Genivi OCF Demonstrator

2016-04-27 | 14th Genivi AMM

A collaborative effort by Genivi JLR Samsung

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IoTivity connects GDP to Tizen
2016-04-27 | IoT development

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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?

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“OCF is a standard & open source project that delivers “just-works” interconnectivity 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

www.iotivity.org
Open Source Implementation
Apache 2.0 License
Linux Foundation co-operative project
Android, iOS, Tizen, Linux, RTOS
Open governance model
OCF Members (~170 and growing)

Diamond

CISCO  GE Software  Intel  MediaTek  Samsung

Platinum

ADT  Atmel  Dell  Eyeball Networks  HP  Honeywell  Siemens

Gold

Acer  ActnerLAB  Allion  Aepona  CableLabs  Cadence  Gluu  GHR  InFocus  Enea  ETRI  ExoU  GCR  Internet Nation  Laplink  Lenovo  Mashery  McAfee  RemoSoftware  Silego  Swiflet  Thycotic  Wind River  Works Systems  Zula
What is Tizen / IoTivity?

- **Tizen**: a FLOSS software platform 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::findResource(...)
OC::FindCallback(...)  
OCResource::observe()

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

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
  - https://github.com/TizenTeam/
Keep in touch

• Questions?
  – Contact me online for support or resources
  – irc://irc.freenode.net/#automotive

• Thank you:
  – GENIVI, Samsung OSG
  – Intel/Minnowboard, CampOSV, Flaticons (CC BY 2.0)
RVI Details

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Anson Fan
Architect
JLR
RVI Service Flow

Node 1 “Client”

Register Service X

Service X Callback

Got: a=b

Message Received

TLS Transport
Connect

Node 2 “Server”

Service X Available

Send Service X: a=b
RVI JSON-RPC

```json
{
    "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

GDP

- HVAC
  - Qt/QML
  - D-Bus Connector

- SmartHome
  - Qt/QML
  - D-Bus Connector

- CAN Router
  - CAN interface

- Service Handlers
  - HTTP/WS

- RVI

OCF Gateway

Apps

RVI
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
SDK Overload for Developers

App Developer (ex. Streaming Music Service)

Connected Car SDK

IoT SDK

Platform SDK

Web Service SDK

Proprietary SDKs

Ioivity SDK

Weave SDK

MQTT SDK

Developer. Tizen.org

Developer. android.com

Developer. apple.com

developers.facebook.com

dev.twitter.com

developer.paypal.com
Siloed Connected Car Ecosystems

- **Store 1**: { Subset #2 of Apps }
  - Car Makers / OEM Group 1
- **Store 2**: { Subset #1 of Apps }
  - Car Makers / OEM Group 2
- **Store 3**: { Subset #3 of Apps }
  - Car Makers / OEM Group 3
App Overload for Users

- Smart Things
- Flipkart
- Twitter
- Sphero
- Sonos
- Car
- Skype
- Hue

User
!=
Service Integrator
Approaches

How to make this simpler?

For users, developers & service providers
Dedicated Hub + Cloud Service Model
Service Plugin Model

IoT Network

Cloud Service

Web Service Plugin

Plugin Download Server

App

Printer

Watch
Distributed App Control Model

IoT Network

Distributed App Control

Service Integration Backend

IoT Protocol

App

App

App

App

App
IoTivity Web Service Interface
Web Service Interface

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

IoT Data Stays Local
Service Access
Credentials Caching

Device
IoTivity

IoTivity Network

Web Service Interface

Device
IoTivity

RESTful Web Services

VoIP Services

“Other” Services
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"
]
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
AUTH SECTION

```json
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

Web Services Interface

WSI API Interface

- Service Management
- Service Request Processing
- WSI Daemon / Service
- Auth Workflow Management
- Config & Caching

Platform Adaptation
- Linux nodejs
- Android
- Web
- Tizen
"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 !!!