INTRODUCTION TO OCF AND IoTIVITY

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Massively connected systems exist today…
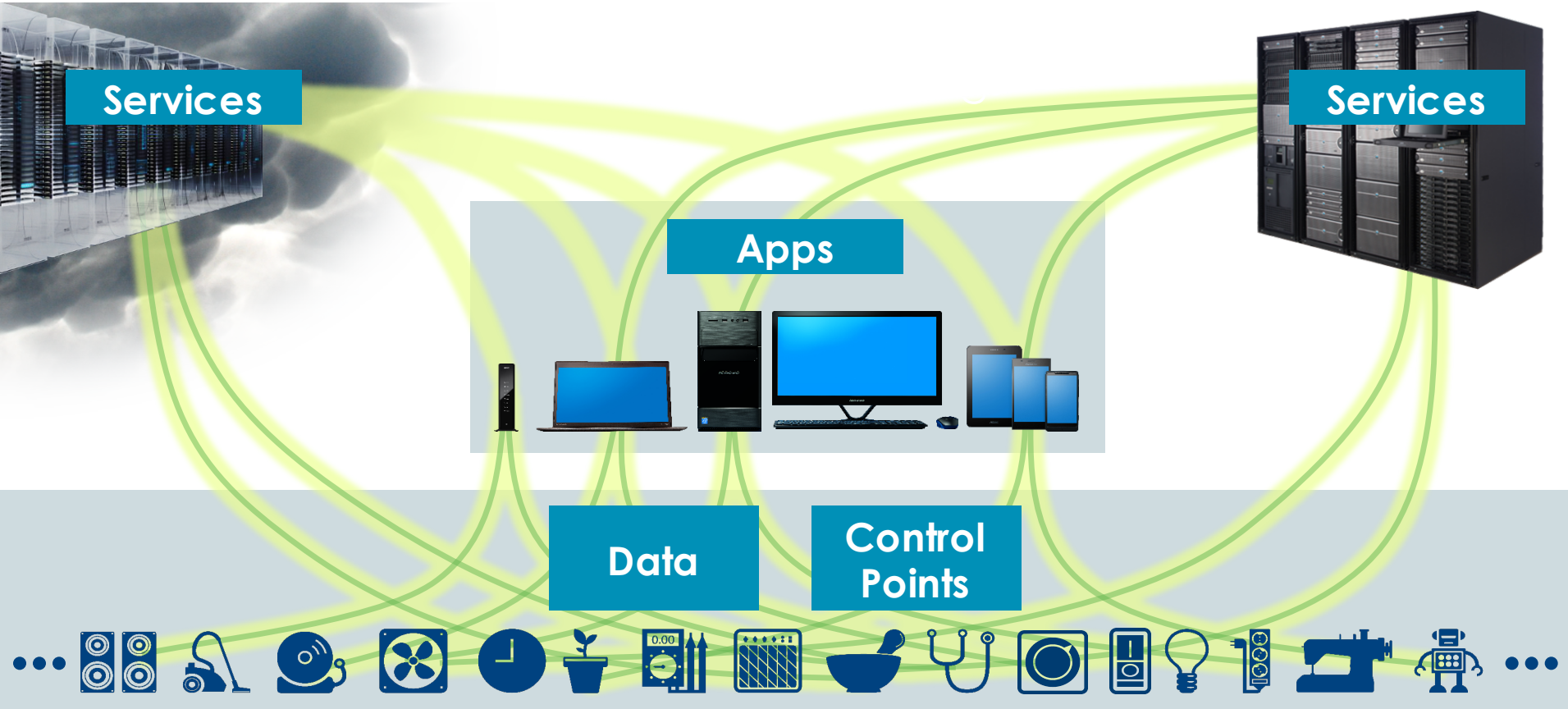

Services

Apps

Services

- Before IoT: Apps on Rich Devices communicate with Services in the Cloud or in Data Centres

- Comms are relatively easy for developers with well defined standards, including security & identity

So, what's changed with IOT…?

- Moore's Law marches on…
  - Lower cost compute power
  - Lower cost communications

- Now realistic to put compute & comms in small, fixed-function devices

- Devices you were already going to buy will now be smart & connected
  - Very fast ramp in volume
  - And some new types of devices too!

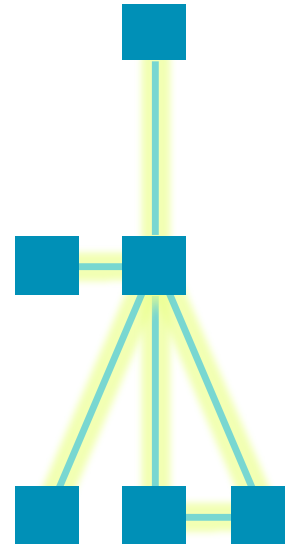- Explosion in the amount of data & number of control points

Services

Services

Apps

Data

Control Points

Communications just got a lot more complicated!

Cloud / Data Centres

Rich Devices / Gateways
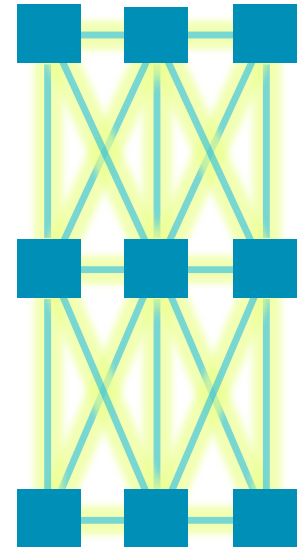
Constrained Devices

Time

Isolated

Aggregated

Massively Connected

The architecture will need to achieve massive scale

Summary of Challenges for IOT Communications

- Value will be delivered by apps & services, and…

- Apps & services need access to data & control points to deliver that value, but…

- Developers find it difficult to access all the data and control points

- Use cases are more complicated

- The system and therefore comms needs to achieve massive scale

- The solution must work across form factors, OSs, platforms, manufacturers, service providers and vertical markets.

- The solution must also scale from constrained devices to smart devices to the Cloud
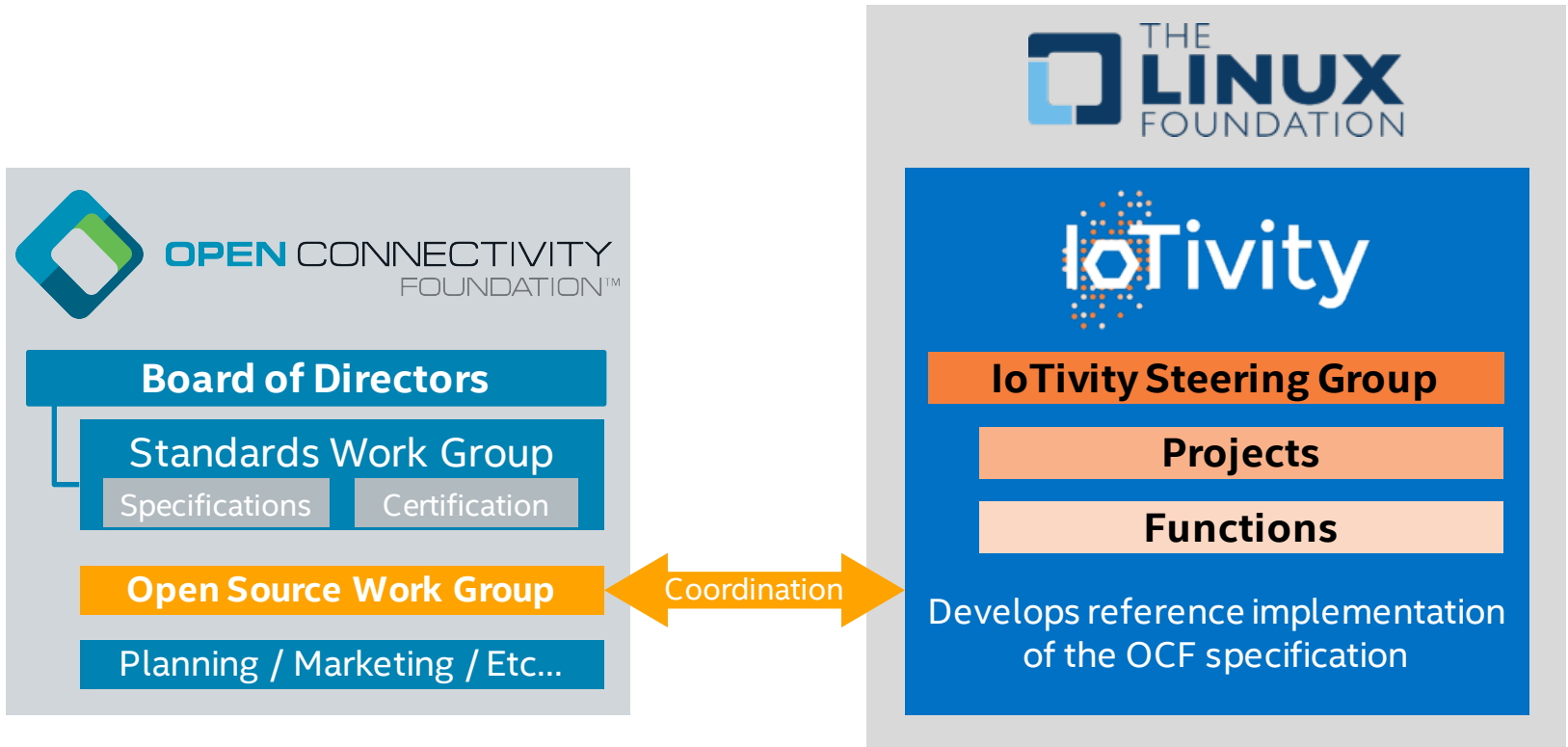
OCF Addresses These Challenges

- 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 data

- Deliver as much **interoperability** as possible in the short term

- Provide a path towards future **consolidation**

- Supports the needs of **multiple vertical markets** (since many use cases span multiple vertical markets)

- Establish an architectural foundation that can achieve the necessary **scalability**

OCF – spec and open source under a single governance

Board of Directors

Standards Work Group

Specifications   Certification

Open Source Work Group

Planning / Marketing / Etc…

Coordination

IoTivity Steering Group

Projects

Functions

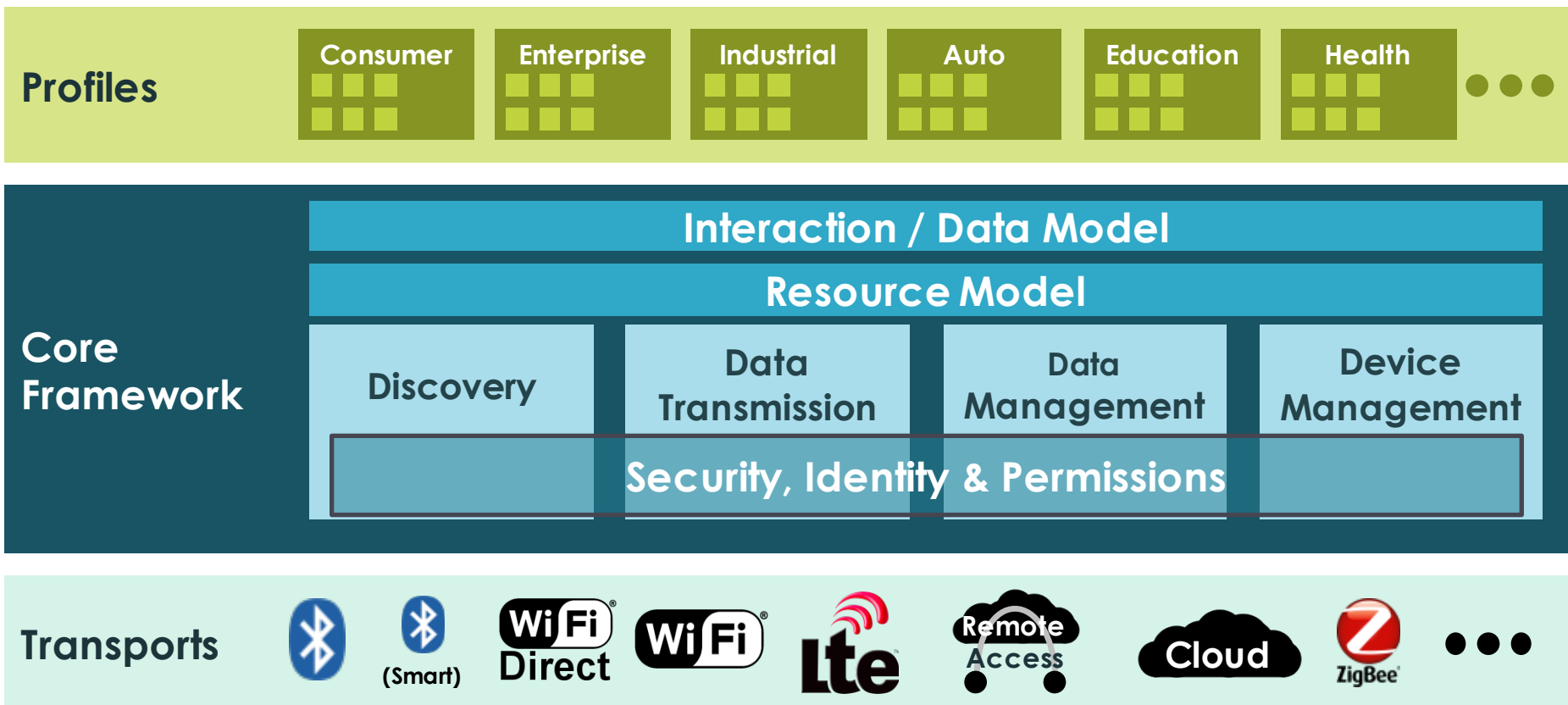Develops reference implementation of the OCF specification

OCF – Key Concepts

- Free IPR License (Code: Apache 2.0 & Spec: RAND-Z)
  - License covers both code, standards and related IPR
  - License applies to members and affiliates of members

- Dedicated and optimized protocols for IoT (e.g. CoAP)
  - Specific considerations for constrained devices
  - Fully compliant towards RESTful architecture
  - Built-in discovery and subscription mechanisms

- Standards and Open Source to allow flexibility creating solutions
  - Able to address all types of devices, form-factors, companies and markets with the widest possibility of options
  - Open Source is just one implementation to solve a problem

- Certification and Logo program
  - Use of certified Authorized Test Labs around the world

OCF Conceptual Framework

Profiles

Consumer	Enterprise	Industrial	Auto	Education	Health

Core Framework

Interaction / Data Model

Resource Model

Discovery	Data Transmission	Data Management	Device Management

Security, Identity & Permissions

Transports

Bluetooth · Bluetooth (Smart) · WiFi Direct · WiFi · Lte · Remote Access · Cloud · ZigBee
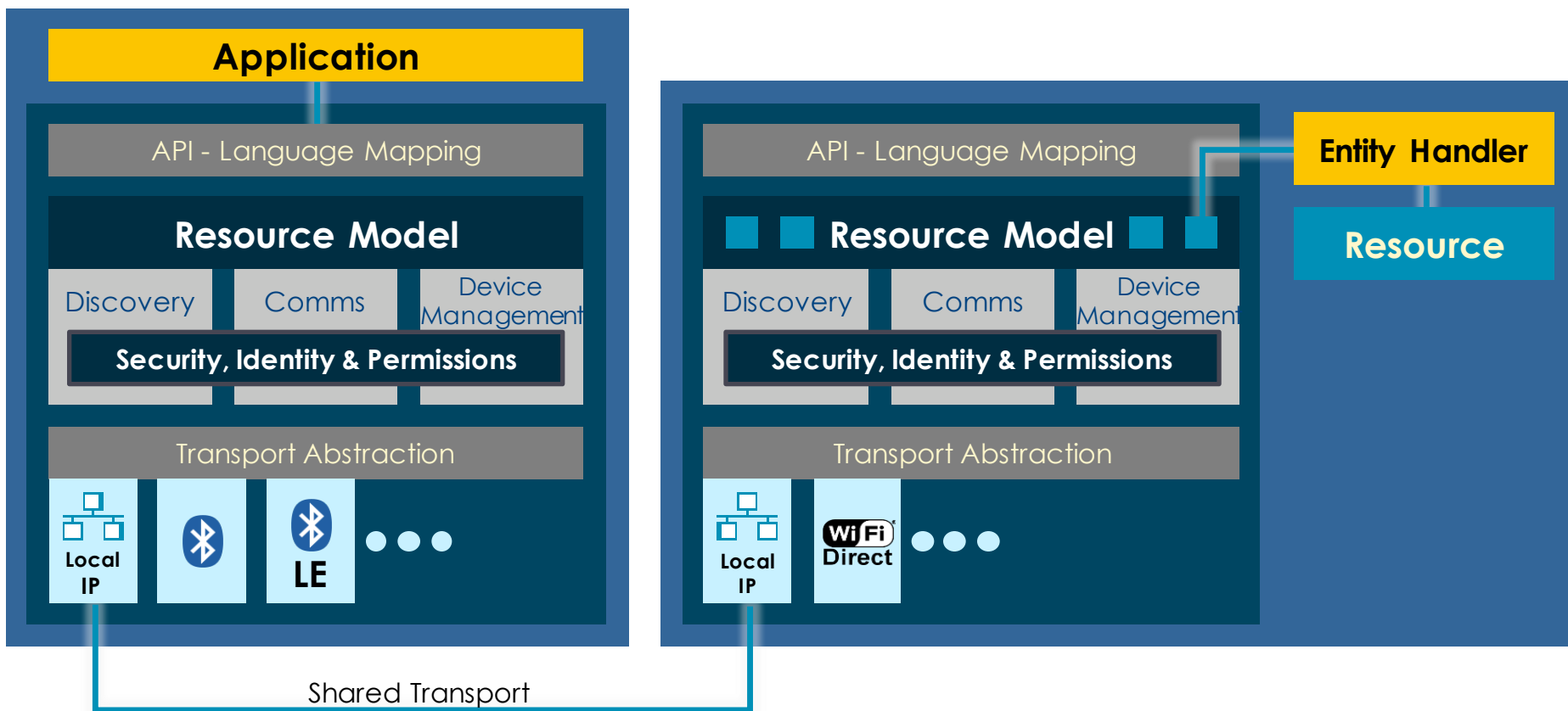
OCF Resource Model

- The resource model, coupled with the common data model, provides the base interoperability of OCF

- Any physical or software artifact on a device that needs to be manipulated or made visible across the network can be described via the resource model

- A resource has a URI and a collection of Properties
  - The following Properties are mandatory:-
    - Resource Type ('rt)
      - 'oic.r.light'
    - Resource Interface(s) ('if')
      - 'oic.if.a'
    - Resource Properties with associated key/value pairs
      - 'status: binary'

# OCF Interaction Model - CRUDN

- CREATE
  - Create a new Resource on the Server
- RETRIEVE
  - Get the current State or representation of a Resource from a Server
- UPDATE
  - Request a partial or complete update to the information stored in a Resource
- DELETE
  - Remove a Resource from the Server
- NOTIFY
  - Request asynchronous notification of state changes in a Resource

Accessing Resources over the Network

Accessing non-OCF Resources
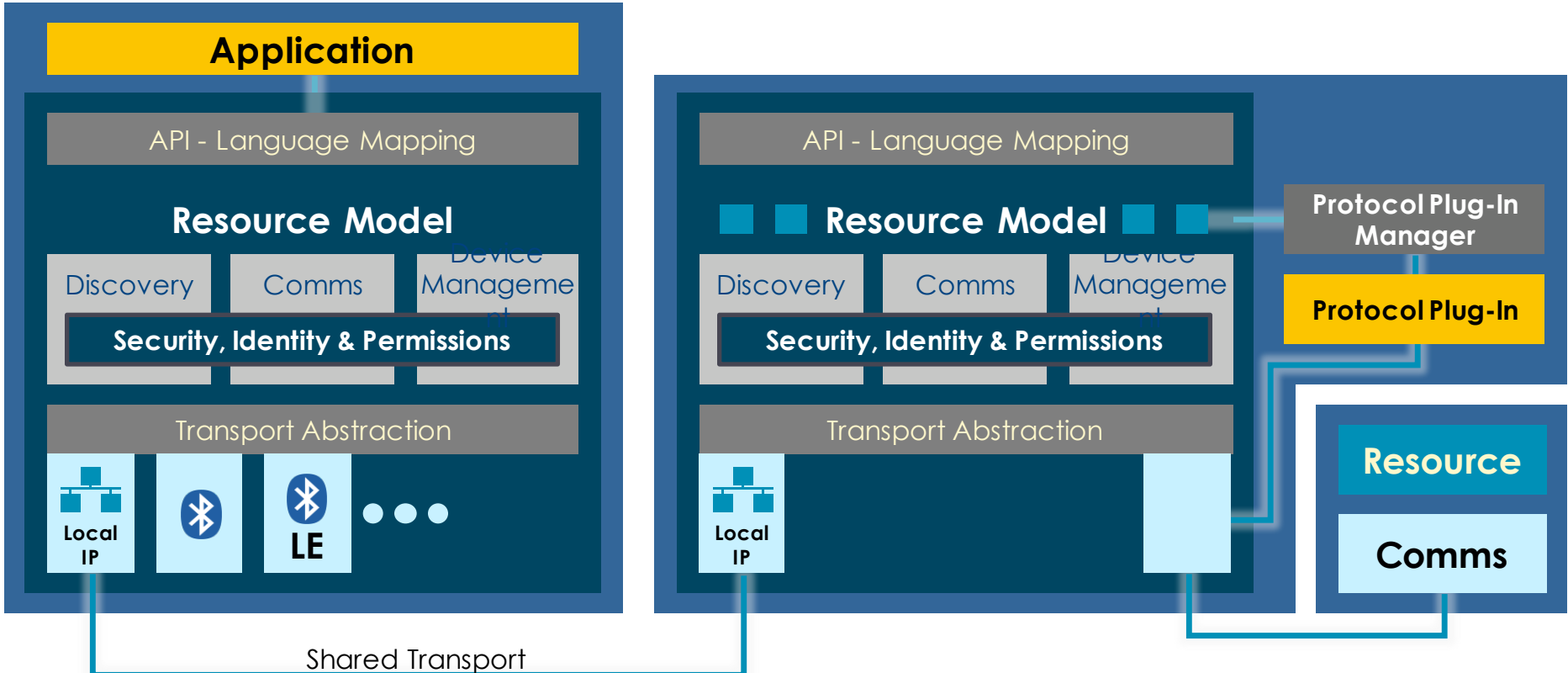
OCF Security Summary

- OIC key management supports end-to-end device protection
  - DTLS link-layer
  - ECC, AES, X509

- Resource layer ACLs allow intended interactions while preventing unintended interactions
  - ACL permissions
    - Resource, interface, wild-card
    - CRUDN

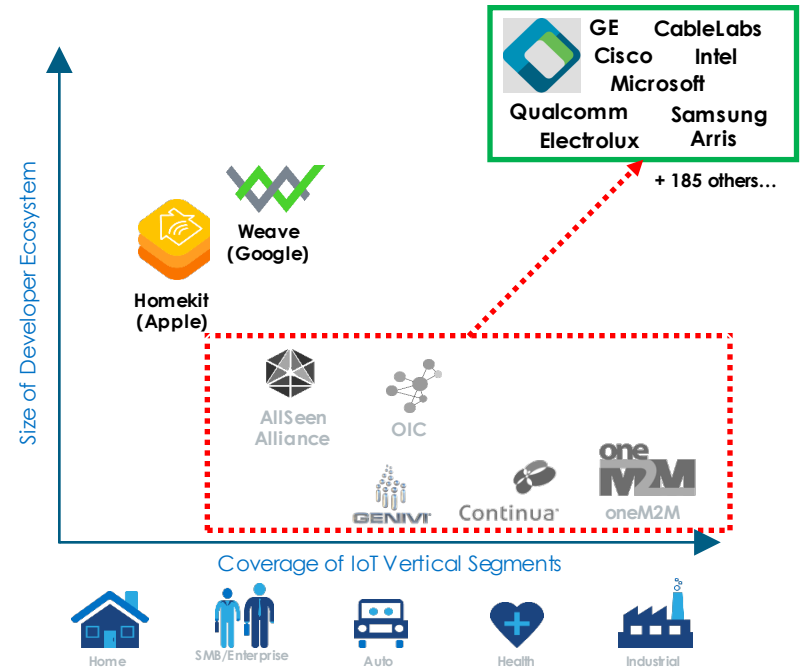- Secure device ownership helps prevent attacks when devices are added to the network

OCF Data Modeling - oneIoTa

- Online tool for designing interoperable device data models for the Internet of Things

- Outputs RAML and JSON files that are instantly compatible with the OCF RESTful architecture

- Enables crowd-sourcing of data models

- Device data models can be used to generate documentation, code stubs and user interfaces

- http://oneIOTa.org

To Summarize…

- The Open Connectivity Foundation (OCF) was announced Feb 2016
  - OCF solves connectivity challenges for OEM's and developers
  - Microsoft, Intel, Qualcomm, Electrolux, GE, Cisco and Samsung have come together and formed OCF with the intention of unifying standards efforts
  - IPR Policy following established industry norms
  - Technical foundation is a cloud-native architecture to achieve massive scale
  - Full interop with AllSeen and other ecosystems planned

- OCF on track to grow to over 300 members by the end of 2016
  - Well-resourced efforts in Smart Home, Industrial, Automotive, and Health
  - Top OEM's, brands, operators and service providers from around the world are now joining
  - Continuing efforts to further converge the industry

- Now is the time to join OCF and help lead

THANK YOU!

For more information:-

https://www.openinterconnect.org

https://www.iotivity.org