
<obj is=zigbee:NetworkDescriptor" is="m2m:NetworkDescriptor"  
  xmlns="http://obix.org/ns/wsd1/1.1"  
  xmlns:m2m="http://uri/etsi.org/m2m/obix"  
  xmlns:zigbee="http://uri/etsi.org/m2m/zigbee/obix">  
  
  <str name="extendedPanID"/>  
  
</obj>
```

```
>>> HTTP GET  
/gsc/applications/zbnw0/containers/descriptor/contentInstance/containers
```

```
<<< 200 OK
```

```
<obj>  
  <str name="networkID" val="Text for correlation purpose">  
  <str name="extendedPanID" val="0x685B3C34"/>  
  
  <list name="nodes">  
    <ref href="/gsc/applications/zbnode0/">  
  </list>  
</obj>
```

Zigbee specific

Generic

# AN representation : logical nodes



## Logical node (Application):

```
<obj is="zigbee:NodeDescriptor" is="m2m:NodeDescriptor"
  xmlns="http://obix.org/ns/wsd/1.1"
  xmlns:m2m="http://uri.etsi.org/m2m/obix"
  xmlns:zigbee="http://uri.etsi.org/m2m/zigbee/obix">
  <str name="ieeeAddress"/>
  <enum name="type" range="#NodeType">
    <list href="#NodeType" is="obix:Range">
      <obj name="endDevice"/>
      <obj name="router"/>
      <obj name="coordinator"/>
    </list>
  </enum>
</obj>
```

```
>>> HTTP GET
/gsc/applications/zbnode0/containers/descriptor/contentInstance/Content
```

```
<<< 200 OK
```

```
<obj>
  <str name="nodeID" val="Text for correlation purpose"/>
  <str name="ieeeAddress" val="0x685B3C88"/>
  <enum name="type" val="endDevice"/>

  <list name="applications">
    <ref href="/gsc/applications/zbapp0/" />
  </list>
</obj>
```

Zigbee specific

Generic

# AN representation : interfaces



## Interface :

```
<obj is="zigbee:InterfaceDescriptor" is="m2m:InterfaceDescriptor"
  xmlns="http://obix.org/ns/wsdl/1.1"
  xmlns:m2m="http://uri.etsi.org/m2m/obix"
  xmlns:zigbee="http://uri.etsi.org/m2m/zigbee/obix">

  <str name="clusterID"/>
  <enum name="clusterType" range="#ClusterType">
    <list href="#ClusterType" is="obix:Range">
      <obj name="input"/>
      <obj name="output"/>
    </list>
  </enum>

</obj>
```

```
<list name="Interfaces">
  <obj>
    <str name="InterfaceID" val="Text for correlation p
    <str name="clusterID" val="0x0006"/>
    <enum name="clusterType" val="input"/>

    <list name="points">
      <bool name="state" val="true">
        <list name="nativeAttributes">
          <ref href="/gsc/applications/zbapp0/containers/0x0006_attrOnOff"/>
        </list>
      </bool>
    </list>

    <list name="operations">
      <op name="0x00" href="/gsc/applications/zbapp0/0x0006_off"/>
      <op name="0x01" href="/gsc/applications/zbapp0/0x0006_on"/>
      <op name="0x02" href="/gsc/applications/zbapp0/0x0006_toggle"/>
    </list>

  </list name="feeds"/>
</obj>
</list>
```

Generic

Zigbee specific

## Semantic tags :

OASIS.OBIX\_1\_1 : OASIS oBix semantic conventions, version 1.1.

ASHRAE.CSML\_1\_0 : ASHRAE 135 annex am Control System Modelling Language (CSML) semantic conventions.

## Application tags :

ZIGBEE.ApplicationProfile/0x0104

## Device tags :

ZIGBEE.DeviceIdentifier/0x0100

```

<obj href="m2m:ApplicationDescriptor"
      xmlns="http://obix.org/ns/wsd/1.1"
      xmlns:m2m="http://uri/etsi.org/m2m/obix">
  <str name="applicationID"/>
  <list name="Interfaces" of="obix:ref m2m:Interface"/>
</obj>

```

Generic semantic template

ZigBee specific derivation

```

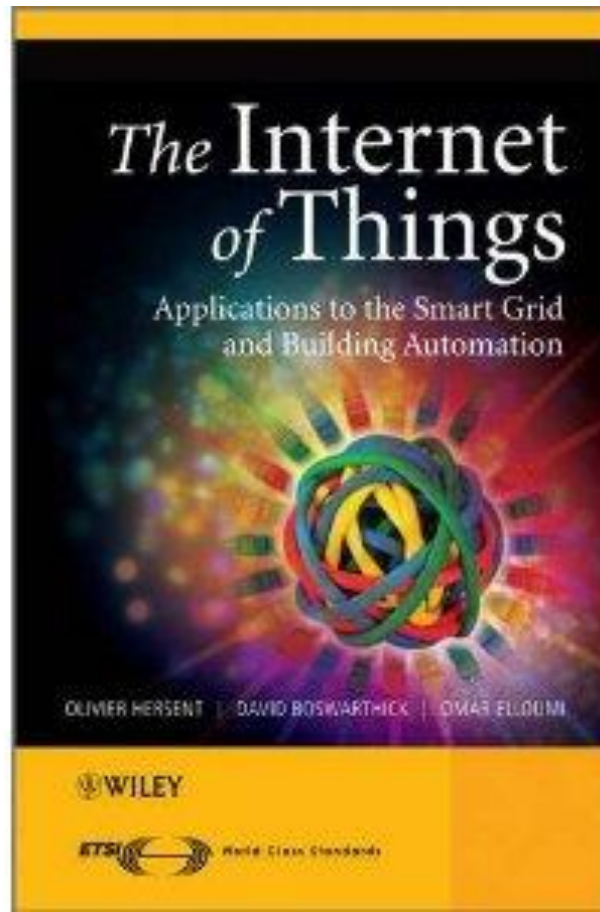
<obj href="zigbee:AppDescriptor" is="m2m:ApplicationDescriptor"
      xmlns="http://obix.org/ns/wsd/1.1"
      xmlns:m2m="http://uri/etsi.org/m2m/obix"
      xmlns:zigbee="http://uri/etsi.org/m2m/zigbee/obix">
  <str name="extendedPanID"/>
  <str name="ieeeAddress"/>
  <int name="endpoint"/>
  <int name="applicationProfileID"/>
  <int name="applicationDeviceID"/>
  <int name="applicationDeviceVersion"/>
</obj>

```

!-- optional element -->  
 !-- optional element -->

# Thank you !

**Looking for more fieldbus & ETSI M2M info ?**  
→ Wiley, look for « *hersent* » on Amazon



actility