

Mapping GENIVI VSS to the OCF Resource Model

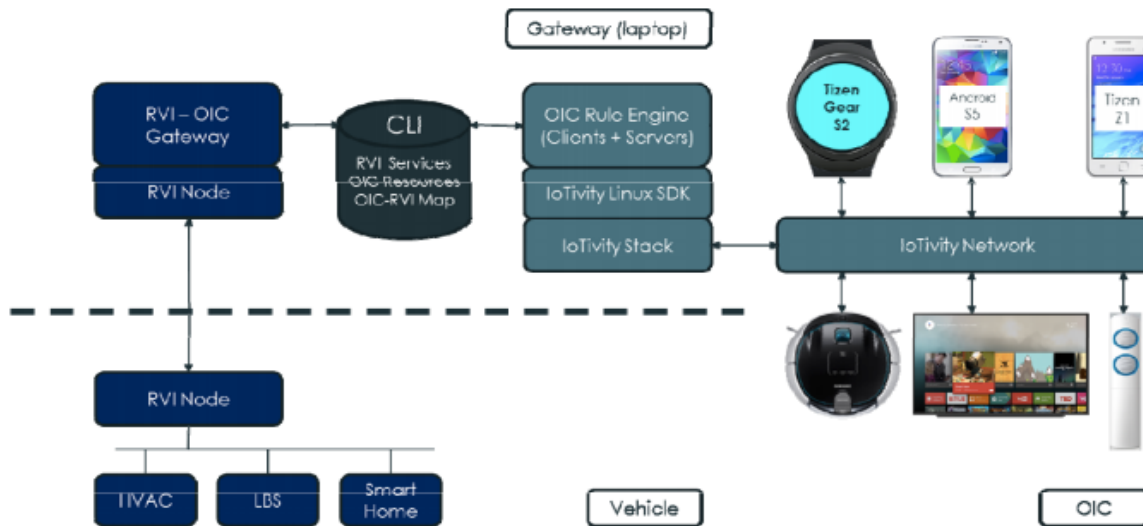
OCF AMM June 29, 2016

From EG-RVI Readout



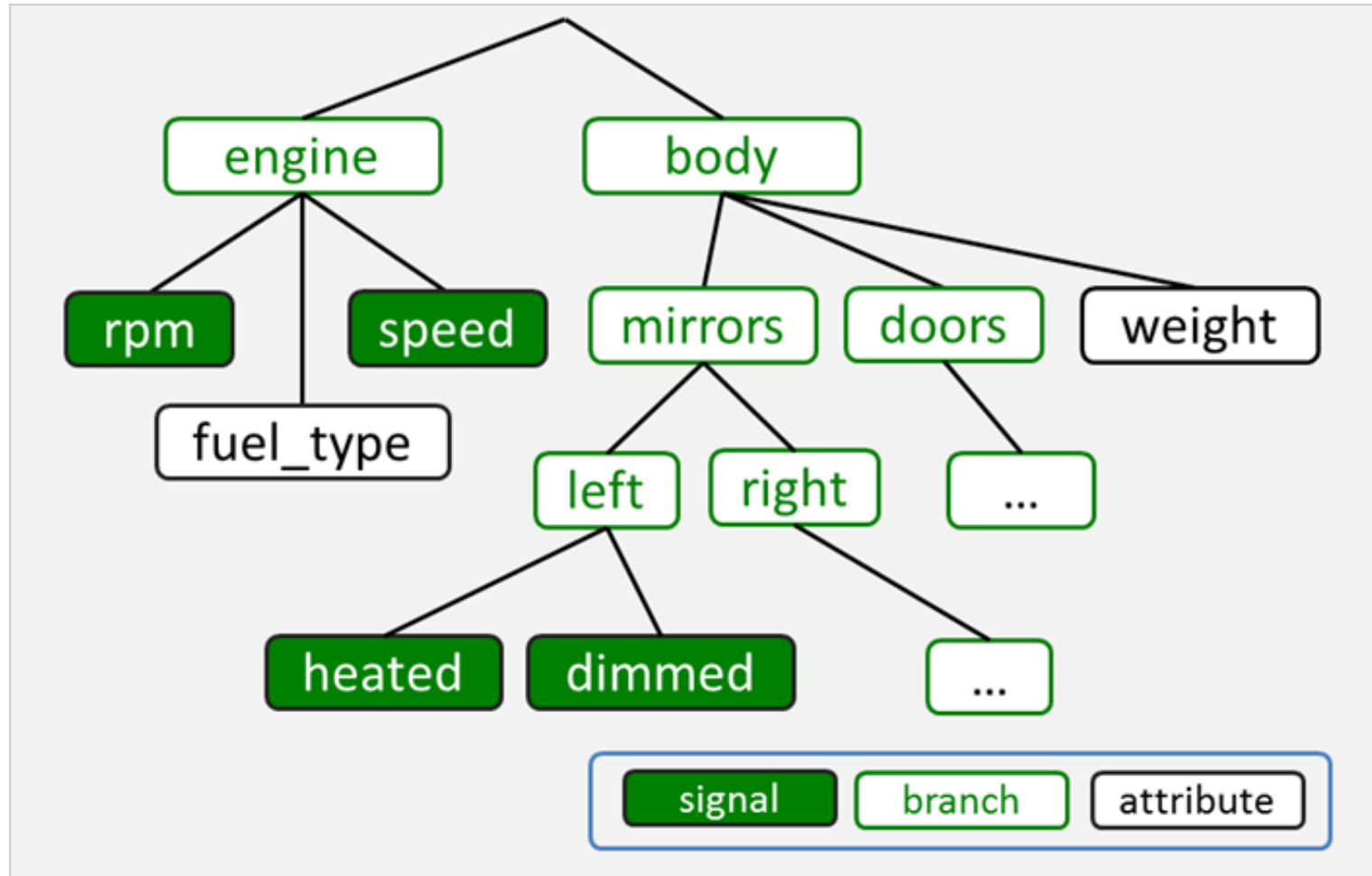
Collaboration: Open Connectivity Foundation

- Joint Samsung-OCF / RVI demo at AMM
- OCF – RVI bridge demonstrating interoperability between IOT and automotive
- Exploring using Vehicle Signal Specification as baseline for OCF standard



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Vehicle Signal Specification



VSS Types

- VSS Defines a simple set of high level classes
- **Branch** – a node in the data structure such as Engine, Body, Door, Mirror, Left, Right
- **Attribute** - a static value associated with a branch, like the capacity of the fuel tank
- **Signal** – a dynamically changing value associated with a branch, like Engine RPM
- Branches may contain Signals, Attributes, and Branches

Sample of VSS JSON file

```
"Engine": {
  "description": "Engine-specific data.",
  "type": "branch",
  "children": {
    "EOP": {
      "description": "Engine oil pressure.",
      "min": 0,
      "max": 10000,
      "type": "Int16",
      "id": 434,
      "unit": "mbar"
    },
    "EOT": {
      "description": "Engine oil temperature.",
      "min": -50,
      "max": 300,
      "type": "Int16",
      "id": 430,
      "unit": "celsius"
    }
  }
}
```

VSS Simple Data Types

Name	Type	Min	Max
UInt8	unsigned 8-bit integer	0	255
Int8	signed 8-bit integer	-128	127
UInt16	unsigned 16-bit integer	0	65535
Int16	signed 16-bit integer	-32768	32767
UInt32	unsigned 32-bit integer	0	4294967295
Int32	signed 32-bit integer	-2147483648	2147483647
UInt64	unsigned 64-bit integer	0	2 ⁶⁴
Int64	signed 64-bit integer	-2 ⁶³	2 ⁶³ - 1
Boolean	boolean value	0/false	1/true
Float	floating point number	-3.4e -38	3.4e 38
Double	double precision float	-1.7e -300	1.7e 300
String	character string	n/a	n/a
Buffer	buffer of bytes	n/a	n/a

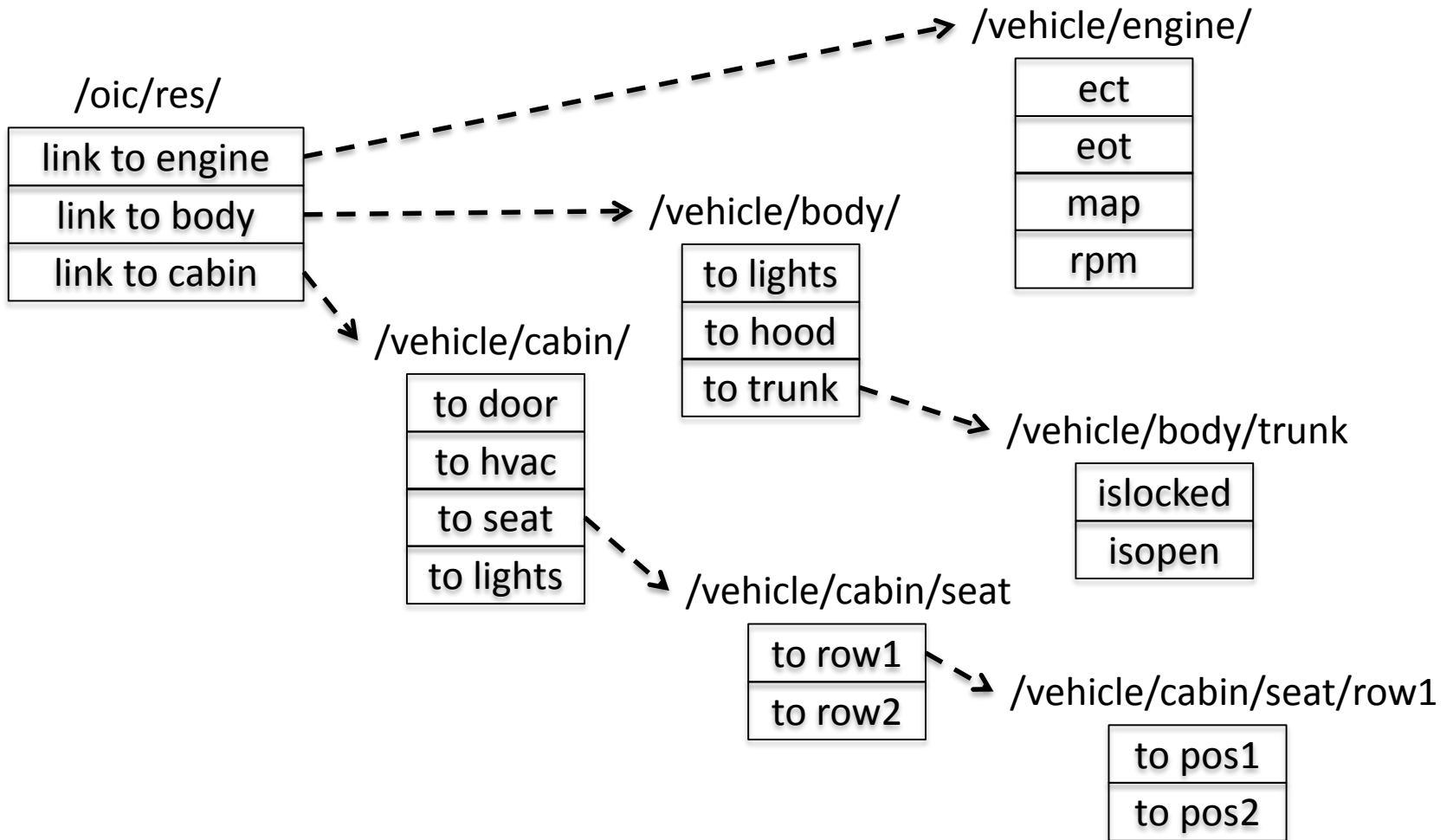
OCF Resource Model

- REST API with asynchronous notification (CRUD+N) works with IETF CoAP - RFC 7252
- Web Linking based on RFC 6690, RFC 5988
- Resources and Resource Collections
- Resource Types define the specific resource behavior and schema
- Resource Types are modeled in RAML and JSON Schema

Mapping VSS to OCF Resource Model

- OCF Resource Type definitions for VSS terms
- Branches can be modeled by OCF Collections
- Signals and Attributes can be modeled by OCF Resources
- Interaction models for Branch, Signal, Attribute classes – mapping to RAML files per class
- JSON-Schema to define specific types
- Conflicts among branch names resolve through context: Cabin.Lights has different children from Body.Lights, can they use the same definition?

Mapping to Collections



/oic/res Example

```
{
  "anchor": "/example/vehicle/",
  "href": "engine",
  "rt": ["vss.branch", "vss.engine"]
},
{
  "anchor": "/example/vehicle/",
  "href": "body",
  "rt": ["vss.branch", "vss.body"]
},
{
  "anchor": "/example/vehicle/",
  "href": "transmission",
  "rt": ["vss.branch", "vss.transmission"]
},
{
  "anchor": "/example/vehicle/",
  "href": "cabin",
  "rt": ["vss.branch", "vss.cabin"]
}
```

Engine Branch Links

```
{
  "anchor": "/example/vehicle/engine/",
  "href": "ect",
  "rt": ["vss.signal", "vss.ect"]
},
{
  "anchor": "/example/vehicle/engine/",
  "href": "eot",
  "rt": ["vss.signal", "vss.eot"]
},
{
  "anchor": "/example/vehicle/engine/",
  "href": "map",
  "rt": ["vss.signal", "vss.map"]
},
{
  "anchor": "/example/vehicle/engine/",
  "href": "rpm",
  "rt": ["vss.signal", "vss.rpm"]
}
```

Example JSON Schema

```
"$schema": http://json-schema.org/draft-04/schema#,  
"title": "VSS Branch",  
  "definitions": {  
    "vss.branch": {  
      "type": "array",  
      "items": {  
        "$ref": "oic.web-link.json#"  
      }  
    }  
  }  
}
```

Example JSON Schema

```
"$schema": http://json-schema.org/draft-04/schema#,
"title": "VSS Engine",
"definitions": {
  "vss.engine": {
    "type": "array",
    "items": {
      "anyOf": [
        { "$ref": "vss.eop" },
        { "$ref": "vss.map" },
        { "$ref": "vss.ect" },
        { "$ref": "vss.eot" },
        { "$ref": "vss.rpm" },
        { "$ref": "vss.tps" }
      ]
    }
  }
}
```

Example JSON Schema

```
"$schema": http://json-schema.org/draft-04/schema#,  
"title": "VSS EOT",  
  "definitions": {  
    "vss.eot": {  
      "type": "number",  
      "minimum": -50,  
      "maximum": 300  
    }  
  }  
}
```

```
"$schema": http://json-schema.org/draft-04/schema#,  
"title": "VSS TPS",  
  "definitions": {  
    "vss.tps": {  
      "type": "number",  
      "minimum": 0,  
      "maximum": 100  
    }  
  }  
}
```