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# Smart Space-Based Interaction Model for Tourist Assistant – TAIS

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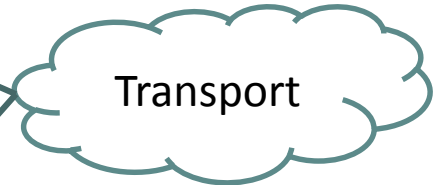
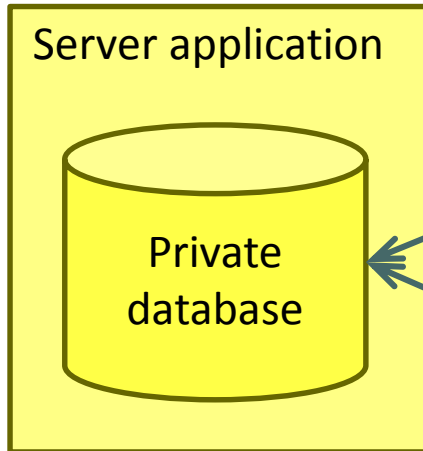
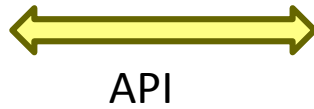
Alexander Smirnov, Alexey Kashevnik, Andrew Ponomarev

St. Petersburg Institute for Informatics and Automation  
of the Russian Academy of Sciences (SPIIRAS)  
ITMO University, St. Petersburg, Russia

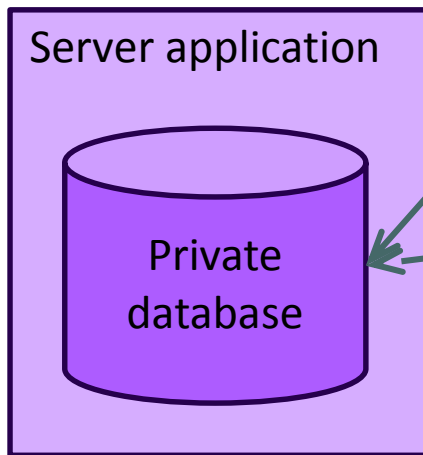


# Motivation (1)

Mobile application



Mobile application





## Motivation (2)

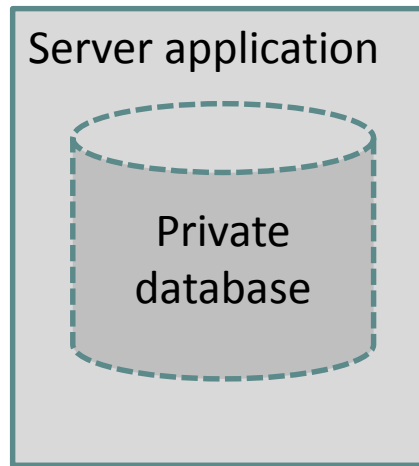
Mobile application



Wrapper API

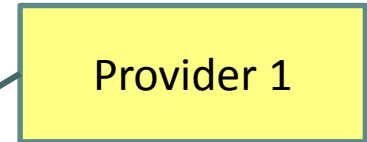


Server application

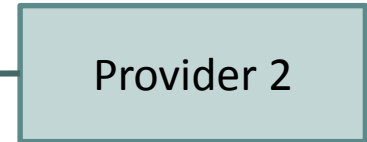


Provider API

Provider 1



Provider 2



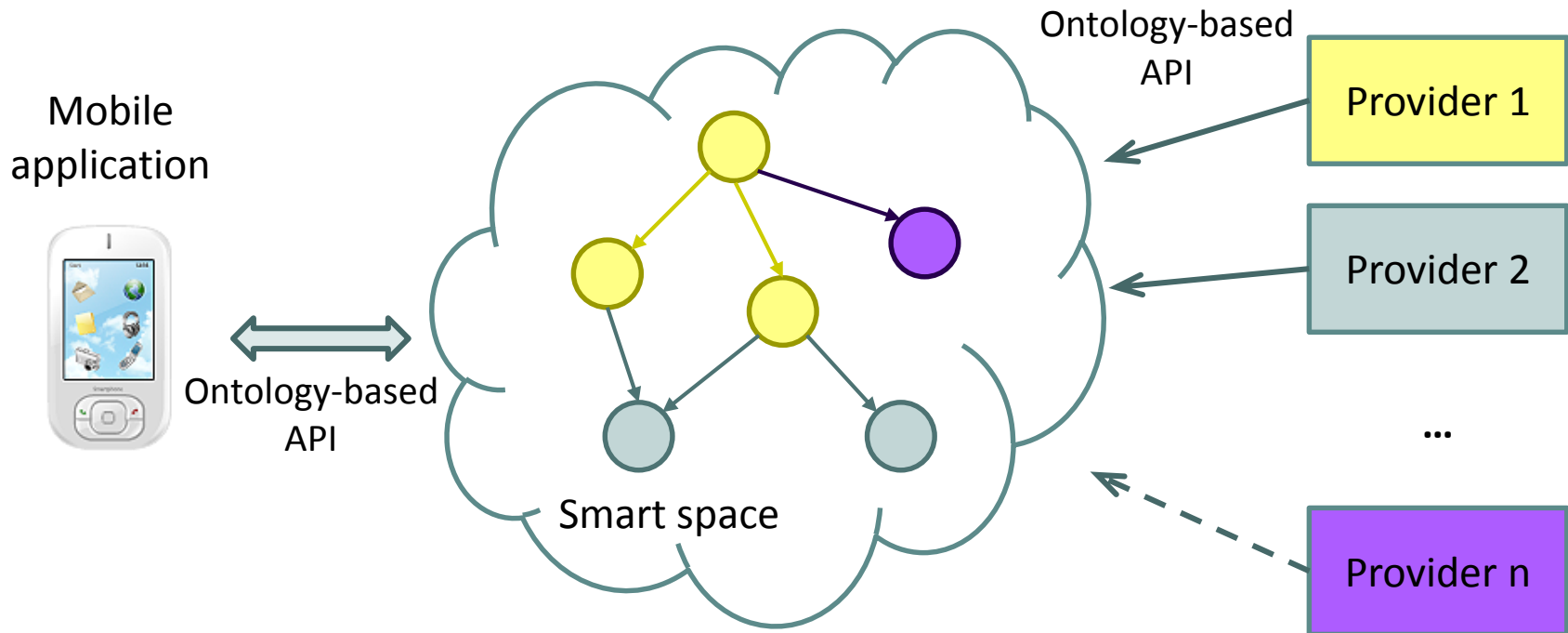
Provider 3



- Typical API:
  - RESTful
  - SOAP
  - RPC (XML-RPC, JSON-RPC, ...)
- In any case:
  - Point-to-points
  - Fixed set of operations



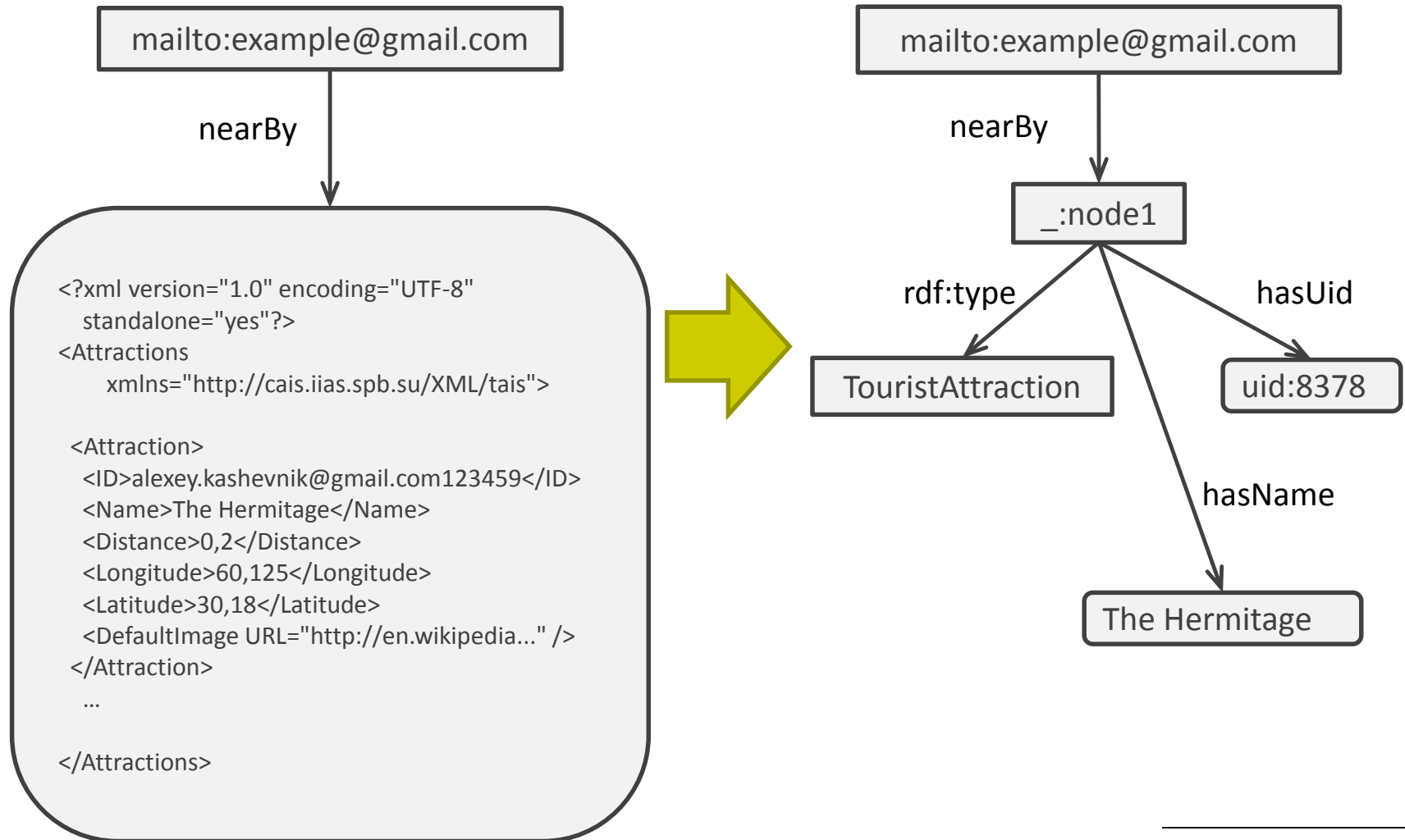
# Smart Space-based Integration



The goal of this paper is to contribute to a development of a **smart space-based bus for tourist information** that would be a convenient **communication media for tourist information services** of various vendors and would enable the creation of **integrated tourist information support systems** based on **Semantic Web** and **smart space technologies**.



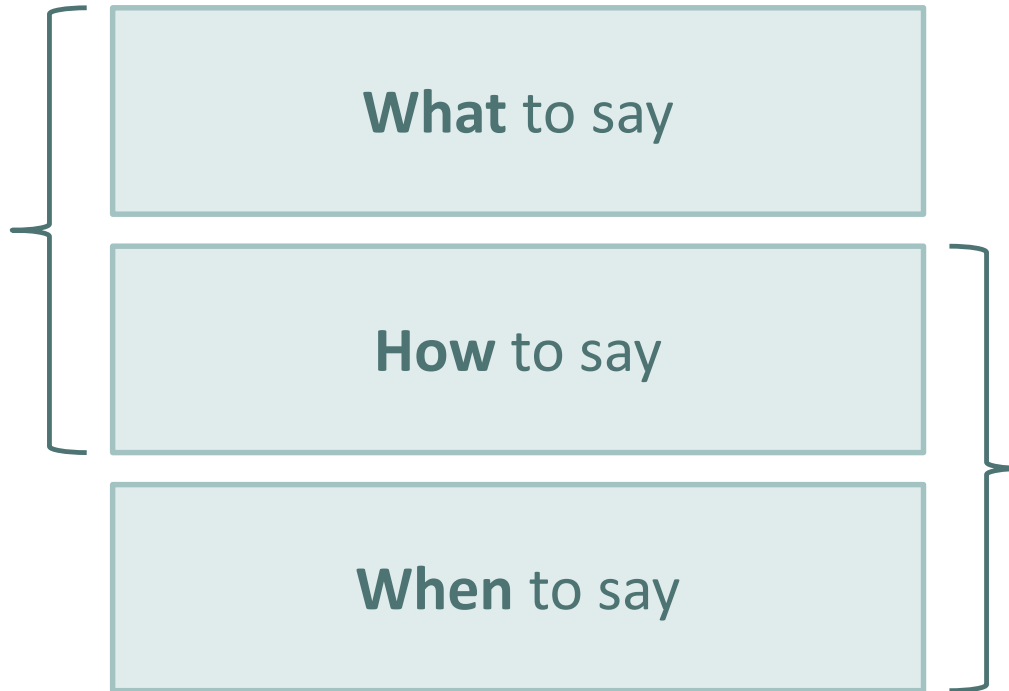
# Extending TAIS



# Contribution



**Ontology**



**Interaction  
model**



## Ontology design goals

1. To provide a **common vocabulary** for all services involved in tourist information interchange.
2. To preserve the information about **the origin** of each “information piece” in the common knowledge space.



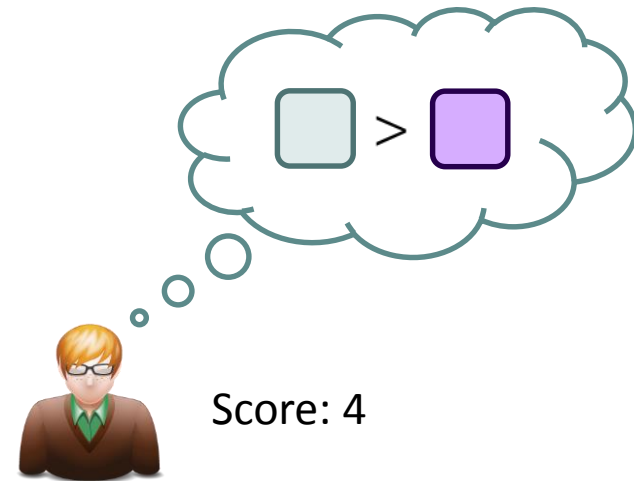
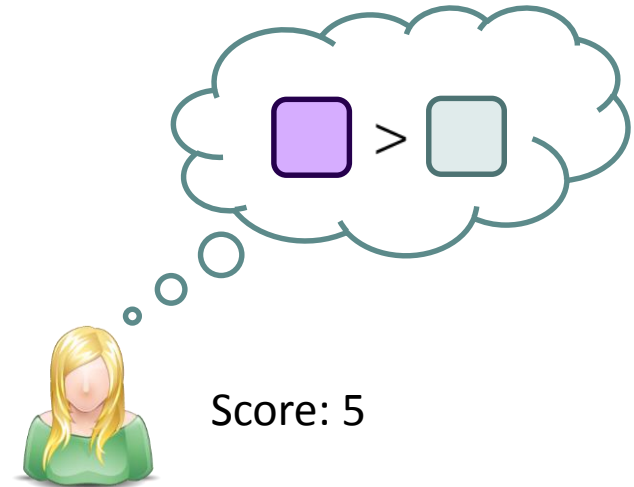
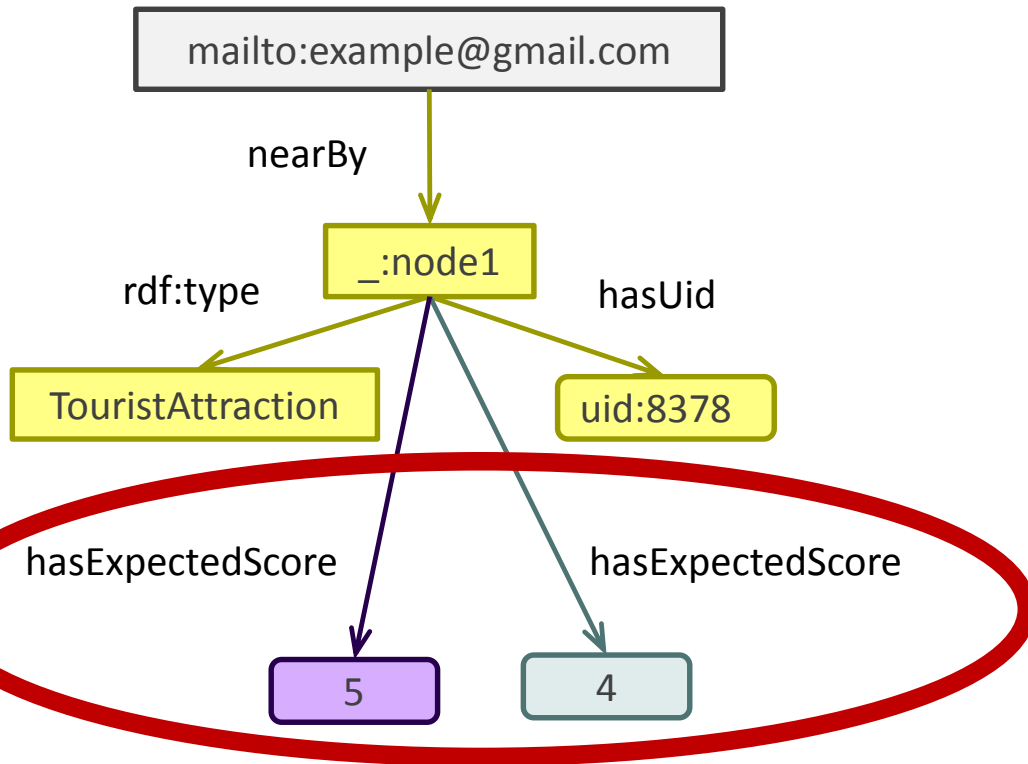
# Existing tourist ontologies analyzed

- Tourist ontologies:
  - Harmonise ontology (HarmonoNET)
  - cDOTT – modular ontology by R.Barta et al.
  - Task Model and Task Ontology for Intelligent Tourist Information Service by H.Park et al.
  - Travel Ontology by C.Choi et al.
  - ...
- Other useful ontologies:
  - Schema.org
  - GoodRelations

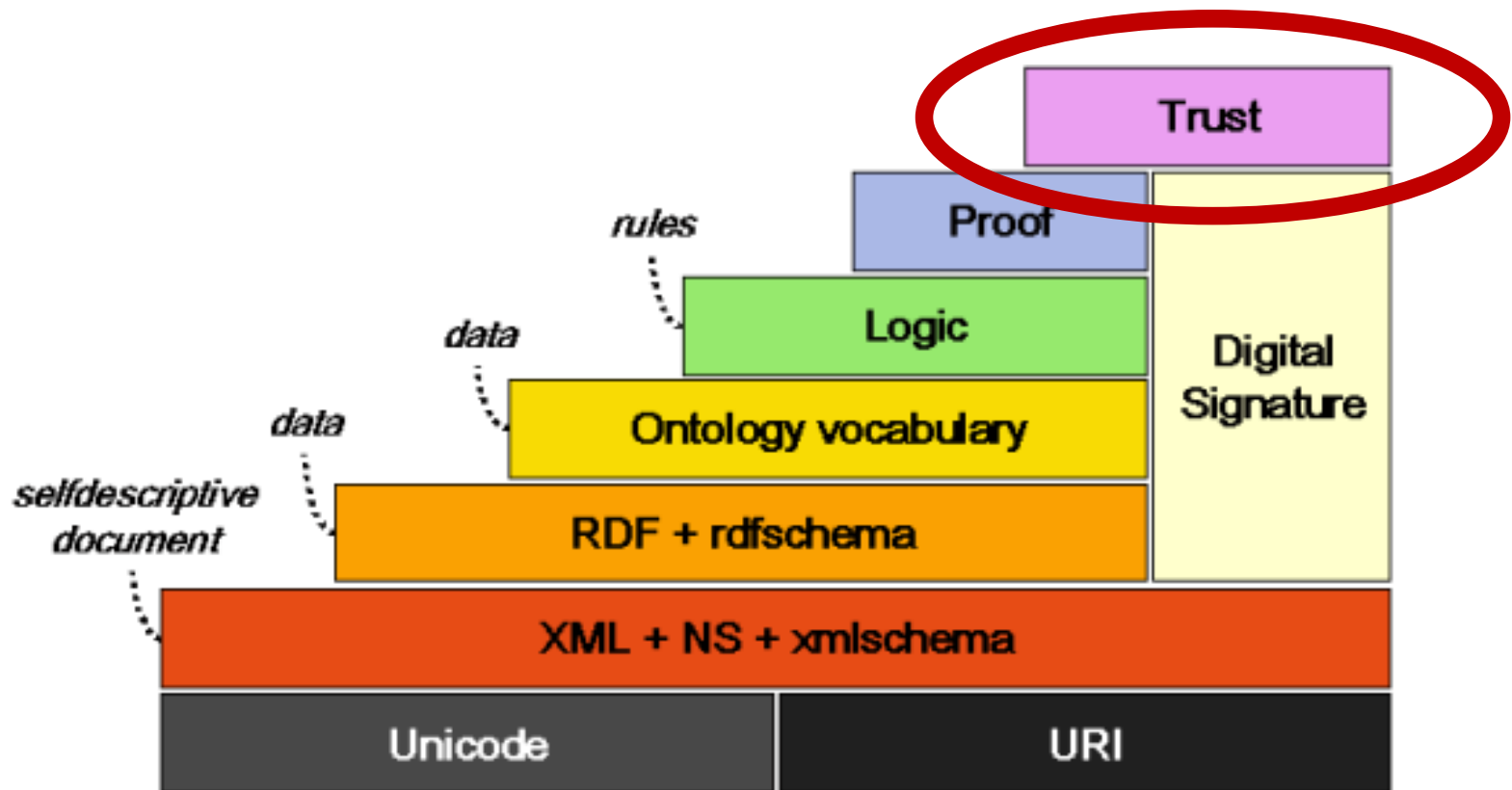




# Keep the source of information



# Trust layer



Original image taken from: <http://www.w3.org/2001/12/semweb-fin/w3csw>

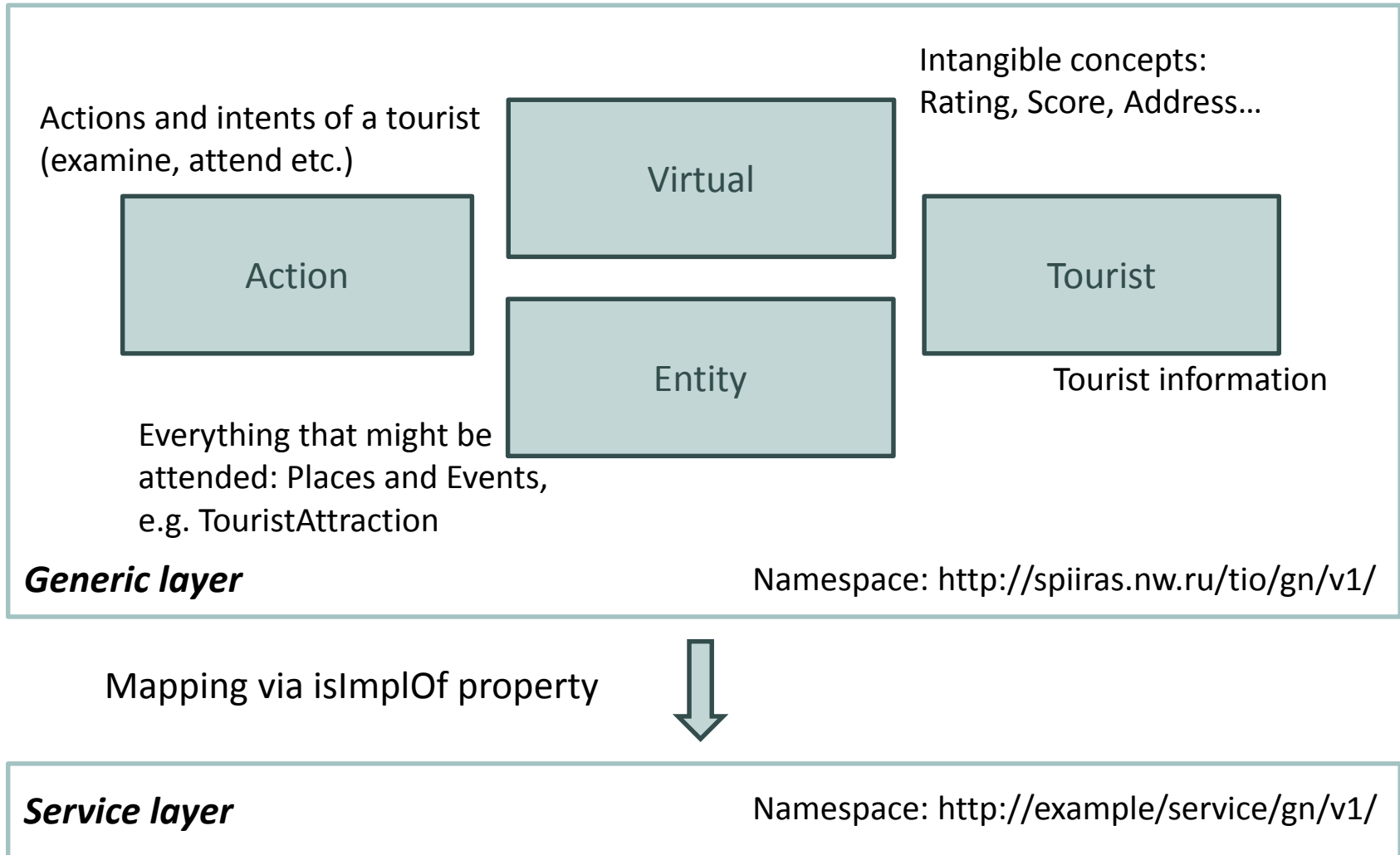


# Trust layer implementation approaches

- Reification
  - Four triples instead of one
  - Overkill (no need to describe *each* triple)
- Named graphs
  - Not supported by Smart-M3
- `rdfs:subPropertyOf` + RDFS entailment regime
  - Not supported by Smart-M3



# Ontology structure



# Service interaction model. Metaphor



Photograph taken by Mark A. Wilson (Department of Geology, The College of Wooster).

# Requirements



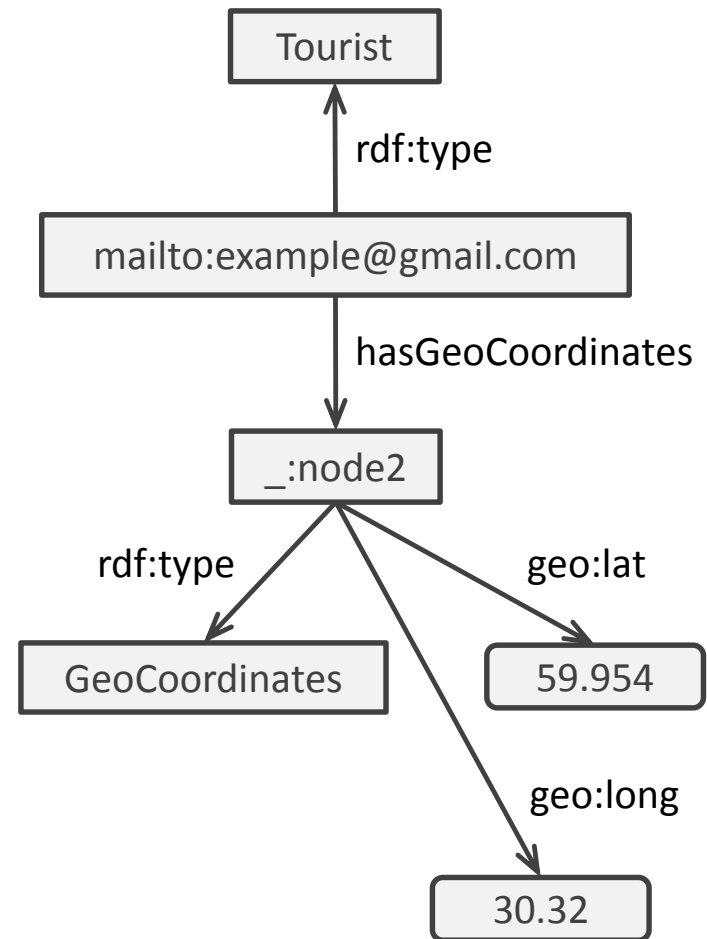
- Each party wishing to join the information exchange must declare:
  - An input ontology pattern specification.
  - An action performed by the service.
  - An output ontology pattern specification.



# Service example. Input pattern

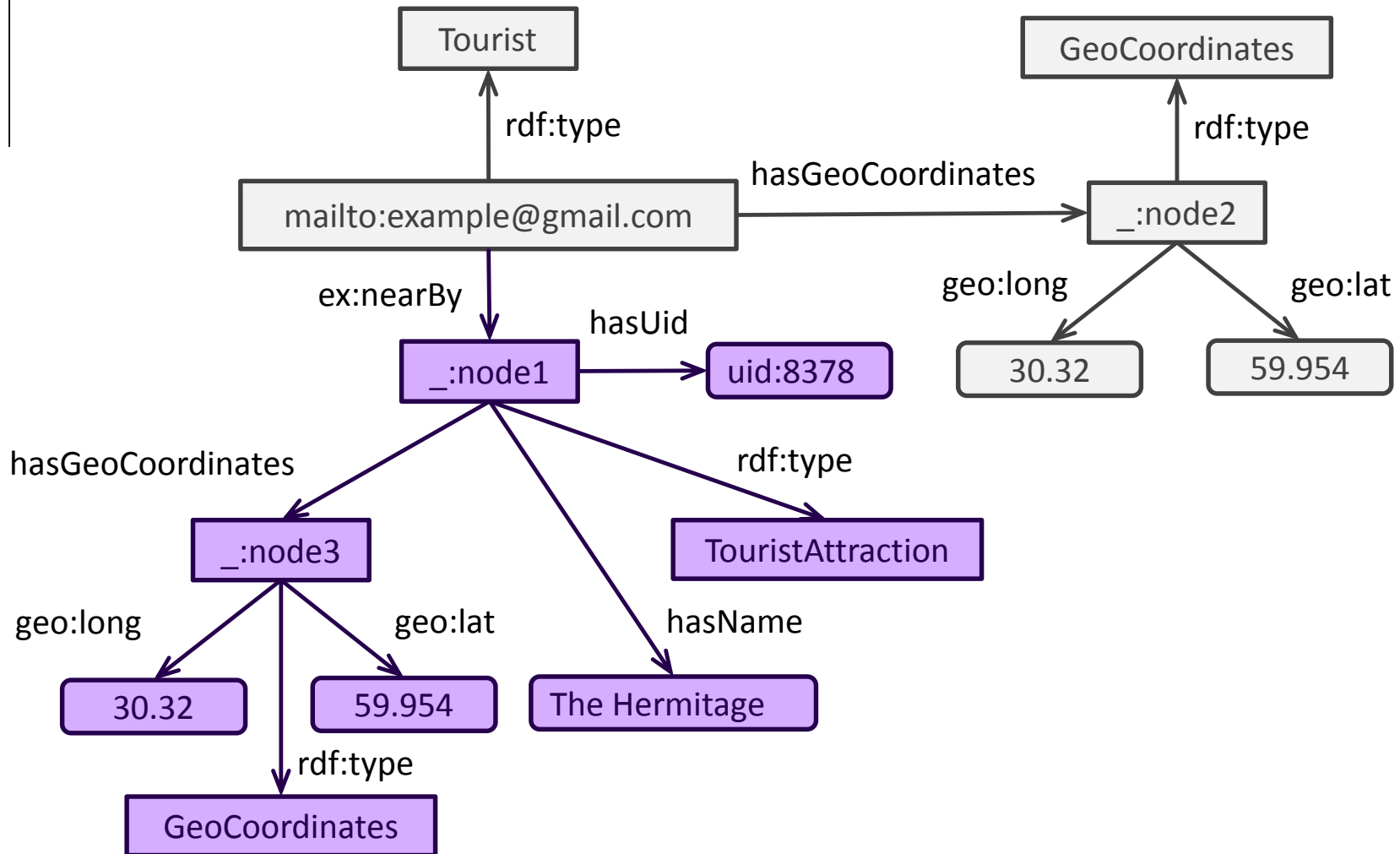
## SPARQL subscription

```
@PREFIX tiog: <...>
@PREFIX geo: <...>
SELECT ?user ?lat ?long
{
  ?user a tiog:Tourist .
  ?user tiog:hasGeoCoordinates [
    a tiog:GeoCoordinates ;
    geo:lat ?lat ;
    geo:long ?long ; ] .
}
```





# Service example. Output pattern







# Conclusion

- Main objectives:
  - ✓ Ontology for tourist information
  - ✓ Interaction model based on incremental growth of an ontology graph
- Current research directions:
  - Formal model for input/output graph patterns (triple graph grammars?) with support for verification
  - Smart-M3 benchmarks on SPARQL graph subscriptions
  - Ontology elaboration to a more fine-grained level



**Thank you!**

**Questions are welcome!**