OPEN INTERCONNECT CONSORTIUM

Introduction to "IoTivity" | OIC Open-source Project

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Agenda

- Open Interconnect Consortium
- IoTivity Technology
- Backup

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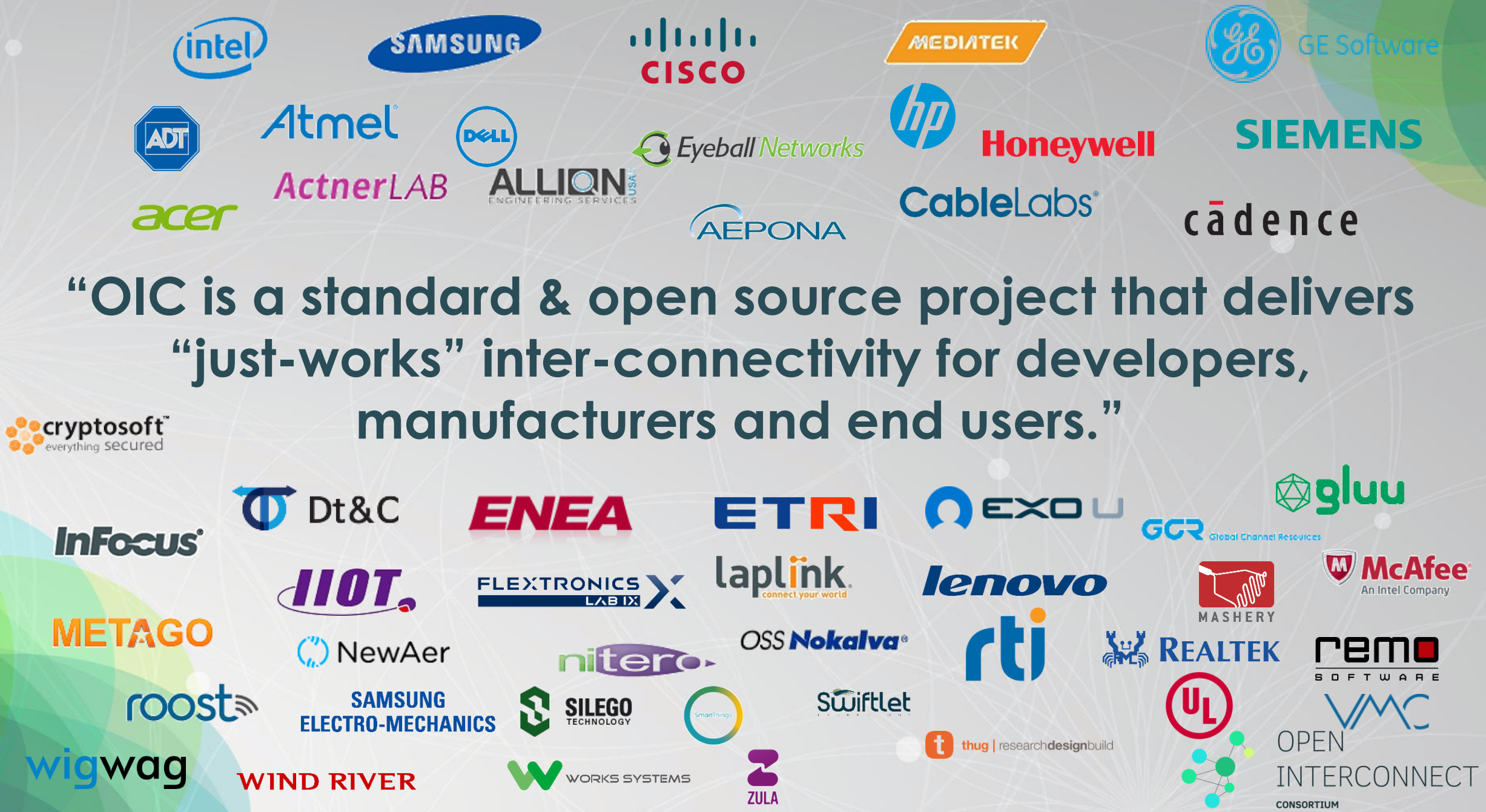
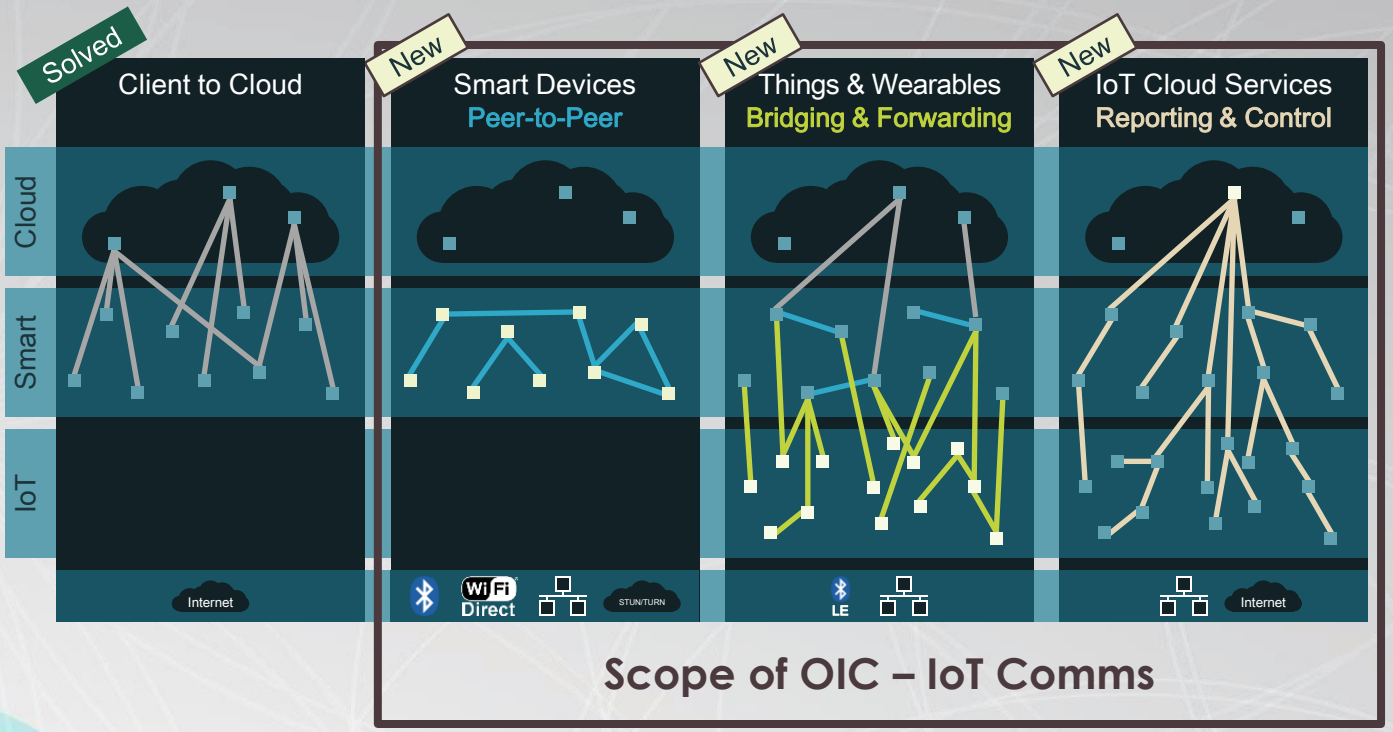
Open Interconnect Consortium



"OIC is a standard & open source project that delivers "just-works" inter-connectivity for developers, manufacturers and end users."

OIC Vision and Goals



Secure and reliable device discovery and connectivity.

Enabling developers and manufacturers via an open source project.

Delivering an industry standard specification & certification program.

OIC will address the challenge of IoT comms

Single solution covering interoperability.
Promotes interoperability versus closed solutions.
Delivers necessary connectivity from all IoT devices.

= Local Network / Same Subnet (Wi-Fi, Ethernet, etc…)

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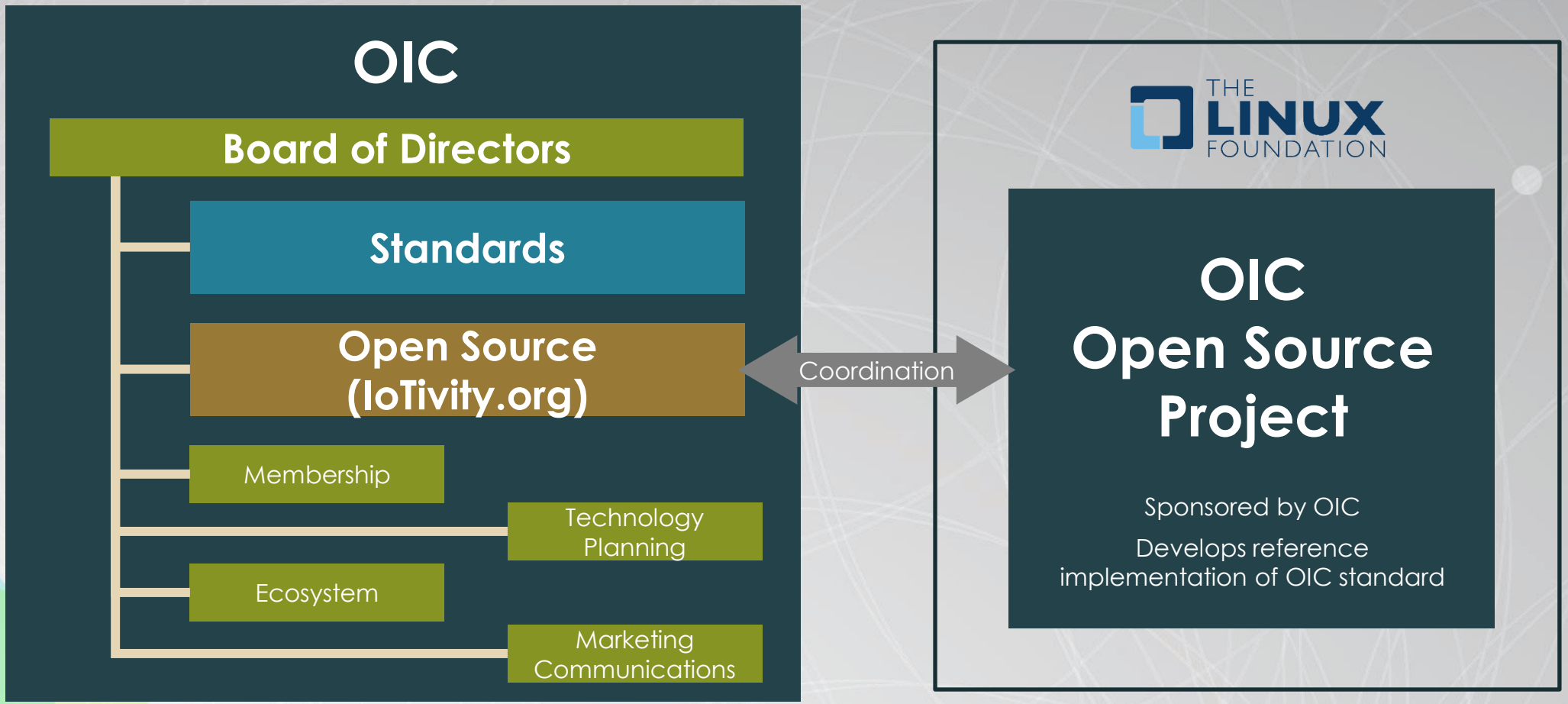
High Level OIC Governance Structure



- OIC is a royalty free organisation
- Open Source – Apache 2.0

Use the code from IoTivity.org

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Introduction to IoTivity
(OIC Open-source Project)

Conceptual Framework

Services

- Soft-sensor
- Protocol Plug-In
- Things Graph
- Notification
- Resource Manipulation
- • • •

Framework

Resource Model

- Discovery
- Data Transmission
- Data Management
- Device Management

Security, Identity & Permissions

Transports

- Ethernet
- LE
- Wi Fi Direct
- Wi Fi
- Remote Access
- Cloud
- ZigBee
- • • •

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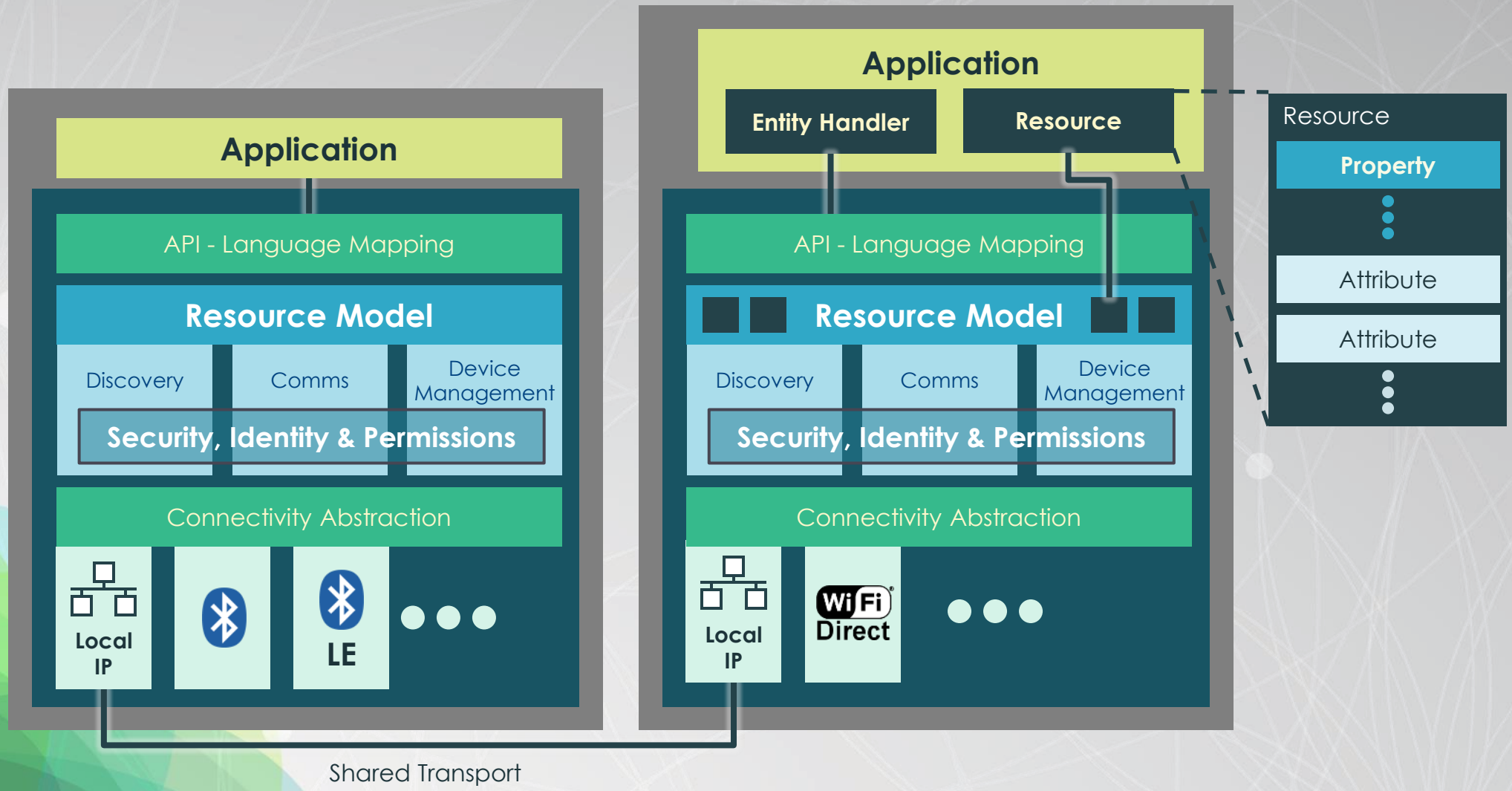
IoTivity Structure



Property
- Resource Name
- Resource Type
- Resource Interface
- Discoverability
- Access Control List
- Observable
- Etc…

Attribute
- On-off state
- Brightness
- Temperature
- Location
- Friendly name
- Sensor version
- Etc…

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Light Resource Examples

Resource
Light
Status: On/Off

Resource
Light
Status: On/Off
Dimming: 0-100

Resource
Light
Status: On/Off
Dimming: 0-100
Hue: RGB
Hue: HSL
Colour Temp: K

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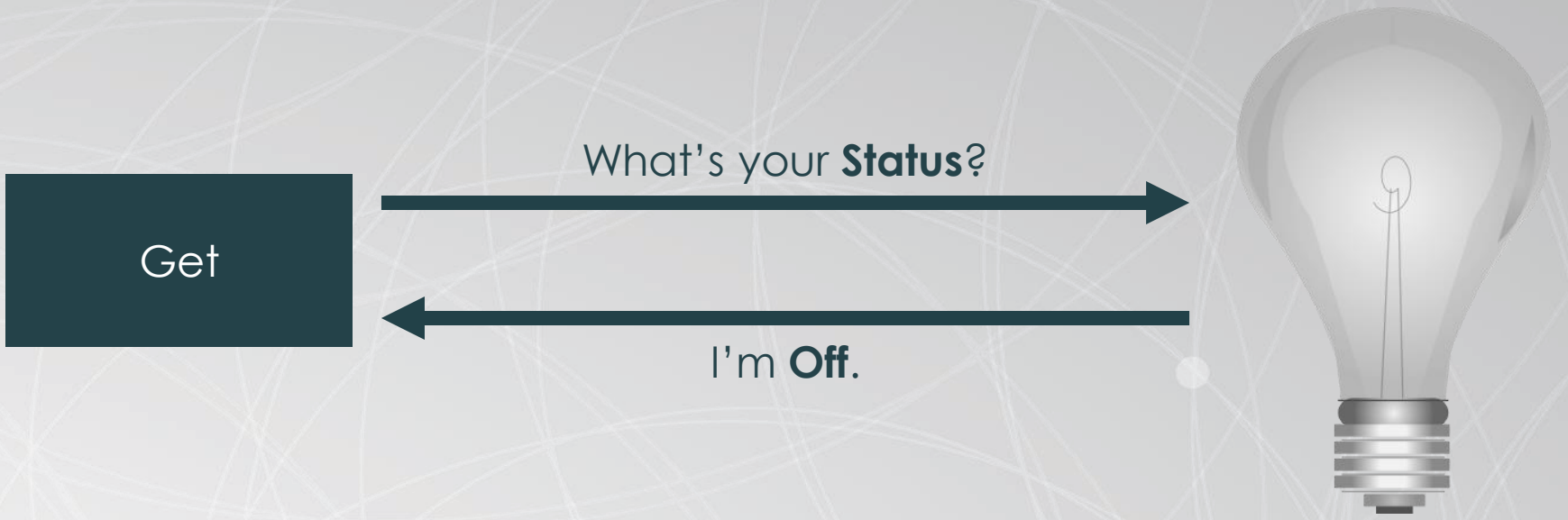
Interacting with Attributes – Messaging



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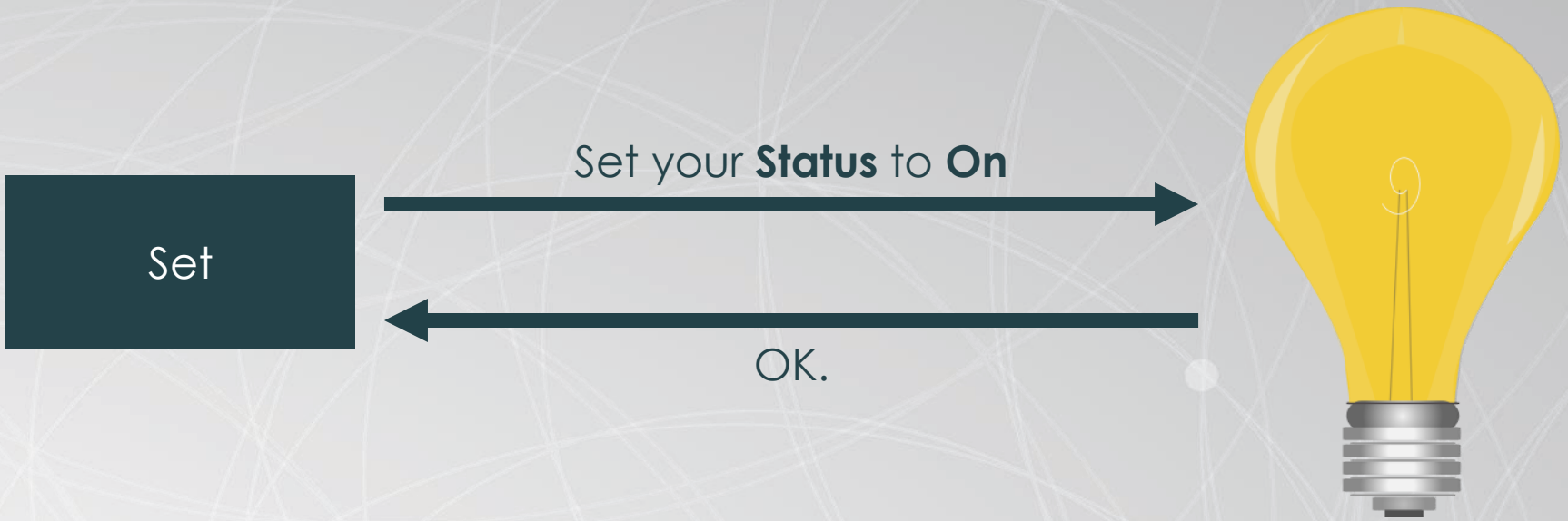
Interacting with Attributes – Messaging



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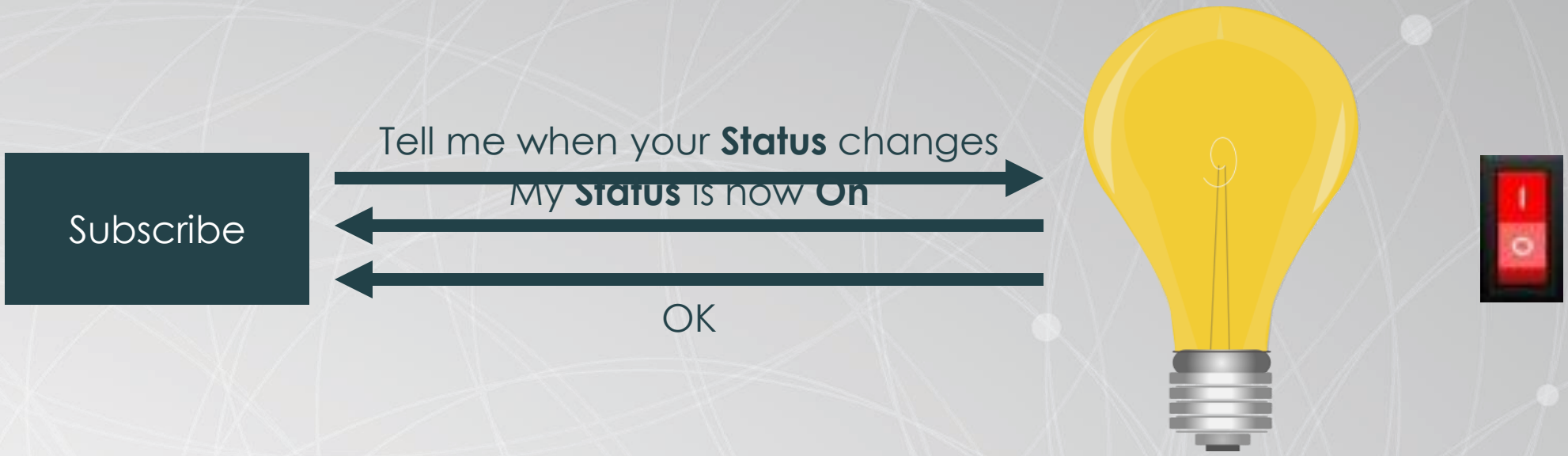
Interacting with Attributes – Messaging



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Appendix : Sample Server / Client : Get

Resource

/a/light

state: false

power: 0

Server

Client

OCPlatform::Configure(Server)

OCPlatform::Configure(Client)

OCPlatform::registerResource("/a/light", … ,&EntityHandler)

Request to Network Find Resource: "/a/light"

OCPlatform::findResource("", "/a/light", …, &foundResource)

Response to Requester Find Resource: "/a/light"

```
foundResource(OCResource rsc)
{
   rsc->get(…, &onGet);
}
```

Request to Server Get Resource Data

Receive Request to Server's EntityHandler: Method "GET"

```
EntityHandler(
        OCResourceRequest req)
{
   if(req->getRequestType == "GET")
   {
      ....
      OCPlatform::sendResource(…);
   }
   if(req->getRequestType == "PUT")
   {
      ....
   }
   if(req->getRequestType == "POST")
   {
      ....
   }
}
```

Send Response to Requester { "state" : false, "power" : 0 }

```
onGet(…, OCRepresentation & rep, …)
{
   rep.getValue("state", m_state);      // false
   rep.getValue("power", m_power); // 0
}
```

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Appendix : Sample Server / Client : Put

Resource

/a/light

state: true

power: 30

Server

Client

```
EntityHandler(
        OCResourceRequest req)
{
   …
   if(req->getRequestType == "PUT")
   {
      ….
   }
   ….
}
```

Request to Server Put Resource Data

Receive Request to Server's EntityHandler: Method "Put"

Send Response to Requester "OK"

```
…(OCResource rsc)
{
   OCRepresentation rep;
   rep.setValue("state", true);
   rep.setValue("power", 30);
   rsc->Put(…, &onPut);
}
```

```
onPut(…, OCRepresentation & rep, …)
{
   rep.getValue("state", m_state);      // true
   rep.getValue("power", m_power); // 30
}
```

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Appendix : Sample Server / Client : Subscribe

Server

Client

Resource

/a/light

state: true

power: 100

```
EntityHandler(
        OCResourceRequest req)
{
   ....
   if(req->getRequestHandlerFlag()
      == ObserverFlag)
   {
      ....
   }
}
```

```
...(OCResource rsc)
{
   rsc->observe(..., &onObserve);
}
```

Request to Server Observe Resource Data

Receive Request to Server's EntityHandler: Method "OBSERVE"

```
...(OCResource rsc)
{
   OCPlatform::notifyAllObservers()
}
```

Send Notify to Requester { "state" : true, "power" : 100 }

```
onObserve(..., OCRepresentation & rep, ...)
{
   rep.getValue("state", m_state);      // true
   rep.getValue("power", m_power); // 100
}
```

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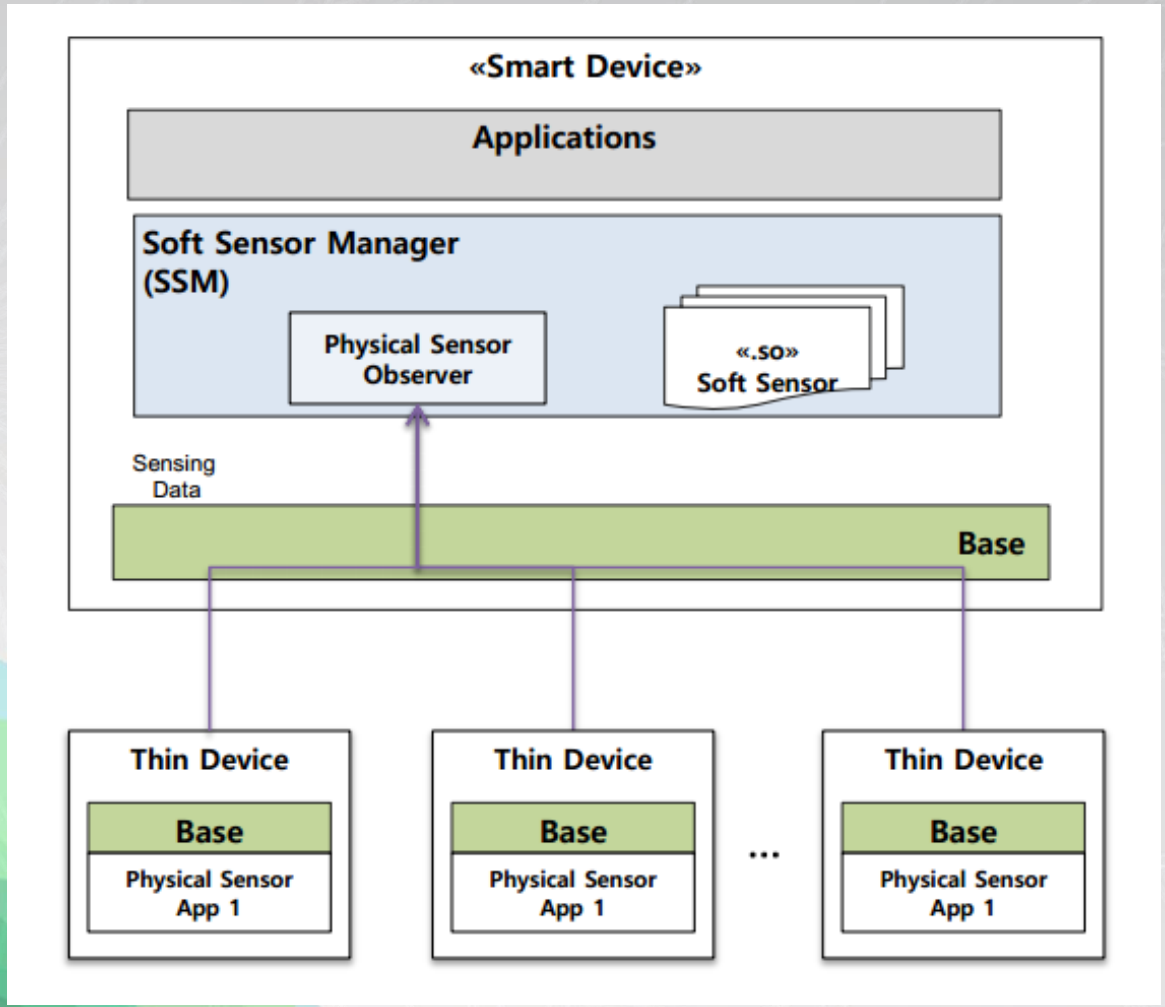
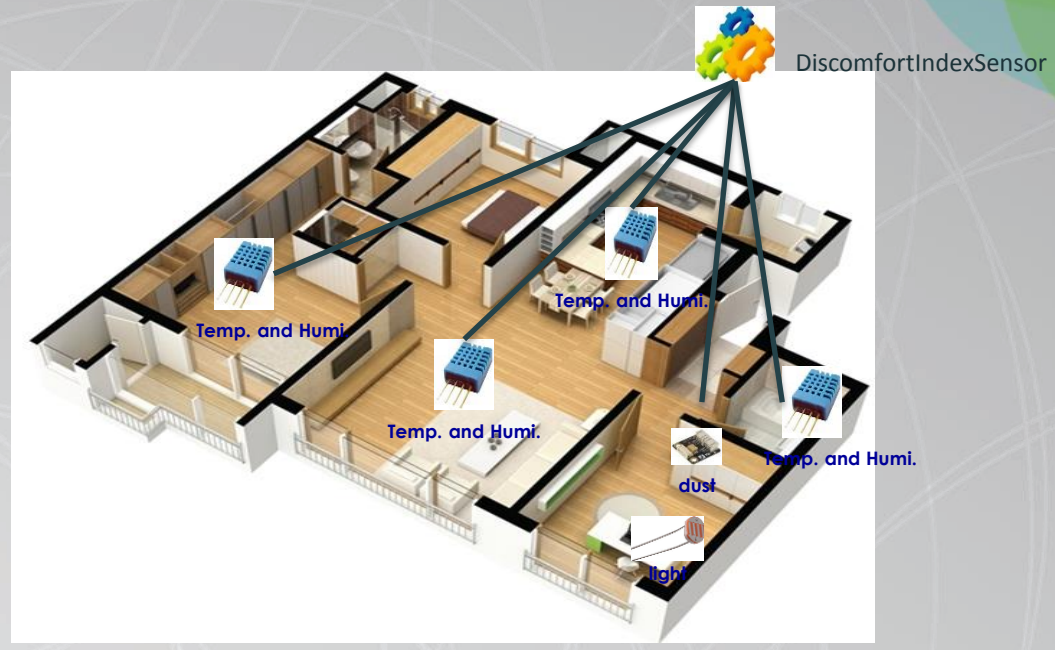
Any Questions?

Jungyong Kim (jyong2.kim@samsung.com)

Appendix : Soft-sensor Manager

[Link]





A software service which receives query statements about physical and logical sensors from applications, executes the queries, and returns results to the application through the Iotivity Base.

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Appendix : Protocol Plug-In Manager

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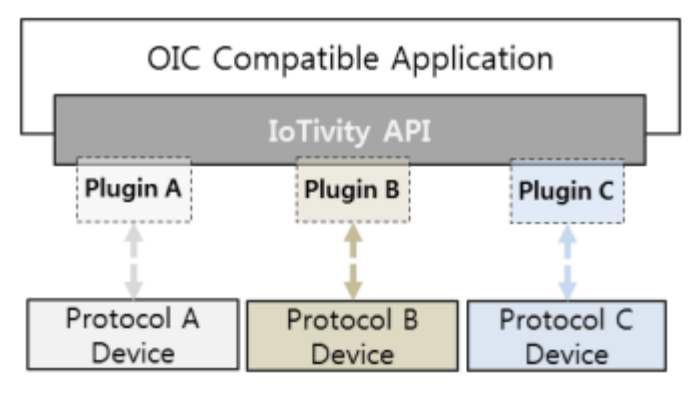

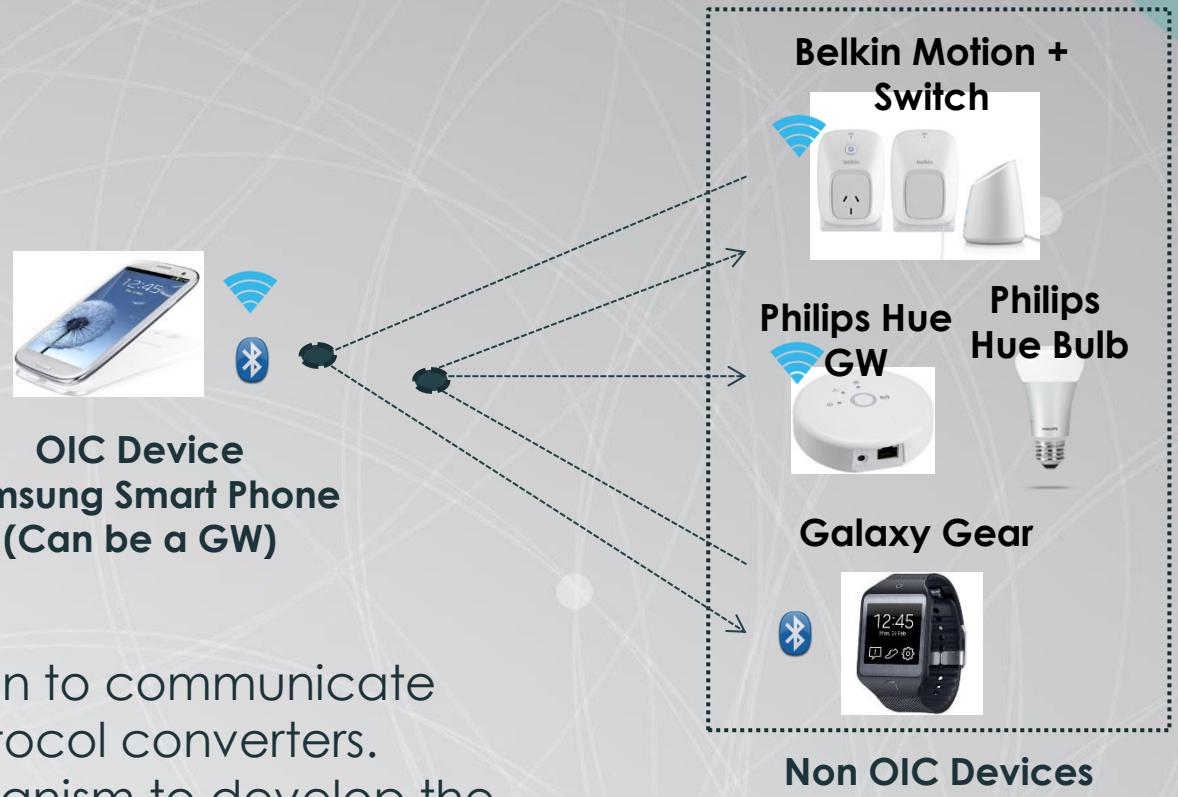

The objective is making OIC application to communicate with non-OIC devices by plugging protocol converters.
For this, protocol plugin provides mechanism to develop the plugins by 3rd party developers.

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Appendix : Things Graph Manager

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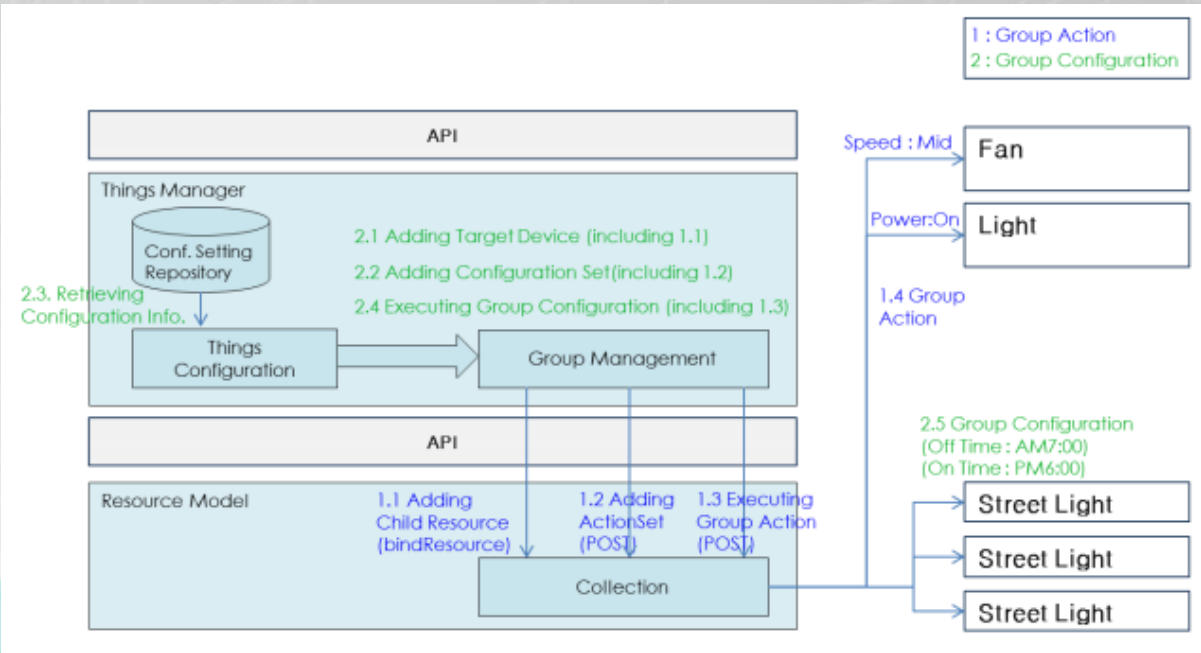

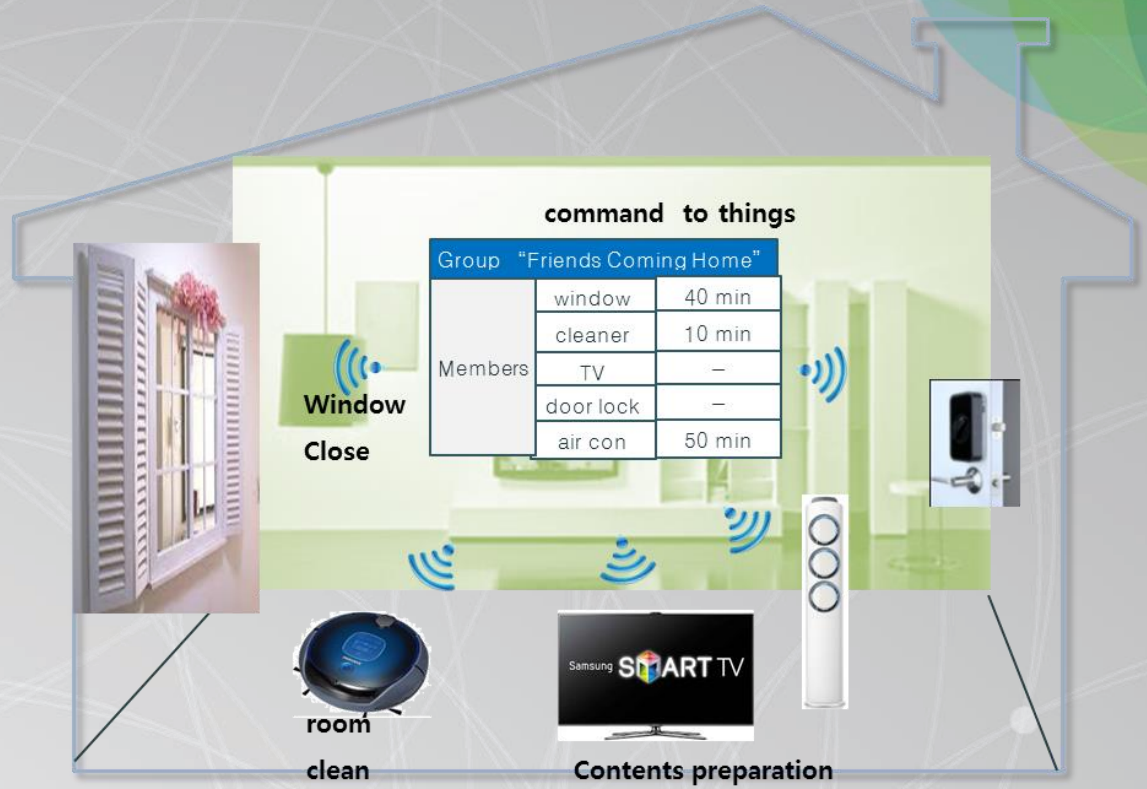

A software service which helps to shape a specific group and maintain that group.
Group action feature creating, maintaining and executing group action related with this group also provided by Things Graph Manager.

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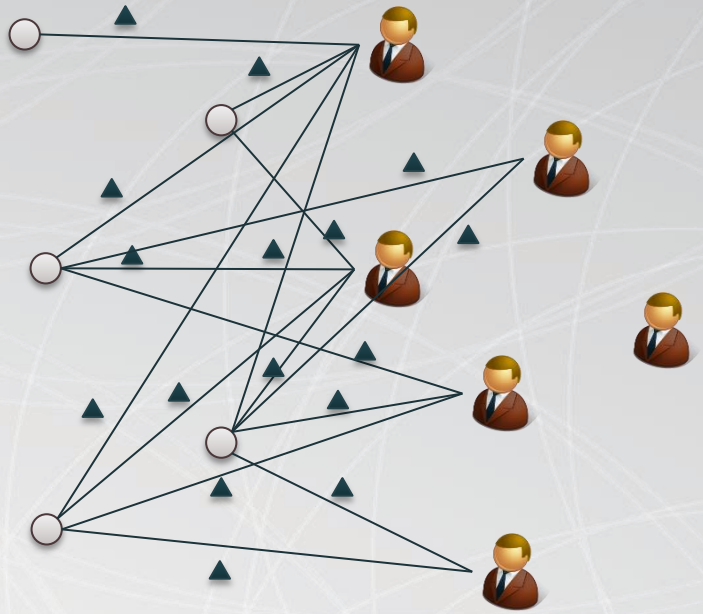
Appendix : Notification Manager

[Link]

Without Resource Hosting

- Many Consumer observes each sensor's resources separately
- The system resources of thin (light) device, e.g. battery, would be drained quickly.

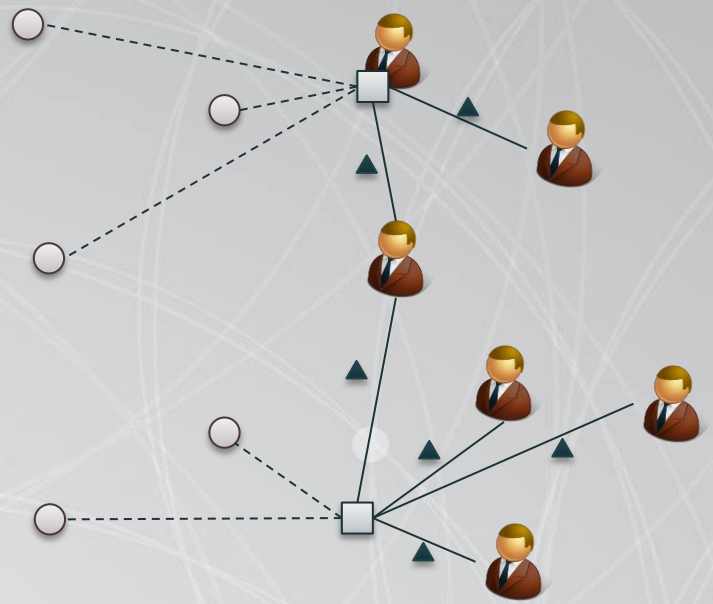


How many subscriptions thin device could support with his constrained system resource?

Thin(Light) device Subscription User/Consumer

With Resource Hosting

- Thin Device delegates the resource information to hosting device
- Many Consumer observes the hosting device so that thin device could prevent the battery drain from over subscription.



Thin Device enhances his lifetime delegating his resource subscriber to richer hosting device

Hosting(Rich) device
Thin(Light) device Subscription User/Consumer

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