Genivi OCF Demonstrator

A collaborative effort by
Genivi
JLR
Samsung

2016-04-27 | 14th Genivi AMM

IoTivity connects GDP to Tizen

2016-04-27 | IoT development

Philippe Coval
Software Engineer
Samsung OpenSource Group

Connected devices : It's all about interconnection

- Why ?
  - Infinite use cases: monitoring, convergence, behaviour, AI...
- What ?
  - Linking user's devices together in a secure way
  - Cross products applications or services
- How ?
  - Open protocols, standards and FLOSS
- When ?

What is Open Connectivity Foundation

OPEN
CONNECTIVITY
FOUNDATION™

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

OCF Approach to Standardization & Adoption

A **SPEC + Open Source Implementation** approach

OPEN CONNECTIVITY FOUNDATION™

openconnectivity.org

Specification & certification

Open Specification

IP protection and branding

WG & TG* headed by industry experts

Certification by OCF

IoTivity

www.iotivity.org

Open Source Implementation

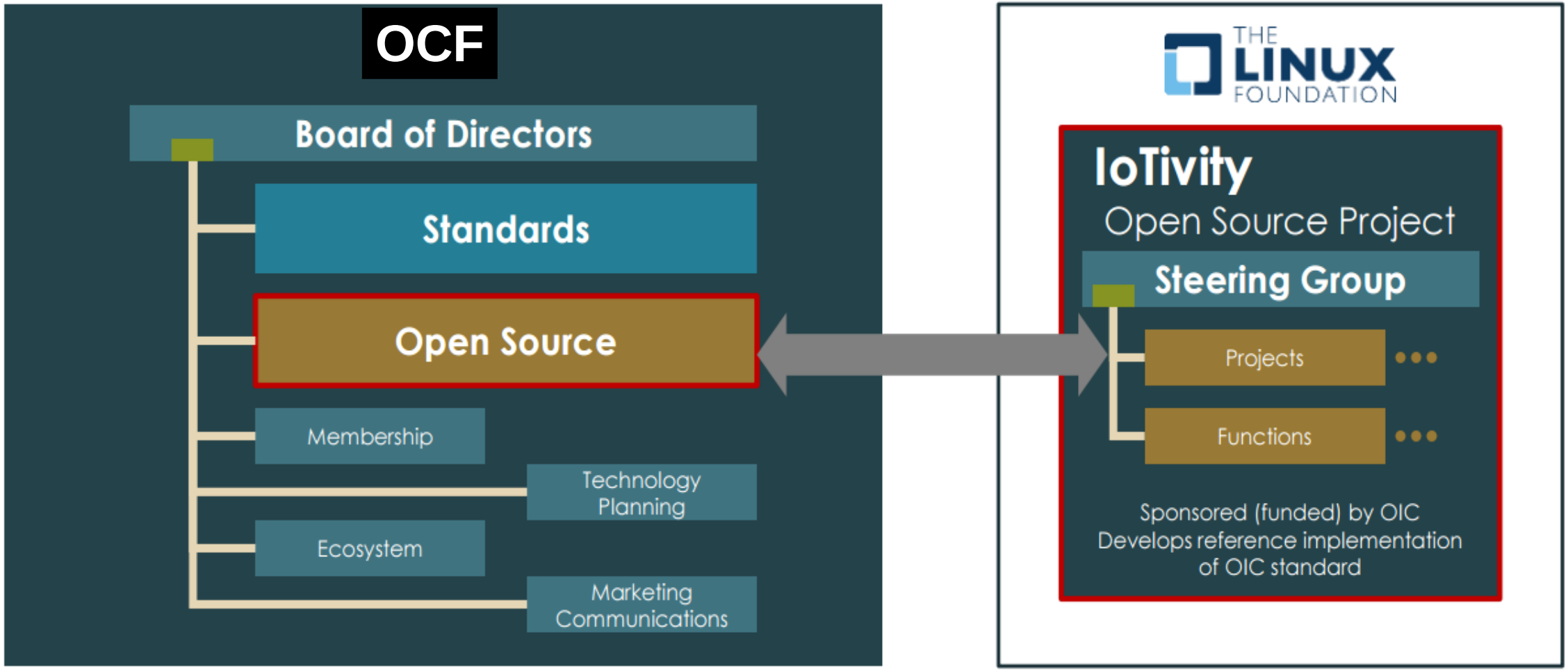
Apache 2.0 License

Linux Foundation co-operative project

Android, iOS, Tizen, Linux, RTOS

Open governance model

OCF Specification



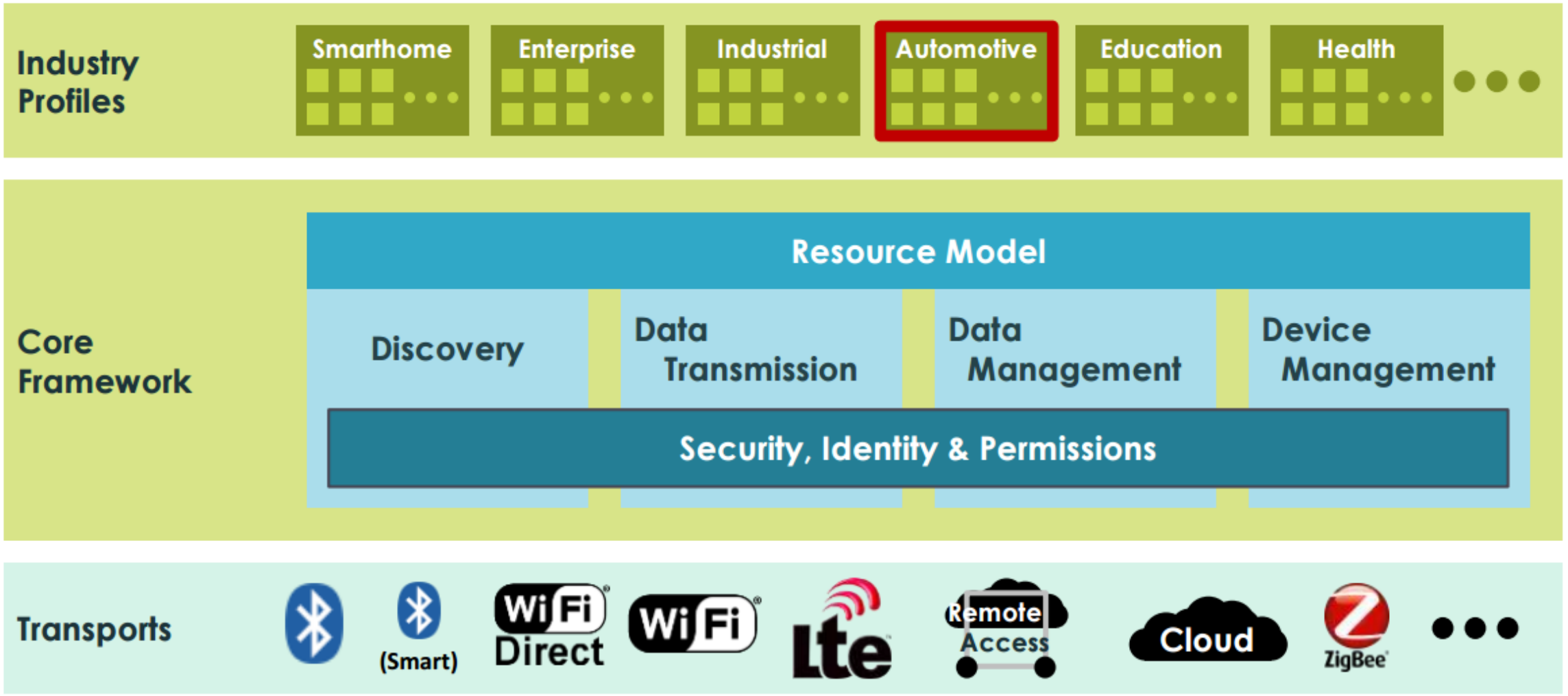
OCF Members (~170 and growing)

Diamond

Platinum

Gold

IoTivity Architecture



What is Tizen / IoTivity ?

- TIZEN : a FLOSS software plaform based on GNU/Linux
  - Split into Profiles : Wearable, Mobile, TV, IVI...
  - Shipped into Consumer Electronic products:
    - Gear S, Z1, Z3, Gear S2, TVs J*

- IoTivity : Seemsless device to device connectivity framework for IoT
  - C/C++ FLOSS library (Apache 2)
  - IoTivity is part of Tizen 3.0 platform
  - Can be integrated into Tizen 2.x products

IoTivity on GDP

- Genivi Demo platform
  - is a Yocto based Linux distribution for IVI
  - so supports **meta-oic** yocto layer that brings IoTivity
- Let's prototype a Server
  - Exposes a physical resource (MinnowMax's GPIO)
  - Share a virtual GPS position to near devices
- And use Tizen devices as clients to interact with

IoTivity on GDP

- https://vimeo.com/164000646#tizen-genivi-20160424rzr

IoTivity Client / Server Flow

IoTivity Server (on Genivi)

IoTivity Client(s) (on Tizen)

OCPlatform::Configure(OC::PlatformConfig)

OCPlatform::registerResource

...

OCPlatform::Configure(OC::PlatformConfig)

OCPlatform::findResource(...)

OC::FindCallback(...)

OCResource::observe()

```
OC::EntityHandler(OCResourceRequest) {
  switch(getRequestType) {
    case 'GET' :
      ...
      OCPlatform::sendResponse();;
    case 'PUT' :
      ...
      OCPlatform::sendResponse()
      OCPlatform::notifyAllObservers();;
 }}
```

OC::OCResource::get(...)

OC::GetCallback(...)

OC::OCResource::put(...)

OC::PullCallback(...)

OC:ObserveCallback(...)

IP Network (* multicast for discovery)

References

- Entry points:
  - https://wiki.iotivity.org/community
  - https://wiki.iotivity.org/tizen
  - https://at.projects.genivi.org/jira/projects/GOCF
- Related:
  - http://slideshare.net/SamsungOSG/iotivity-on-tizen-how-to
  - http://blogs.s-osg.org/iotivity-ready-automotive/
  - https://github.com/TizenTeam/

Keep in touch

- Questions ?
  - Contact me online for support or resources
  - https://wiki.tizen.org/wiki/User:Pcoval
  - irc://irc.freenode.net/#automotive

- Thank you:
  - GENIVI, Samsung OSG
  - Intel/Minnowboard, CampOSV, Flaticons (CC BY 2.0)

RVI Details

Anson Fan
Architect
JLR

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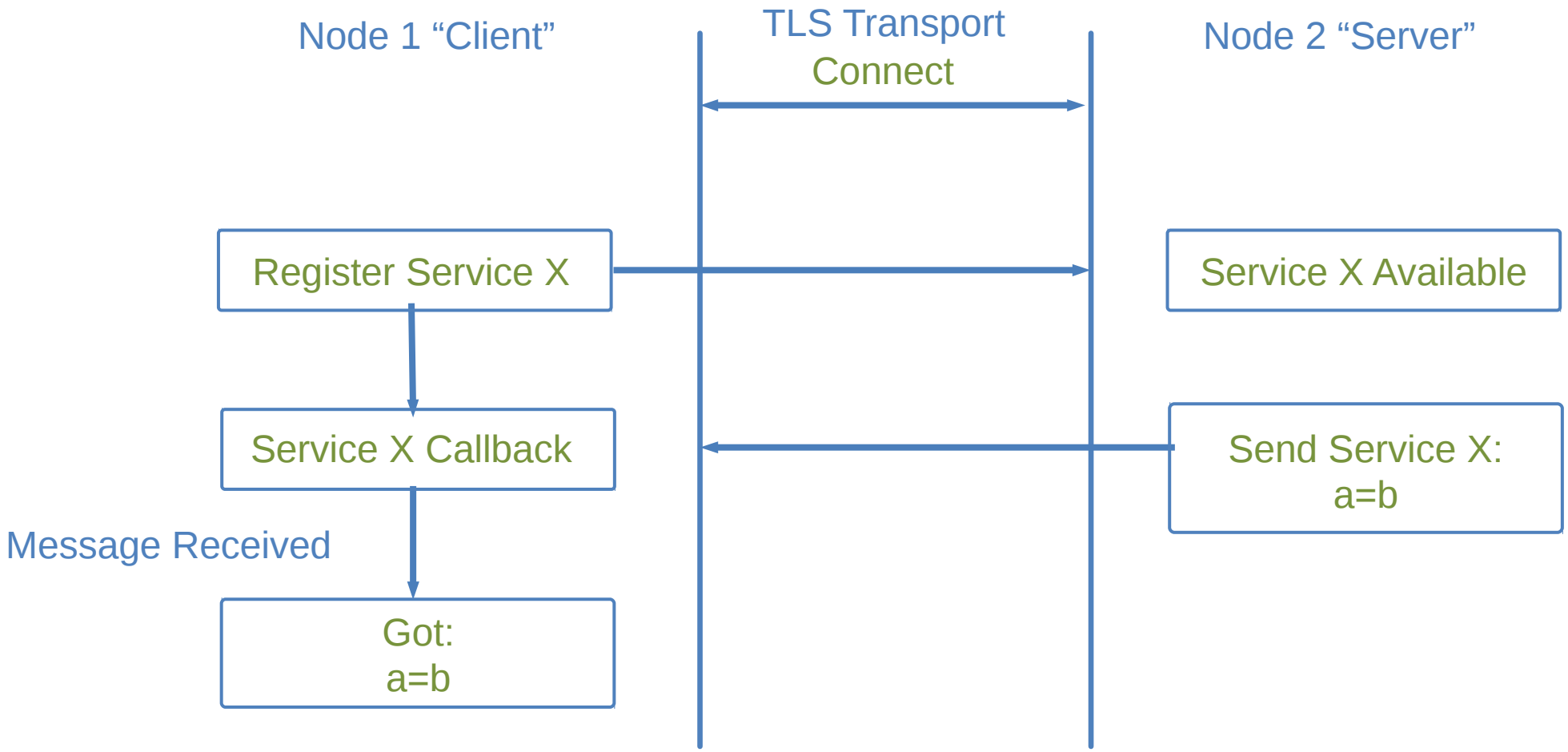
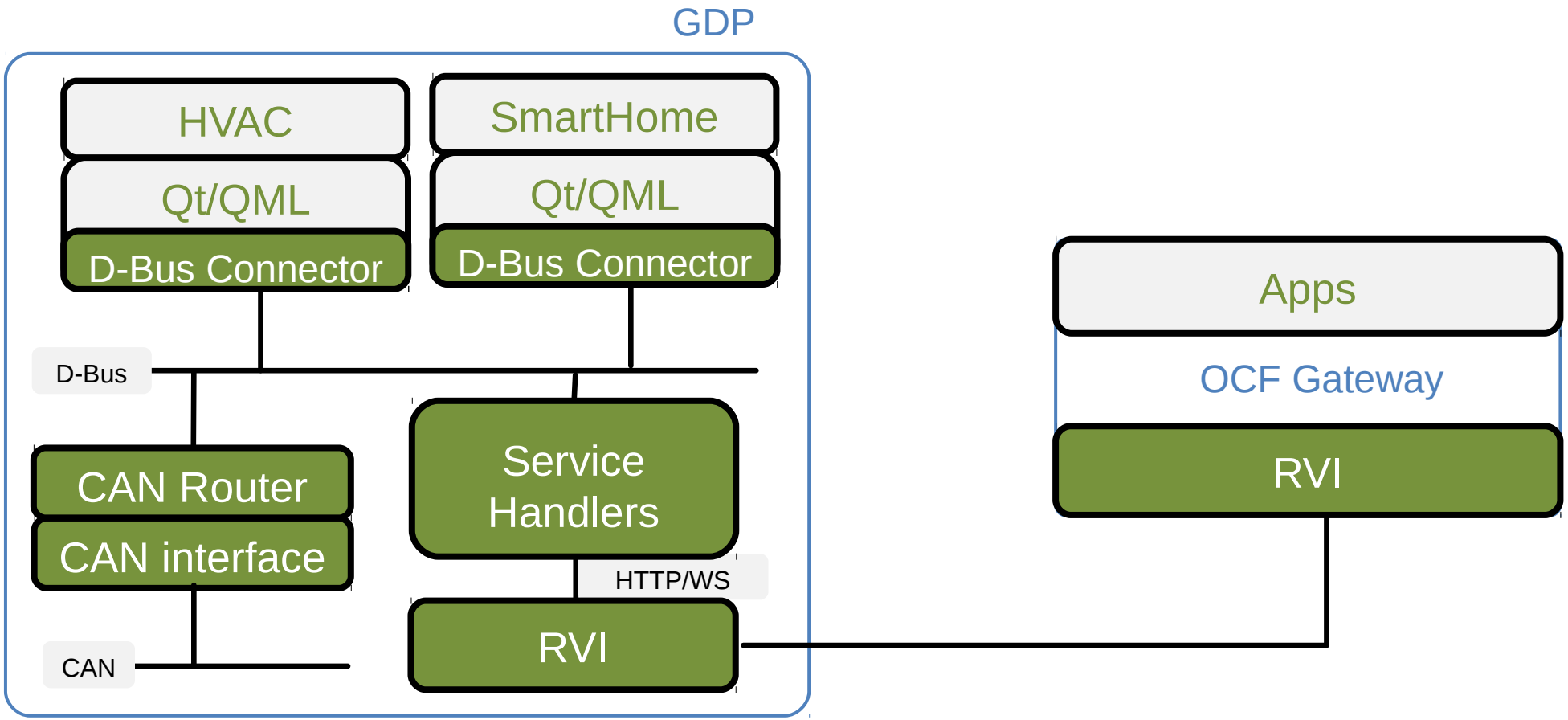
RVI Service Flow



RVI JSON-RPC

```
{
    "jsonrpc“ : "2.0",
    "id“ : "1",
    "method“ : "message",
    "params“ : {
        "timeout“ : 1559388884,
        "service_name“ : “genivi.org/node/vehicle_id/rvi/vehiclecontrol",
        "parameters“ : {
            "function“ : "fanSpeed",
            "newValue“ : 20,
            "target“ : "SETHVAC"
        }
    }
}
```

GDP Application Architecture



Realizing Connected Car Scenarios With IoTivity and RVI

Sanjeev BA
Senior Engineer
Samsung OpenSource Group

2016-04-27 | 14th Genivi AMM

Background

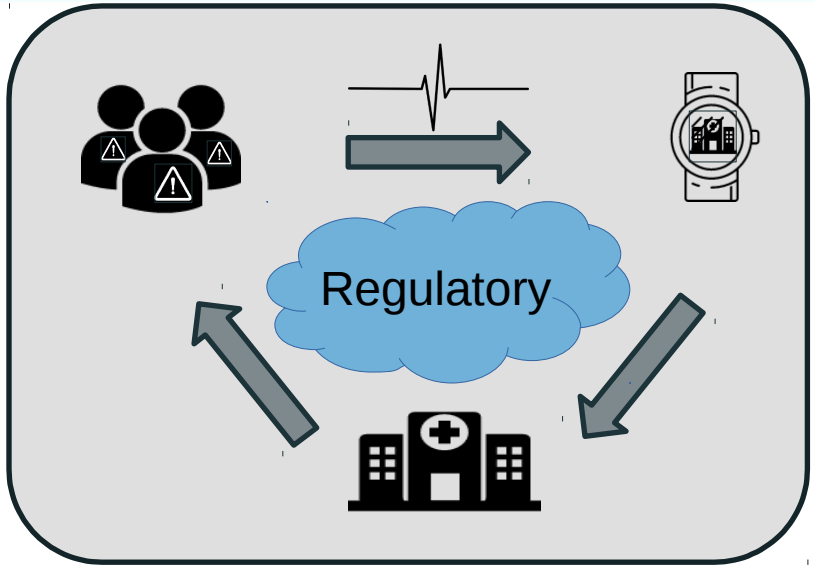
- Developers looking for niche areas
  - Direct revenues from apps slowing down
  - 52% make < $1000 / month
- 53% working on IoT related apps already.
  - Estimated 5.5 Million mobile app devs.
  - Smart Home and Wearables
- Users already have app fatigue

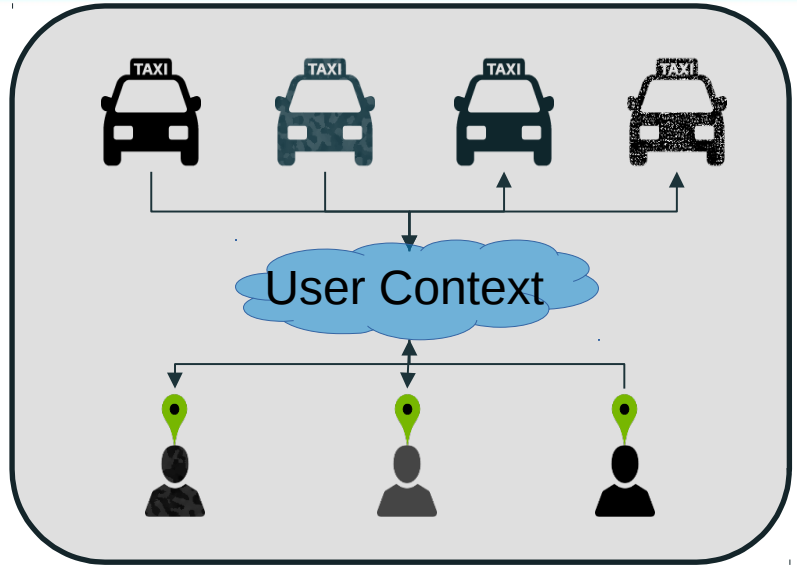
* Source : VisionMobile™ Developer Economics Q1 2015: State of the Developer Nation

Challenges

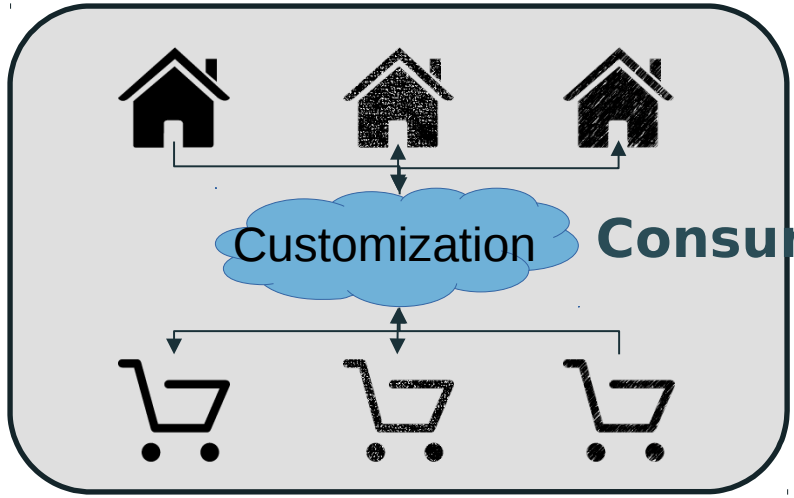
IoT & Connected Services

Critical



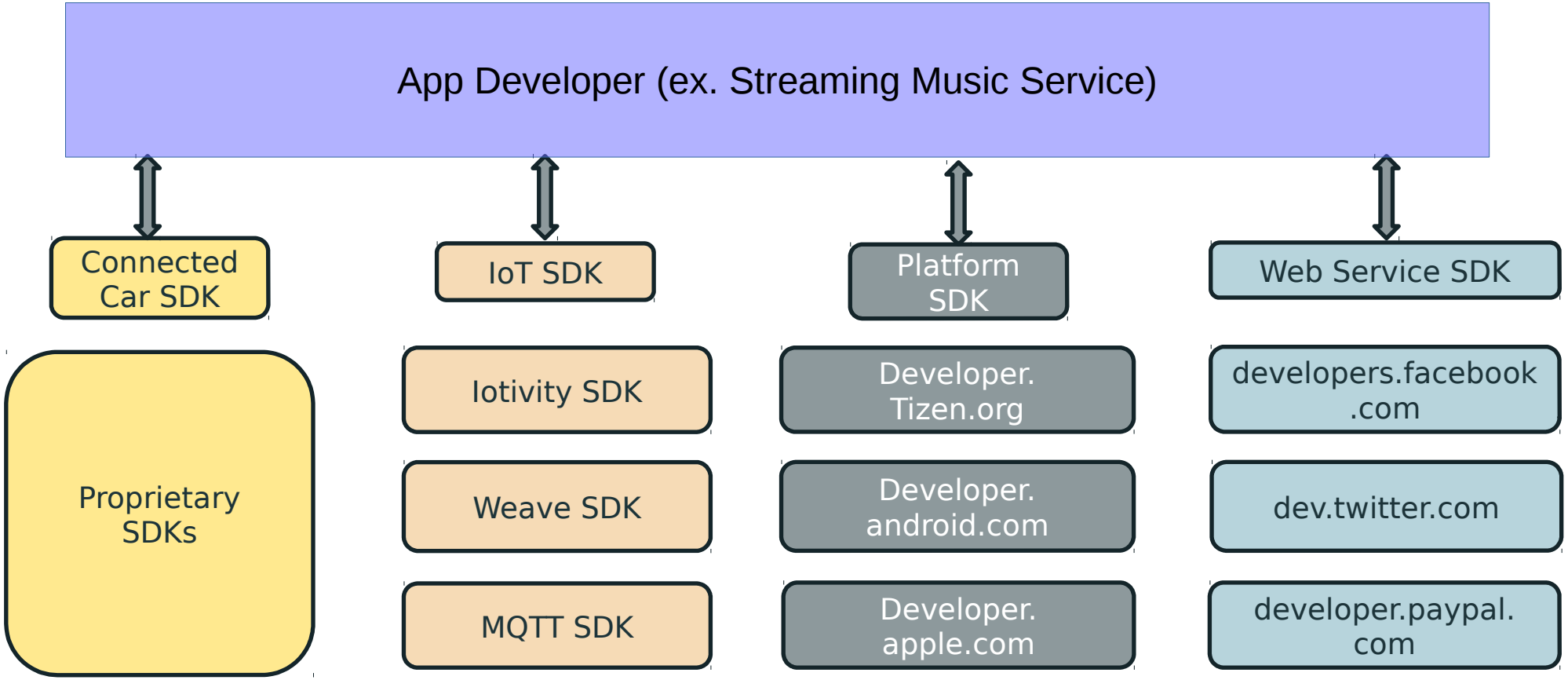


Just in Time

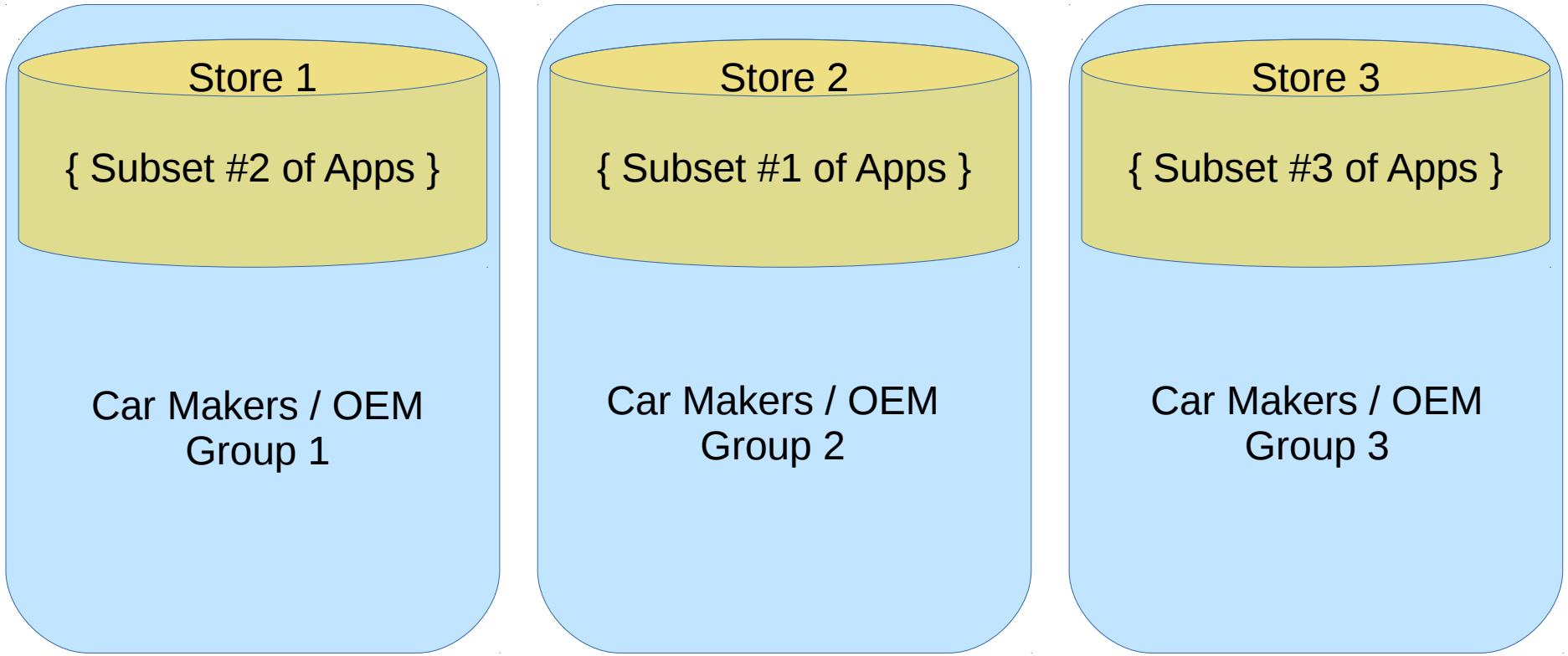


Consumer Specific

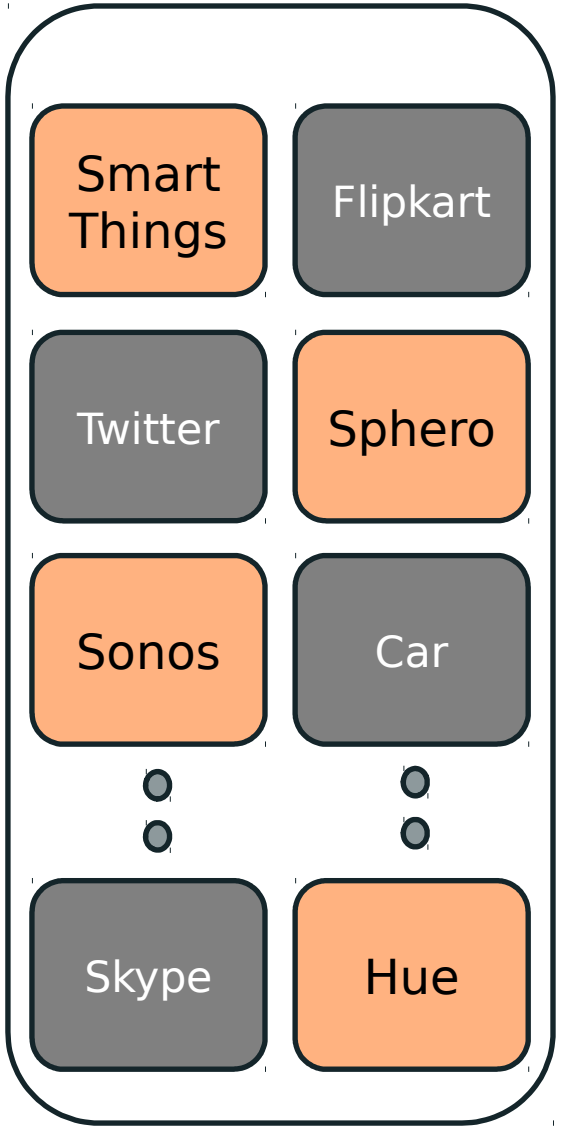
SDK Overload for Developers

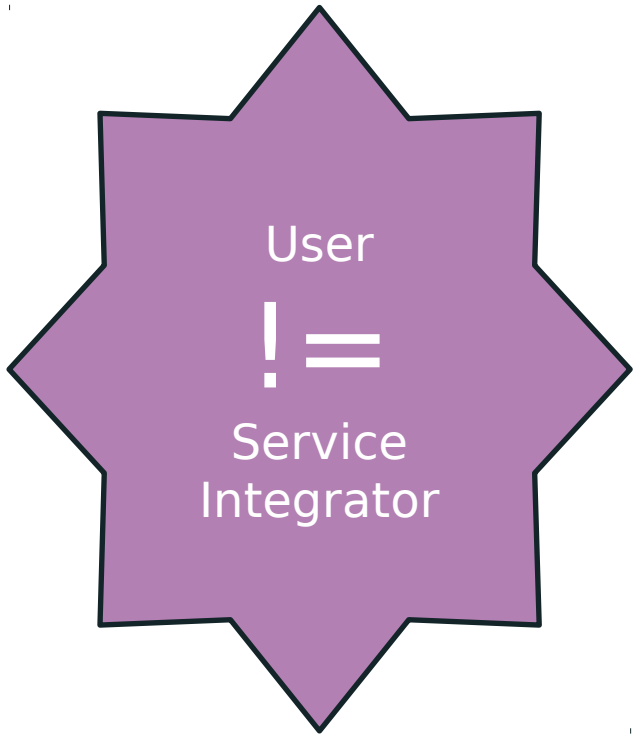


Siloed Connected Car Ecosystems



App Overload for Users



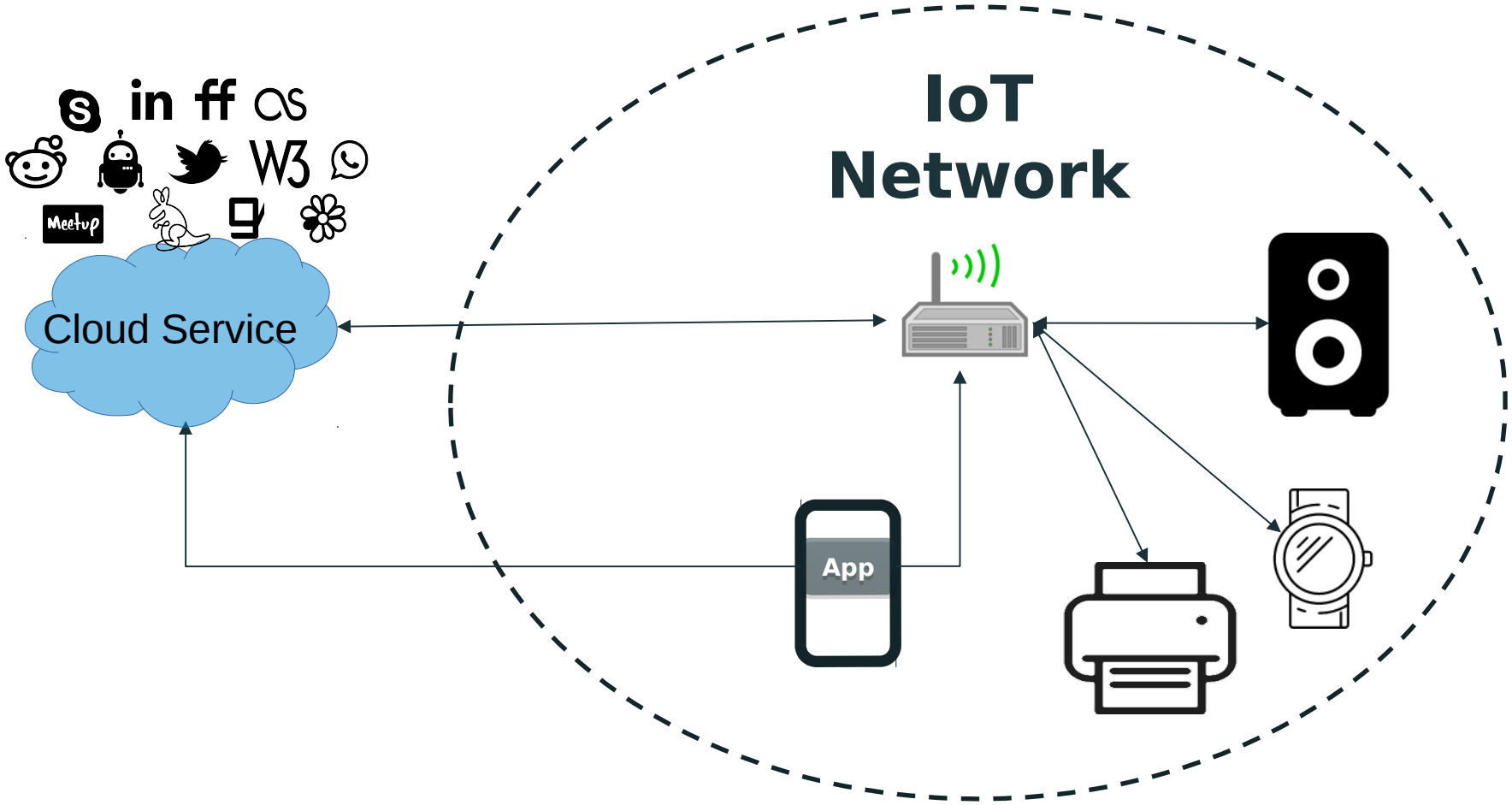


Approaches

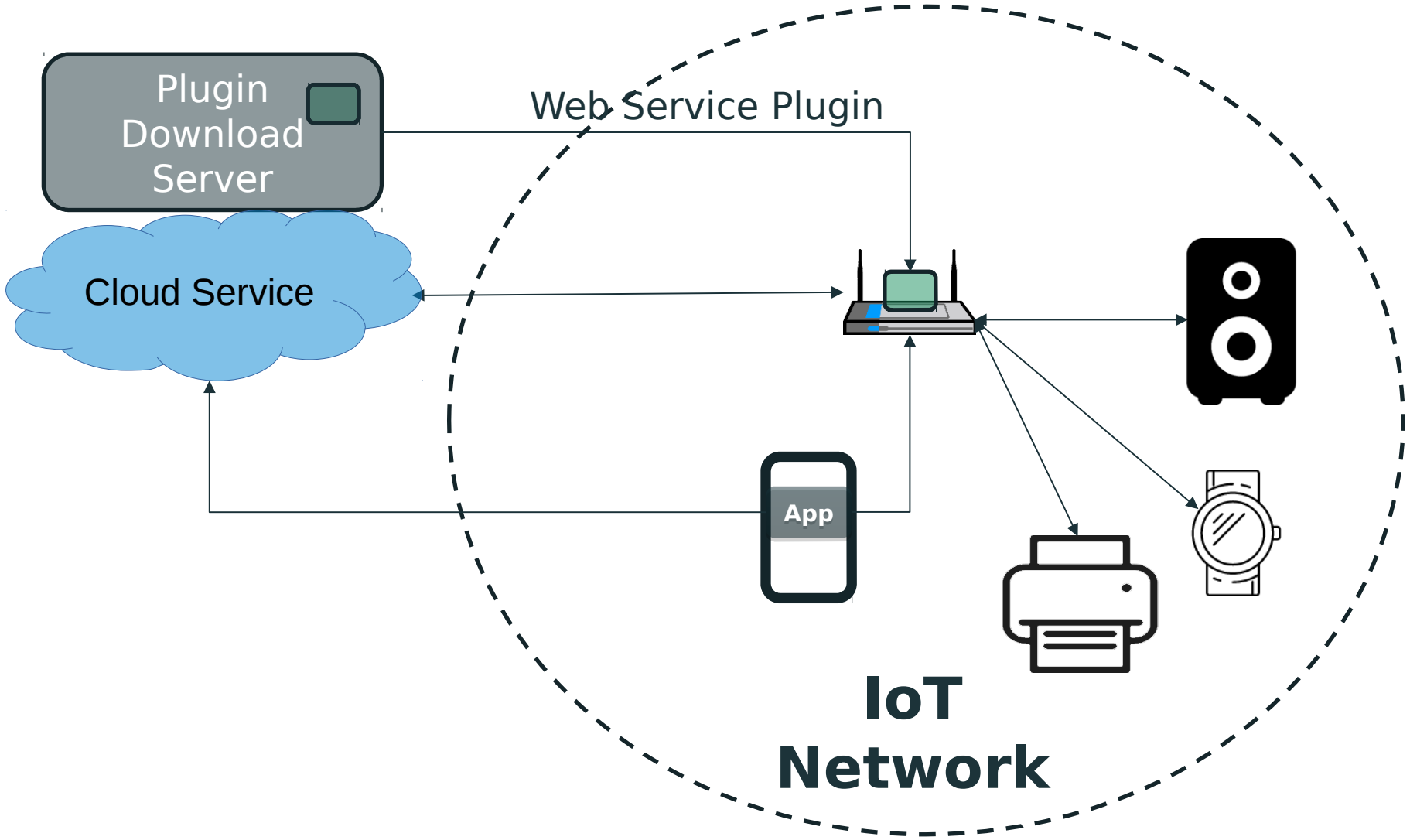
How to make this simpler ?

For users, developers &
service providers

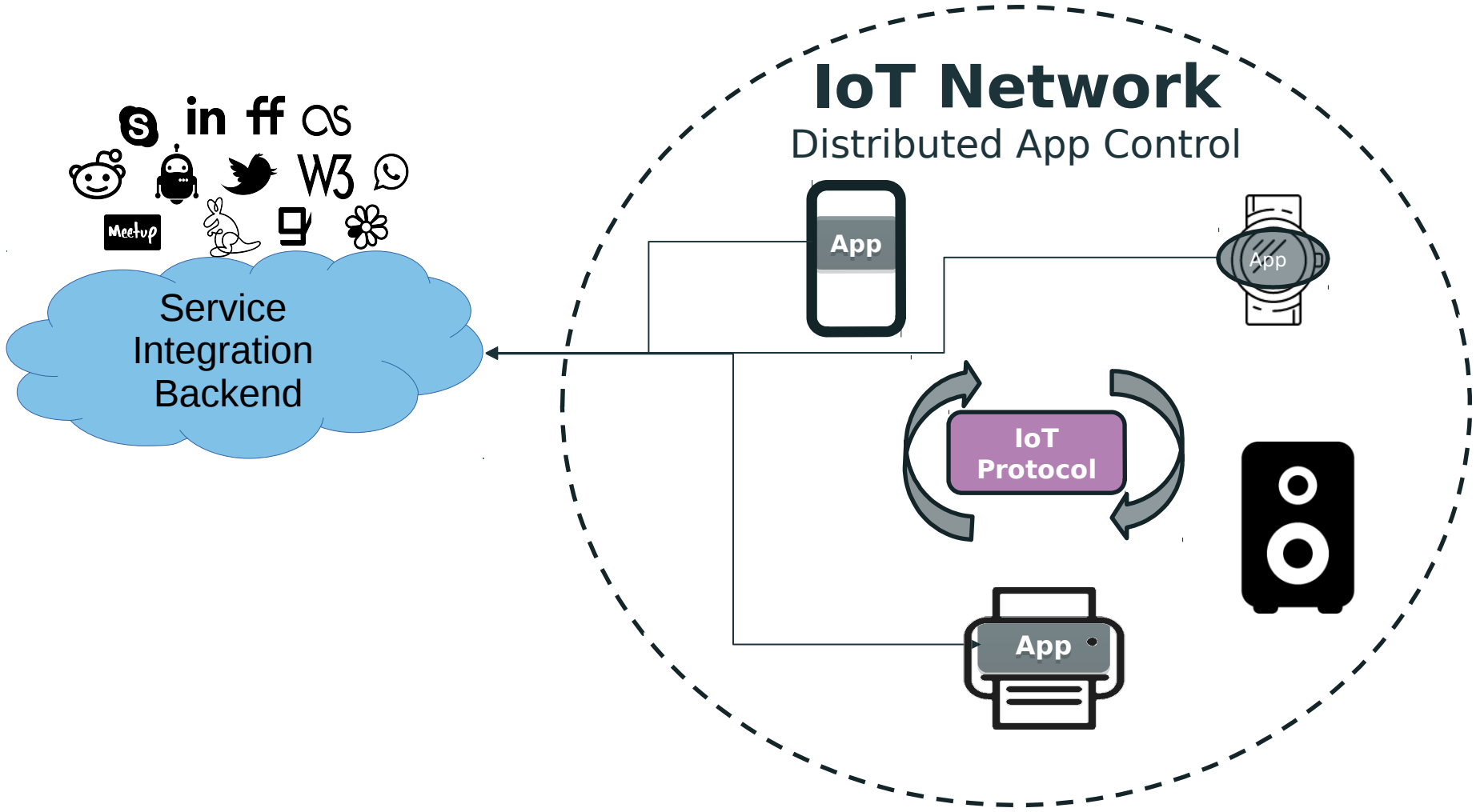
Dedicated Hub + Cloud Service Model



Service Plugin Model



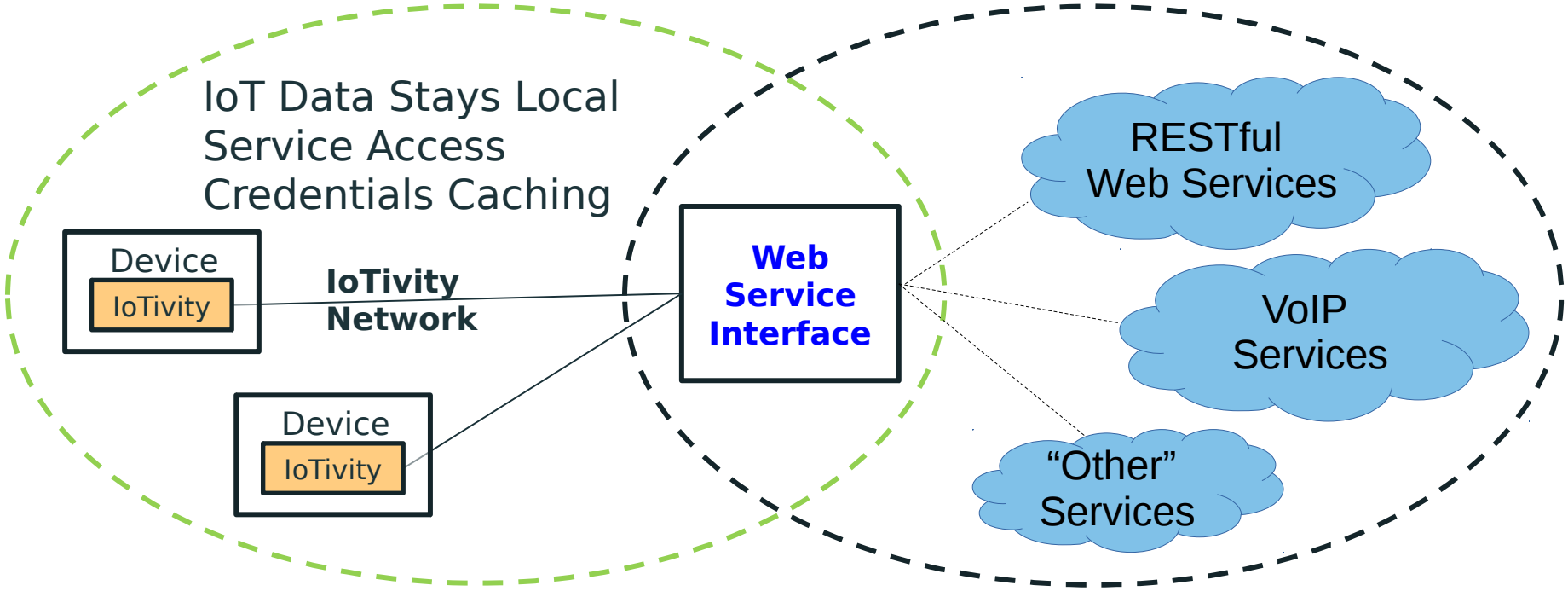
Distributed App Control Model



IoTivity Web Service Interface

Web Service Interface

- Enabler of interactions
  - From IoTivity devices to a variety of Services
- Service abstraction



Service Representation : JSON Blocks

SERVICE META DATA

"name":“Openweathermap",

"id":“org.openweathermap",

"description":“A service that has weather for more than 200,000 cities",

“logo" : "http://openweathermap.org/images/OWM_logo32_32.png"

SERVICE TAGS

"tags":[

"search",

“weather”

]

Service Representation : JSON Blocks

CAPABILITY DESCRIPTION

```
capability:[
{
id                    : org.openweathermap.findbycity,
isauthrequired    : true,
description         : Find the weather by cityname string.,
endpoint            : api.openweathermap.org/data/2.5/weather?
endpointtype     : REST,
operation           : GET,
params               :{
   q                    : {{cityname}}
},
response           :{
          <response JSON body format>
}
```

Service Description details

- Mustache syntax for variables
  - {{ variable }}
- Services
  - Authorization Section
  - Capability Section
    - Params Section
- Cues using tags
- Extensible and customizable

Service Representation : JSON Blocks

AUTH SECTION

```
auth:{
      type                          :oauth2.0,
      subtype                       :application-only,
      appcredentials:   {
            cust_key                :{{cust_key}}
            cust_sec                :{{cust_secret}}
            oauth_key               :{{oauth_key}}
            oauth_sec               :{{oauth_secret}}
       }
}
```

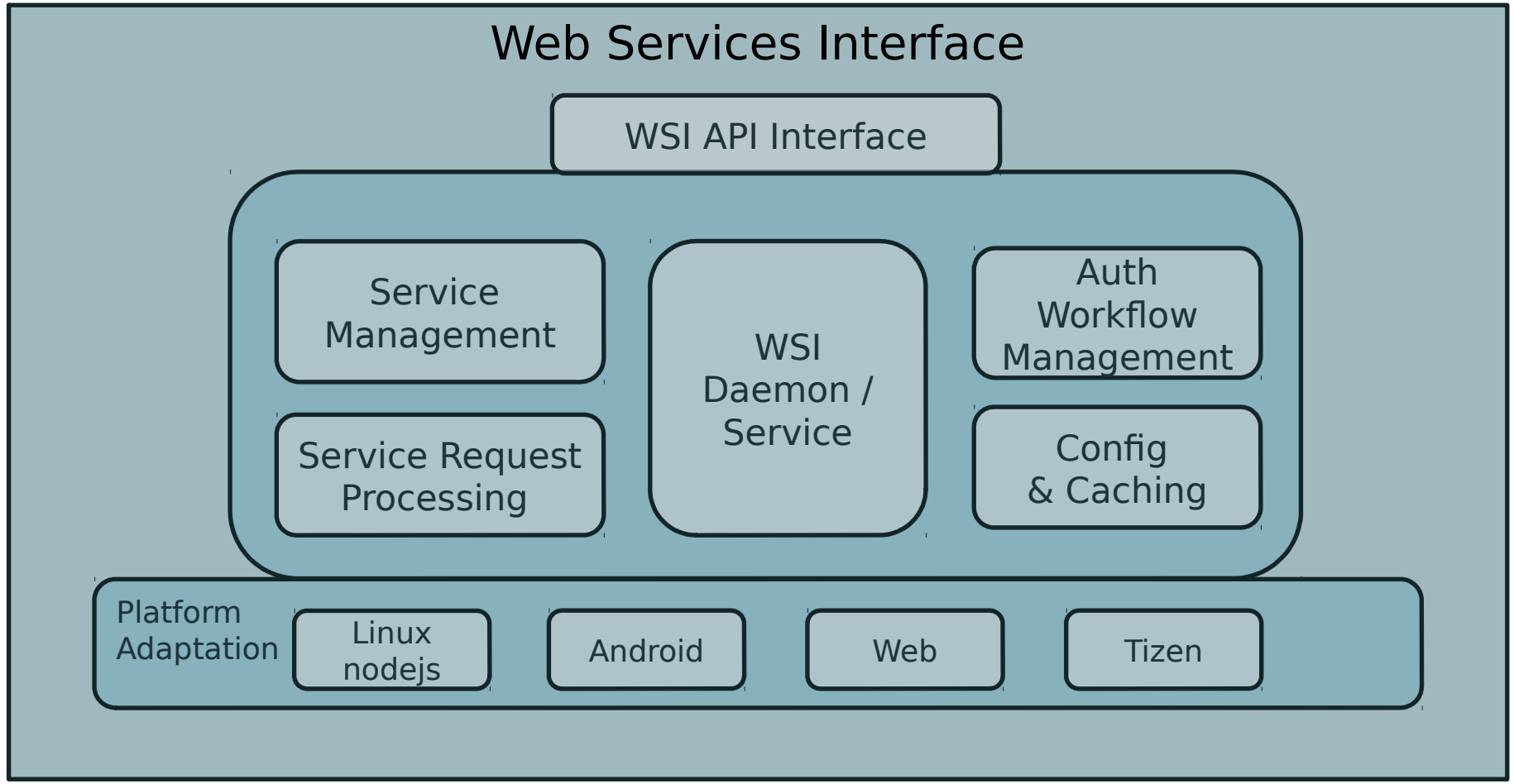
Supported Types :

- oauth2.0,
- oauth1.0a,
- oauth1.0

Supported SubTypes :

- application-only
- client credentials
- oob

Putting it all together



RVI Service Description

```
"capability": [
    {
        "cid": "org.genivi.rvi.connect",
        "isauthrequired": "false",
        "description": "Connect to RVI.",
        "endpoint": "{{rviurl}}",
        "endpointtype": "rvi",
        "chain" : "http://localhost:8081/callback",
        "operation": "RVICONNECT"
    },
    {
        "cid": "org.genivi.rvi.send",
        "isauthrequired": "false",
        "description": "Post Message to RVI.",
        "endpoint": "{{rviurl}}",
        "endpointtype": "rvi",
        "operation": "RVISEND",
        "params": {
            "message": "None"
        }
    }
```

Connect Capability

Notify URL for remote RVI msgs.

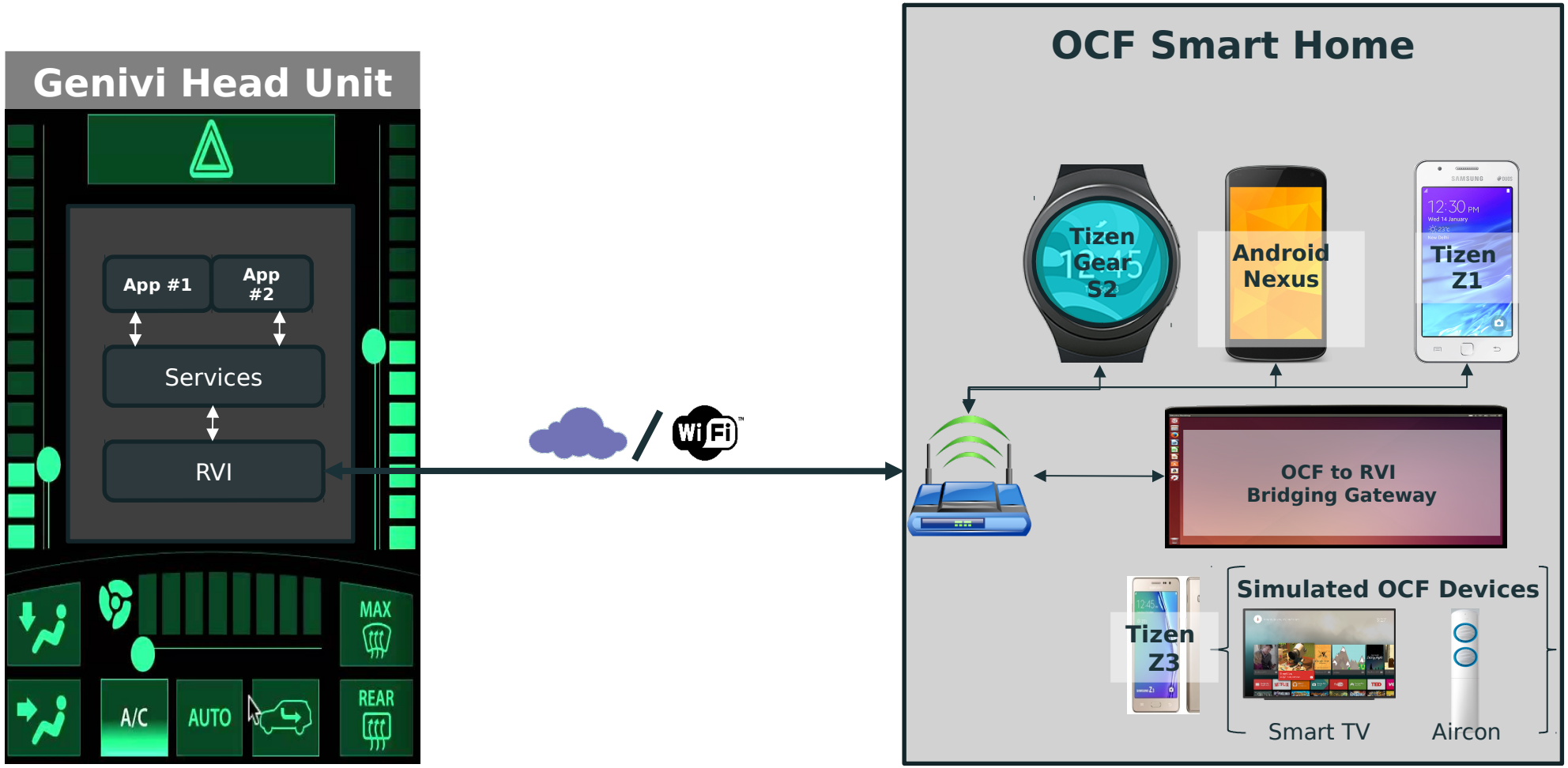
Send Capability

Genivi OCF Demo Theme

- **Vehicle to Smart Device Control**
  - Associating a set of devices using rules
    - Executing the rule to change device states
  - Getting the status of home devices
- **Smart Device to Vehicle Control**
  - Control Vehicle Parameters (HVAC, Temperature)
  - Getting the status of Vehicle
- **Notifications**
  - Vehicle Location Notifications

RVI-OCF Gateway Demo Concept

https://at.projects.genivi.org/wiki/display/PROJ/GENIVI-OCF+Demonstrator



Openness

What did we publish ?

git clone https://gerrit.iotivity.org/gerrit/iotivity
(wsi-dev branch)

Tizen Mobile/Wearable & Android applications
http://git.projects.genivi.org/?p=meta-genivi-ocf-demo.git;a=summary

* cleanup and publishing to be done post demo

Openness

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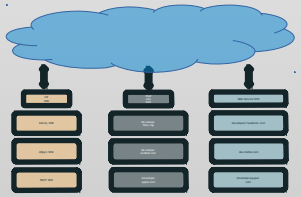
Challenges Addressed

SDK Overload ?

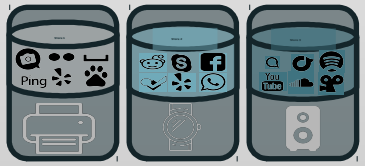


Partial

App Overload ?

No

Siloed Ecosystems ?



Open Standards
OCF & RVI

New IoT Apps ?

Yes !!!