Platforms and Data Models: Emerging Mechanisms for interoperability

Chair: Jarmo Eskelinen (Future Cities Catapult)
Speakers: Ovidiu Vermesan (SINTEF), Svet Mihaylov (EC, H2), Bart Rosseau (Ghent), Juanjo Hierro (Fiware), Martin Serrano (INSIGHT) and Thimo Thoeye (DataLab)

Abstract

Smart cities have been a promising concept for over a decade. Despite the efforts and investments of major cities and companies, the current marketplace remains broken. One city is not a market. Urban services are too often bespoke solutions, and cities can't benefit from the economics of scale, harmonisation of technologies, open standards and shared practices would provide. On the other hand, cities are – for a reason – wary about the risks of a technology lock-in, being locked in the solution of one provider with a "one platform to rule them all" solution.

Openness is the fast route to interoperability. In this panel we discuss open urban platforms and harmonised data models across cities through concrete case examples. Harmonisation of all urban systems would be an impossible task because of the amount of existing legacy systems and data locked in them. We will discuss the minimum level or harmonisation needed to support service portability, and how to support modular platforms which can grow to new service domains and support multi-vendor delivery models.

Lastly, we will discuss the potential of the urban community to support cities in becoming smart. Which methods can cities use to harvest the lateral power of the Web, utilizing wide-scale citizen participation, involvement and crowdsourcing, distributed value chains, fast prototyping and piloting, and service creation through experimentation?

Opening Remarks: Jarmo Eskelinen (Future Cities Catapult)

The Smart city market is currently non functioning and business in urban platforms is hard, cities don't support portability of platforms, and a single city is not a market. We need an environment where services can scale between cities with modular approaches that fit an individual city needs. To achieve this we require practitioner standards and in time, open and closed systems standardisation. This session will explore different platform approaches, case studies, business cases, the level of harmonisation needed and how we support our cities to serve their citizens best.

Presentations

Ovidui Vermesan, SINTEF

Gave an overview of a global market review of existing IoT platforms, as part of the Unify IoT project. The full report is available here www.internet-of-things-research.eu/pdf/D03_01_WP03_H2020_UNIFY-IoT_Final.pdf

Of 360 IoT platforms identified, the USA dominates with 56% based there, 27% were based in the EU, over 55% were from start ups. Detailed analysis was carried out of 36 platforms and the key findings were:

- Open source is only popular in US and Europe, with Europe having 4x more projects
- Germany has most providers in EU, followed by UK, Spain and France
- Germany has a very high percentage of multinational companies
- UK has no MNC and mainly SMEs and start-ups
- Sector agnostic platforms currently dominate. In B2C segments smart home followed by lifestyle and mobility dominate while health is still in early stages
- The manufacturing sector offering is proportionally stronger developed in Europe so is the one for the Energy sector.

IoT Platforms are key for the development of scalable IoT applications and services. The market is still emerging and currently fragmented. Although many projects strive to create interoperability there is a danger that resource may be wasted on platforms, which now or in the near future may have no market relevance. The focus is on developing and deploying IoT technologies and applications using a federation of IoT platforms and a strong IoT ecosystem of integrators, aggregators, service providers, RTOs across various industries. These ecosystems need industrial, consumer and business stakeholders that enable customers to create managed services offerings and co-create value (products, services, experiences). This must be based on new business models and exchange of data to unlock the true data value chain in order to deploy solutions for digital single market.

Svet Mihaylov, European Commission H2 Connect

Spoke about how the EC is pushing towards EU driven platforms. The European Innovation Partnership for Smart Cities & Communities (EIP-SCC) aims to deliver scale, acceleration and impact though common solutions, an integrated approach and collaboration. The initial focus is on Energy, transport and ICT in 6 action clusters; integrated planning, sustainable districts, urban mobility, integrated infrastructure (platforms), business models and citizen focus.
As part of the smart city data stack, urban platforms are an important part in evolving integrated solution architecture and should be driven by needs, not "the tail wagging dog". The vision is of a platform that will allow interoperability enabling several cities to use the same application and avoid vendor lock in. The Urban Platform Initiative aims to Accelerate the adoption of Urban Platforms in EU cities by bringing together demand side groups to agree common requirements, and speed adoption with a leadership guide and management framework. It will also bring the

industry together to adopt common open solutions; reference architecture and standards allowing it to scale. By 2018 the Urban Platform initiative will create a strong EU city market for Urban Platforms and by 2025, ensure that 300m residents of EU cities are supported by Urban Platform(s) to manage their business with a city and that the city in turn drives efficiencies, insight and local innovation through the platform(s).

Question: How does commission see international situation after recent tension of Russia and USA and security, do we we need home grown cloud infrastructure?
A: A lot of effort has been put into security to address this. The idea is to beat the googles of the world to prevent lock in and have several suppliers in market with easy switching.

Bart Rosseau, City of Ghent

Bart Rosseau reminded us that technology is not the only challenge and investing in the human and organisational side is important.

Complexity is an issue because the market is not ready. Complexity is not only within organisations but between city's, even in small region, where the legal context is different with different responsibilities. However as civil servants used to tackling complexity, interoperability doesn't equal standardisation.

Investing in human and organisational side is important - this is still lacking in talk of smart cities

Business has different definition of openness to public. So what is importance of openness? Shared/connected data is more important

Initially there was a focus on willingness to procure a platform - now there is a focus on willingness to change the way they do things, then they accept that platform is the issue. The platform is the keystone - but it need the stones below it as well - cities need to change existing procedures and change skills (hire based on knowledge or scrutinise algorithms). Make the change together.

Question: What is role of government in the Quadruple helix (government, citizen, companies and academics work together in smart city)?
A: An actor, and also the director/manager to make it all work. Co-creating is the way to go and urban platforms will make solutions scalable

Juanjo Hierro, FIWARE

Spoke about bringing the OASC into execution now that it has built traction in over 100 cities in 22 countries. The basic mechanisms for smart city
- Common APIs - firewareNGSI (initially)

- Standard data models - Sity SDK
- Platform for open data / API publication
- Driven by implementation approach

Cities are starting to agree what needs to be done with OASC, its now time to go. FIWARE will push to help work together driven by an implementation approach - bringing concrete cities together to agree to common challenge to address and work on actual projects.
There is a need to work on data models to ensure interoperability, real projects will enable common information models. These will need to be published to create portable solutions. Examples help cities understand impact for example projects in Porto and Santander.
We need collaboration and will do this by creating meeting points for cities and solutions providers, for example TM Forum. Set up joint collaboration program for OASC principals, collecting cities that wish to collaborate to publish common info models. GSMA, just produced common reference architecture recommendation for IoT platforms that want to create ecosystem. ETSI announced creation of new industry specification group to consolidate all contribution into standards.
The Fiware foundation is well connected to the Spanish ministry that will support process to create common information model. They are looking for more cities to join Spanish cities with a promise to bring them into their public procurement process
Shared context information would boost innovative services and the dev of multi-side markets.
The future is economy of data we need to move from making data available, to business models

Question: We have heard a lot about platforms, and that business should be part of collaboration - but who and how?
A: Juanjo, just because data is open source doesn't mean there is no opportunity for business model. There will need to be solutions on top of platform, businesses based on data and monetisation of data ownership will emerge.
A: Bart: from a customer perspective cringe at monetisation of data, huge market but huge liability - at some point using data will be expensive and as move towards data driven services may not be able to afford the data! Need to think about this. Role of business on local level - inform businesses as much as possible of opportunities. Need to communication:

Question: what is good method of dialogue?
A: Juanjo: in Spain running national level smart cities plan with financial backing, want to run in a way to ensure development for 1 city work in all. Cities apply to program for solution. To ensure harmonised result - define info models and common standards which will be part of tender requirements. Bring companies and cities together to agree common info models - spain want to work with other cities from around the world
A: Svet: market dialogue - there is a forum xxxx that brings together industry, city etc, consultations, create forums as part of projects eg espresso
A: Bart: how do you be an informed client? Locally have networks to meet with different actors. Common challenges are important to keep interest. As with open data can provide platforms where people have questions, art is knowing when to be quite to allow conversation and

learning. Big role to be played by federations. Sometimes underestimate role of trainings a schools

Dr, Martin Serrano, INSIGHT, Irish National Centre for Data Management, NUI Galway

Presented the deployment and implementation of the Vital platform as an urban IoT Platform case study. The platform has been tested in the field in Galloway with a smart building insight project using off the shelf equipment to collect periodic and event based data.

Global move in smart cities = competition = winners and losers - there is currently no winners
Bottleneck is procurement and legal?
Focus on one platform to test - Vital
Community focus and connecting cities
They have tested in the field - prove deployment in a municipality then prepared a tender
Provides complex analytics
Smart building Insight - real deployments in Galway with off shelf equipment - sensors, but what will they do with it:
Collecting periodic and event based data
Use open API following FIWARE philosophy
Have an agreement with Galway as part of OASC - create interface for mayors to know each other. Galloway smart city program
Controlling traffic lights based on noise pollution

Thimo Thoeye, Data Lab, City of Ghent

Shared his thoughts on how to involve SMEs and citizens linked to open data and platforms. While working as a software engineer with SMEs making applications for government Thimo had trouble getting, and harmonising data in order to sell products to multiple cities. Thimo described one experience making a parking solution for accessible parking where each city department and different companies had a different list of the disabled parking spaces and the semantics are not always clear. The city is now making a sensor network for smart parking. The company that provides sensors will also provide platform, in procurement, companies want to provide whole stack. They often prefer to use their own systems. How do we convince SME's to use standards? They need to understand how the city works and its shared semantics. We won't want one big system to integrate, we need a common understanding of descriptions and what they mean. This is an application for linked, open data. If you define terms for sensors on semantic web. OASIS - open applications on semantic

Question: How do we ensure when we procure services, they comply with open data standards?
A: Thimo: this is a challenge that all governments facing. Governments should specify that the city owns its data. Smaller players are more amenable to changing platforms. Some framework contracts are still running, waiting to die.

A: Martin: The government has specified that in UK and Ireland all data must be open.

Question: When using IoT in the urban environment what are effective security mechanism?.
A: Martin: security by design,
A: juanjo: security is challenge in many platforms. ETSI isd will give space for addressing how security is resolved. Info coming from IoT and other data will be gathered together in context information management layer, this makes it more simple, as it's about security to get access to common info management layer. Simplifies the issue as not expected that applications connect directly but to higher level context info layer therefore tackle in harmonised way
Interesting evolution in security (sizes getting smaller) so can't do strong encryption. Alternative is to distribute stuff, eg like blockchain security?
Security discussion is big issue, it's a race between good/bad. The more integrated the more vulnerable

Question: There have been funded smart city projects for a few years with a focus on high TRL applications. Are the platforms used compliant with open data? This is important as they will become baseline applications for future projects.
A: Svet: There is a requirement for open data in platforms specified.

Summary

Ovidiu summarised the IoT platform landscape currently filled with many platforms, but in the future they will converge and many will disappear.
Svet gave the vision of the EU as leader in IoT and how the Commission is pushing for EU driven platforms ecosystem without lock in.
Bart reminded us that it's not all about technology, but mind-sets and collaboration. Cities need new skillsets and a willingness to make a change, not just procure a platform. Although the platform is the focus it requires the stones underneath.
Juanjo asserted that it is time to move from making data available to business models and common information models. Collaboration.
Martin gave the case study of the Vital platform with example smart building applications in Galloway.
Thimo gave a good example of collaboration with different interests and requirements from stakeholders and the need for shared understanding.