



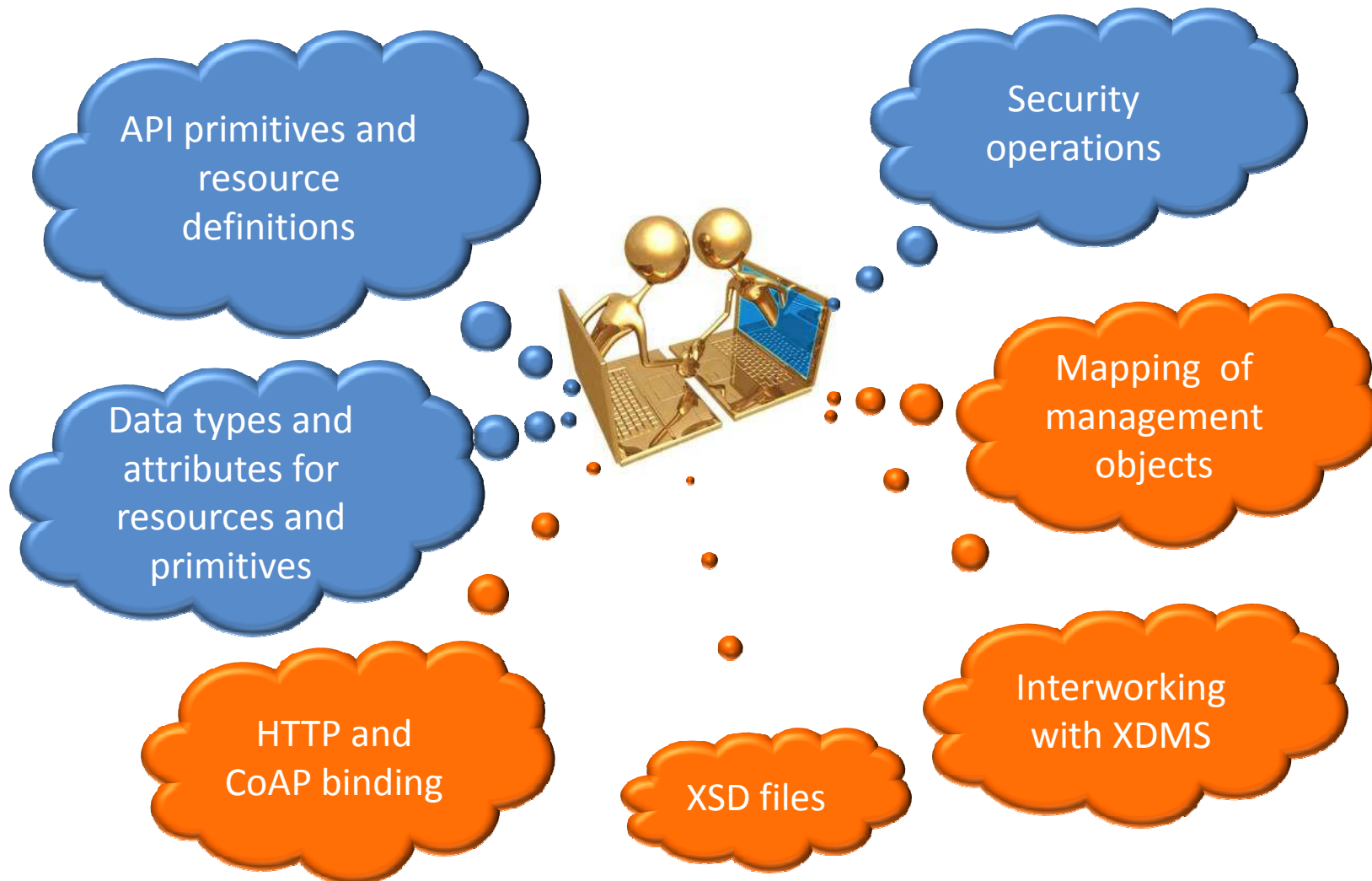
**Welcome  
to the World  
of Standards**



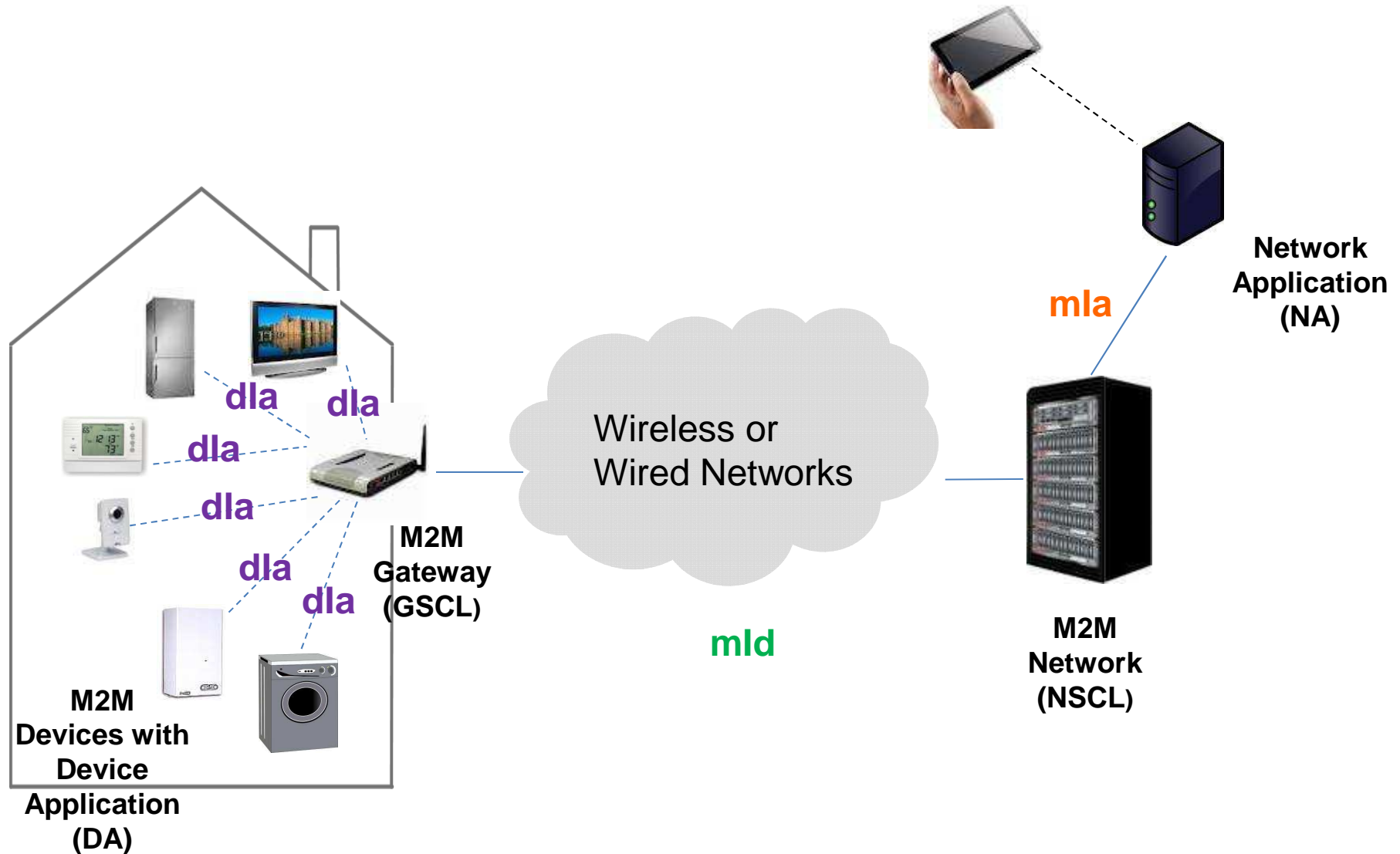
## **OVERVIEW OF ETSI M2M RELEASE 1 STAGE 3 – API AND RESOURCE USAGE**

Presented by Guang Lu, WG3 Rapporteur, InterDigital

- TS 102 921 overview
- ETSI M2M reference points
- ETSI M2M resource tree
- ETSI M2M API procedures
- Binding to HTTP and CoAP
- Example of call flows for a connected home use case



# Example: Connected Home



# ETSI M2M Defines 3 Reference Points



## mla

- Network Application (NA) ↔ Service Capabilities in the M2M Network Domain (NSCL)
- Is a reference point for NA to register to NSCL and access resources on NSCL

## dla

- Device Application (DA) and Gateway Application (GA) ↔ Service Capabilities in the M2M Device / GW (D/GSCL)
- Is a reference point for DA/GA to register to D/GSCL and access resources on D/GSCL

## mld

- Service Capabilities in the M2M Network Domain (NSCL) ↔ Service Capabilities in the M2M Device / GW (D/GSCL)
- Is a reference point for D/GSCL to register to NSCL and access resources on D/G/NSCL

🌐 REST (Representational state transfer) is a software architectural style by Roy T. Fielding in his Ph.D. dissertation

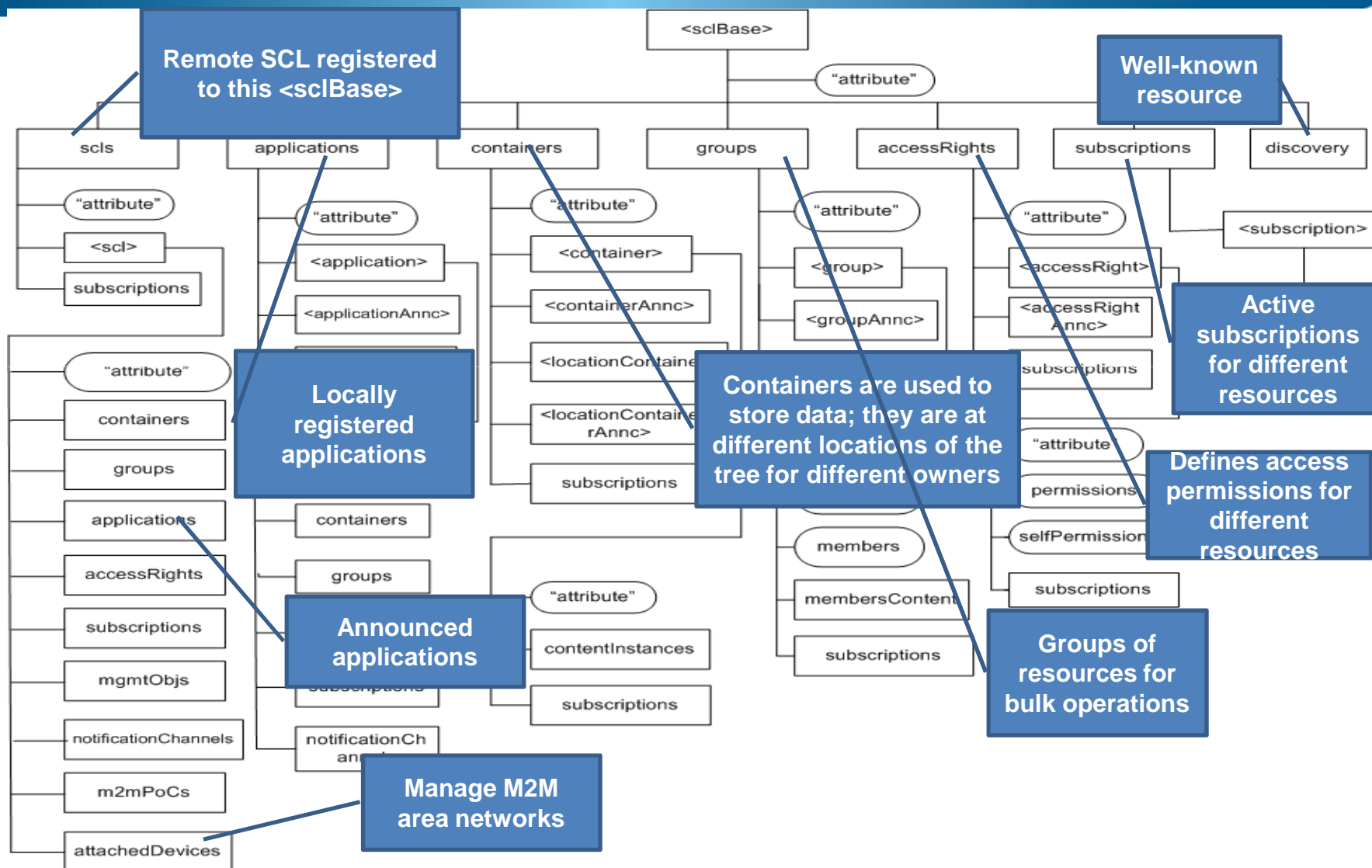
- Client-server
- communication is stateless
- resources can be cacheable
- Uniform Interface
- Resource operations
  - Resource: is a uniquely addressable entity in the RESTful architecture. A resource has a representation that shall be transferred and manipulated with the CRUD verbs. A resource shall be addressed using a Universal Resource Identifier (URI)
- ... ..

🌐 REST approach is widely adopted and can be easily applied to M2M communications

🌐 Interface primitives are based on CRUD (Create, Retrieve, Update, Delete) operations

- Uniform interface can LARGELY reduce implementation efforts

# Resource Tree Overview



- SCL base management: Retrieve and Update SCL base resource
- Collection management: Retrieve and Update collection resources
- SCL management: Registration (Create), De-registration (Delete), Update, Retrieve. Subscription
- Application management: Registration (Create), De-registration (Delete), Update, Retrieve, Subscription, announce/de-announce
- Access rights management: Create, Retrieve, Update, Delete, Subscription, announce/de-announce
- Container management: Create, Retrieve, Update, Delete, Subscription, announce/de-announce; manage container instances
- Group management: manage group resource and members
- Subscription and notification management: subscribe for modifications to a resource and receive updates with the resource is modified
- m2mPoC management: Create, Retrieve, Update, Delete
- Remote entity management: applies RESTful methods to device management procedures
- Resource discovery: retrieve resources under a resource tree
- Announce/De-Announce: common procedures for resource advertisement

**achieved by RESTful operations**



# Binding to HTTP and CoAP

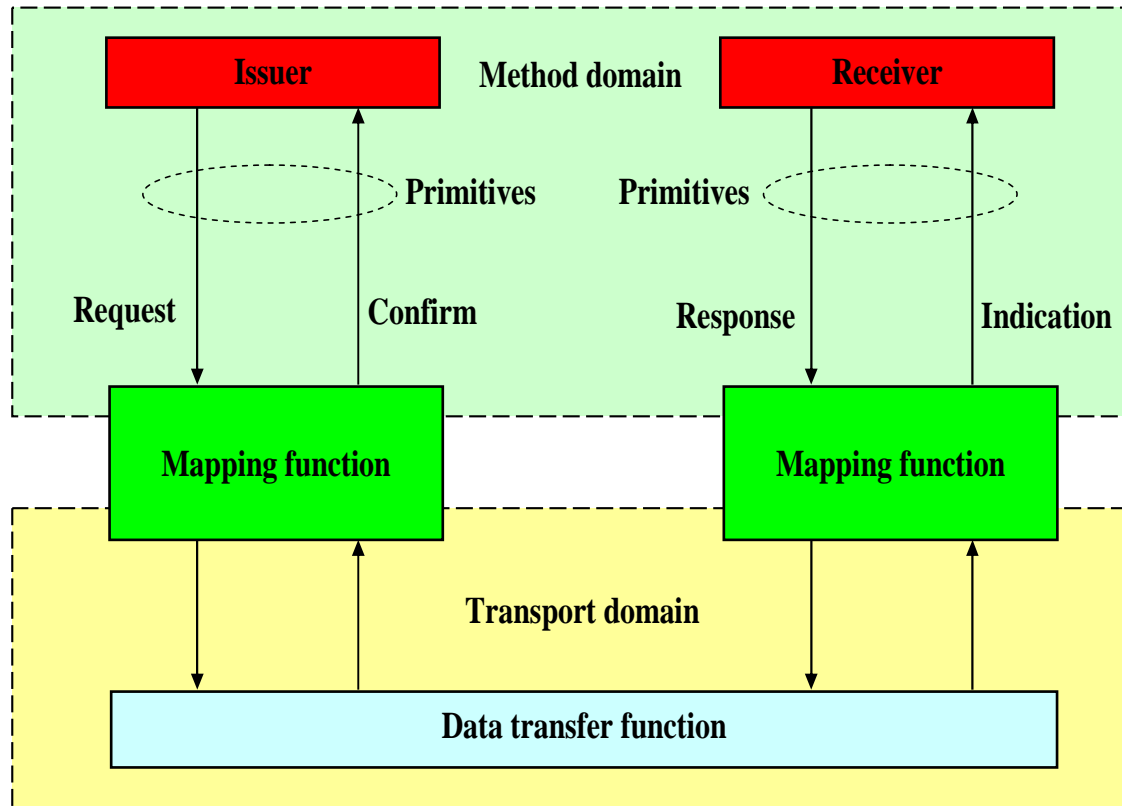


Illustration of ETSI M2M Primitive Binding to Transport Layer Protocols

- Binding to HTTP and CoAP is easy due to ETSI M2M RESTful approach
- Normative mapping defined for both HTTP and CoAP
- Primitives represent the resource operation in the Method domain

# Mapping to HTTP and CoAP Methods



Primitive type	HTTP Method	CoAP Method
xxxCreateRequestIndication	POST	POST
xxxRetrieveRequestIndication	GET	GET
xxxUpdateRequestIndication	PUT	PUT
xxxDeleteRequestIndication	DELETE	DELETE
xxxExecuteRequestIndication	POST (without a body)	PUT ( a GET follows if the execution result or status is not piggybacked in the response)
xxxNotifyRequestIndication	POST (asynchronous notify) response to POST (long polling notify)	POST (asynchronous notify)

# CREATE an sc/ Resource using HTTP

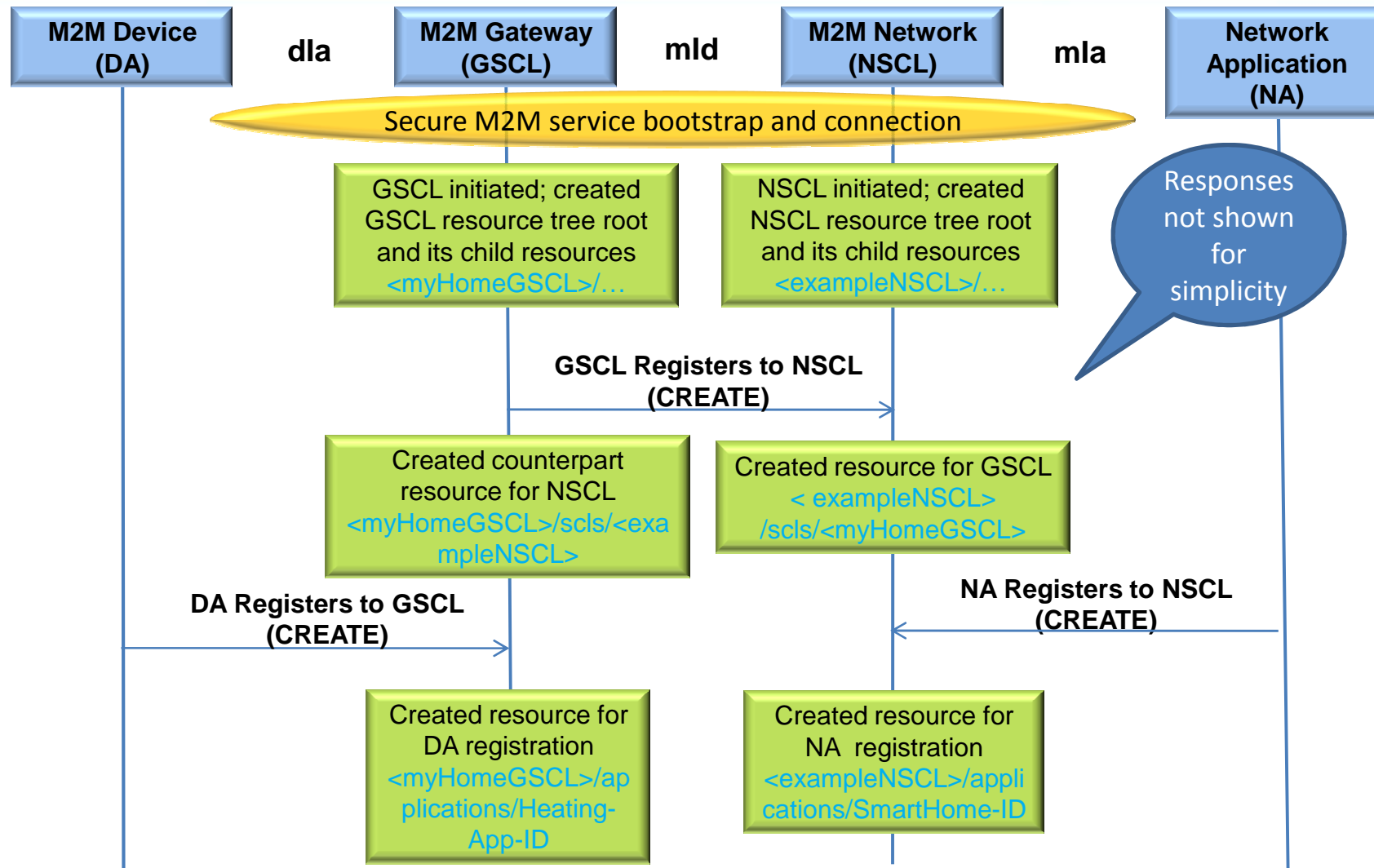


```
POST /scIs HTTP/1.1
Host: nscl.example.com
Content-Type: application/xml
Content-Size: 42
```

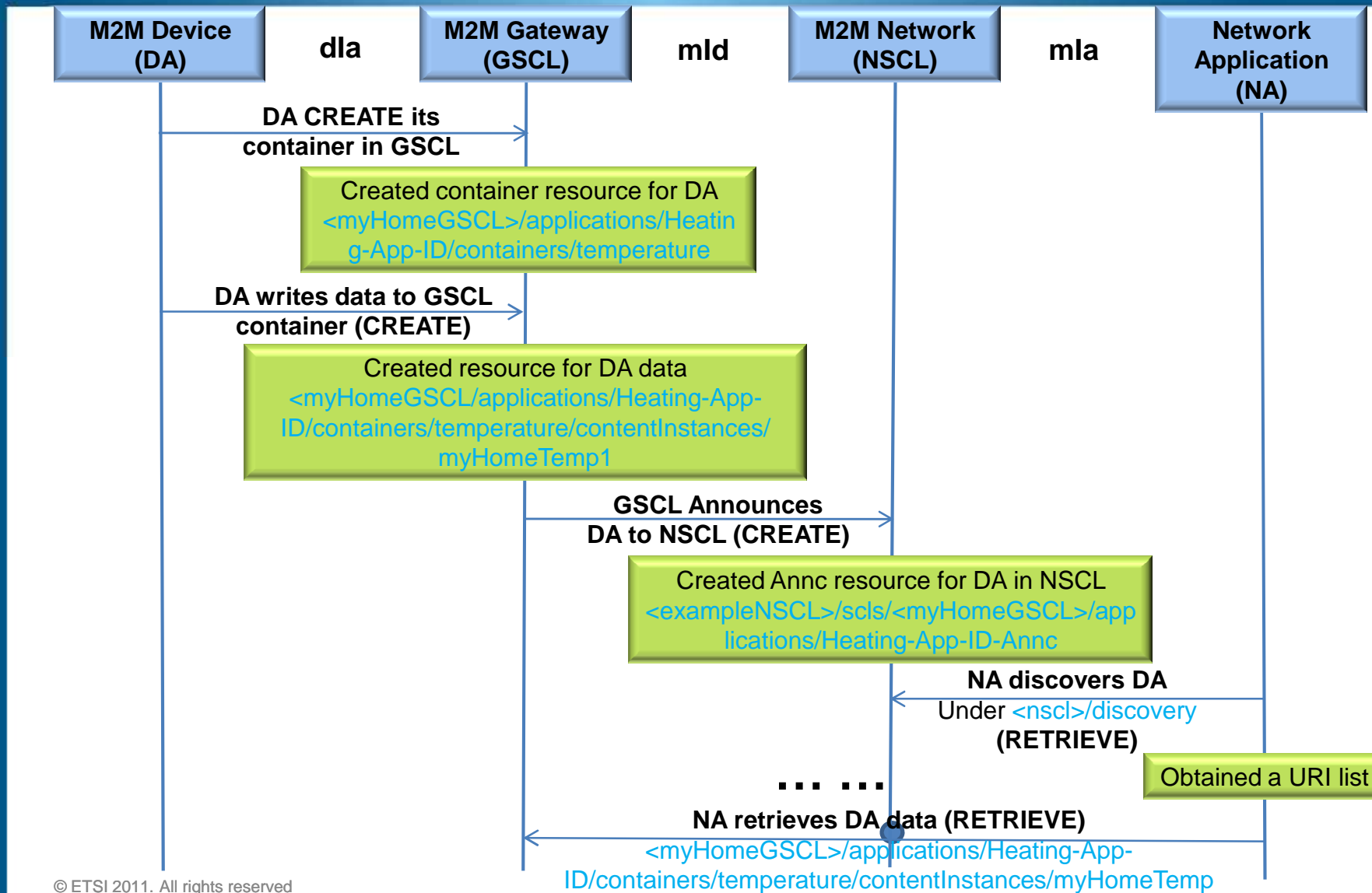
```
<?xml version="1.0" encoding="UTF-8"?>
<scI id="123456789" xmlns:tns="http://uri.etsi.org/m2m"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
  <link>http://gscl.example.com</link>
  <expirationTime>2011-10-27T18:00:00</expirationTime>
  <accessRightID>http://nscl.example.com/accessRights/someAccessRight</access
RightID>
  <searchStrings>
    <searchString>location:sophia antipolis</searchString>
  </searchStrings>
  <mgmtProtocolType>OMA DM v1.2</mgmtProtocolType>
</scI>
```

```
HTTP/1.1 201 Created
Location: http://nscl.example.com/scIs/123456789
```

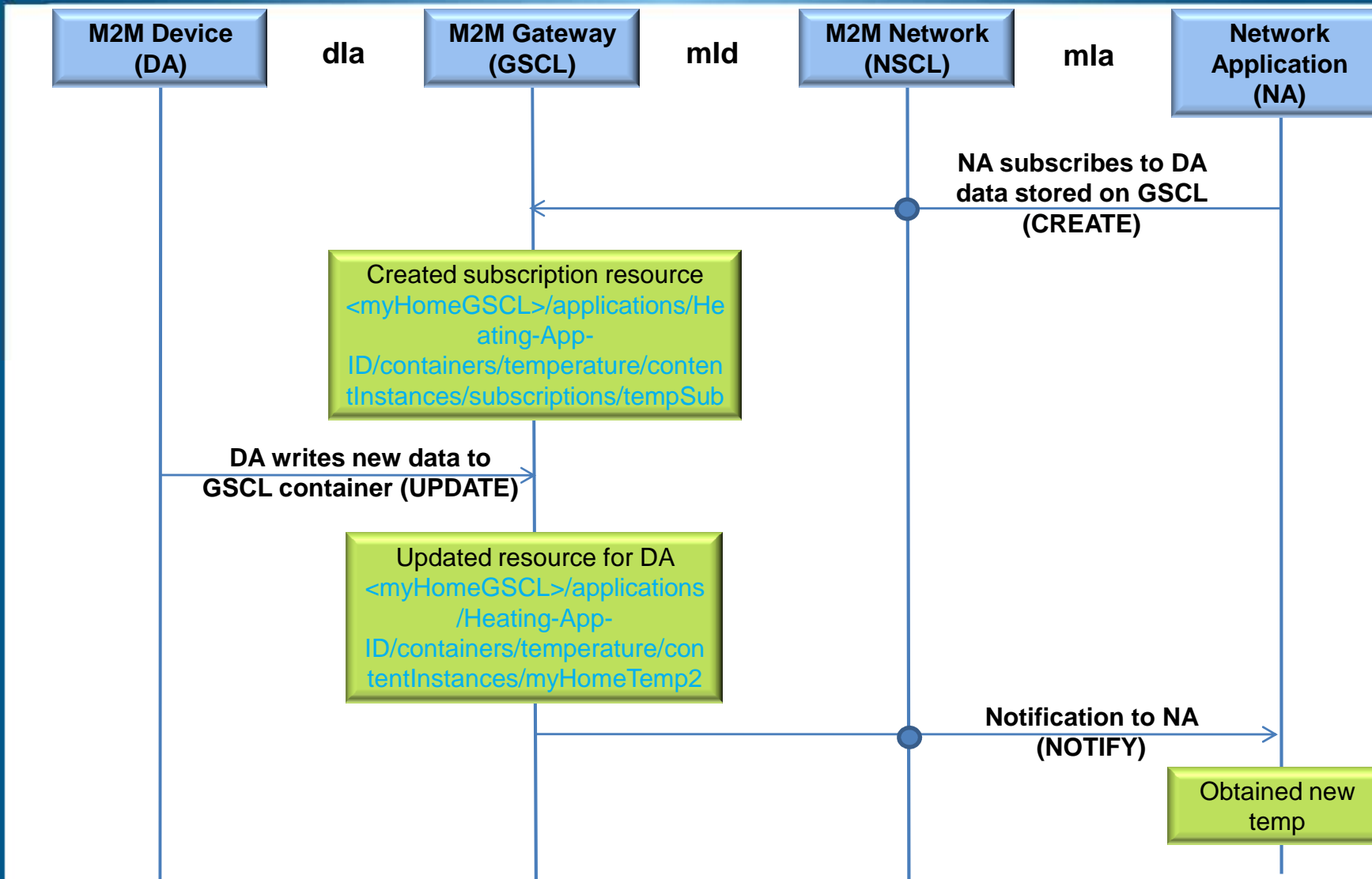
# Example of API and Resource Operations: SCL and Application Registration



# Example of API and Resource Operations: Write Data to Containers, Announce and Data Retrieval



# Example of API and Resource Operations: Subscription / Notifications



- Uniformed interfaces simplify implementation and enable interoperability
- Resources are managed by CRUD operations and addressed by URIs
- Binding to most popular protocols, such as HTTP and CoAP
- Independent from vertical domains (e.g. smart meters, eHealth...)
- Demos compliant to ETSI M2M R1 showing API and resource operations are available after the session

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Thank you!