Linked Data infrastructure for SDI

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National Land survey of Finland

- National mapping and cadastral authority (NMCA)

- Also national Land registration authority

- Responsible of NSDI implementation

- Strategic goal: Interoperability

- Working to introduce a URI-based management of data infrastructure

  - A national recommendation for public administration on unique HTTP URI identifiers and specialization on spatial data, approved September 1, 2015

- Developing URI-based maintainance and data delivery in new national core location data (NTDB) – at pilot stage

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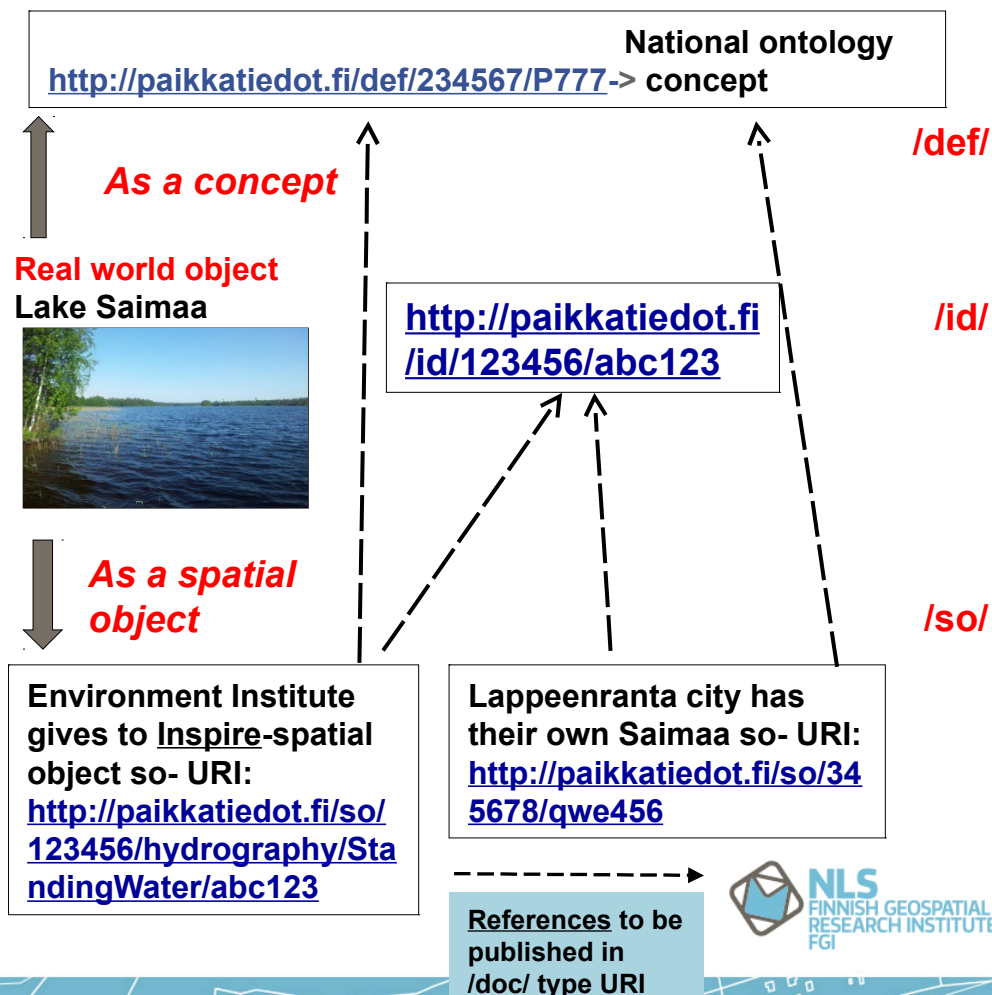RESEARCH INSTITUTE
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Content

- National URI-recommendation on spatial data

- Data linking principles

- New NTDB for core location data

- URI linking in core location data

- Implementation of linked data

- Towards nationwide linked SDI data

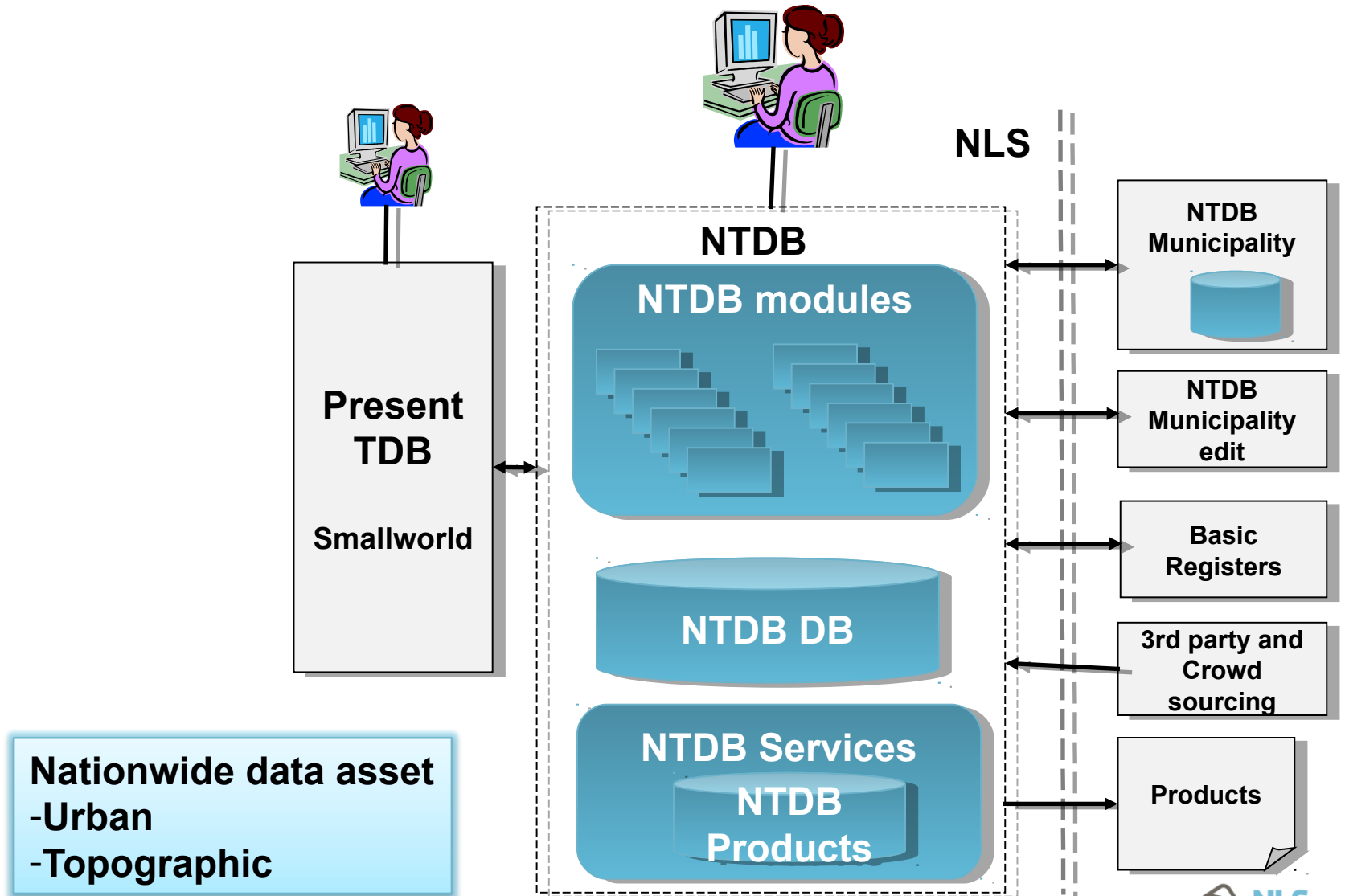# National URI-recommendation on spatial data

- URI-design: http://{domain}/{type}/{datasetId}/{localId}[/{versionId}]

  - One domain for all spatial data:
    - paikkatiedot.fi = "spatial data.fi"
    - with redirections to service interfaces of data providers
  - datasetID
    - dataset identifier in the national metadata catalogue
- Principles on URI-referencing, guidelines for INSPIRE-URI

- On the other hand: The national topographic database (NTDB) is regarded as one of the national core data systems
  - Project for renewal, currently started and piloting

URI recommendation & linking principles

- http://{domain}/{type}/{datasetId}/{localId}[/{versionId}]

- type /so/= spatial object, but publishing http URIs also

- <u>For concepts</u> to link spatial objects with concepts - /def/

- <u>For real world entities a</u> placeholder-URI to enable combining data and searches of spatial objects modeling the same real world entity - **/id/**

- Suggested referencing from spatial objects to real world entities and concepts, which are embedded in national ontology service

National ontology
http://paikkatiedot.fi/def/234567/P777 -> **concept**

/def/

As a concept

Real world object
Lake Saimaa

http://paikkatiedot.fi/id/123456/abc123

/id/

As a spatial object

/so/

Environment Institute gives to <u>Inspire</u>**-spatial object so- URI:**
http://paikkatiedot.fi/so/123456/hydrography/StandingWater/abc123

Lappeenranta city has their own Saimaa so- URI:
http://paikkatiedot.fi/so/345678/qwe456

<u>**References**</u> **to be published in /doc/ type URI**

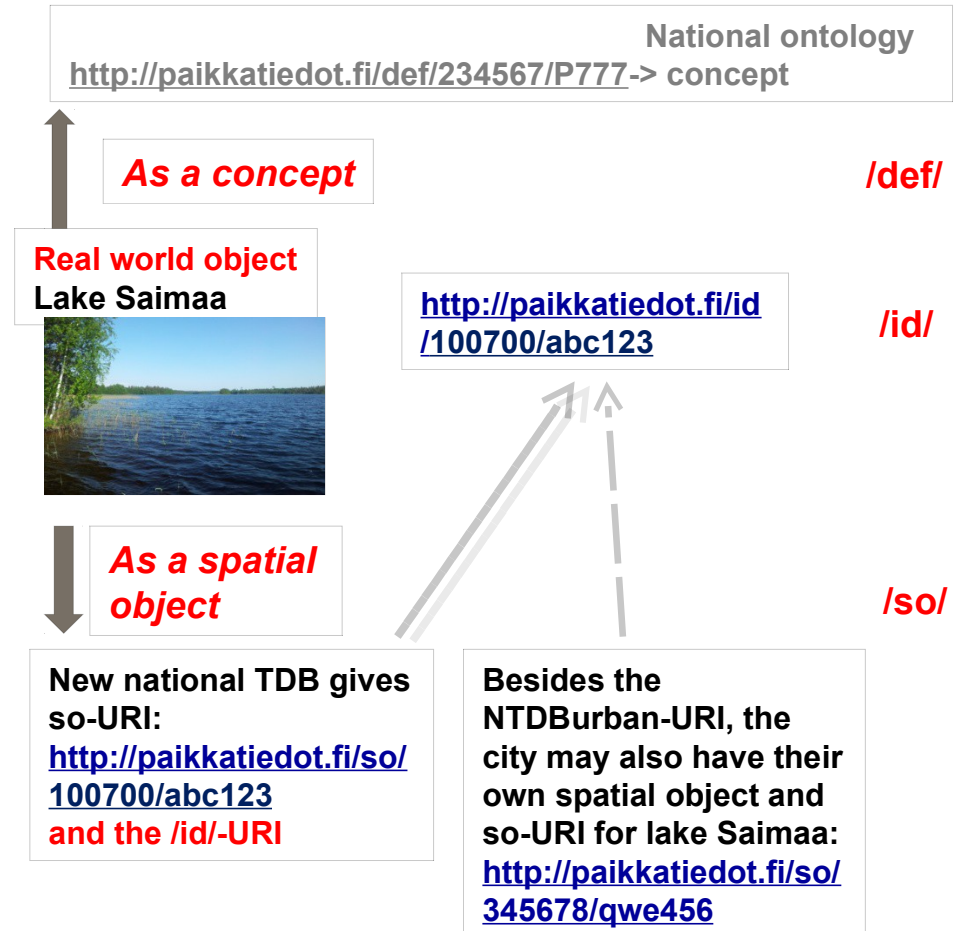**NLS FINNISH GEOSPATIAL RESEARCH INSTITUTE FGI**

New NTDB – outline architecture

URI linking in core location data (NTDB) – outline for pilot

- New NTDB is populated and updated jointly by

  - Cities on densely populated areas (large scale), "NTDBurban"

  - NLS on other areas (mid scale), "NTDBtopo"

- NTDB creates URIs to

  - spatial objects

  - real world entities

- NTDB generates and submits these to the spatial objects of city system for updates or reuse

National ontology
http://paikkatiedot.fi/def/234567/P777 -> concept

As a concept /def/

Real world object Lake Saimaa

http://paikkatiedot.fi/id/100700/abc123 /id/

As a spatial object /so/

New national TDB gives so-URI:
http://paikkatiedot.fi/so/100700/abc123
and the /id/-URI

Besides the NTDBurban-URI, the city may also have their own spatial object and so-URI for lake Saimaa:
http://paikkatiedot.fi/so/345678/qwe456

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Implementation of linking - URI's to real world entities

- Spatial objects in NTDB model concrete objects as for reference

  - feasible for linking

  - represent real world entities as placeholders for URI

- Spatial objects-URIs of NTDBtopo and NTDBurban are linked by /id/-URI of real world entity assigned for the generalized object in NTDBtopo

- NTDB creates and updates references in RDF database (also the URI of city system)

  - If RDF database will be generated later the references can be saved in /doc/-type URI or even database.
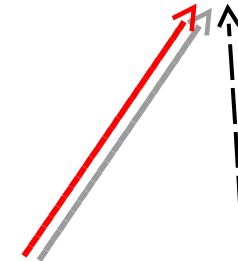
Real world object
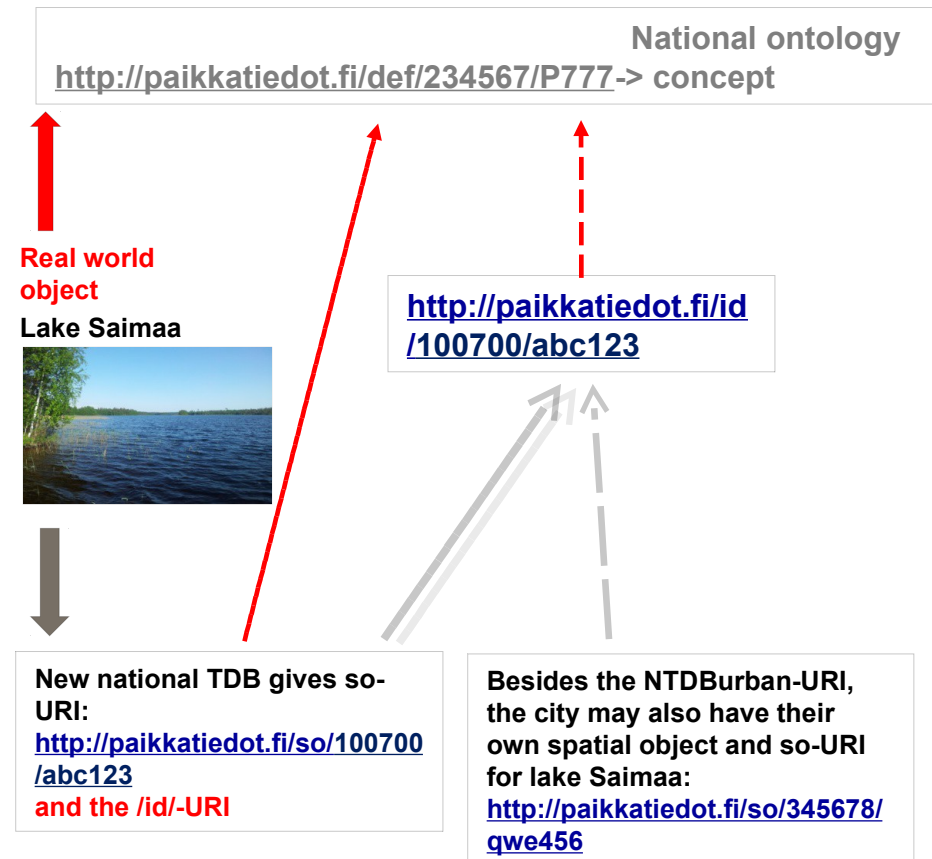**Lake Saimaa**

As a spatial object

http://paikkatiedot.fi/id/ 100700/abc123

New national TDB generates so-URI:
http://paikkatiedot.fi/so /100700/abc123
and the /id/-URI

Besides the NTDBurban-URI, the city may have their own so-URI for lake Saimaa:
http://paikkatiedot.fi/so /345678/qwe456

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Implementation of linking - Concepts

- Linking to concepts to integrate spatial and non-spatial data

- Linking from real world URIs (or spatial object URIs)

- And upload to RDF database

- Not yet in the piloting agenda

- Special case: Place names

  - Place name service platform

  - to provide applications for tagging different assets and further linking through RDF

  - Presentation on pilot and technical solutions in EuroSDR2016 (Eero Hietanen NLS FGI)

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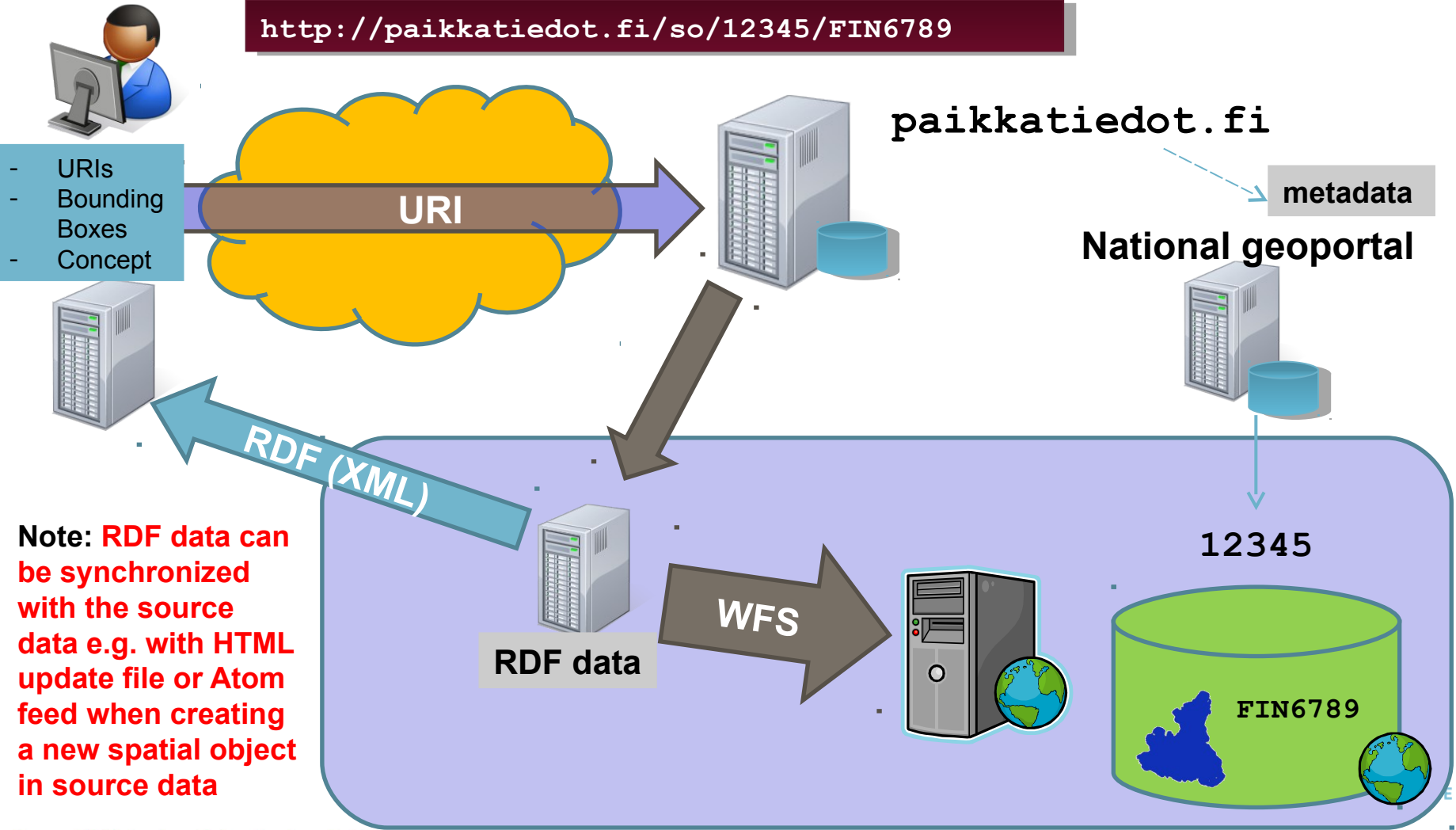http://paikkatiedot.fi/so/345678/ qwe456

Towards nationwide linked data SDI

- The new NTDB is directing to nationwide linking of spatial data

  - By combining spatial data from different providers

  - By establishing a new linked data infrastructure

  - By linking data via real world objects

  - By enabling to integrate spatial and non-spatial data via real world objects or concepts

- Current stage: piloting & proof of concept

- Principles of URI linking allow one organisation to maintain and manage linked data infrastructure for SDI

Technical structure

`http://paikkatiedot.fi/so/12345/FIN6789`

- URIs
- Bounding Boxes
- Concept

URI

paikkatiedot.fi

metadata

National geoportal

RDF (XML)

Note: RDF data can be synchronized with the source data e.g. with HTML update file or Atom feed when creating a new spatial object in source data

RDF data

WFS

`12345`

`FIN6789`

More information

http://www.fgi.fi/fgi/research/department/sdi-services
www.nls.fi

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