



SexTant: Visualizing Time-Evolving Linked Geospatial Data

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TELEIOS is a European project that addresses the need for scalable access to petabytes of Earth Observation data and the discovery and exploitation of knowledge that is hidden in them using **Scientific Database**, **Semantic Web** and **Linked Data** technologies. **SWeFS** is a Greek project that develops a novel Sensor Web platform for protecting wildland-urban interface zones against the serious threat of forest fires. To achieve its goal SWeFS integrates techniques from **sensor networks**, **distributed vision** systems, **remote sensing**, **data stream fusion**, space-time predictive modeling, and control systems. **Optique** is a European project that brings a unique combination of technologies to bear on **Big Data** challenges: an end-user-oriented query interface; scalable query rewriting from the end-user to the source vocabulary; **temporal** and **real-time** continuous stream processing; scalable storage and query evaluation using elastic clouds.

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Exploration of linked geospatial data that span across **multiple** SPARQL endpoints



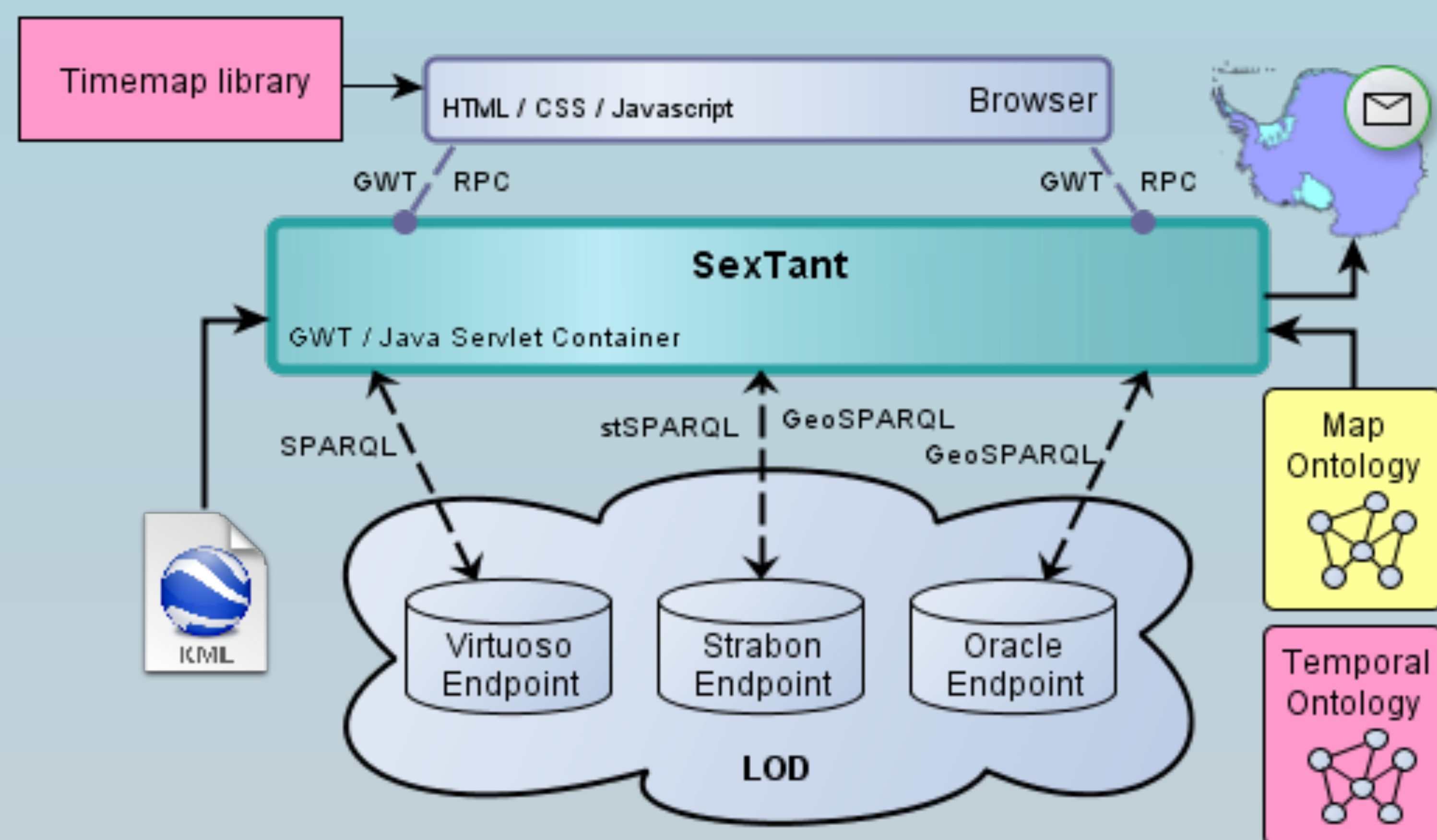
Creation of thematic maps produced by querying the **temporal** and **spatial** dimensions of linked data and other **geospatial** data sources in OGC standard file formats (e.g., KML, GeoJSON)



Sharing and collaborative editing of thematic maps



Interoperability with well-known GIS tools (e.g., ArcGIS, QGIS)



SPARQL to KML translation

SPARQL query

```

SELECT DISTINCT ?t ?geo
WHERE {
  ?area clc:hasLandUse clc:sclerophyllousVegetation ?t .
  ?area clc:hasGeometry ?geo .
  ?ba rdf:type noa:BurnedArea ?t2 .
  ?ba noa:hasGeometry ?geo2 .
  FILTER (strdf:intersects(?geo, ?geo2) && strdf:before(?t, ?t2)) }

```

SPARQL XML results

```

<result>
  <binding name='geo'>
    <literal datatype='http://strdf.di.uoa.gr/ontology#WKT'>
      POLYGON((21.821 38.283,21.821 38.282,...))
    </literal>
  </binding>
  <binding name='t'>
    <literal datatype='http://strdf.di.uoa.gr/ontology#period'>
      [2000-01-01T00:00:00,2012-09-30T00:00:00)
    </literal>
  </binding>
</result>

```

Query evaluation



KML file

```

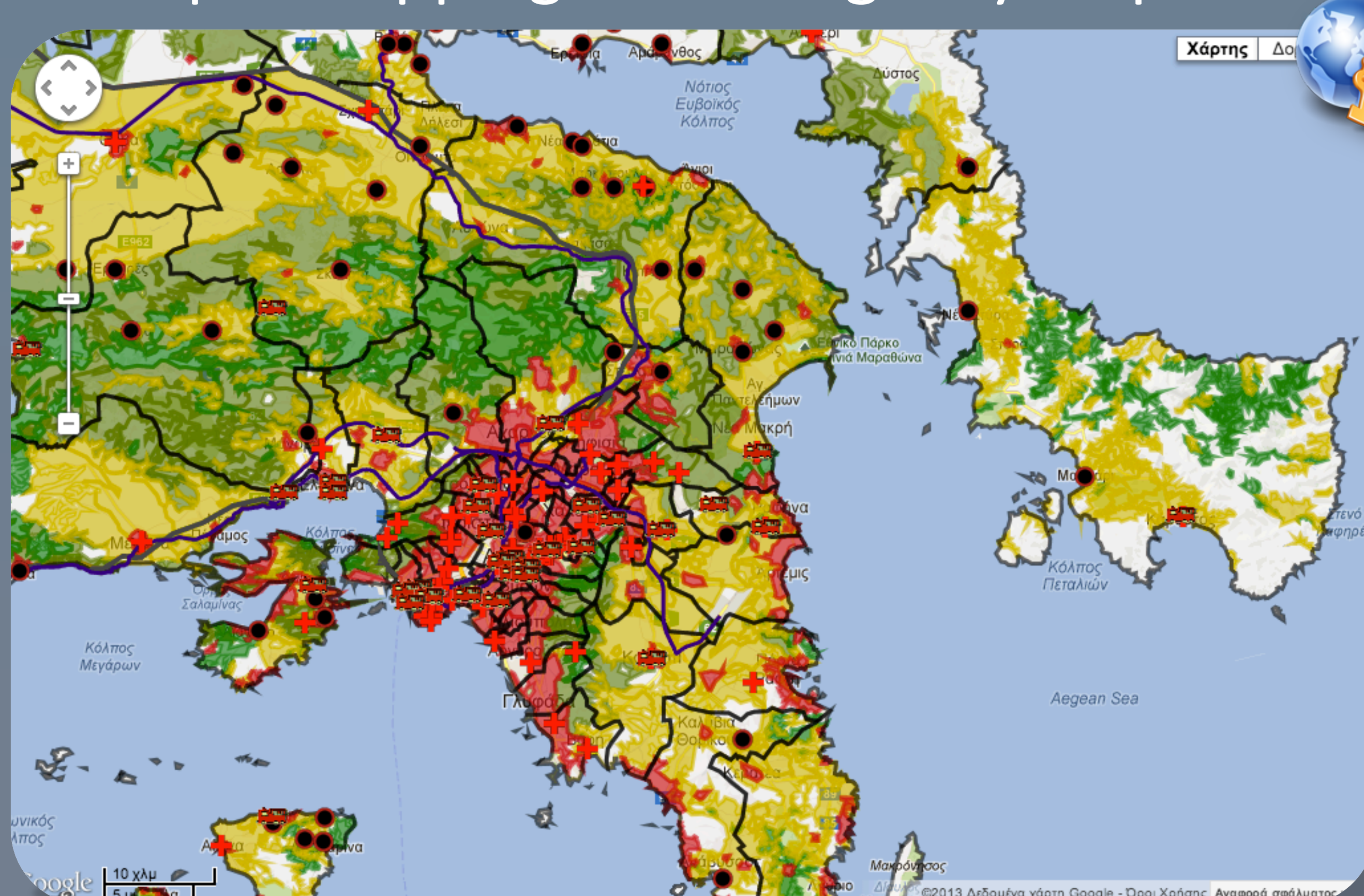
<Placemark>
  <TimeSpan>
    <begin>2000-01-01T00:00:00</begin>
    <end>2012-09-30T00:00:00</end>
  </TimeSpan>
  <Polygon>
    <outerBoundaryIs><LinearRing>
      <coordinates>21.821,38.283 21.821,38.282...</coordinates>
    </LinearRing></outerBoundaryIs>
  </Polygon>
</Placemark>

```

SPARQL XML results to KML

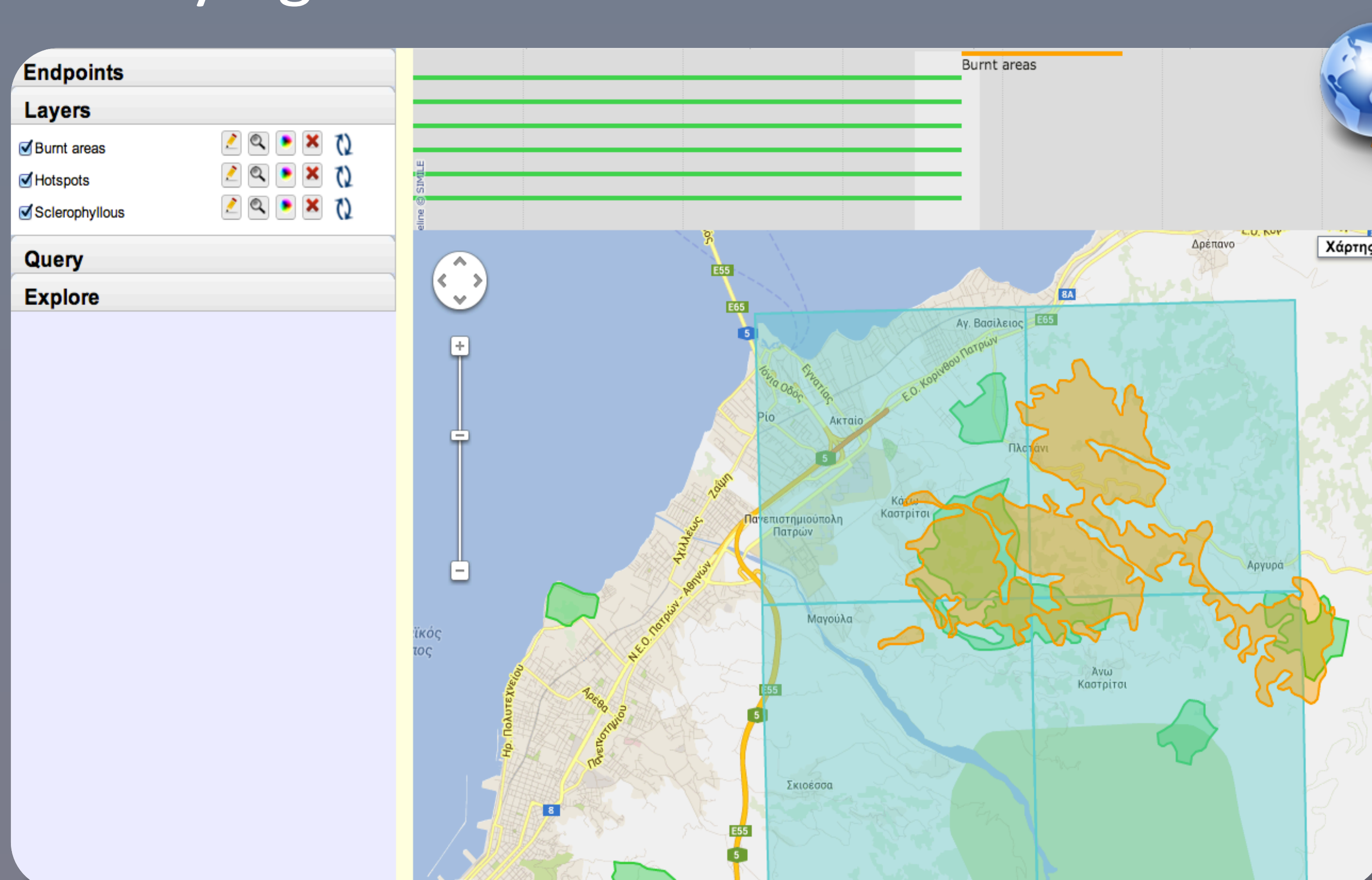


Rapid mapping for emergency response



A map produced on SexTant using the query languages stSPARQL/GeoSPARQL, linked geospatial data, and KML files.

Studying the evolution of land cover of areas



The interface of SexTant that an EO expert employs to produce thematic maps with time-evolving linked geospatial data. The technologies used are: (i) the query language stSPARQL for queries with **temporal** constructs, (ii) the spatiotemporal RDF store **Strabon**.

- The spatiotemporal RDF store **Strabon** (strabon.di.uoa.gr)
- K. Kyzirakos, M. Karpathiotakis, M. Koubarakis: **Strabon**: A Semantic Geospatial DBMS. **ISWC 2012**
- K. Bereta, P. Smeros, M. Koubarakis: Representation and Querying of **Valid Time** of Triples in Linked Geospatial Data. **ESWC 2013**
- C. Nikolaou, K. Dogani, K. Kyzirakos, M. Koubarakis: **Sextant**: Browsing and Mapping the Ocean of Linked Geospatial Data. **ESWC 2012**

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