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Registro delle infrastrutture di nuova generazione (RING)

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Università di Roma Tor Vergata

Workshop GARR 2014 "Next network: costruiamo il futuro della rete"
Roma, 2-4 dicembre 2014

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Agenda

1. Rationale for a RING
2. Inventory mapping in the world
3. Italian situation
4. Possible RING architecture
5. Conclusions & next steps

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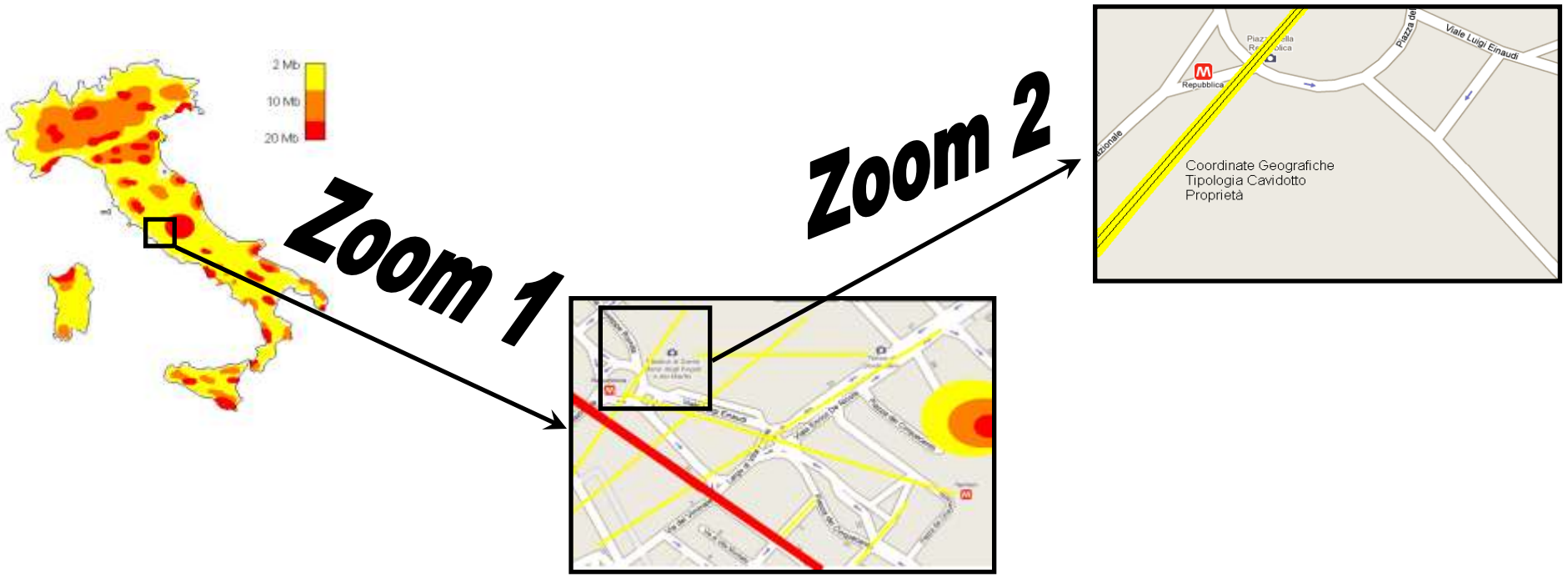
RING rationale

- The cost of civil works to deploy wideband infrastructures (60-80% of total costs) constitutes a serious obstacle to the implementation of next generation networks (NGN / NGAN), dictating restricting excavation activities only wherever strictly necessary
- Existing, not (or partially) utilized infrastructures should then be reused as much as possible, also taking into account existing underground pipelines and ducts for water, electricity, etc. which could also accommodate optical networks without new digging
- The lack of a detailed map of the existing underground infrastructures at national level currently prevents proper planning of fibre optic networks through reusing existing ducts
- To this end, in order to avoid duplicating infrastructures, reduce digital divide and duly inform stakeholders for transparency and decision making purposes, it would be extremely beneficial to make available a registry of next generation infrastructures (RING), aiming at implementing an inventory mapping of available infrastructures for broadband and ultra-broadband access networks

RING goals

- RING (Registry of Next Generation Infrastructures) for inventory mapping of ultrabroadband access infrastructures (physical layer)
- It is a relevant information tool – utilizing Geographical Information System (GIS) features - to avoid duplicating infrastructures, try to reduce digital divide and duly inform customers / stakeholders for transparency and decision making purposes



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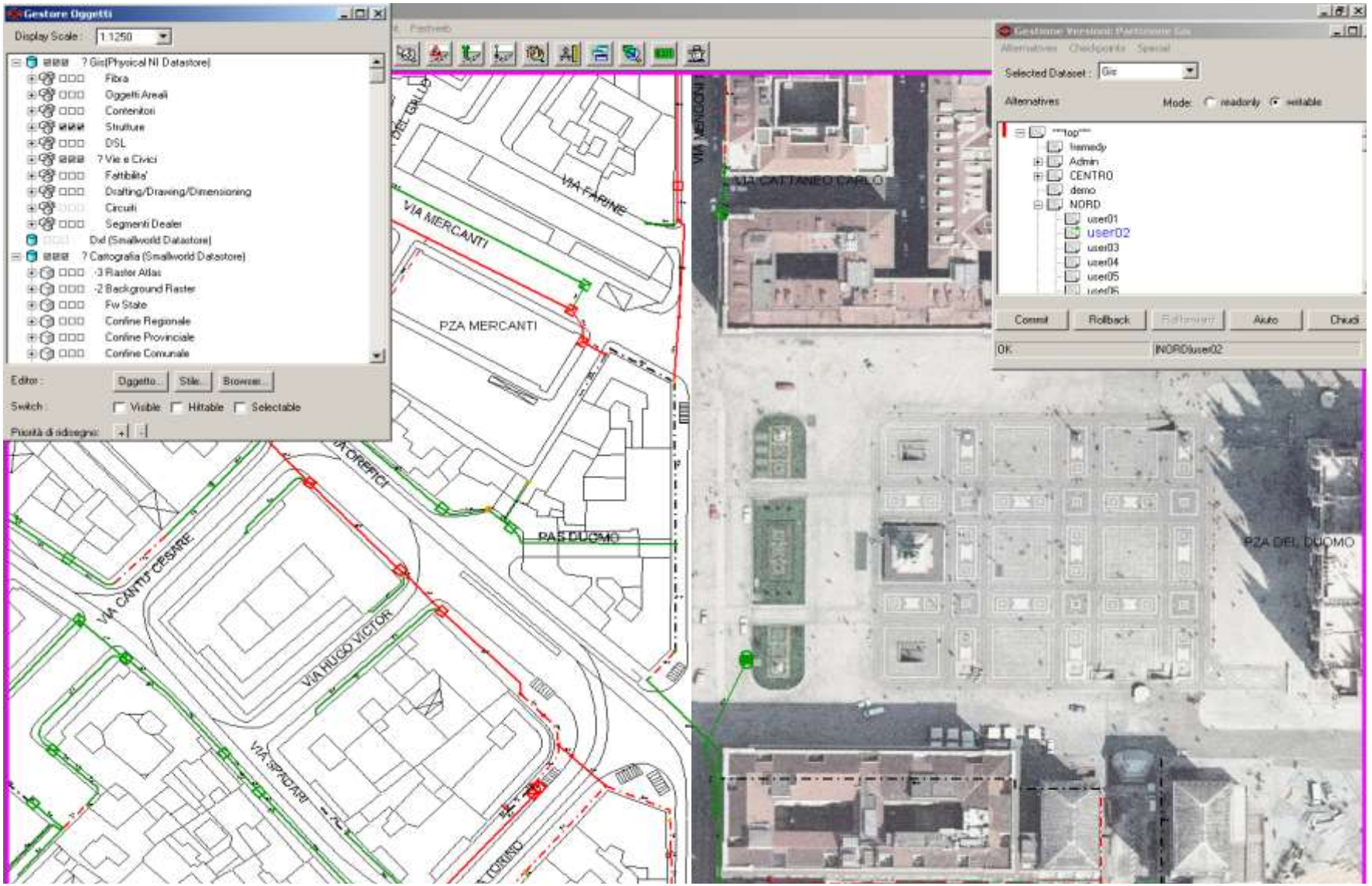
Inventory Mapping (IMap) - example



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IMap in the world

All over the world other similar projects are investigating how to measure ultrabroadband diffusion, monitoring where, when and how high-speed internet is delivered to population. Just to mention a few:

USA — *Recovery Act* (2009) -- www.broadband.gov

New Zealand — www.broadbandmap.govt.nz/map

Denmark — LER data base for Underground infrastructures (2005) -- www.ler.dk

Germany — BNetzA (2009) “Infrastructure Atlas” www.bundesnetzagentur.de

Switzerland — *Network (Geographic) Information System* (2000)

UK — *Digital Britain* -- http://digitalbritainform.org

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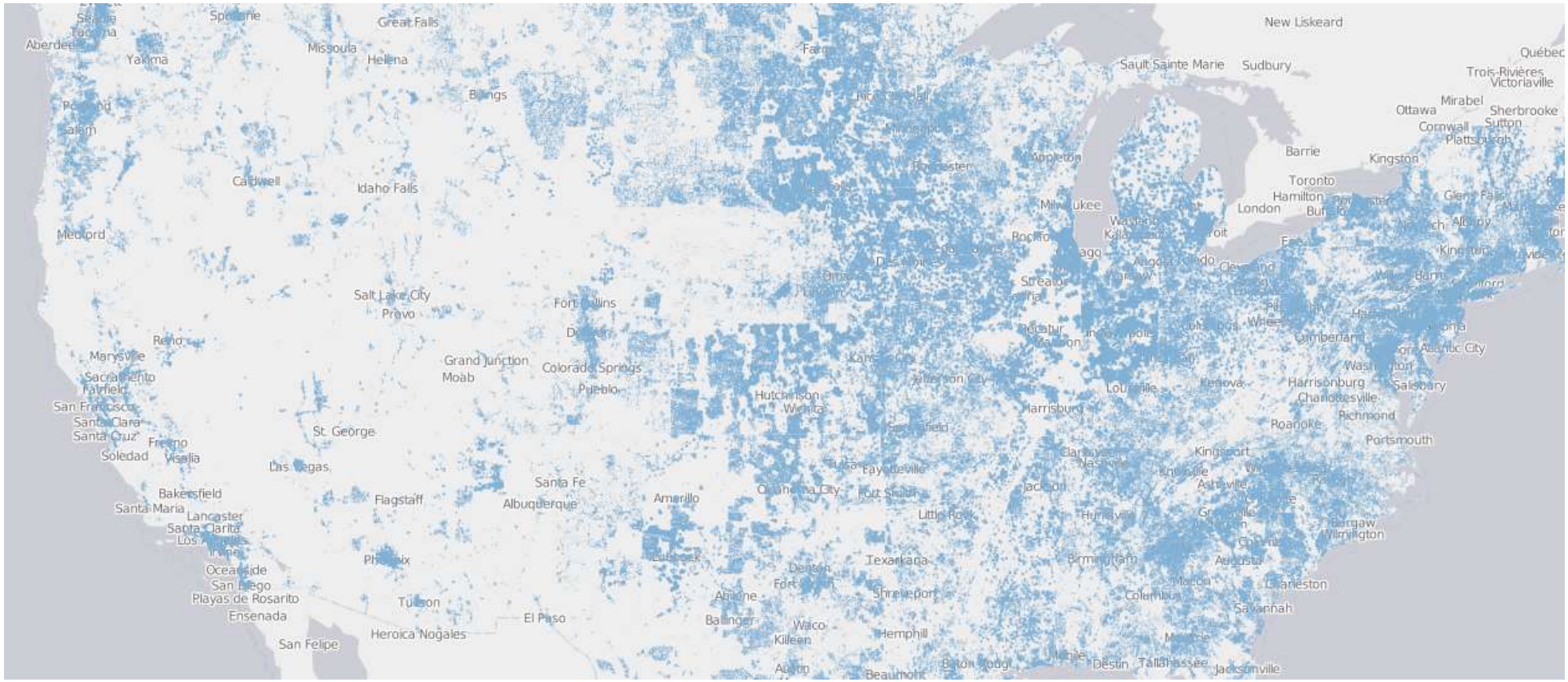
USA – Broadband Plan

In the US, the staff of the Federal Communications Commission (FCC) created the National Broadband Plan. The FCC started the process of creating this plan with a Notice of Inquiry in April 2009. Thirty-six public workshops held at the FCC and streamed online - which drew more than 10,000 in-person or online attendees -, provided the framework for the ideas contained within the plan.

Approximately 100 million Americans do not have broadband at home. Broadband-enabled health information technology can improve care and lower costs by hundreds of billions of dollars in the coming decades, yet the United States is behind many advanced countries in the adoption of such technology.

USA – Broadband Map

An important part of the broadband plan is the National Broadband Map, a tool to search, analyze and map broadband availability across the United States.



Other inventory mapping national projects

New Zealand Broadband Map

Digital Britain

LEDNINGSEJERREGISTRET

The Danish Register of Underground Cable Owners

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Italian regional initiatives

- Lombardy has enacted specific laws, and implemented an "electronic registry" at municipal level (Bergamo, Milan, Monza, Varese, …)
- Some cities in Emilia Romagna have moved on this road (Bologna, Riccione, …), and it is worth mentioning the tender issued by Lepida (regional body for planning, development and management of telecommunication infrastructures) for integrating in a single platform mapping data from various local authorities throughout the region
  - ✓ The bid was awarded to Marconi Labs / Italtel (platform "Invento“), to map underground infrastructure (gas pipelines, water and sewage networks, networks for public lighting and heating, telecom networks, …), converting available data (often in different templates) to an international standard format, to be accessed through web interfaces
  - ✓ Telecom Italia stores the data collected from Invento and makes them accessible to users through its cloud services offering
- It would be desirable extending such regional IMap experiences to the whole Country, as a strategic priority of the Digital Agenda

RING – Background

- Some initiatives were stimulated by the Italian regulator AGCOM between 2009 and 2011, aiming at developing a registry of next generation infrastructures (RING)
- The project RING began with the ISBUL program (“Broadband and ultra-broadband infrastructures & services”, see ref.1) and continued in collaboration with the University of Rome Tor Vergata (Master IPA), with the goal of providing a tool to support the issues related to the location, consistency, adequacy and ownership of network infrastructures on the Italian territory
- RING was intended as an instrument of knowledge to allow the optimization of the use of economic resources, limiting replication and underutilization of existing infrastructures, as well as providing an overview and monitoring of territory digital divide
- ESRI ArcGIS Telecommunication Data Model was suggested, as well as conceptual models as per implementation details of the Emilia Romagna Regional Communications Registry

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RING – data loading / linking

- RING is a geo-database with distributed architecture, taking advantage of “third parties” data feeding onto the RING platform -- data linking and / or loading through a collaboration Geoportal (A)
- It has to be distinguished between:
  - “GIS-infrastructured” players - TelCos, big firms, … - with in-house geographical information system (GIS) mapping of their networks → they can make available to RING data **links** to their GIS database;
  - “non GIS-infrastructured” companies – small companies, local Administrations, … – owning data but no GIS → they can make available (raw) geo-referenced data that can be **loaded** onto RING
- *loading* standard interfaces (I/F) identify standard data formats to be utilized by "non-GIS infrastructured“ players to upload geo-referenced data (shapefile, GeoJSON / TopoJSON, …) onto the RING database
- "GIS infrastructured“ players should instead adapt to specific *display* I/F to allow web consultation of territory next generation infrastructures
- In so doing, it would be possible to see in the RING database both data “pre**loaded**” from "non-GIS infrastructured“ players and data **linked** from each “GIS infrastructured” operator / player

RING architecture (1/4)

1. LOADING / LINKING SET-UP

2. GEO-DATABASE

3. END-USER SERVICES

Geoportal A

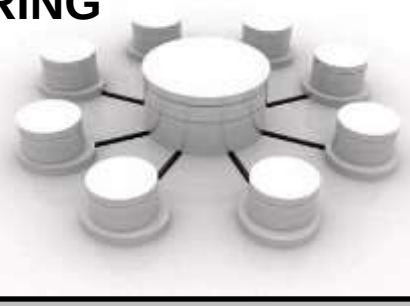
non GIS-infrastructured companies

(small) TelCo's Operators

Local Administration

data loading

RING



data linking

Incumbent

OLO

Large Local Administr.

GIS-infrastructured companies

Geoportal C

Private users

Stakeholders

INTERNET

desktop app. B

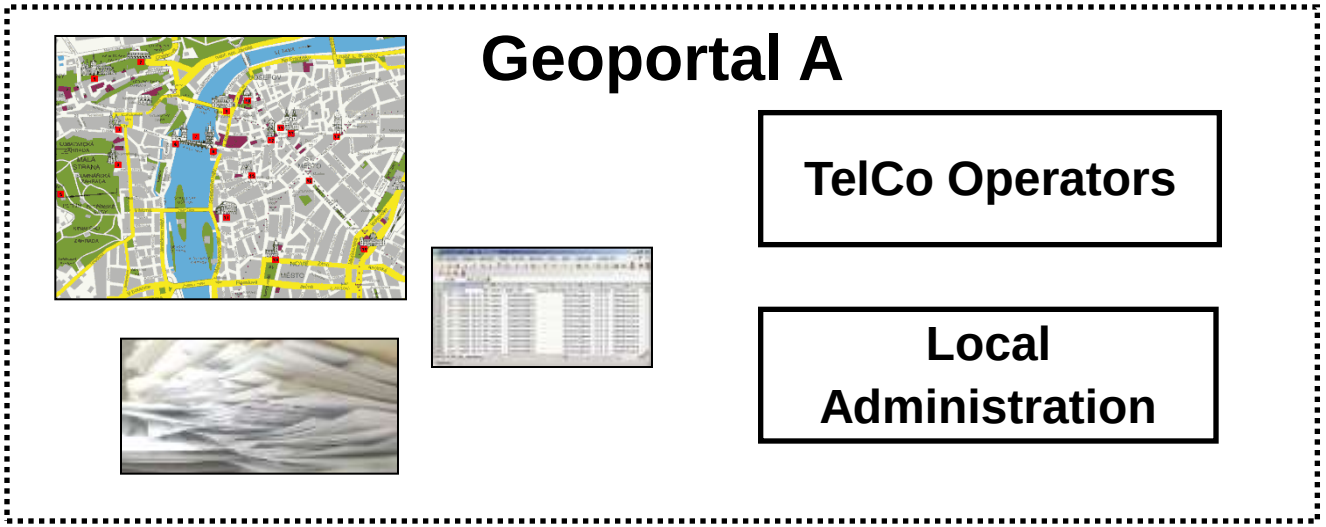
NRA (regulatory officer)

VIP user

INTRANET

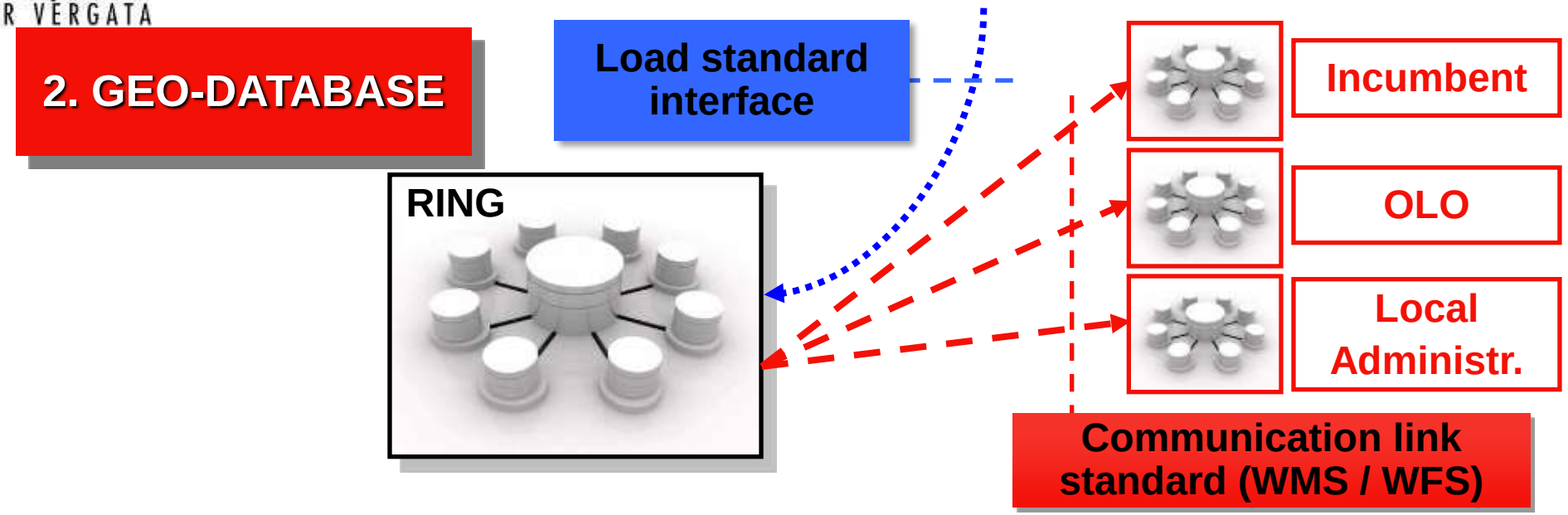
RING architecture (2/4)

1. LOADING / LINKING SET-UP



- a web Geoportal (A) is used to support a distributed loading and / or linking of georeferenced data coming from third parties;
- Geoportal A also describes the standard format of the geodata, and gives instructions how to perform the set-up of loading / linking;
- “professional” users (companies) can access the Geoportal A, in order to manage their participation / collaboration to RING.

RING architecture (3/4)

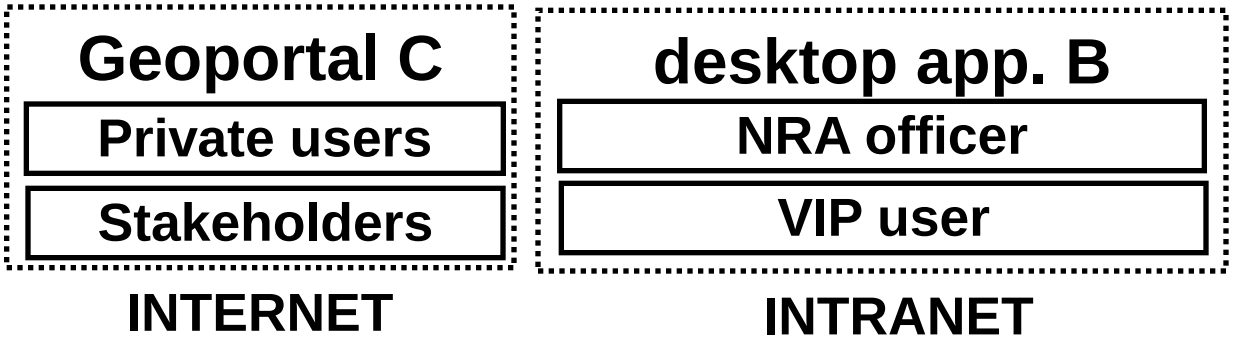


RING geo-database distributed architecture:

- "GIS-infrastructured" TelCos would share their (NGAN) data through **linking** via WMS / WFS standard cartographic web services interface (**red box**) – preserving market sensitive proprietary information (e.g. part #, network active devices,…);
- local Administration (or small TelCos) without GIS infrastructure would use the **loading** standard interface (**blue box**).

RING architecture (4/4)

3. END-USER SERVICES



- private users / citizens can access RING through Geoportal C -- for example, to query about broadband and ultrabroadband services in their zone of interest
- stakeholders can do the same, to better decide about their possible investment in future (NGAN) infrastructures
- priviledged users – e.g. National Regulatory Agency (NRA) staff - could also access the RING database via a desktop application (B)

5. Conclusions & next steps

- In order to avoid duplicating (costly) NGA infrastructures and duly inform stakeholders, an advanced information tool such as RING would allow optimizing the economic resources for NGN deployment, limiting replication and underutilization of existing infrastructures, as well as monitoring territory digital divide
- Starting from the general design considerations provided here, in light of international best practices on the matter, and recent recommendations by European Institutions (see e.g. the “Sblocca Italia” decree by Italian government), we are presently assessing some relevant implementation options for a territorial / national RING
- Upon a technological scouting on GIS technologies (open and web based), we are evaluating such options in terms of implementation requirements, timeplans and costs

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Thank you for your attention !!!

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