



OPEN
INTERCONNECT
CONSORTIUM

oneM2M & OIC technical alignment

Joint Technical Workshop
July 20th 2015

OIC & oneM2M alignment

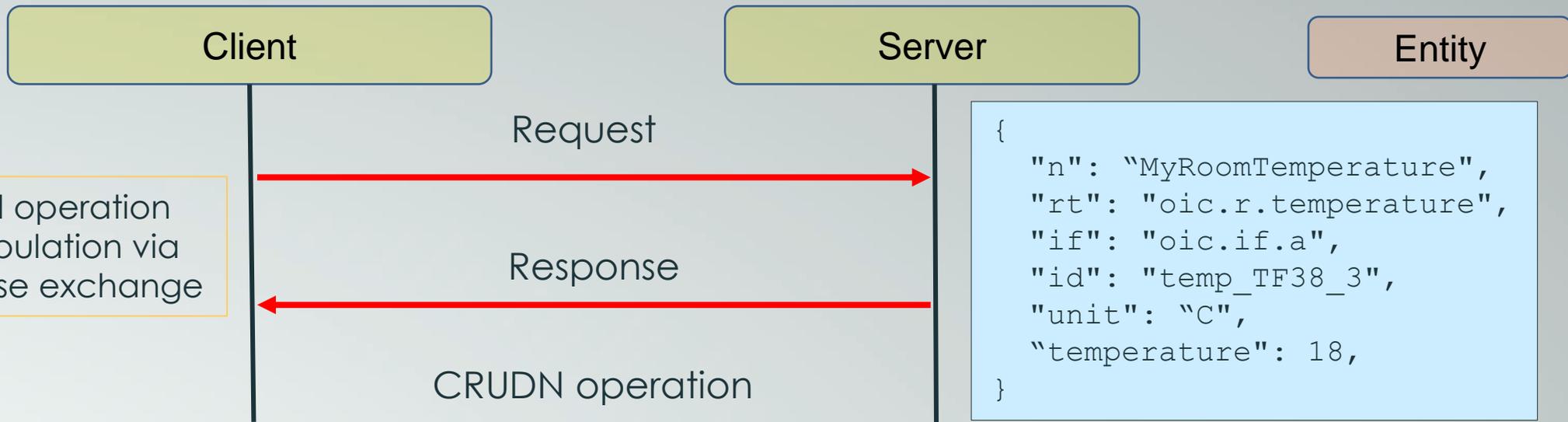
- Objective
 - Definition of 'alignment'; with respect to OIC & oneM2M.
 - e.g. OIC client accesses oneM2M server to turn on oneM2M light & vice versa.
- Requirements
 - Which functionalities are needed for the objective.
 - e.g. OIC client discovers oneM2M server for oneM2M light.
- Means
 - With which technology to provide those functionalities.
 - e.g. OIC client & oneM2M server support Resource Directory following OIC Core spec.



RESTful Architecture Style: OIC & oneM2M



Entity handler



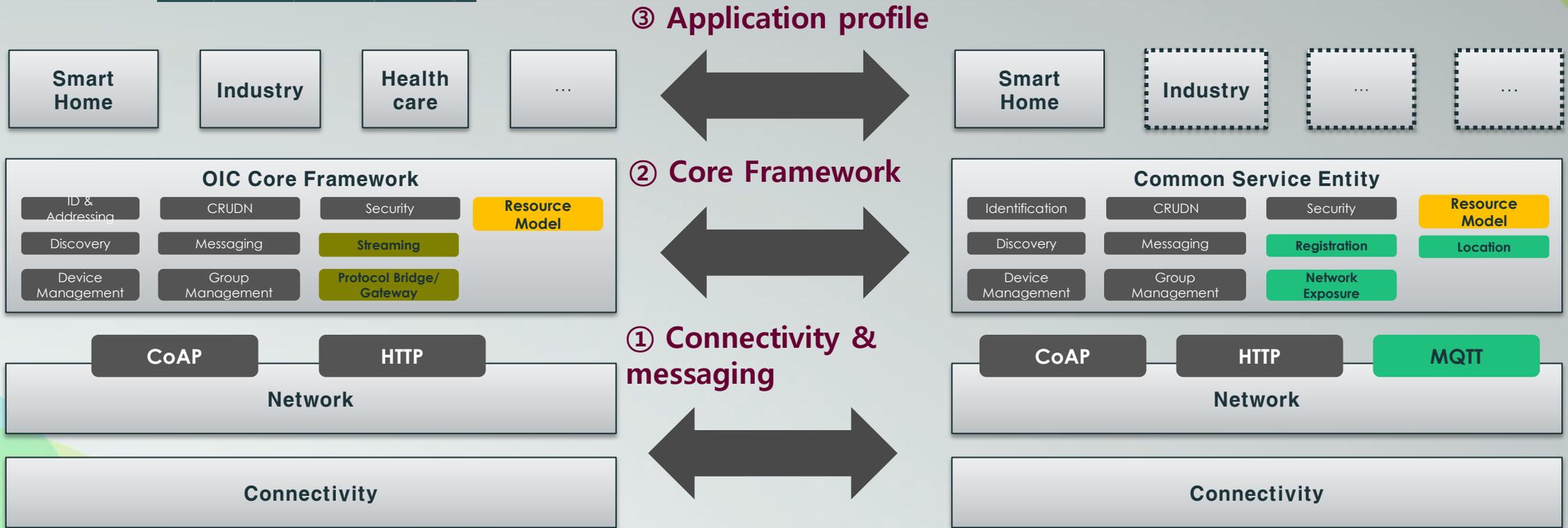
- Resource based operation
- Resource manipulation via Request/ Response exchange

```
{
  "n": "MyRoomTemperature",
  "rt": "oic.r.temperature",
  "if": "oic.if.a",
  "id": "temp_TF38_3",
  "unit": "C",
  "temperature": 18,
}
```

RESTful Architecture Style

- Common operation principle for OIC & oneM2M
 - OIC & oneM2M alignment under RESTful Architecture style
- Alignment considered across 3 layers
 - i) Connectivity & messaging, ii) Core Framework, iii) Application profile

OIC – oneM2M Standard Alignment (suggested)



- common function btw. OIC & oneM2M
- Difference btw. OIC & oneM2M
- oneM2M unique function
- OIC unique function

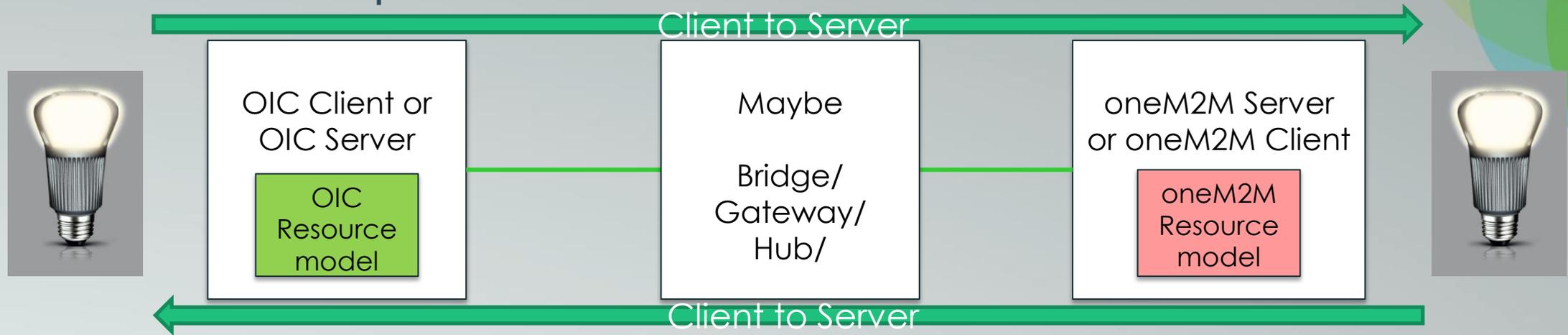


OIC & oneM2M interoperation

- OIC & oneM2M interoperation
 - ✓ OIC Client accesses oneM2M server to manipulate oneM2M resource & interact with the corresponding entity (e.g. set thermostat to cool).
 - ✓ oneM2M Client accesses OIC server to manipulate OIC resource & interact with the corresponding entity (e.g. set thermostat to cool).



Technical requirement



- Connectivity & messaging
 - Client & Server are able to exchange CRUDN request & response messages.
- Core Framework
 - Client is able to discover the Server and resources.
 - Client is able to establish a secure connection to the Server
 - OIC resource model can be mapped into oneM2M resource model and vice versa.
- Application profiles
 - Particular OIC resource representation(s) (data model element) can be translated into oneM2M resource representation(s).

Is this a complete set? Any other high-level requirements?

OIC & oneM2M Alignment current status

- 3 suggested alignment areas for further analysis
 - Application Profile: Ensure OIC & oneM2M application profile interoperability (equivalency/mapping).
 - Core Framework: Ensure the interoperability of OIC framework functions & oneM2M Common Service Functions
 - Connectivity & messaging: Ensure the packet exchange & messaging alignment between OIC & oneM2M entities.

Alignment area	Issues	Description	Current status (from OIC perspective)
Application profile	Application profile discrepancy	OIC & oneM2M may define different resource type for the same physical entity.	i) Need to explore illustrative Use Cases to identify gaps and discrepancies ii) Payload encoding schemes need to align or be readily mapped
Core Framework	Resource model	Different resource construction between OIC & oneM2M	i) Not clear how oneM2M constructs resources. ii) Not clear how or if oneM2M defines mandatory common properties iii) Not clear how or if oneM2M defines what in OIC are core resources (e.g. oic/res or /.well-known/core) iv) OIC uses IETF defined web links (RFC 5988) extensively, not clear how or if oneM2M supports this
	Discovery	Different discovery mechanism between OIC & oneM2M	i) Not clear how oneM2M enables resource discovery.
	ID & Addressing	Discrepancy of identifier & address between OIC & oneM2M	i) Needs to map AE/ CSE & OIC device. ii) URI structure alignment
	Security	Separate security mechanism	i) Needs shared security scheme
Connectivity & Messaging	Connectivity	Ensure the packet delivery among OIC & oneM2M entities	i) Both IP networking based, so potentially interoperable.
	Messaging	Interoperability between messaging protocols (CoAP/ HTTP/ XMPP/ MQTT)	i) Both use CoAP, so CRUDN message can be exchanged if both adhere to applicable RFCs (7252).

Connectivity & Messaging initial comparison

Work items	Description	OIC	oneM2M	Tentative approach
Connectivity	Ensure the packet delivery among OIC & oneM2M entities	<ul style="list-style-type: none"> i) IP network. Underlying connectivity can be any IP supporting PHY/MAC. ii) Non-IP support under consideration iii) UDP & TCP transport iv) No store & forward support yet 	<ul style="list-style-type: none"> i) CSE in charge of data forwarding ii) Store & Forward support iii) IP network support 	<ul style="list-style-type: none"> i) First IP network based connectivity. IP version? ii) May support non-IP network later iii) oneM2M IPE or OIC intermediary can bridge two network
Messaging	Interoperability between messaging protocols (CoAP/ HTTP/ XMPP/ MQTT)	<ul style="list-style-type: none"> i) CoAP mandatory ii) XMPP under development iii) HTTP, MQTT, DDS under consideration 	<ul style="list-style-type: none"> i) CoAP binding ii) HTTP binding iii) MQTT binding 	<ul style="list-style-type: none"> i) First CoAP based messaging ii) Need to align difference in CoAP usage iii) oneM2M IPE or OIC intermediary may translate other protocols



Core Framework initial comparison

Work items	Description	OIC	oneM2M	Tentative approach
Resource model	Different resource construction between OIC & oneM2M	<ul style="list-style-type: none"> i) Resource has 1+ properties ii) Flat structure (no assumed hierarchy) iii) typed web link with "rel" to establish the resource relation iv) Core resource: oic/res, oic/d, oic/p v) Common properties: "rt", "if" vi) Interface (IETF Draft) to manage resource representation on the wire 	<ul style="list-style-type: none"> i) Resource with attribute(s) ii) Hierarchical structure iii) Link relationship iv) Core resource(?) v) Common properties (?) vi) Interface support (?) 	<ul style="list-style-type: none"> i) Compare resource construct ii) Compare Resource Types defined iii) Identify the critical resources for interoperability
Discovery	Different discovery mechanism between OIC & oneM2M	<ul style="list-style-type: none"> i) Distributed discovery support: multicast based CoAP discovery with well-known core resource (oic/res) ii) Centralized discovery support: Resource Directory defined in CoAP 	<ul style="list-style-type: none"> i) Centralized discovery support: CSE in charge (?) ii) Distributed discovery support(?) 	<ul style="list-style-type: none"> i) Centralized discovery based ii) Compare the data structure of resource directory in OIC & oneM2M
ID & Addressing	Discrepancy of identifier & address between OIC & oneM2M	<ul style="list-style-type: none"> i) OIC device (Client & Server) identification as CoAP endpoints ii) Resource identified as URI iii) URI structure with data path & query 	<ul style="list-style-type: none"> i) AE & CSE (Client & Server) identification as CoAP endpoints ii) Resource identified as URI iii) Query? 	<ul style="list-style-type: none"> i) URI structure comparison ii) Resolution mechanism for ID & Address

Application profile comparison

Work items	Description	OIC	oneM2M	Tentative approach
Application profile	OIC & oneM2M may define different resource type(s) for the same physical entity or device property.	<ul style="list-style-type: none"> i) OIC device is defined as a set of resources connected with links to oic/res. Device type is indicated as the rt in oic/d. ii) Resource type represented with "rt" value iii) Flat structure: the set of key=value pair iv) ri (token ID) & content type (Content-Format) in CoAP header 	<ul style="list-style-type: none"> i) oneM2M node hierarchically organized ii) Resource type indication (?) iii) Key= value pair enclosed in "con" (?) iv) ri & cnf in payload. 	<ul style="list-style-type: none"> i) Identify discrepancies ii) Find a way for semantic & syntactic translation iii) Investigate translation point: oic bridge/ intermediary, oneM2M IPE

OIC temperature representation



oneM2M temperature representation

```
{
  "rt": "oic.r.temperature",
  "temperature": 25.32,
  "units": "C",
  "range": "0,100"
}
```

```
{
  "ri": "28375964",
  "cnf": "application/json:0",
  "con": "{ 'timestamp':1413405177000, 'value':25.32 }"
}
```

Proposal for Alignment activity between OIC & oneM2M

- Next steps

- Identify technical requirements: what should be done for which functions as captured in this presentation? Are there further areas for consideration?
- Application profile equivalency.
 - OIC has 20+ devices profiled (and an extensibility mechanism for vendor defined extensions) and 50+ resources defined (schema and API).
- Approach in consultation with specific targeted Use Cases: e.g. simple device control

