

## Proposal for a presentation

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**Presentation title:** New Tools for Citizen Innovators Promise to Tear Down Europe's Geospatial Barriers

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### Abstract

In recent years, stakeholders across Europe have begun to understand the potential benefits of providing up-to-date, easily available and universally accessible geospatial information. Many national governments have developed their own individual GI strategies for providing integrated location-based data. However, despite significant advances at the national level, the full European potential of GI datasets for innovation remains unrealised. A key challenge lies in making the rich sources of data that currently exist accessible to non-GI experts. Practical visualisation tools and ready-to-use harmonised data can help address this challenge and ultimately enhance the usability of Europe's vast array of geospatial datasets.

### Contributors

Dr Julia Glidden is President & Founder of 21c Consultancy. Julia completed her D.Phil. in International Relations at Oxford University and is an internationally recognised expert on Digital Government. Dr Glidden is currently serving as an expert advisor to the United Nations on the 2016 eGovernment Readiness Survey and the European Commission on the new 2018/19 Horizon 2020 Programme. She is actively involved in the European Commission's Smart City initiative, and is the founder of the pioneering EU project Citadel-on-the-Move which has helped over 140 cities across all six continents to Open Data. Julia is currently working with the British Standards Institute Smart Cities Working Group, BIM - which is developing Building Information Modelling standards for the global construction industry, W3C, the Open Data Institute and the Open Knowledge Foundation to help advance and promote practical bottom up open data standards.

Susie Ruston is a founding partner of 21c consultancy. With over twelve years of experience in the creation and delivery of eGovernment projects and services, Susie began her career during the dotcom era with Election.Com where she helped to make history through the delivery of the world's first legally binding online public elections. For the past decade, Susie has worked with central and local governments in the UK and Europe on wider public service modernisation initiatives, including the introduction of innovative WiMAX solutions for polling stations, the use of Cloud for public service delivery and the business case for opening data for innovation and co-creation. Susie has studied and assessed a wide variety of government programmes and policies across Europe, and has written and edited specialist papers and journals for organisations ranging from the European Commission and Council of Europe through to CLG, BECTA and Yorkshire Forward.

Aneta Rapacz is a dedicated young professional with extensive first-hand knowledge of EU regulations, financial and administrative practices as well as procurement procedures. Prior to joining 21c, Aneta worked for FRONTEX – the European Agency for the Management of Operational Cooperation at the External Borders of the Member States of the EU in Warsaw, where she managed a range of projects on the regulatory and administrative sides of the organization.

Pavel Kogut is an experienced researcher with a background in international relations, socio-economic affairs and EU policy-making. Prior to joining 21c, Pavel worked at the Hague Centre for Strategic Studies, and before that at the European Economic and Social Committee, a consultative body of the EU. His experience also includes monitoring and evaluation of Big Lottery-funded projects run by two London-based charities.

## **Introduction to OpenTransportNet**

OTN has been created to address key challenges that currently hinder the use of Geographic Information (GI) in Europe. By addressing these challenges OTN will stimulate open innovation as well as create market opportunities for businesses, especially SMEs. Both private and public sector stakeholders can derive enormous benefit from the increasing availability of open data and GI, therefore it is important to ensure that everyone can access and use this data in an easy and engaging way.

Challenges that prevent stakeholders from taking advantage of this opportunity mainly revolve around standards, which are relatively complicated and so are not extensively used outside the geospatial community. OTN will address these challenges by creating collaborative virtual service hubs that aggregate, harmonise and visualise open transport-related data from a wide variety of sources that meet international standards and therefore ensure easier access to useful GI for all. OTN has chosen transport as a cross border focus area because it is vital for Europe's economic growth and job creation, as well as the long-term well-being of its societies. From ensuring the effective delivery of goods and services through to creating safer, healthier and more pleasant living environments, transport touches upon almost every facet of 21<sup>st</sup> century living, making it an ideal target area for the creation of solutions that can be enhanced by location-based services, such as Global Navigation Satellite Systems (GNSS) including Galileo and VG resources such as OSM.

Currently, datasets that can be used to improve transport – from safer biking lanes through to identification of the best emergency vehicle response routes – are disharmonised, scattered across different domains and difficult to access. Voluntary GI is often disharmonised, too. And businesses frequently complain that they lack easy APIs and GUI for easy access and analysis of data which could help them derive accurate insights and apply knowledge in a real world context to create new services and commercial opportunities in the transport domain. All these shortcomings create a need for technology that could provide easy integration of data streams from sensors and mobile objects, including humans, and which could also ensure security and privacy of all users concerned.

## **Meeting User Needs**

To meet these needs OTN will use an automated flexible dataset aggregator which will make it easy to integrate and harmonise transport related data. The aggregator will be embedded in the OTN hub, a website hosted by a region or city that offers free web services and user interfaces for specific use cases and publishes harmonised Linked Open Transport Data in the Linked Open Data (LOD) cloud. Each hub will combine spatial (GI), dynamic data streams (sensors and monitoring of mobile objects) and non-spatial (OD) data using techniques such as RDF and data analysis based on ontology's, and derive insights from the data through visualisation tools and pattern detection algorithms.

OTN Hubs fill the current gap in the market by (a) improving the accuracy of data insights by enhancing knowledge with Volunteered Geographic Information (VGI), and (b) deploying a sophisticated Access Control and Identity Management system (ACM) which will manage privacy controls for personal and/or sensitive data. OTN Hubs will be structured in such a way as to enable platform visitors to be directed to the innovation tools that best suit their needs. Users can play with data mash-ups, share insights with the OTN community, post service needs and create new business applications all for free. For a small subscription, users will have the opportunity to access more detailed data insights and personalized business mentoring.

OTN will cater to the needs of three types of users: discoverers, sponsors and innovators. Discoverers are those who basically want to have fun with data. By visiting OTN they will be able to explore the 'mash-up' of different datasets and gain insights and knowledge about transport situations, locations and conditions, among other things. Sponsors are those who visit OTN in search of solutions. Sponsors may be Local Authorities or businesses that have a particular transport related

need which they want to be addressed. Sponsors will be able to help Innovators shape their new services and will have the opportunity to enter into a business venture with the creator. Finally, innovators are problem solvers. They are individuals or small businesses that have an idea for a new business application or service. They will visit OTN hub to gain insights from data, build a service using the data and market it directly to the sponsors or other markets.

### **OTN Visualisation**

A study of existing open datasets has revealed that the majority of datasets are available in some form of tabular structure (e.g. CSV), much less in hierarchical structure and almost none in graph structures. In particular, for GI datasets there are a couple of widely used techniques: (1) the use of location information such as address, or coordinates; (2) the use of vector data to describe geographic features (e.g. ESRI Shape file). Based on the more common datasets, and the requirements for the OTN project, the focus on visualization will be in three categories: geospatial and spatio-temporal visualisation, charts and temporal views.

Geographic information is commonly shown on cartographic maps. Data on top of maps is usually reduced to three different types of geometries referring to different types of information: dots represent events, points of interests and single locations, lines or paths represent usually movement of objects or borders of areas, and finally polygons represent areas or objects with a spatial extent. Charts include all kinds of information that can be represented as flat files or tables. The related visualizations to initially support include: bar-, line-, pie charts and scatter plots. Temporal views contain different types of possible visualizations that all intend to capture the temporal dynamics hidden in the data. Such views are: animated views and time lines, such as temporally stacked line charts, etc.

Based on the intended use of the solution and the preliminary identification of user needs for visualisation, OTN has selected a number of different visualisation solutions to be integrated within the Hub. These include Open Layers, HSLayers and Dojo Charts. OpenLayers, created by OpenGeo, is a Javascript library for displaying maps in any web page. These maps can come from Google Maps or OpenStreetMap, but will have well-known distinctive OpenLayers user interface controls such as panning, zooming, and centering. The layered design of OpenLayers allows for placing user-defined features at specific locations on the map, with full support for the above-mentioned controls. HSLayers is another OpenLayers & ExtJS based mapping framework. Its development started in 2007 and is provided by OTN partner HSRS (Help Service - Remote Sensing). HSLayers is released under GNU/GPL. Currently, 3.0 development branch is the actual. HSLayers are designed as set of basic stones and components, which can be put together and custom application can be build. Dojo is a collection of JavaScript utilities providing solutions for JavaScript developers. Dojo Base is the foundation of the Dojo Toolkit and functionality such as DOM and AJAX convenience methods, animations, and other base functionality suitable for building simple Web sites. Dojo Core is a larger set of components built upon Dojo Base and includes things such as drag and drop, L10n and i18n components, and data stores.

### **Conclusion**

Practical visualisation tools and easily accessible harmonised data will allow users with no or little GI expertise to gain easy access to practical transport related information that is of real interest and relevance to them. Insights generated from this information will provide more opportunities for all stakeholders to extract greater value from open data and GI, enhancing the usability of Europe's vast array of transport-related datasets. Harnessing this potential is vital for ensuring the continent's status as one of the world's leading innovation hubs. It is also crucial for steady socio-economic development and the well-being of European citizens.