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The project has received funding from the Union's ICT Policy Support Programme as part of the Competitiveness and Innovation Framework Programme.
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SDI4Apps is an EU-funded project managed by the University of West Bohemia from the Czech Republic. The project is being implemented with the concerted effort of 18 organizations across Europe. SDI4Apps seeks to build a cloud-based framework with open API for data integration focusing on the development of six pilot applications. Work on the project SDI4Apps up to August 2015: Development and publication of one cloud based on SDI services supporting collection, management, and processing of spatial data and related with metadata. Actually the work is going on according to WP and to unit of development has meetings on Hackathon. Also we are working on precision of the methodology for qualitative assessment of open data including quality assurance, quality control, precision accuracy and representativeness, providing semantic annotation of data using RDF schema and other principles of semantic data. All this is going to be prepared for evaluation according to the framework SDI4Apps and instruments are deployed through the (6) pilot's demonstrations. The main target is to improve the development, management, utilisation and maintenance of geospatial data from the INSPIRE infrastructure by the wider community. A close collaboration with other WPs (especially WP 4, WP 5, WP 6 and WP 7) will be essential for successful implementation of this work packages.

Events a meetings:

Pizen Code Camp: 'Conception' of the SDI4Apps Platform (<http://sdi4apps.eu/2015/07/465/>)

Pizen Code Camp: Organization of the Work (<http://sdi4apps.eu/2015/07/organizing-the-work/>)

Lisbon invited under the roof of Geospatial World Forum (GWF) also experts and enthusiasts with the interest in potential use and exchange of spatial data across the INSPIRE and Linked Data environments. (<http://geospatialworldforum.org/>) (GWF). An SDI4Apps poster is on display at the INSPIRE Conference in Lisbon (<http://geospatialworldforum.org/>). On Friday, 29 May 2015, there was a workshop dedicated to linked data. This was a joint workshop of the SDI4Apps, SmartOpen-Data and OpenTransportNet projects. (<http://geospatialworldforum.org/>)

The "Saxon GI/GIS/SDI Forum" (GI 2015) was held in Dresden in 15th September 2015. More details can be found at <http://gdi-sn.blogspot.cz/>. At the same time the ISAF conference and Open Data Hackathon was held 19th International Conference on Information Systems for Agriculture and Forestry (ISAF 2015) together with the Open Data Hackathon for Agriculture, Forestry, Environment, Tourism and Rural development and the Club of Ossiach Networking Event Call for papers Conference topics: Open Data (<http://gdi-sn.blogspot.cz/>)

Dr. Tomáš Mildorf, (project coordinator)
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Project title: Uptake of Open Geographic Information Through Innovative Services Based on Linked Data
 Project acronym: SDI4Apps
 Project reference: 621129
 Funded under: The Information and Communication Technologies Policy Support Programme
 Call: OP-ICT-PSA-2013-7
 Objective: 2.Ea Open Data experimentation and innovation building on geographic information
 Total budget: EUR 4.070 m
 EU contribution: EUR 2.035 m
 Duration: 01/04/2014 - 31/03/2017
 Coordinator: University of West Bohemia in Pilsen, Czech Republic
 Website: <http://sdi4apps.eu/>

KEYWORDS

geographic information, linked open data, INSPIRE, GEOSS, Copernicus, easy data access, tourism, sensors, land use, education, ecosystem services evaluation, application programming interface, app developers

OBJECTIVES

The potential of geographic information (GI) collected by various actors ranging from public administration to voluntary initiatives of citizens is not fully exploited. The advancements of ICT technologies and shift towards Linked Open Data give room to innovation based on reuse of geographic information. The main objectives of SDI4Apps are to:

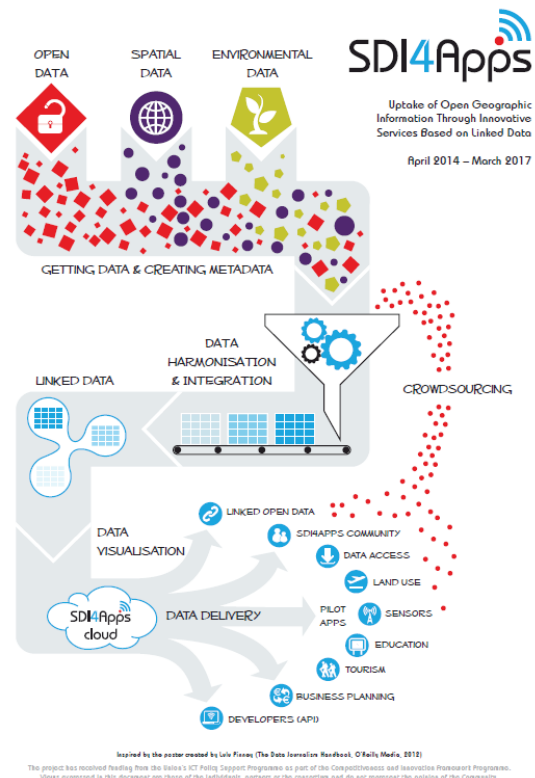
- Integrate a new generation of spatial data infrastructure (SDI) based on user participation and social validation.
- Support easy discovery and accessibility of spatial data for everybody.
- Link spatial and non-spatial data using the Linked Open Data principles.
- Support multilingualism of spatial data.
- Build scalable cloud based infrastructure for support of SDI initiatives and location based services (LBS).
- Integrate in-situ measurements and Earth observation data.
- Design open application programming interface (API) supporting integration of spatial data and LBS into applications developed and deployed by non-GI developers.
- Integrate a demonstration set of pilot applications.
- Test new approaches for data sharing by users through pilot applications.
- Attract external developers (mainly from SMEs, students and researchers) to test the newly integrated platform.
- Organise contests for application developers supporting wider use of GI data.
- Build a sustainable business model for a cloud based SDI.

PARTNERS

Asplan Viak Internet as (NO)	RTD Talos Limited (CY)
Baltic Open Solutions Center (LV)	Scuola Superiore Sant'Anna (IT)
Czech Centre for Science and Society (CZ)	Slovak Environmental Agency (SK)
e-Pro Group as (SK)	Strategia Strutturati di Antonio Paterno' & c. sas (IT)
European Regional Framework for Co-operation (GR)	The National Microelectronics Applications Centre Ltd (IE)
Help service remote sensing s.r.o. (CZ)	Uhlava (CZ)
Hyperborae S.r.l. (IT)	University of West Bohemia in Pilsen (CZ)
Masaryk University (CZ)	Vidzeme Planning Region (LV)
Pronatur (SK)	Zemgale Planning Region (LV)

CONTACT

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Inspired by the poster created by John Foxley (The Data Journalism Handbook, O'Reilly Media, 2012)
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Pilot 1 – Easy Access Pilot

Leader: The National Microelectronics Applications Centre LTD ,
Contact person: Dr. John J O’Flaherty, Technical Director, MAC Ltd, john@mac.ie

Burren National GeoPark, Co. Clare, Ireland

1,500 hectares on the west coast of Ireland, managed by the Irish National Parks & Wildlife Service. An unique area of high conservation value containing many habitats of international importance including limestone pavement, calcareous grassland, oligotrophic lakes, troughs, hazel scrub & ash/hazel woodland. Involves many Communities & Europe-wide environmental issues

SDI4Apps functionality required by the Scenarios:

Advanced visualisations

Data harmonisation

Integration of mobile apps

- Scalable crowdsourced/VGI real-time data collection with Open API.

Interoperability between local & global geospatial models.

Scalable Geo-focused Crawler for automatic collection of OGC services endpoints representing spatial content available via the deep web.

Linked Open Data

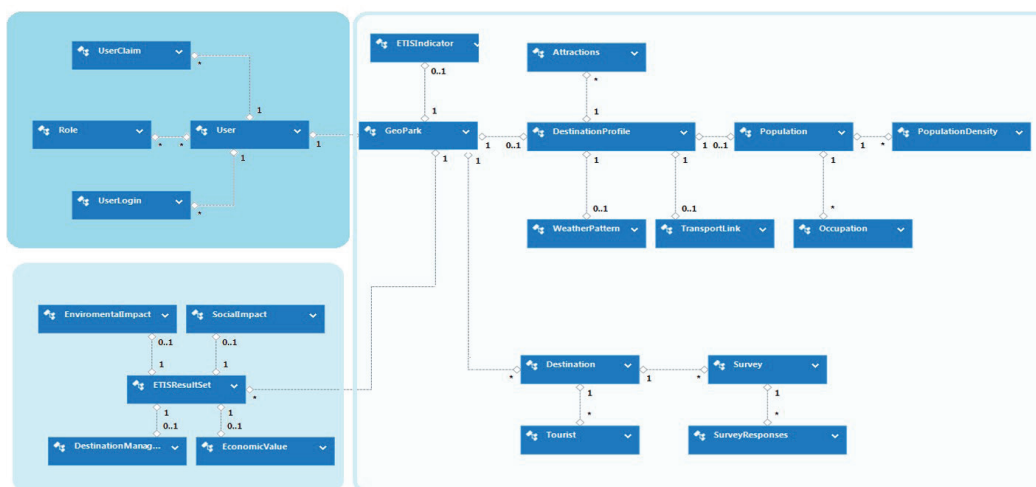
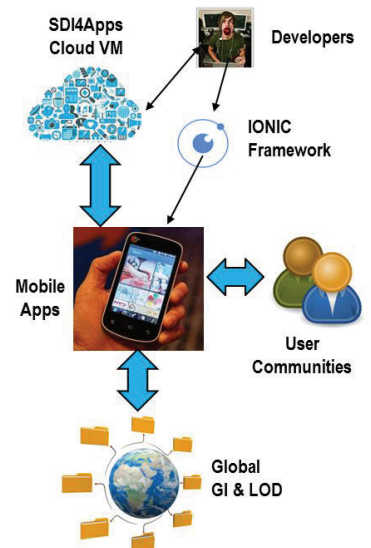
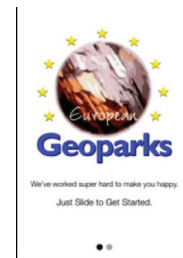
- Scalable INSPIRE GI schema to LOD transformation & harmonisation service, with persistent URIs.
- Scalable RDF Triple Storage service for LD (such as Virtuoso)
- Semantic indexing infrastructure to transform GI to LOD
- Scalable MapServer (or GeoServer) implementation

Framework approach

- Decouples the client application from the backend architecture, & Open common framework for both mobile development & web portal clients.

ETIS (European Tourism Indicator System) – Mobile App User Interface

- **Mobile Apps to support Tourism for Conservation – Data Model for ETIS**



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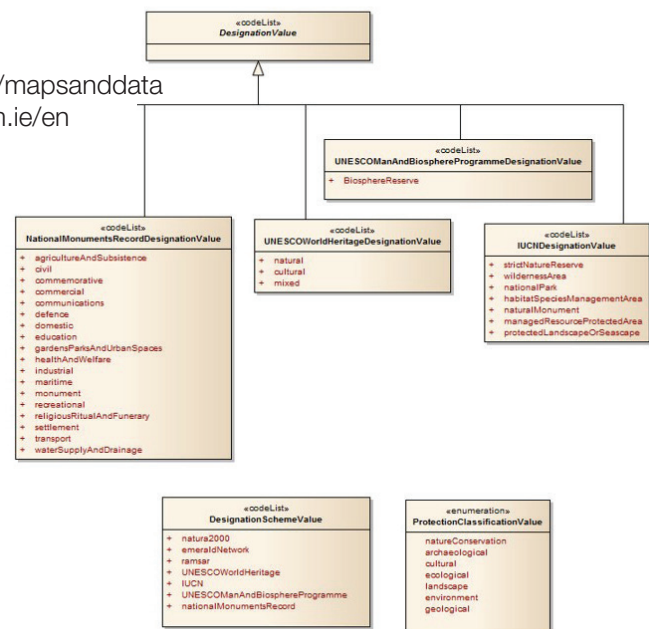
Irish National Monuments Dataset

- Compliant to INSPIRE Protected Site Theme – PS v3.2 - http://inspire.ec.europa.eu/documents/Data_Specifications/INSPIRE_DataSpecification_PS_v3.0.pdf

External Open Datasets include

- Irish Heritage Council heritage maps - <http://www.heritagecouncil.ie/heritage-maps/heritage-maps/>
- Irish Spatial Data Infrastructure GeoPortal – www.geoportal.ie
- Irish National Parks & Wildlife Services (NPWS) – www.npws.ie/mapsanddata
- Logainm Placenames Database of Ireland – LOD – www.logainm.ie/en
- Irish Open Government Data Portal - <http://data.gov.ie/>
- Irish Spatial Data Exchange (ISDE) – www.isde.ie
- Eurostat Linked Data - <http://eurostat.linked-statistics.org/>
- Open Street Map – www.openstreetmap.org
- GeoNames – www.geonames.org

Mobile Apps to support Tourism for Conservation – Data Model for ETIS



Pilot 2 – Open Smart Tourist Data

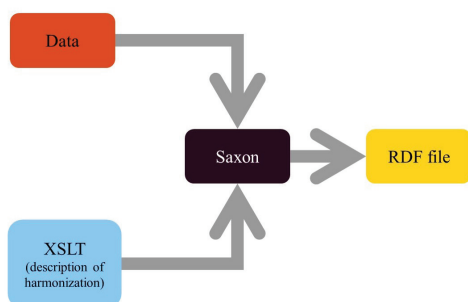
Leader: University of West Bohemia

Contact person: Dr. Otakar Čerba, Ota.Cerba@gmail.com

Introduction

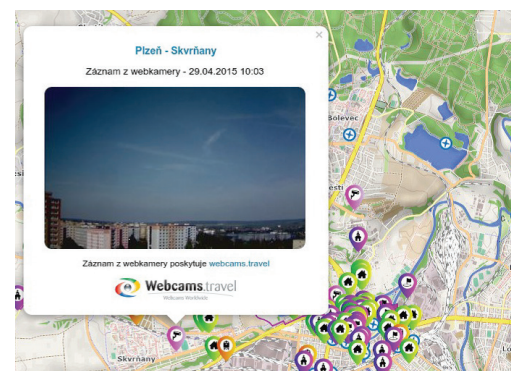
Proposed solution will represent a useful subset from the wide range of outputs of tourist data, GeoNames.org (dumps), Local data – documents from Posumavi region, Sicily and travel agency, Semantic data – experimental ontologies (OWL) of UWB (ski resort, sight in Rome), related projects such as OpenStreetMap, Habitats, CentraLab, E.L.F. It will be based on data exploitation, linking, harmonization and advance visualization. **The current version of covers almost all European countries and contains more than 4 206 573 POIs (Sept.2015)**

Data harmonization - scheme



Data Harmonization technology

- **XSLT 2.0 templates** (Transformation language based on XML, Process XML based files and non-structured files)
- **Saxon processor** (Java-based, XSLT + input data)



Identifier – persistent URI, Description – label(s) & description / comment (rdfs:) – multilinguality, Geometry (WGS 84 W3C Geo Positioning – GeoSPARQL WKT as a link), Classification (Waze, OSM), Contact information (foaf:) – address, email..., Tourism information – opening hours, cuisine..., Links – country

The SDI4Apps Points of interest data set is the seamless and open resource POIs that is available for other users to download, search or reuse in applications and services. The added value of the SDI4Apps approach is comparison to other similar solutions in implementation of linked data, using of standardized and respected datatype properties and development of the completely harmonized data set with uniform data model and common classification.

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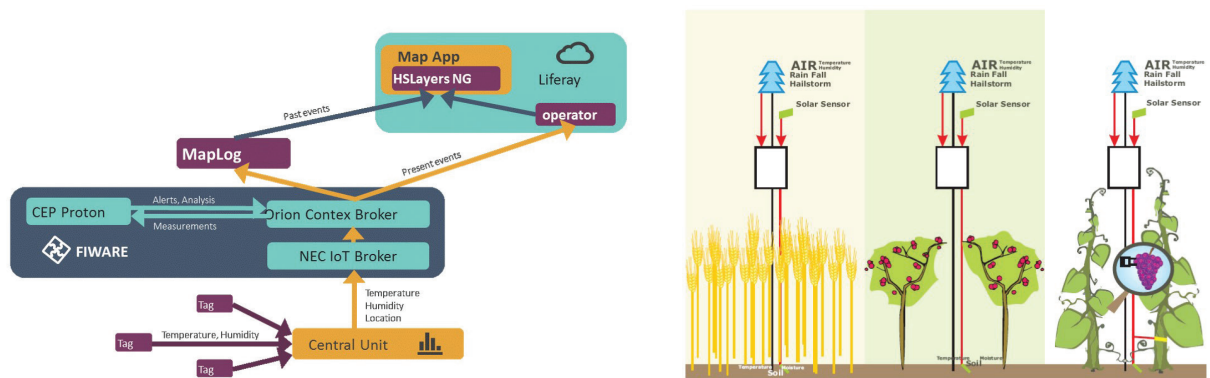
Pilot 3 – Open Sensor Network

Leader: Baltic Open Solution Center, Latvia
Contact person: RNDr. Karel Charvát, Charvat@ccss.cz

Overview:

Open Sensors Network – will create an environment where different groups of volunteers (for example farmers) will be able to integrate low cost sensors (meteorological, quality of air, etc.) into local and regional web sensor networks. The OpenSensorNetwork defines a framework for taking advantage of intelligent sensor webs based on the converging technologies of standard meteorological sensors, micro sensors, computers, and wireless telecommunications with data management and analysis in support of agriculture production activities, such as the chemical protection, grape and wine production, fruit protection and production.

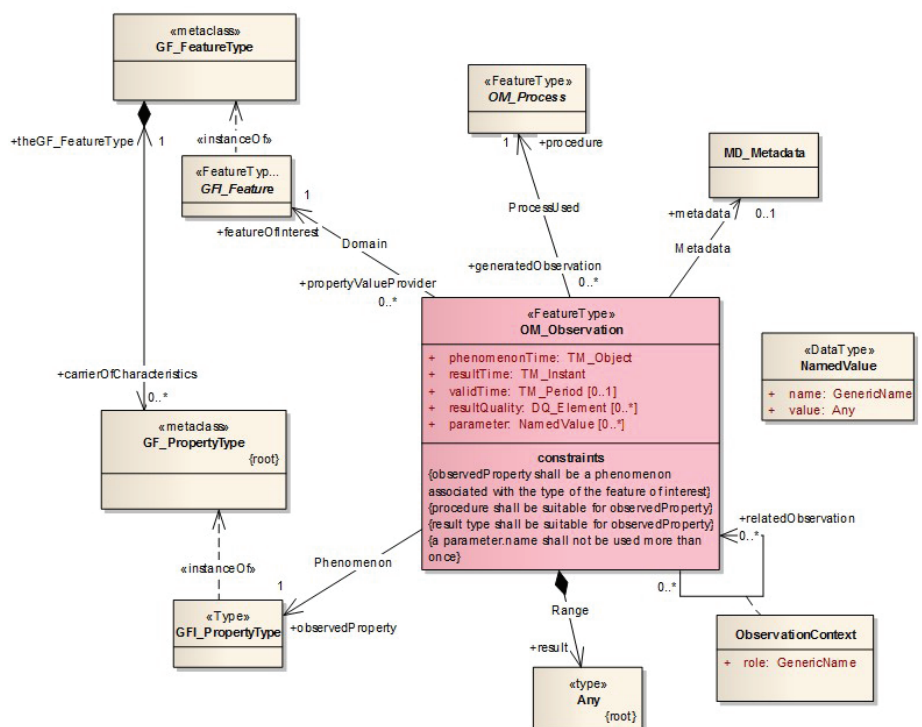
Figure 1- Architecture



The ongoing significant advancements in sensor technologies and in-situ sensing are expected to support also the development of more systematic capabilities for assimilating all sorts of in-situ measurements in agro-meteorological models, at relevant scales, to generate immediately (in real time) useful information for farmer’s decision making. The data will also be available for the public sector. It will help not only the farmers, but also protection services. Large monitoring networks will be built using neogeography and VGI (volunteered geographic information) principles for sensors.

In a pilot solution now is working on data models and architecture. The development team presented solutions to business meetings - Dresden Lithuania

Figure 3- Data Model



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Pilot 4 – Open Land Use Map Through VGI

Leader: Vidzeme Planning Region, Latvia

Contact person: RNDr. Karel Charvát, Charvat@ccss.cz

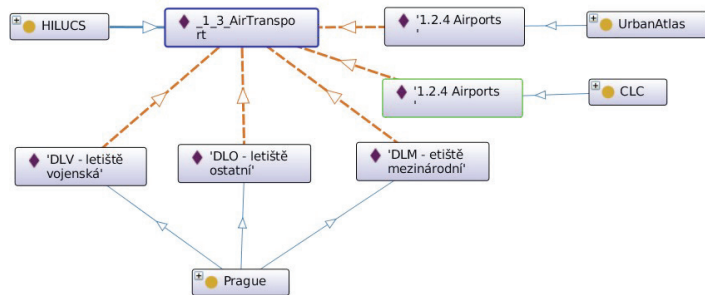
The work is divided into the next tasks:

State-of-the-art

- Relation database
- Uniform data model following from the INSPIRE specification and combining existing and planning land use
- First draft of RDF data model
- Mappings of various classification systems (e.g. CORINE land cover, GlobCover, GeoBase – Land Cover, Urban Atlas, Prague City Plan, Czech Cadastre) to HILUCS

Task

- New data & information resources
- Revision of data model (e.g. to add a land cover classification) and mapping rules (e.g. transformation to RDF)
- Transformation of data model and data to RDF (First draft of RDF data model)
- Massive linking
- Architecture
- Clear and simple visualization principles
- Data quality information for common users



Open Land Use
+inspireId: Identifier
+geometry: GM_MultiSurface
+hilucsLandUse: HILUCSValue
+regulationNature: RegulationNatureValue [0..1]
«lifeCycleInfo, voidable»
+beginLifespanVersion: DateTime
+endLifespanVersion: DateTime [0..1]
«voidable»
+hilucsPresence: HILUCSPresence [0..*]
+specificLandUse: LandUseClassificationValue[1..*]
+specificPresence: SpecificPresence [0..*]
+observationDate: Date
+processStepGeneral: ProcessStepGeneralValue
+backgroundMap: BackgroundMapValue
+dimensioningIndication: DimensioningIndicationValue [0..1]
+validFrom: Date [0..1]
+validTo: Date [0..1]
«Open Land Use Specific attributes»
+note: Citation [0..1]
+landCoverClassValue: CorineValue

Note
OLU model is combining
existing and planning
land use data models.

All descriptions of attributes
are in the INSPIRE Land Use
specification.

«codelist» CorineValue
tags
asDictionary = true
extensibility = any
vocabulary = http://www.eea.europa.eu/data-and-maps/data/corine-land-cover-2006-raster-1/corine-land-cover-1
xsdEncodingRule = iso19136_2007_INSPIRE_Extensions

```
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  xmlns:gcm="http://inspire.jrc.ec.europa.eu/schemas/gcm/3.0/"
  xmlns:geo="http://www.opengis.net/ont/geosparql#"
  xmlns:gml="http://www.opengis.net/gml"
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<http://sdi4apps.eu/>

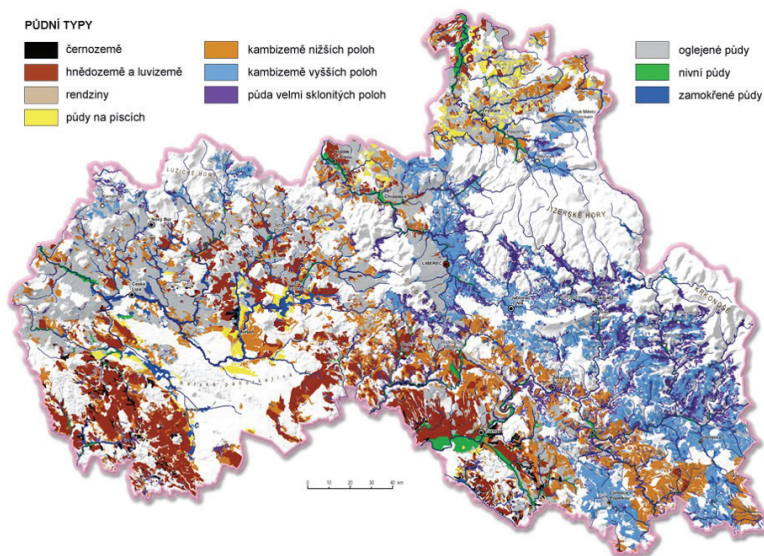
<http://www.linkedin.com/groups/SDI4Apps-3516067>

Pilot 5 – Open INSPIRE4Youth

Leader: Czech Centre for Science and Society
Contact person: RNDr. Karel Charvát, charvat@ccss.cz

PILOT will be focused on extension of idea of electronic version of Regional Atlas of environment. Printed version of the Atlas is from 2008. 2nd place in Czech national competition „The Book of the year“ in Atlases section. Maps. Main components of environment are introduced:

Water air, soil and forests, nature and landscape, waste management, forest management, flood protection etc.



- **Components of eATLAS**
- Web App - the first this type maps are done from the Hackathon in Jelgava!
- Mobile App
- Games - Geogame
- **Some general principles**
- to keep digital cartography principles to have nice map
- to use online data as much as possible to display actual condition (sensor data)
- To use „historical data“ to display trends (timelines)
- To try to prepare conditions for active using of eAtlas
- To use elements of gamification

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Pilot 6 – ECOSYSTEM SERVICES EVALUATION

Leader: Slovak Environment Agency - SAŽP
Contact person: Ing. Martin Tuchyňa, martin.tuchyna@sazp.sk

Background:

Action 5 of the EU Biodiversity Strategy to 2020 calls Member States to map and assess the state of ecosystems and their services in their national territory with the assistance of the European Commission. The pilot will be focused on the identification of spatial representation of the outcomes of ESS Evaluation with focus on sustainable support of tourism. In order to further compare the spatial interpretation of the ESS Evaluation outcomes from various areas on national and international level pilot web application is foreseen utilising the outcomes of Open API adopted by the project.

Main pilot objective:

This pilot will be focused on the identification of spatial representation of the outcomes of ESS Evaluation with a focus on sustainable support of tourism

Audience

- **Public sector**
- **Private sector**
- **Citizens**

Data identification : API: Direct access: Geoserver Layer Preview

Enablers selection

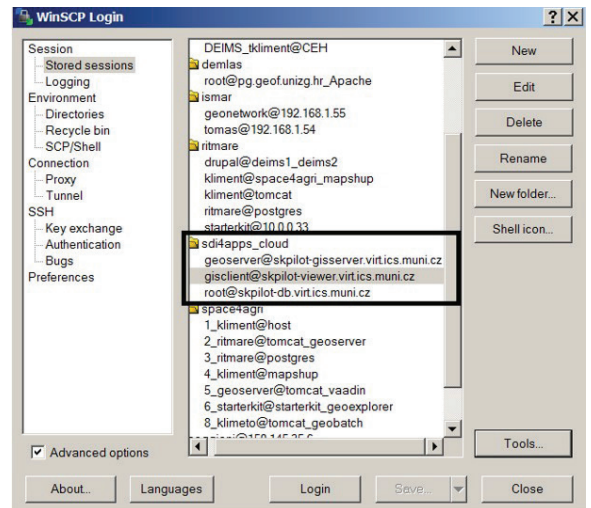
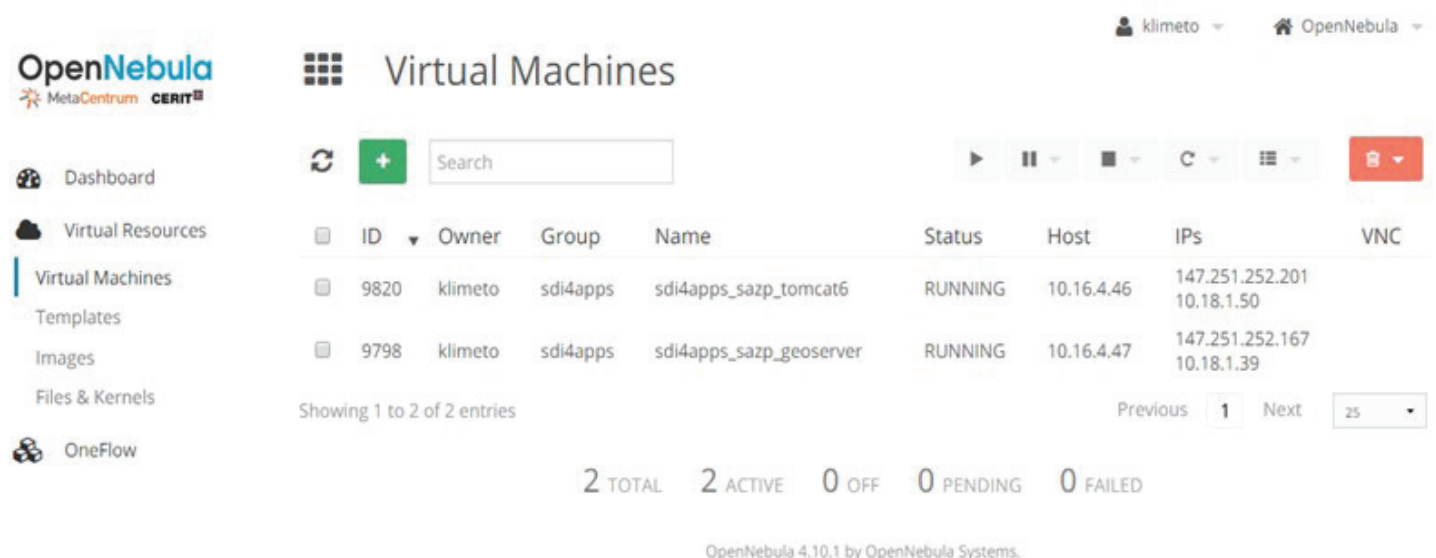
- **Data processing: Esri ArcGIS**

SDI4Apps cloud infrastructure

- **PostGIS**
- **Geoserver (with use of tiling service via GeoWebCache)**
- **Open Layers 3**

Deployment of SDI4Apps cloud instance for SK ESS pilot

OpenNebula Metacentrum virtual resources

ID	Owner	Group	Name	Status	Host	IPs	VNC
9820	klimeto	sdi4apps	sdi4apps_sazp_tomcat6	RUNNING	10.16.4.46	147.251.252.201 10.18.1.50	
9798	klimeto	sdi4apps	sdi4apps_sazp_geoserver	RUNNING	10.16.4.47	147.251.252.167 10.18.1.39	

Showing 1 to 2 of 2 entries

2 TOTAL 2 ACTIVE 0 OFF 0 PENDING 0 FAILED

OpenNebula 4.10.1 by OpenNebula Systems.

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