OPEN CONNECTIVITY FOUNDATION™

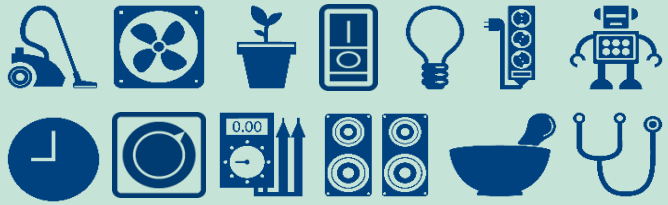
oneM2M Industry Day

Alan Soloway, Qualcomm

12 July 2017

Cloud / Data Centres

Rich Devices / Gateways

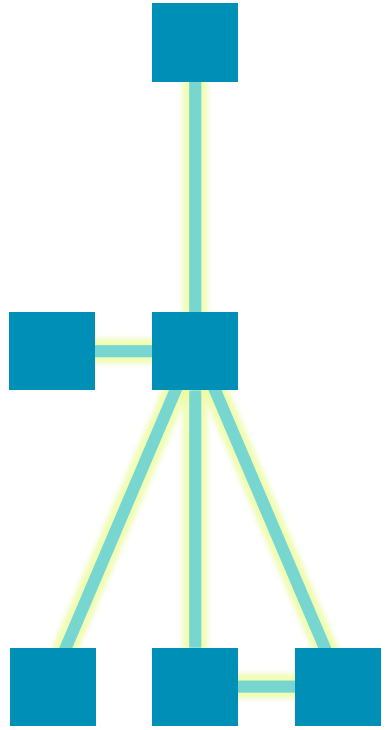


Constrained Devices

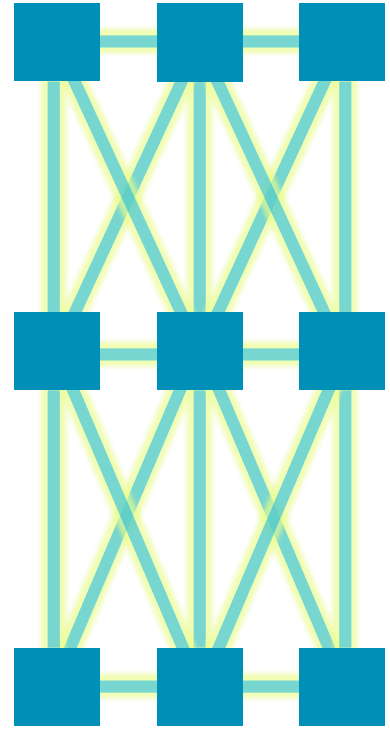
Time

Isolated

Aggregated



Massively Connected



The architecture will need to achieve massive scale

Complexity of Standards

Home/Building

Manufacturing/
Industry Automation

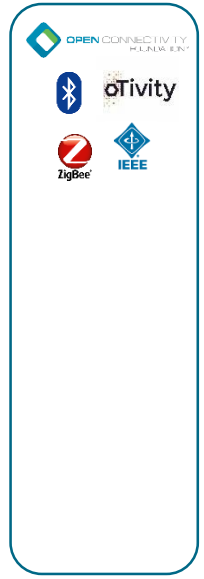
Vehicular/
Transportation

Healthcare

Energy

Cities

Wearables



Farming/
Agri Food

Fragmentation is ***BAD!***

OCF – Driving Consolidation

2014	2015	2016	2017

OPEN INTERCONNECT CONSORTIUM℠

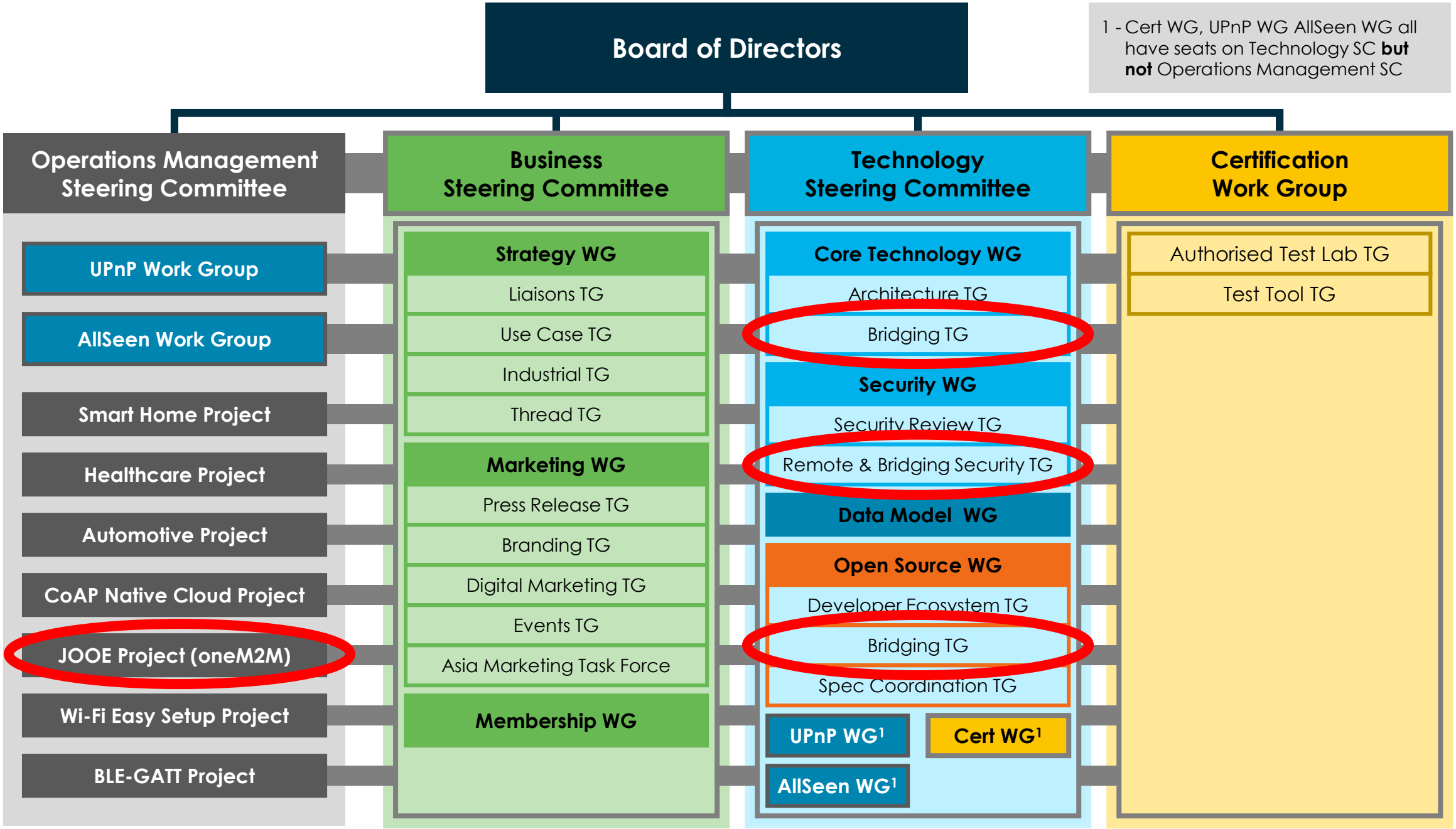
OPEN CONNECTIVITY FOUNDATION™

UPnP™

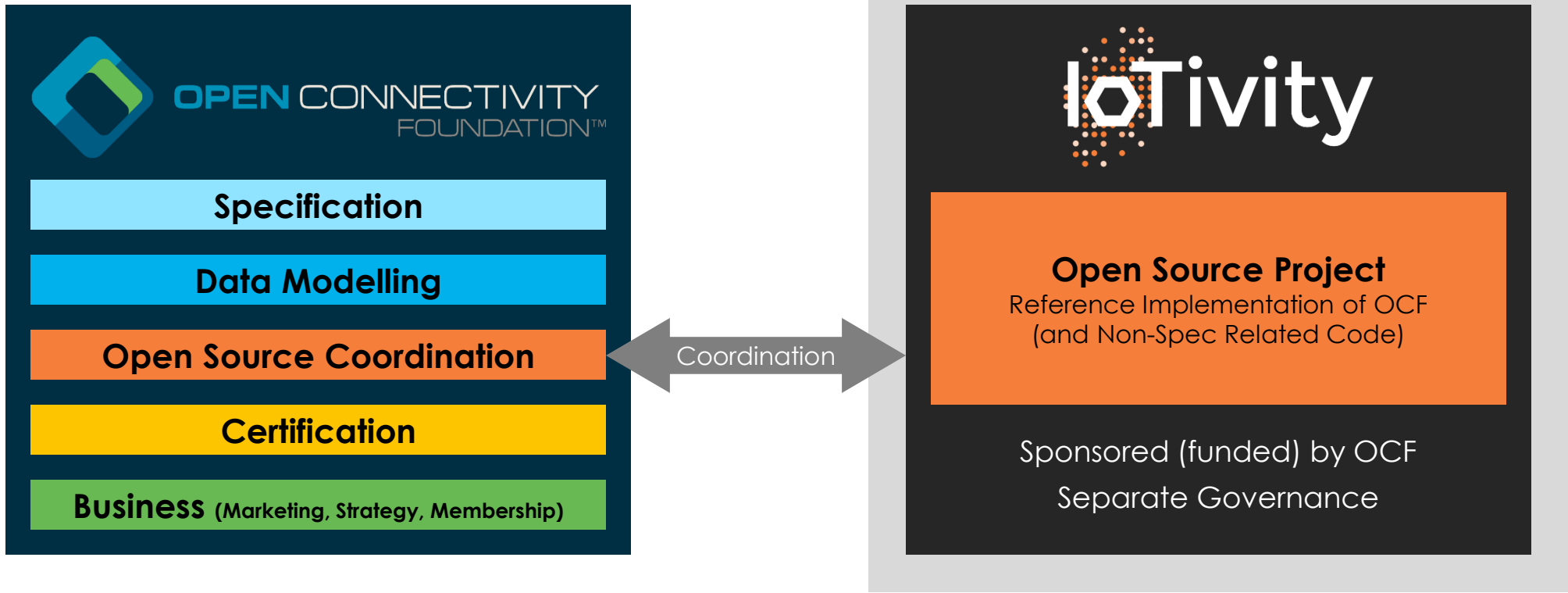
ALLSEEN ALLIANCE

OCF – High Level Goals

- Make it **easy for developers** to deal with the complexity of IoT comms
- Provide a **common data model** that developers can use to interface with all IoT devices and their underlying data
- Establish an architectural foundation that can achieve the necessary **scalability**
- Focus the architecture around **interoperability**
- Supports the needs of **multiple vertical markets** (since many use cases span multiple vertical markets)
- Provide a path towards future **consolidation** of standards

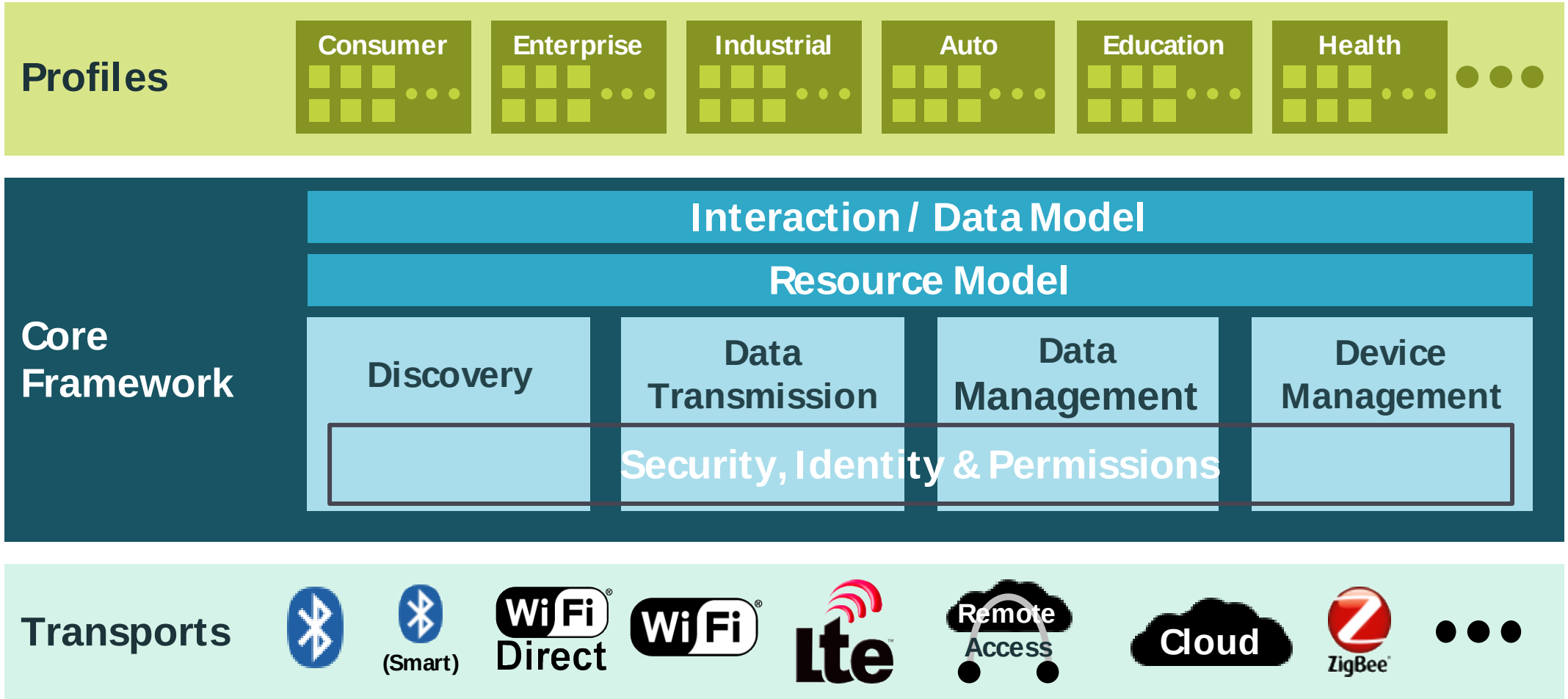

Board of Directors
1 - Cert WG, UPnP WG AllSeen WG all have seats on Technology SC **but not** Operations Management SC
Operations Management Steering Committee
Business Steering Committee
Technology Steering Committee
Certification Work Group
UPnP Work Group
AllSeen Work Group
Smart Home Project
Healthcare Project
Automotive Project
CoAP Native Cloud Project
JOOE Project (oneM2M)
Wi-Fi Easy Setup Project
BLE-GATT Project
Strategy WG
Liaisons TG
Use Case TG
Industrial TG
Thread TG
Marketing WG
Press Release TG
Branding TG
Digital Marketing TG
Events TG
Asia Marketing Task Force
Membership WG
Core Technology WG
Architecture TG
Bridging TG
Security WG
Security Review TG
Remote & Bridging Security TG
Data Model WG
Open Source WG
Developer Ecosystem TG
Bridging TG
Spec Coordination TG
UPnP WG1
Cert WG1
AllSeen WG1
Authorised Test Lab TG
Test Tool TG

OCF & IoTivity



Innovative coordination – Specs & Open Source ready simultaneously

OCF – Conceptual Framework



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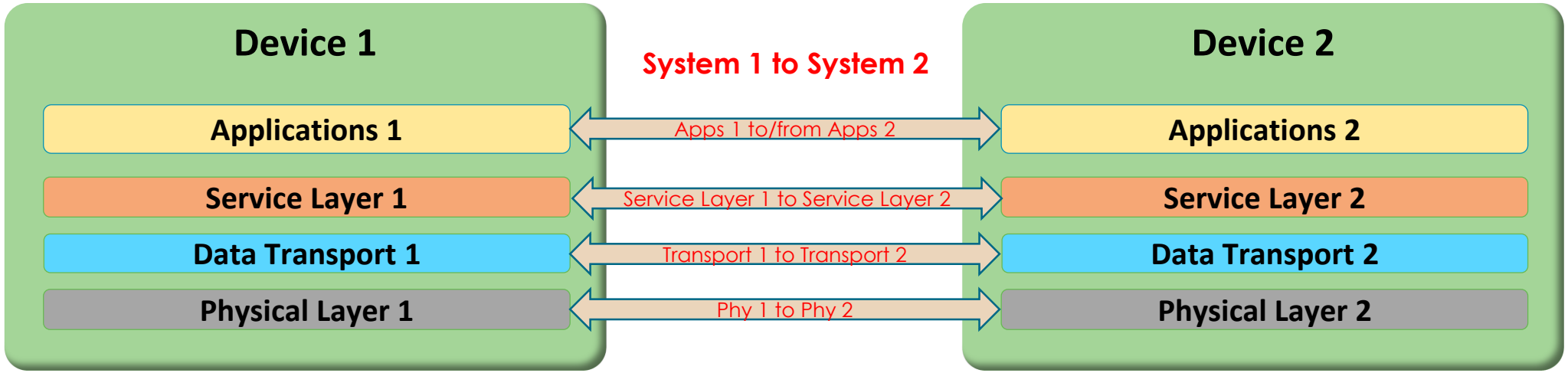
INTEROPERABILITY BETWEEN OCF AND A PARTNER ECOSYSTEM

Interoperability – Building Blocks



- Bridging between ecosystems can happen at any or all of these layers
- Each bridged layer may be independent of or dependent on other layers

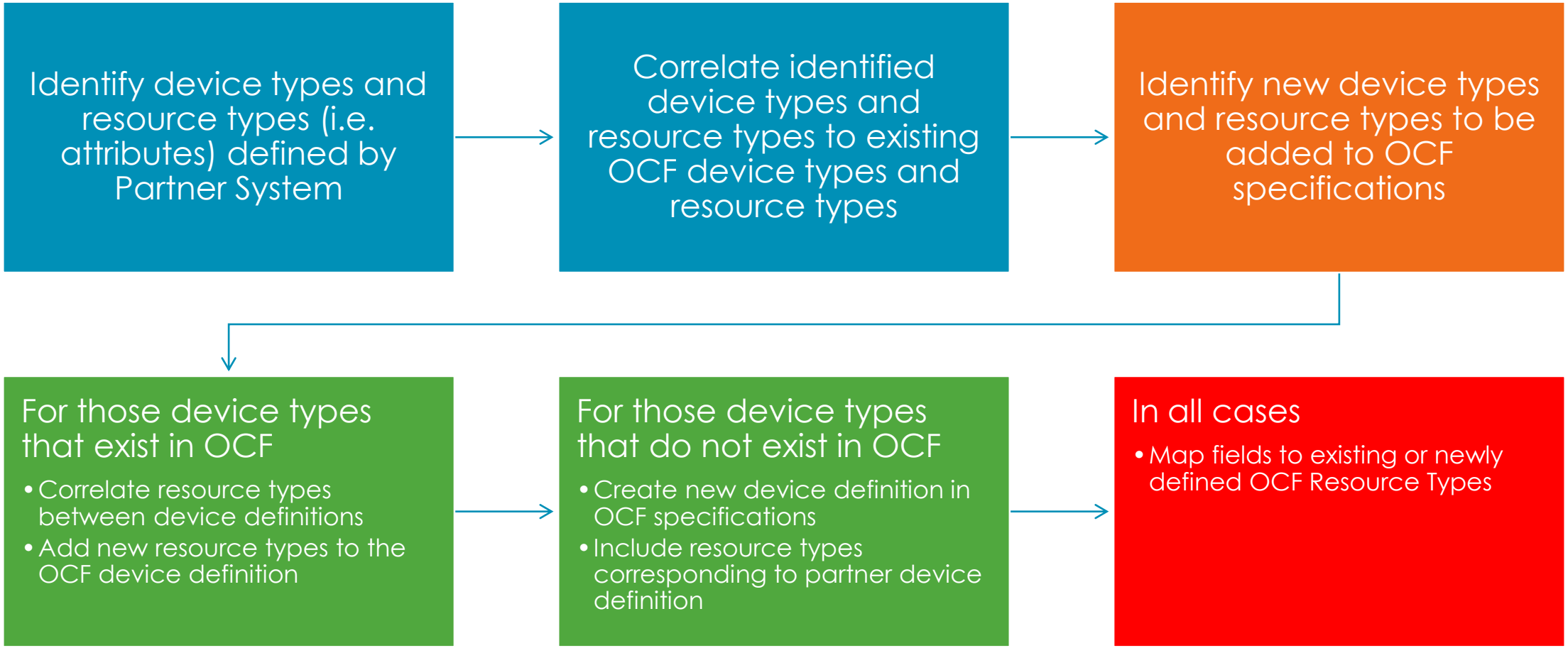
Interoperability Levels

- Data Model – Translation between ecosystem data models
  - Fundamental data types, device definitions and assigned attributes
  - Data Model representation design patterns
    - Arrays, links, inheritance, hierarchical representations
  - Data Model representation markup language
    - JSON, Swagger2.0, RAML/YAML
- Service layer
  - Translation of resource models
- Transport – Translation of ecosystem protocol messages
  - The assumption that there is a one-to-one mapping between operations in different ecosystems is not correct in many cases
  - Transport mapping: Addressability, Encoding, Security
- Logical – Execution of operations across ecosystems
  - State machines, Complex operations, Protocol metadata, Security

Evaluation Steps

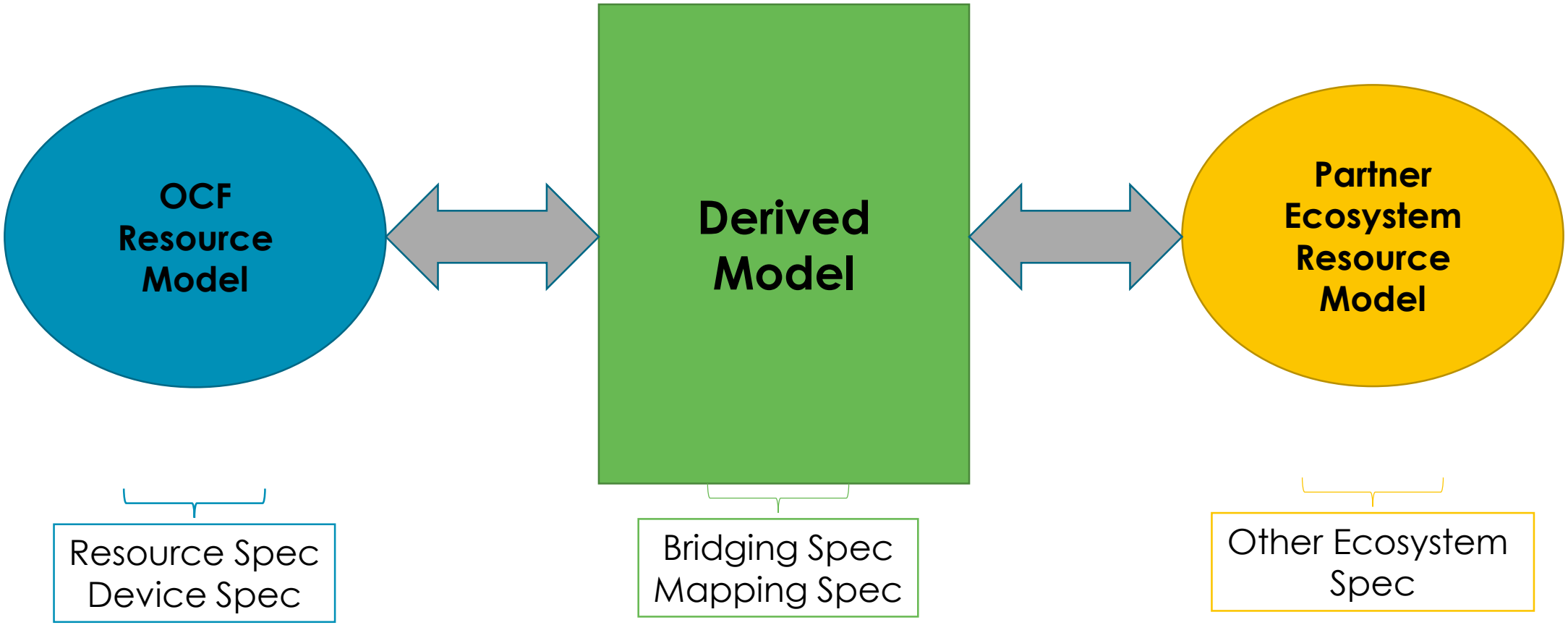
- The primary goal is to determine which levels of interoperability need to be specified by OCF and the Partner Ecosystem
  - Physical Layer
    - This is out of scope of the OCF specifications
  - Transport Layer
    - This is generally out of scope of the OCF specifications
    - OCF assumes IP connectivity and has not addressed the mapping of IP to other ecosystems
      - IP over normally non-IP transport may be addressed in other organizations (e.g. IP over BTMesh)
      - CoAP over non-IP transport may be addressed by OCF if no other industry activity exists (e.g. CoAP over BLE-GATT)
  - Service Layer
    - OCF has created the Bridging Specification to handle the generic interoperability definition between OCF and a Partner Ecosystem
  - Application Layer
    - OCF created Device Specifications and Resource Type Specifications
    - OCF created Mapping Specifications for data mapping between OCF and Partner ecosystems

Evaluation Steps – Data Models



Should the Partner Ecosystem desire equivalence with OCF Data Models, similar effort will need to occur to update the Partner Data Models.

Bridging Concept – Data Model



Bidirectional Operation

Bridging Process – www.oneIoTa.org

- OCF has created an agnostic online repository where the entire IoT industry can address data model interoperability
  - Any organization can request to be registered
  - Each organization owns their own data models
  - Each organization selects the licensing regime most appropriate to that organization
  - JSON, RAML/YAML and Swagger2.0 are currently supported
- Interoperability can be supported by creating derived modelling between organizations whose data models reside in oneIoTa.org
  - Derived modelling frameworks can be generated
- Interoperability can be supported for a bridge implementation
- Used to generate documentation, code stubs and user interfaces

Bridging Process

- OCF and a Partner organization decide to support a bridge between ecosystems
- The Partner organization requests registration on oneIoTa.org
- The Partner organization enters its data models into oneIoTa.org
- OCF creates a derived data model in oneIoTa.org
- A member company of either or both organization(s) implements a bridge
- OCF Plugfests are available to be able to test that bridge device
- The OCF Certification program is enabled to test the bridge device
  - The Partner organization can also certify the bridge device independently or a joint certification program can be discussed

Bridging Security – Last but NEVER Least

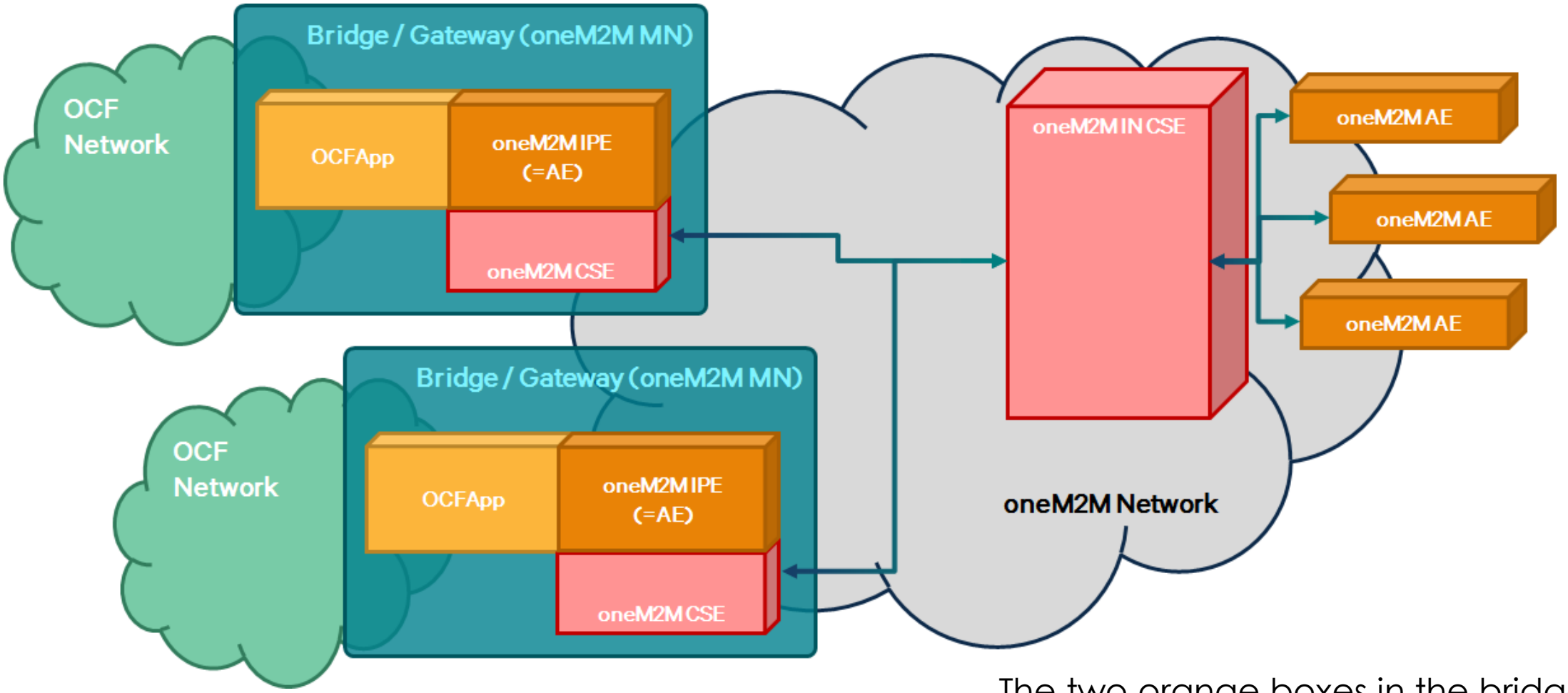
- The Bridge (between ecosystems) needs to be a trusted entity as it translates at the message payload level
- The Bridge itself and all Virtual Devices that it exposes must be onboarded (transfer of ownership) and provisioned for secure operation
- Each Virtual Device must implement the security (including encryption) requirements of the ecosystem to which it is connected
- Enables selective blocking of communications with specific service endpoints and clients
  - This fine-grained control allows the network administrator to selectively allow communications across the ecosystems which may not have the same security capabilities

JOINT OCF/ONEM2M ECOSYSTEM (JOOE)

JOOE Charter

- The purpose of this project is to fully define solutions for interworking between OCF and oneM2M components in a complementary way and coordinate between the organizations for significant market penetration
- The overall goal is to create a joint ecosystem larger than the sum of the individual parts that benefits from the strength of both technologies while avoiding significant overlap
- The work will include specification of technical solutions for interworking, alignment of data models, coordination on work split, joint marketing/communications activities, and business development

JOOE Conceptual Architecture



The two orange boxes in the bridge represent a single operational control point

QUESTIONS?

THANK YOU

https://openconnectivity.org