IoT Standards Trends and Convergence - Joint Workshop: Internet of Things for Smart Cities & Communities (IoT4SCC)

Pierre Gauthier
Chief API Architect TM FORUM
TMF Smart City Reference Architecture

Smart City Business Capabilities

Smart City Technical Capabilities

- IoT and Smart City Data Models (TMF, ETSI, FIWARE, GSMA FrontRunner)
- TMF Smart City Open Source API Suite
- TMF IoT Service and Device Management Open Source API Suite
- FIWARE Standard Open Source Data Access APIs NGSI
TMF Open APIs

- From IoT device management to complex B2B value fabrics
- Managing partner arrangements across any business boundary
- Onboarding, SLA management, policy management and revenue sharing & settlement
Modular Platform and Open APIs

Open APIs
- Industry standard data models
- Cross-industry best-practice

‘Black-Box’ Platform
- Vendor/operator specific
- Innovative
- Agile & flexible

Smart City Platform

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All integration done through stanadrezides APIS

Pierre Gauthier; 03/05/2019
Smart City Architecture Enabled by Open APIs
Retirer les Apis non nécessaires
Pierre Gauthier; 03/05/2019
Component suites are highly cohesive sets of APIs that support end-to-end scenarios or execution flows across managed resources.
Network as a Service (NaaS) API Component Suite

TMF 909
Version 1.3
June 2018

https://projects.tmforum.org/jira/browse/AP-1041
TM Forum Open APIs based Platforms

Customer Product Management Domain
A set of APIs supporting the E2E Management of Customer, Product Offerings, Orders, Charging and Billing

Service Management Domain
A set of APIs supporting the E2E Management of Services

Resource Management Domain
A set of APIs supporting the E2E Management of Resources/Devices
TMF-Component-Suite-for-IoT-Device-Management

https://projects.tmforum.org/wiki/display/IM/TMFxxx+++API+Component+Suite+for+IoT
Layering

- Who wants services? dedicated access offers for example.
- Product offering that depends on the services of the IOT service component suite.
- Offers can be at $0.

- Raw data Service that can be categorized by location, QoS, vendor, and so on
- Augmented data Service for example optimized routes in the context of garbage cans

- Management of sensors and sensor data.
- Open Source IoT and Smart City data models
- Standard Data Access API NGSI (OMA standard)
Utiliser Garbage Example

Pierre Gauthier; 03/05/2019
This project is part of FIWARE and has been made in collaboration with the TM Forum.

The Business API Ecosystem is a joint component made up of the FIWARE Business Framework and a set of APIs (and its reference implementation) provided by the TMForum. This component allows the monetization of different kinds of assets (both digital and physical) during the whole service life cycle, from offering creation to its charging, accounting and revenue settlement and sharing. The Business API Ecosystem exposes its complete functionality through TMForum standard APIs, concretely, it includes the catalog management, ordering management, inventory management, usage management, billing, customer, and party APIs.

The Business API Ecosystem is not a single software repository, but it is composed of different projects which work coordinately to provide the complete functionality.

Concretely, the Business API Ecosystem is made of the following components:

- **Reference implementations of TMForum APIs**: Reference implementation of the catalog management, ordering management, inventory management, usage management, billing, customer, and party APIs.
- **Business Ecosystem Charging Backend**: Is the component in charge of processing the different pricing models, the accounting information, and the revenue sharing reports. With this information, the Business Ecosystem Charging Backend is able to calculate amounts to be charged, charge customers, and pay sellers.
- **Business Ecosystem RSS**: Is in charge of distributing the revenues originated by the usage of a given service among the involved stakeholders. In particular, it focuses on distributing part of the revenue generated by a service between the Business API Ecosystem instance provider and the Service Provider(s) responsible for the service. With the term “service” we refer to both final applications and backend application services (typically exposed through an API). Note that, in the case of composite services, more than one service provider may have to receive a share of the revenues.
- **Business Ecosystem Logic Proxy**: Acts as the endpoint for accessing the Business API Ecosystem. On the one
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<table>
<thead>
<tr>
<th>Knutaa  Validation result [skip ci]</th>
<th>Latest commit 2961bc0 4 hours ago</th>
</tr>
</thead>
<tbody>
<tr>
<td>.circleci  Validation result [skip ci]</td>
<td>4 hours ago</td>
</tr>
<tr>
<td>Common  Declaring name and value as required attributes</td>
<td>4 hours ago</td>
</tr>
<tr>
<td>Customer  Updates based on UsageConsumption review from SophieB</td>
<td>3 days ago</td>
</tr>
<tr>
<td>EngagedParty  Schema fix-ups: more descriptions, format: uri</td>
<td>7 days ago</td>
</tr>
<tr>
<td>Enterprise  Fixed broken links and typo</td>
<td>2 months ago</td>
</tr>
<tr>
<td>MarketingSales  Fixed broken links and typo</td>
<td>2 months ago</td>
</tr>
<tr>
<td>Product  Updates based on UsageConsumption review from SophieB</td>
<td>3 days ago</td>
</tr>
<tr>
<td>Resource  Merge branch 'master' of <a href="https://github.com/tmforum-rand/schemas">https://github.com/tmforum-rand/schemas</a></td>
<td>7 days ago</td>
</tr>
<tr>
<td>Service  Merge branch 'master' of <a href="https://github.com/tmforum-rand/schemas">https://github.com/tmforum-rand/schemas</a></td>
<td>7 days ago</td>
</tr>
<tr>
<td>.gitignore  Add .gitignore</td>
<td>8 days ago</td>
</tr>
<tr>
<td>LICENSE  Update LICENSE</td>
<td>4 months ago</td>
</tr>
<tr>
<td>README.md  Update - test</td>
<td>16 days ago</td>
</tr>
<tr>
<td>_config.yml  Set theme jekyll-theme-minimal</td>
<td>a month ago</td>
</tr>
<tr>
<td>package-lock.json  Additional reference fix</td>
<td>18 days ago</td>
</tr>
<tr>
<td>package.json  Missing js-yaml</td>
<td>21 days ago</td>
</tr>
</tbody>
</table>
TMF DATA MODEL SCHEMAS = OPEN SOURCE
Smart City and IoT Data Models

- Models maintained in Open Source Front Runner and TMF Data Model
- Harmonized with FIWARE
- JSON Schemas (similar to TMF Data Models)
Thanks!