

Environmental SDI in Tuscany: state of the art and future developments

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What, Why and How

- Our experiences with INSPIRE and actual developments
- Reporting the 'state-of-the-art' of environmental information in Tuscany, focusing on the Regional Environmental Agency contribution
 - Data collection and environmental indicators
 - Data dissemination (network services and smart GeoUI to enhance user experience)
- Looking towards new opportunities in both data and energy policies granted by affordable environmental indicators

Our mission

- Multi-user dissemination on environmental information:
 - Internal users:
 - Support to environmental monitoring and controls activities
 - External users:
 - Policy Makers
 - Citizens
- 'Two-ways' interface:
 - Regional Node ('Focal Point') of the National Environmental SDI managed by ISPRA
 - Node of the Regional SDIs for spatial information:
 - **SITA** - Cartography, photos, and much more!
 - **SIRA (ARPAT)** - Environmental monitoring/control
 - **LAMMA** - Weather and environmental modeling
 - **CFR** - Weather monitoring and alerts

Environmental Data Access: how?

- Since about ten years (2004-2013), our data portal delivers information related to the Regional Environmental Agency (ARPAT) activities:
 - Water/air quality monitoring
 - Low/High frequency EM fields monitoring and modelling
 - Noise monitoring and modelling
 - Industrial and soil pollution controls
 - Waste management activities controls
 - Environmental emergencies (i.e. Isle of Giglio coastal monitoring near the 'Costa Concordia' relic)
- Key professional competencies in our sector involved in data collection/management/dissemination:
 - IT professionals
 - Network/data administration, software development
 - GIS/DB professionals
 - Data/geodata management and reporting
- You can find us on

<http://sira.arpat.toscana.it>

INSPIRE - Our first experiences

- Our sector started to follow INSPIRE requirements since 2004
- Success:
 - Promotion of data sharing culture, both for internal and external uses
 - Standardization of technologies, ontologies and user interfaces (→ easier data and service maintenance)
- Problems:
 - Too much technologies and standard to practice by IT and non-IT personnel
 - XML/GML/WMS/WFS/WCS/WPS/CSW.....
 - Poor network services usability (high latency times for big datasets due to network bandwidth's constraints)
 - Limited datasets' publishing by non-IT personnel (datasets' managers) due to lack of user-friendly GFOSS tools
 - Forced to use a custom Metadata language translation due to lack of official one
 - Differences between INSPIRE and national Datasets' categorization (INSPIRE vs. 'well-known' categories)

INSPIRE – Actual developments

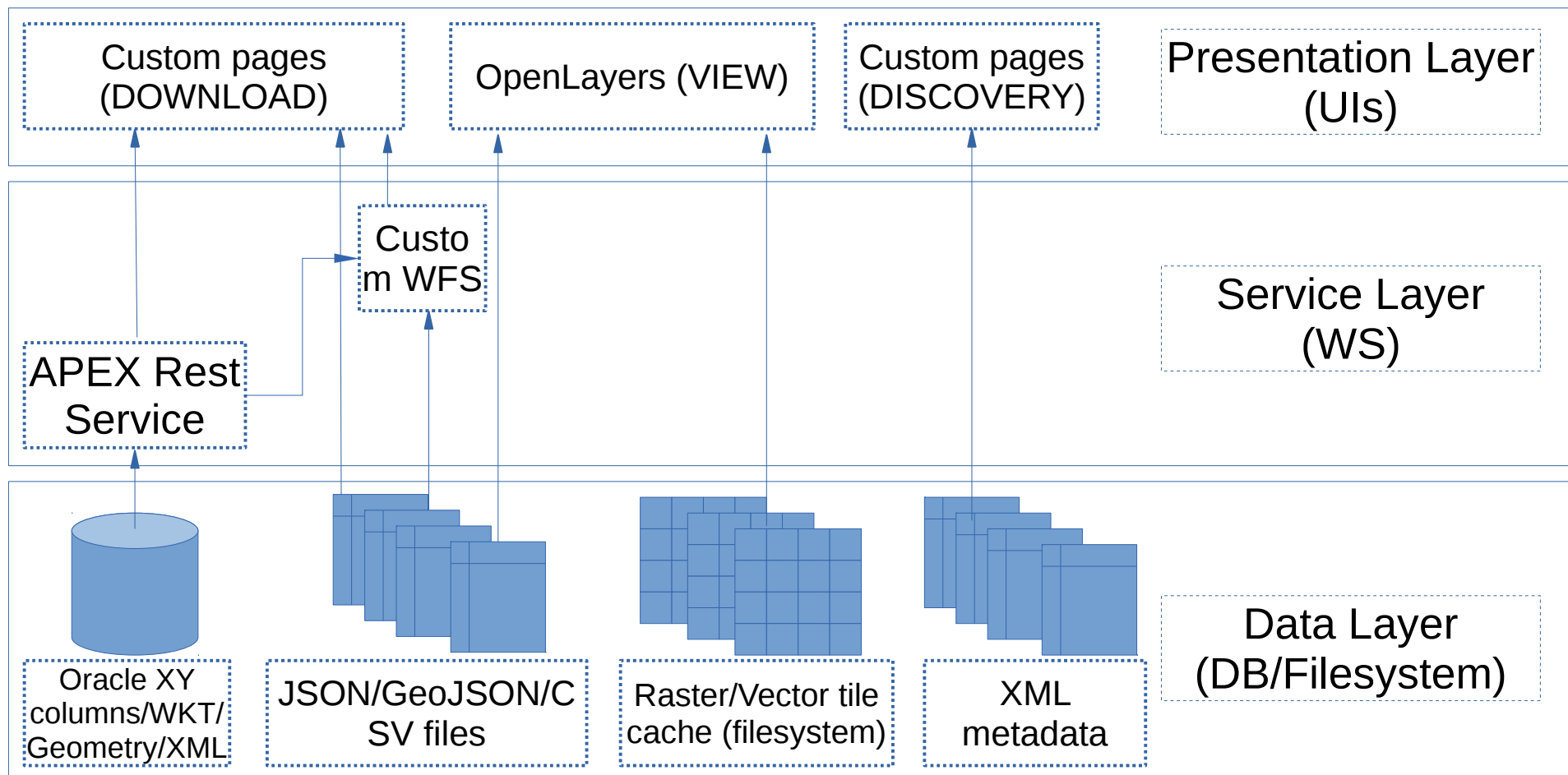
- Opportunities:
 - Many commercial providers have focused on big raster datasets publishing (satellite photos, terrain, etc...), sharing new techniques for fast network access (tiling)
 - Many GFOSS tools are now available for various platforms
 - Good budget for IT and non-IT personnel training on GFOSS tools and technologies have been available in our sector for 5 years
 - GFOSS community have considerably grown
 - Web 2.0 has brought improvements in geodata user experiences (AJAX, slippy maps)
- Custom solutions:
 - Dataset-based optimizations
 - Raster dataset preprocessing and caching
 - Vector data access limitations by extent/feature number
 - Rich UIs with content and spatial browsing/filtering ('web-based' optimization)

Focus on Technology (1/2)

- View Service
 - TMS for large raster datasets (cached data)
 - Supported EPSG SRS: 4326/3003
 - WMS for small geodatasets
 - Point datasets
- Download Service
 - REST download services with custom filtering interface and feature number limitations
 - Supported formats: JSON/WKT/GeoJSON/KML/SHP
 - WFS with feature number limitations
- Catalogue Service
 - Geonetwork schema + Geonetowrk UI for metadata editing
 - Custom XML search
- Further details:
 - See poster '*From small to medium and large datasets: technology pitfalls and smart solutions for affordable INSPIRE services in web 2.0 applications*'

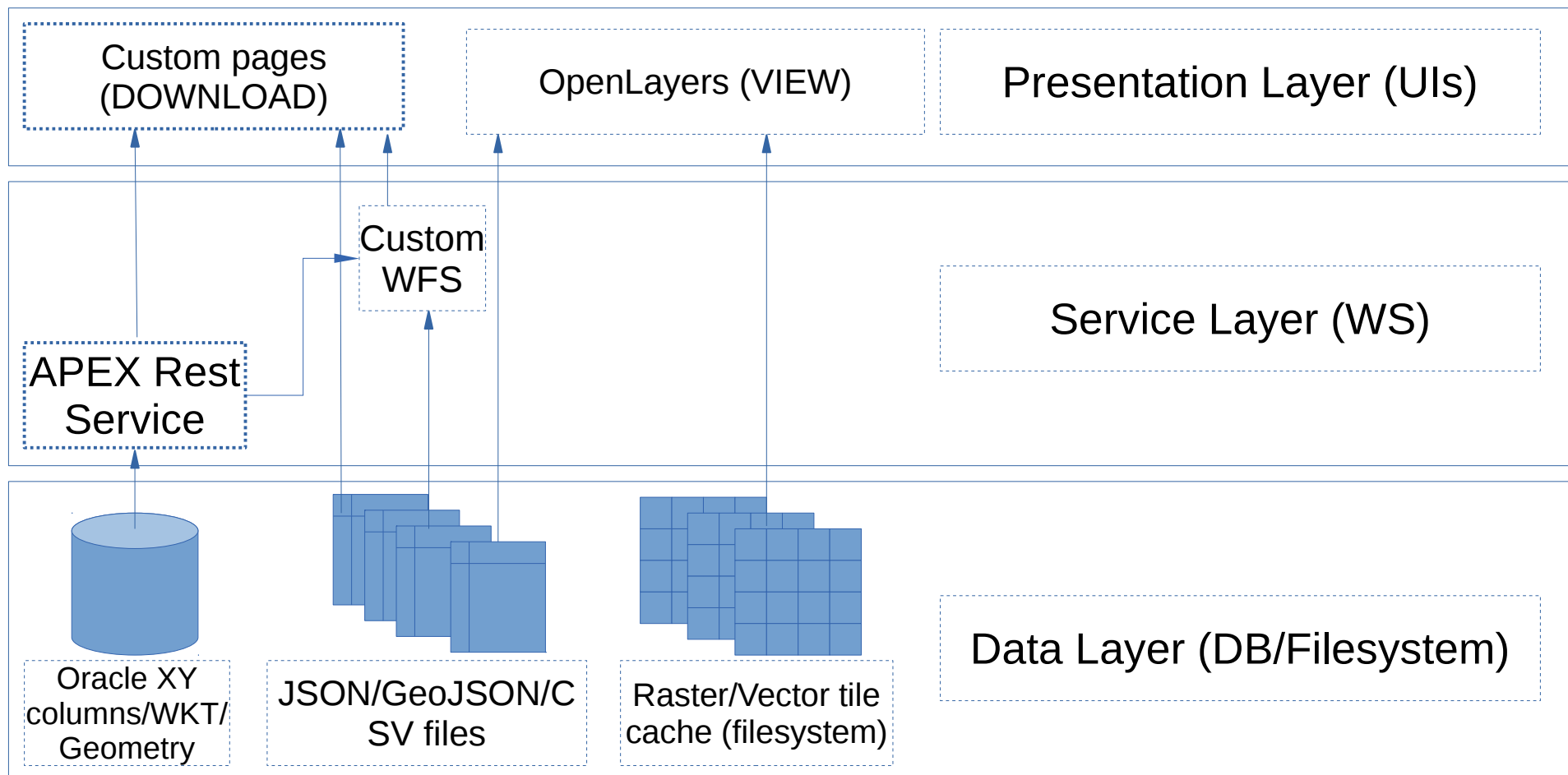
Focus on Technology (2/2)

- Etherogeneous data formats (Oracle RDBMS + Locator)
- Etherogeneous WS platforms (Oracle APEX + custom routines)
- Layered architecture



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Focus on usability

- Easy datasets access
 - By data portal (PCs and handheld devices)
<http://sira.arpat.toscana.it/sira/inspire/inspire.php>
 - By website
<http://www.arpat.toscana.it/datiemappe/banche-dati>
 - By Android/IOS apps
- Multiple datasets categorization and faceted search
 - Users can find datasets by category filtering (INSPIRE and national/regional)
- Geodata preview:
 - Slippy map preview
 - Content preview
 - Metadata browsing

Access by data portal

- <http://sira.arpat.toscana.it/sira/inspire/inspire.php>

[INSERT IMAGES]

Data aggregation use cases (1/2)

- Soil contamination management system (SisBon)

[INSERT IMAGES]

Data aggregation use cases (2/2)

- Cellphones' and TV's Transmission nodes (Circom)

[INSERT IMAGES]

What you can find

- 20 INSPIRE Annex III datasets:
 - ✓ III.6 - Utility and governmental services (25%)
 - ✓ III.7 - Environmental monitoring Facilities (50%)
 - ✓ III.8 - Production and industrial facilities (10%)
 - ✓ III.11 - Area management / restriction / regulation zones & reporting units (5%)
- Most of core ARPAT activities' datasets are categorized in III.7 and III.8 (60%)
- Other datasets relevant for ARPAT's core activities are categorized in III.6 and III.11 (40%)

Utility and governmental services

5 over 20 datasets (25%):

- ✓ Urban water treatment facilities
- ✓ Transmission lines (electrical)
- ✓ Cellphones' Transmission nodes (antennas)
- ✓ TV Transmission nodes (antennas)
- ✓ Water-treatment waste storage sites

Environmental monitoring Facilities

10 over 20 datasets (50%):

- ✓ Air quality monitoring stations
- ✓ Air quality bio-indicators monitoring sites
- ✓ Surface water monitoring sites
- ✓ Groundwater monitoring sites
- ✓ Drinking water monitoring stations
- ✓ Bathing monitoring sites
- ✓ Fish water monitoring sites
- ✓ ARNO river quality monitoring stations
- ✓ Geothermal plant emissions data
- ✓ Air quality monitoring stations for geothermal emissions

Production and industrial facilities

3 over 20 (15%):

- ✓ Industrial sites – Waste production
- ✓ Industrial sites – 'IPPC' directive
- ✓ Industrial sites – 'SEVESO II' Directive

Area management / restriction / regulation zones & reporting units

2 over 20 (10%):

- ✓ Soil contamination
- ✓ Noise classification

What we are going to do

- Build INSPIRE services for dissemination of internal geodata not covered by INSPIRE directive
- Use external INSPIRE services for:
 - Map mashups in GIS clients
 - Coordinate transformation
 - Geocoding
- Long term datasets' organization and standardization with INSPIRE schema
- Automatization of indicators' building via INSPIRE WPS services

Opportunities for Environmental policies

- Following european guidelines, regional environmental policies are becoming more and more integrated with energy ones
- One key objective of next Environmental and Energy Policy Plan (PAER) is to enhance all regional geodatasets availability for policy makers
- INSPIRE could play a great role in many fields:
 - Network services' standardization
 - Easier data aggregation from various network nodes
 - Smart indicators' representation to policy makers

Our contribution in indicators' representation

- ARPAT plays a great role in environmental indicators' publishing (former yearly enviromental state reports)
- Since last year ARPAT media sector has tried to improve indicators' representation quality and usability for policy makers and citizens with the yearly pubblication of the environmental data report (see [2012 environmental datasets report](#))
- Our contribution should be:
 - Indicators' geodataset generation by INSPIRE service
 - Smart user interfaces for indicators' geodataset browsing and downloading

Environmental Indicators

- Development of a smart UI for easier indicators' access and browsing:
 - Browse by category ('well-known')
 - Filter by field value/range
 - Map View/Data View integration
 - CSV/JSON/KML data download
- See it in action at:
 - http://sira/arpatooscana.it/sira/progetti/annuario_2012/....

Towards a regional environmental SDI for policy makers

- Things to do:
 - Higher infrastructure performances (network speed/reliability and IT optimizations)
 - Data collection planning focused on indicators' generation (temporal/spatial/numerical resolution)
 - Cooperation between all regional INSPIRE datasets' responsible parties for higher technical and semantic interoperability
 - Higher usability of aggregators and data miners for policy makers
- Key competencies:
 - Policy makers
 - Public managers
 - IT and data managers
 - IT and data professionals

Inspire ROI: who wants to be 'inspire(d)'?

- Open data: it's time to use them!
 - Time to finalize IT and GIS professional hard work in data dissemination
- Towards a more 'scientific' approach in environmental policies
 - 'data-aware' policy makers and public managers needed
 - citizens has the right to know
 - State of the environment
 - What can be done (and what not!)
 - How much does it cost
- Lessons learnt:
 - SUCCESS
 - RESPONSABILITY

Surfing INSPIRE networks

'If a man does not know to what port
he is steering, no ~~wind~~^{data} is favourable
to him'

(The Younger, Seneca, Epistulae Morales ad Lucilium, 71, sett. 13)