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FLORENCE 2019

Fortezza da Basso • FLORENCE (Italy)

30th September • 2nd October 2019

***THE CADASTRE OF UNDERGROUND INFRASTRUCTURE NETWORKS:
THE REGIONE LOMBARDIA MODEL***

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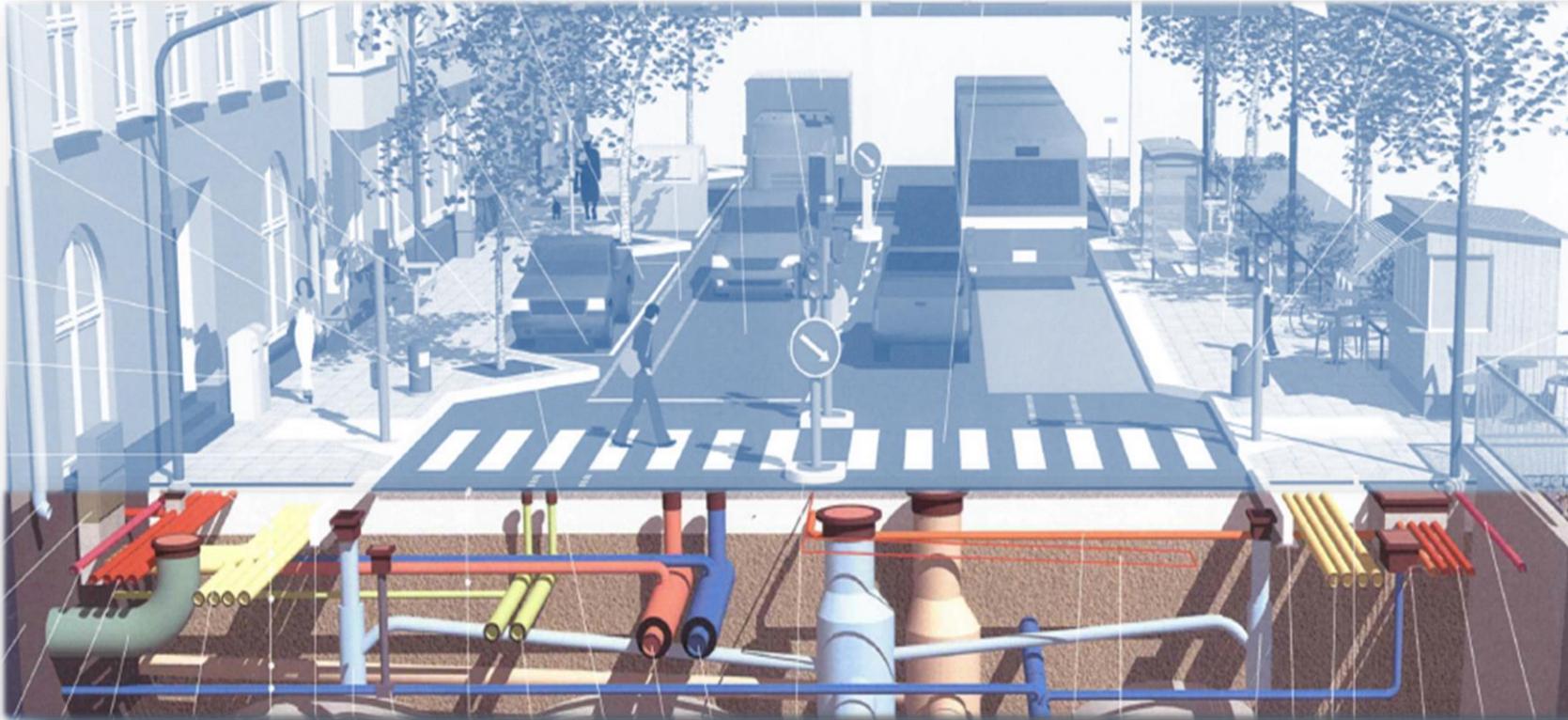


D.G. INFRASTRUTTURE, TRASPORTI E MOBILITÀ SOSTENIBILE
U.O. FERROVIE E INFRASTRUTTURE PUBBLICHE
RETI PUBBLICHE E MOBILITÀ SOSTENIBILE

WHAT ARE UNDERGROUND INFRASTRUCTURE NETWORKS?



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PUBLIC ILLUMINATION

ELECTRICITY

BROADBAND

WATER SUPPLY

SEWAGE DISPOSAL PLANT

GAS

ISSUES ABOUT THE SUBSOIL



IRRATIONAL USE



EXCAVATION INCIDENTS



UNAUTHORIZED TAMPERINGS



INTERFERENCE MANAGEMENT



NO SAFETY

INCREASED POLLUTION



CHAOTIC OCCUPATION

1999 - Directive by the President of the Council of Ministers *“Rational Arrangement of the Technological Systems in the Subsoil”*



2003 - Law n. 26 *“Management of Local Services of Public Interest. Rules on Waste Management, Energy, Use of Underground and Water Resource”*



2007 - *INSPIRE DIRECTIVE - IN*frastructure for *SP*atial *InfoR*mation in *Europe* (Annex III)



THE VALUE OF THE PROJECT «LABORATORIO SOTTOSUOLO»



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2005 - A project conceived and coordinated by Regione Lombardia to deal with issues regarding a more rational, optimal use of the subsoil

COMMITMENT STATEMENTS FROM:

6 Regions, 2 Lombard Provinces, 7 Municipalities, 1 Union of Municipalities, 30 Public Utility Providers, 2 Universities and 1 Research Institute
pledging their commitment to the project by signing a “Declaration of Commitment”



ESTABLISHMENT OF A
COMMUNITY

considers the various
aspects related to the
management of
subsoil

adopts an integrated
approach

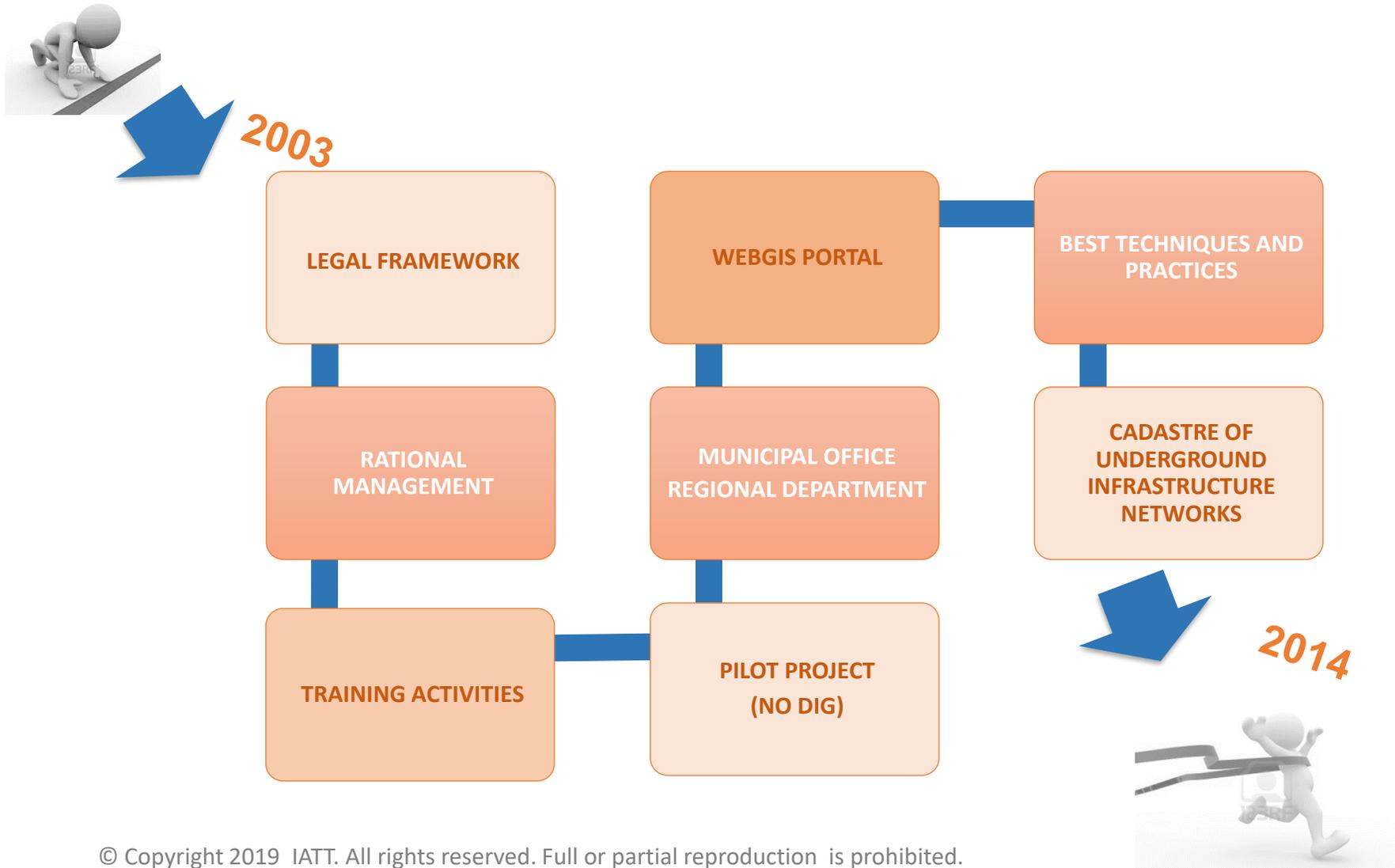
1.EFFECTS SYNERGY WHILE TAKING
ACCOUNT OF THE NEEDS OF EACH
INDIVIDUAL PLAYER

2.PURSUES A COMMON, SHARED
OBJECTIVE

LABORATORIO SOTTOSUOLO, A LONG WAY TO..



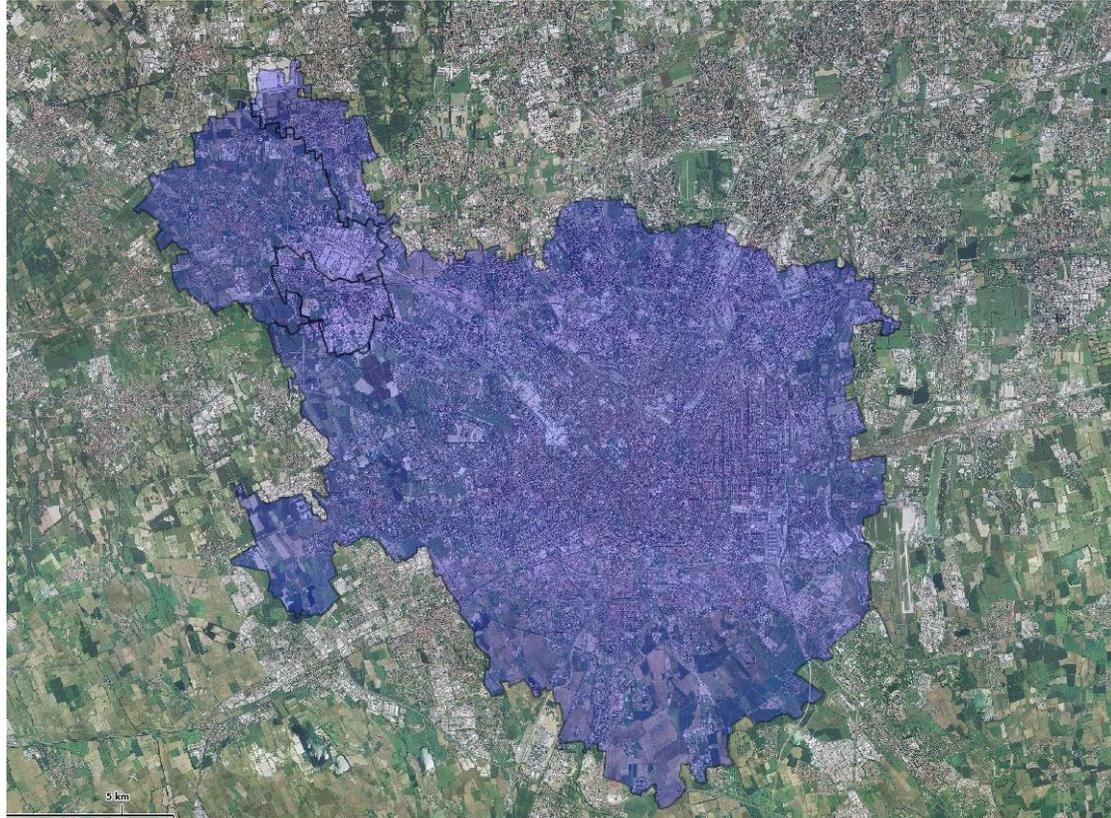
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A PILOT PROJECT FOR THE EXPO AREA: PARTICIPATORY PLANNING OF UNDEGROUND UTILITIES



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Networks: water, electricity, centralized heating, sewage, storm water, gas, TLC, public lighting

Utility companies: ENEL, Colt, Ionomi, Metroweb, Telecom, Fastweb, Wind, Terna, A2A, Snam, MM

Total project area: 48.166.242 mq

Area occupied by utilities: 2.423.212 mq

Population in the area: 168.966 inhabitants

Index for utility crowding on the area = 5%

PROJECT AREA, PERCENTAGE AND TYPE OF NETWORKS



Comune Arese



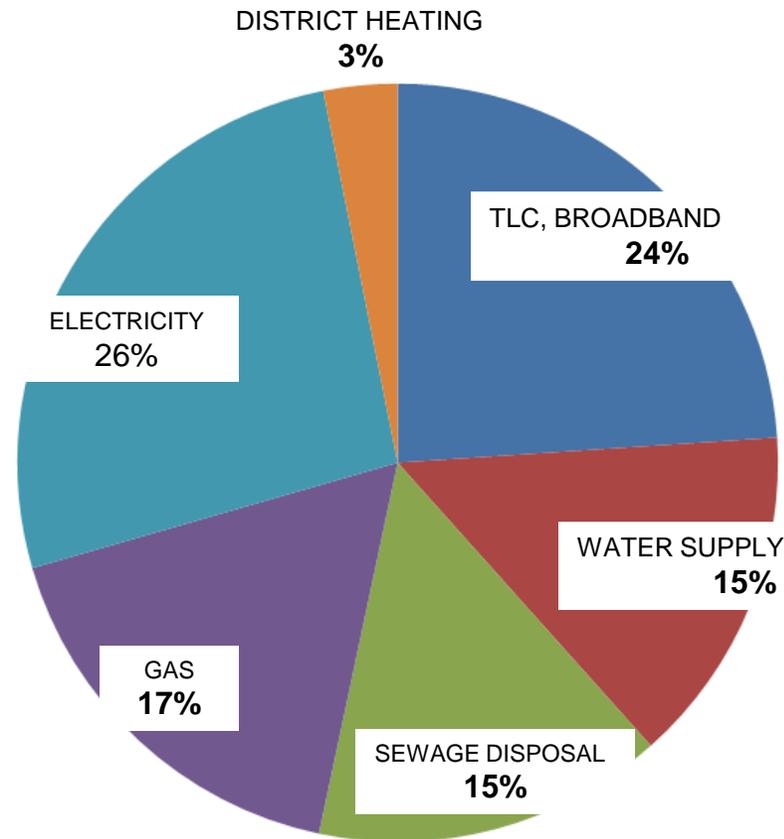
Comune Pero



Comune Rho



Milano
Comune di Milano



KEY ELEMENTS:

- MAPPING NETWORKS ACCORDING TO EXISTING SHARED STANDARDS;
- TESTING GEO-RADAR AVAILABLE TECHNOLOGIES AND PROTOTYPES

PURPOSE:

TO ALLOW THE GOVERNMENT TO DEFINE THE BEST TARGETS, PRIORITIES AND POLICIES FOR OPTIMAL PLANNING OF UNDERGROUND INFRASTRUCTURE

EVALUATION OF FEASIBILITY

EVALUATION OF COSTS

MODEL TESTING

DATA ACQUISITION:

- ACQUIRING THE UTILITY DATABASE
- INSTRUMENTAL SURVEYS
- PROCESSING ALL DIFFERENT DATASET
- MASHING THE GEO-DATABASE
- DATA REPRESENTATION
- WEBGIS PORTAL



TESTING DIFFERENT SURVEY METHODS:

- DIFFERENT MAPPING METHODS:
 - DIGITAL SLIT TRENCHES
 - GPR STANDARD
 - GPR 3D COMPLEX
- DATA PROCESSING
- DATA MASHING
- 2D-3D WEBGIS



DATA REPRESENTATION:

- REGIONAL LEVEL: MANAGEMENT OF A PUBLIC PORTAL CONTAINING ALL THE REGIONAL COMMON DATASET
- LOCAL AUTHORITIES: DATA INTERCHANGE INFRASTRUCTURE FOR SHARING INFORMATION BETWEEN UTILITY COMPANIES AND AUTHORITIES
- ADOPTION OF COMMON DATABASE TABLES

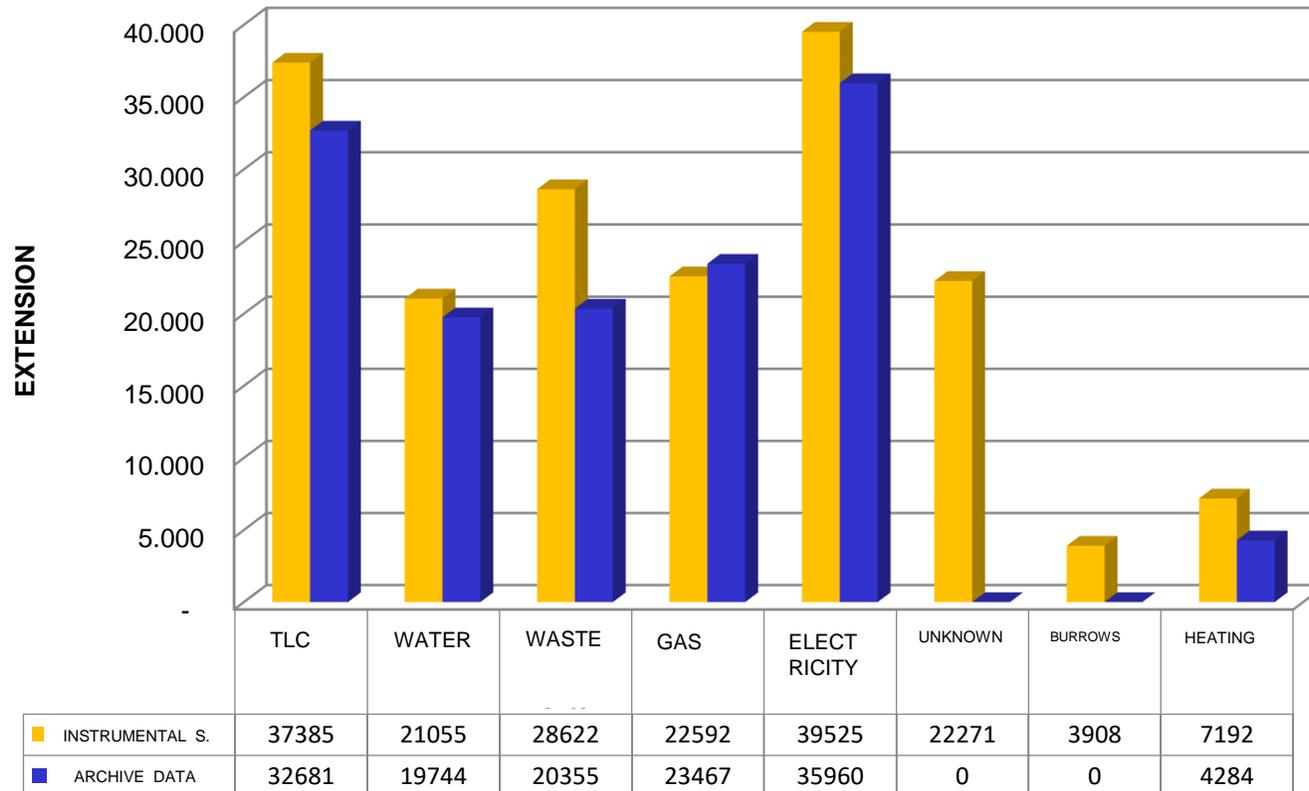


DATA COMPARISON: QUANTITATIVE ACCURACY OF THE NETWORK INFRASTRUCTURE IN THE PILOT AREA



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THE ANALYSIS OF THE EXTENSION DATA FROM GPR SURVEYS SHOWS A **PERCENTAGE DEVIATION** OF APPROXIMATELY **34%** COMPARED TO THE VALUES PRESENT IN HISTORICAL ARCHIVES

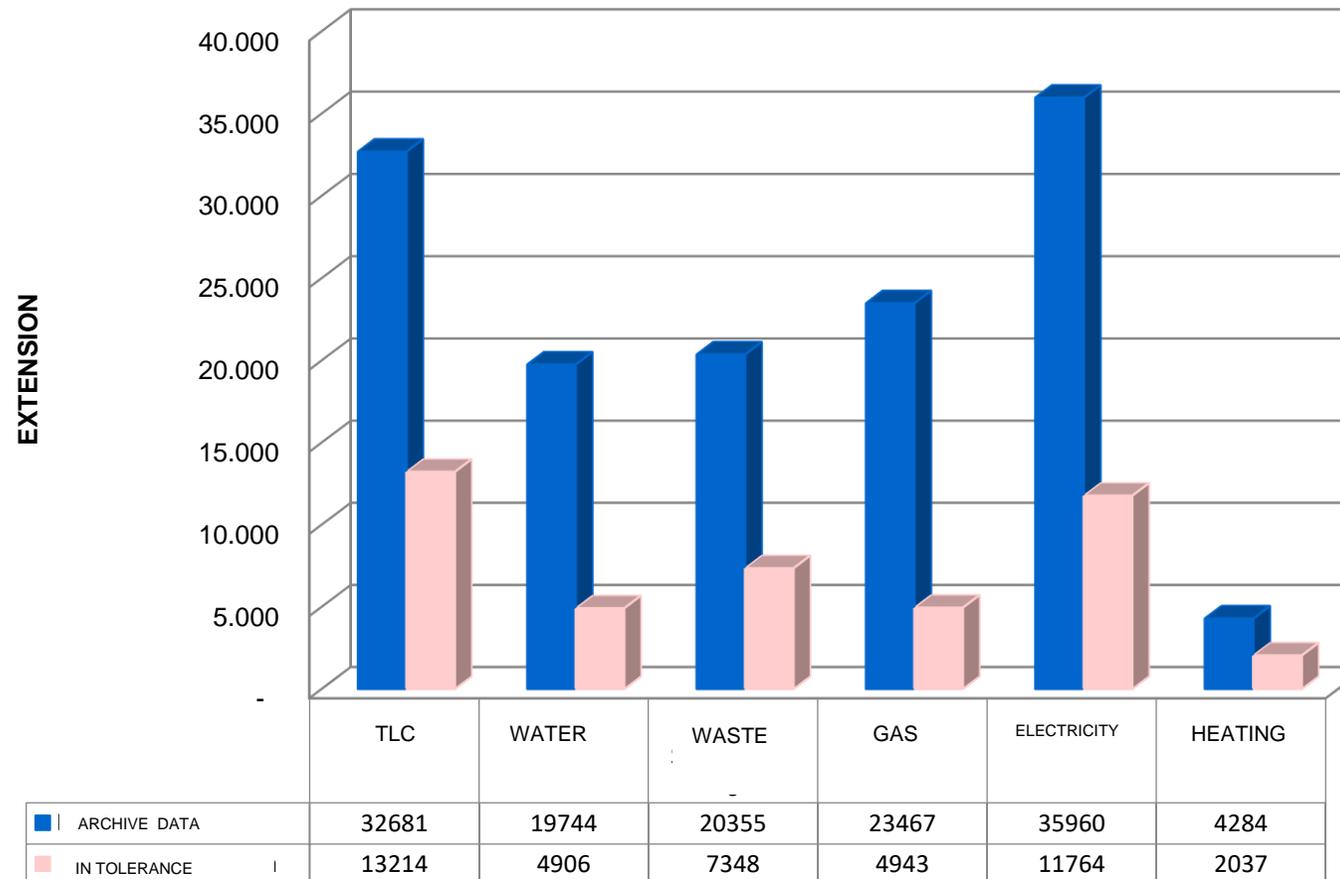


A THIRD OF THE NETWORKS PRESENT IN THE UNDERGROUND ARE NOT REPORTED IN ANY ARCHIVED CARTOGRAPHY

DATA COMPARISON: QUALITATIVE ACCRACY OF DATA POSITION



THIS PARAMETER EXPRESSES THE PERCENTAGE OF ERROR IN THE PLANIMETRIC POSITION OF THE PIPELINES DRAWN IN THE HISTORICAL ARCHIVE COMPARED TO THEIR REAL LOCATION AS FROM INSTRUMENTAL SURVEYS



DATA COMPARISON: QUALITATIVE ACCRACY OF DATA POSITION

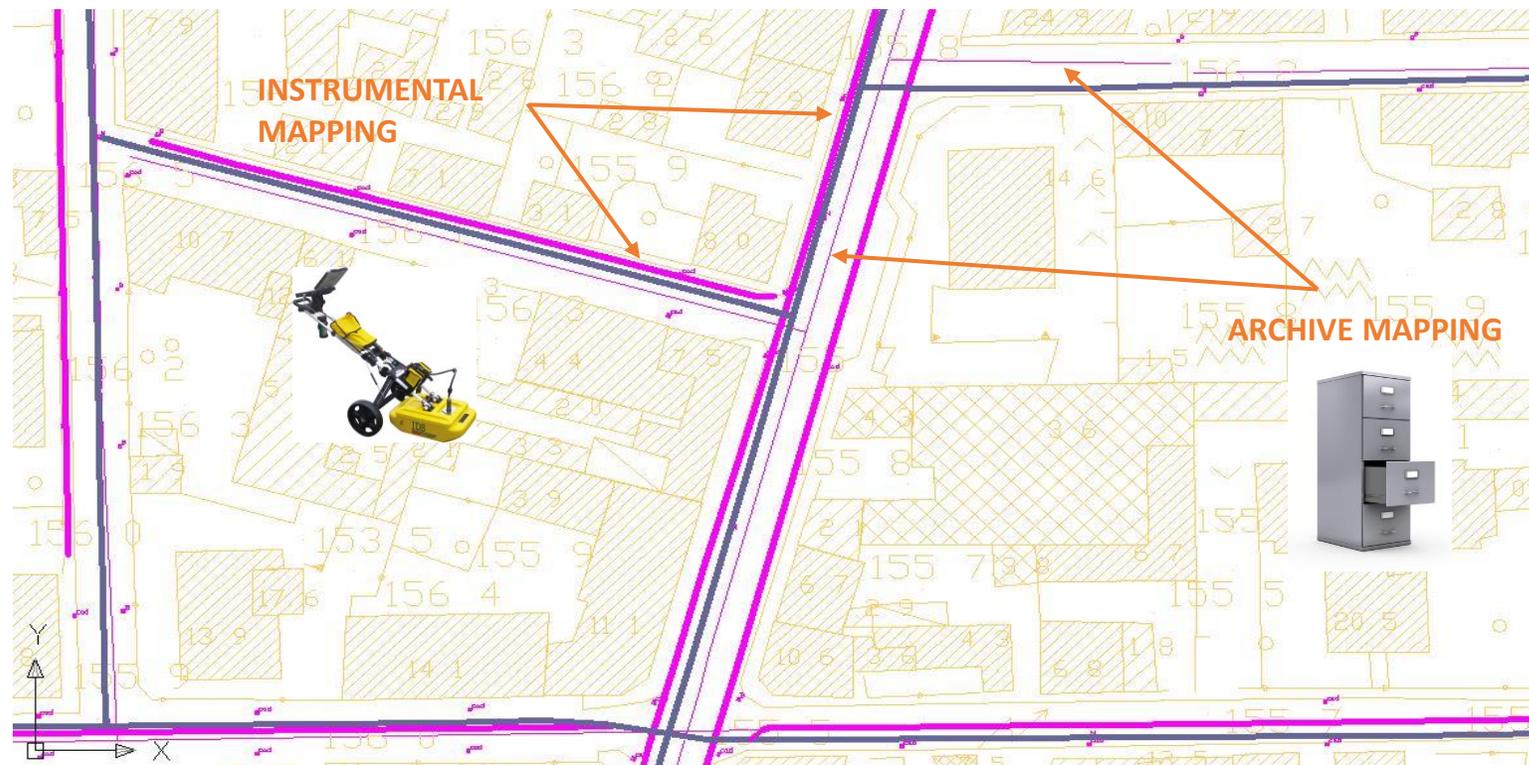


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32%

WAS THE ESTIMATED PERCENTUAL OF PIPELINES IN TOLERANCE:

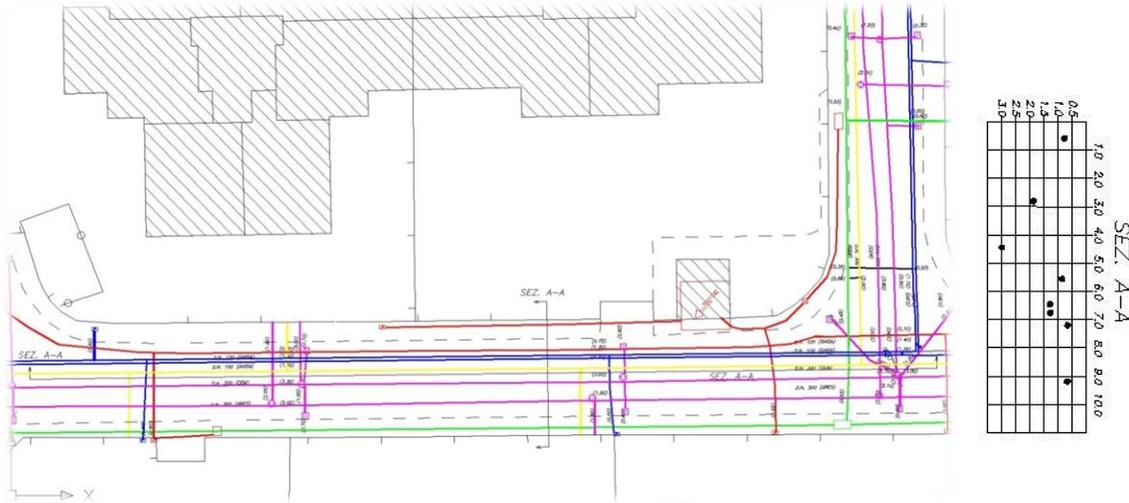
THE DISCREPANCY FOR THE PLANIMETRIC POSITION BETWEEN HISTORICAL AND INSTRUMENTAL DATASET WAS CONSIDERED ACCEPTABLE BASED ON THIS FIGURE



NO-DIG UTILITY MAPPING

MULTI-TECHNICAL APPROACH TO EVALUATE:

- ✓ THE MOST SUITABLE TECHNOLOGY FOR THE CADASTRE OF UNDERGROUND UTILITIES
- ✓ COSTS AND BENEFITS



EXAMPLE OF TRANSVERSAL AND LONGITUDINAL SECTIONS

TECHNICAL ASPECT: WHICH TYPE OF GPR CAN BE USED AND WHY?

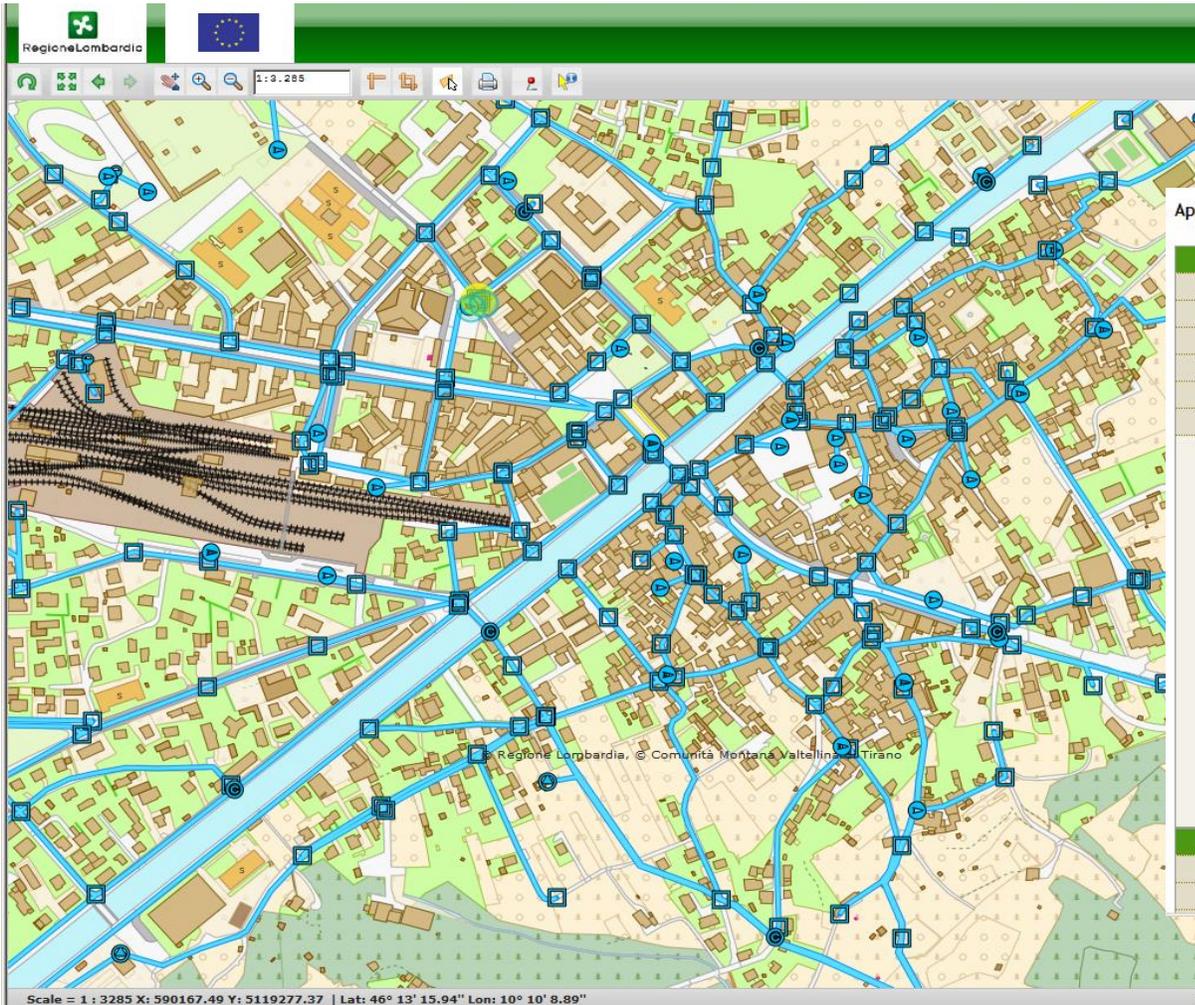
PROCEDURAL ASPECT: SEQUENCE OF OPERATIONS FOR EACH SPECIFIC SURVEY TYPE



DATA REPRESENTATION: 2D WEBGIS PORTAL



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Approvvigionamento acque puntiforme > Tipo di elemento: Pozzetto di ispezione

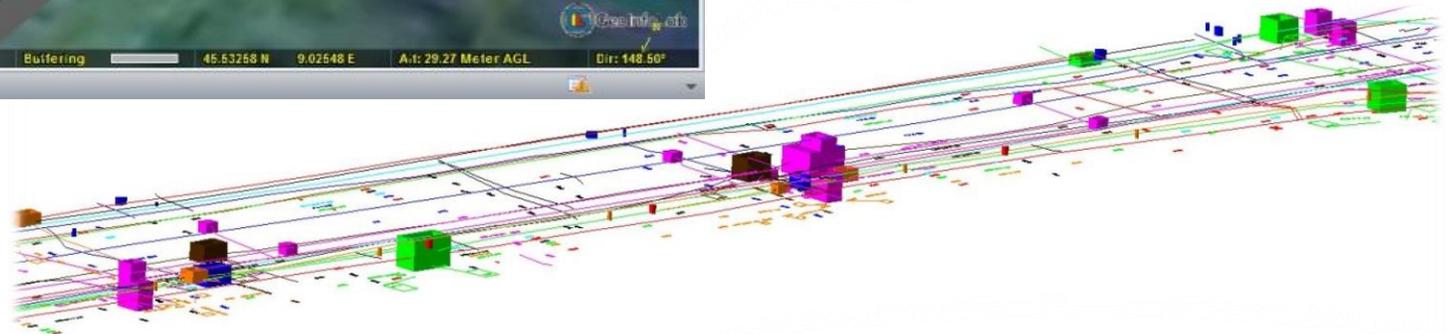
Attributi identificativo	
Cod. elemento 070102	N° elemento 337
Descrizione Approvvigionamento acque puntiforme	Fonte ATO
Tipo Pozzetto di ispezione	Cod. acquedotto 91 - Ignoto
Strada Ignoto	Cod. posizione 91 - Ignoto
Rilevatore 02582430126	Data rilievo 25/07/2007
Cod. istat 14066	Annotazioni

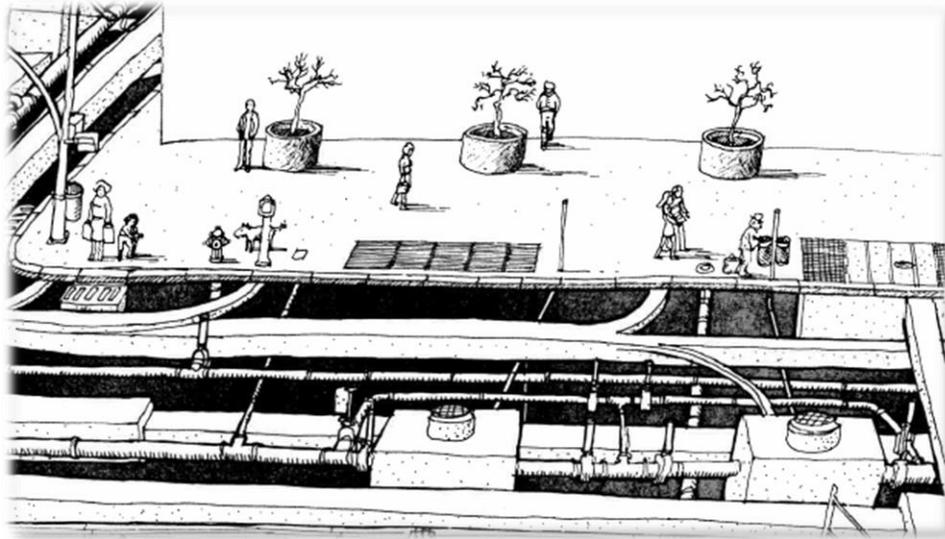
Attributi di tipo geografico	
Cod. posizione 91 - Ignoto	Quota 433.26
Den. punto	

DATA REPRESENTATION: 3D PROTOTYPE WEBGIS PORTAL



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THE CADASTRE IS AN INSTRUMENT OF KNOWLEDGE:

- supporting decision makers in both design and investment choices to optimize the use of resources
- making more effective interventions in case of failure, and to ensure greater security of networks and systems
- making it easier to design renovations of a network or its expansion
- identifying existing usable infrastructure in order to reuse them
- facilitating access to information on networks layout in order to avoid interference construction

THE CADASTRE OF UNDERGROUND INFRASTRUCTURE NETWORKS



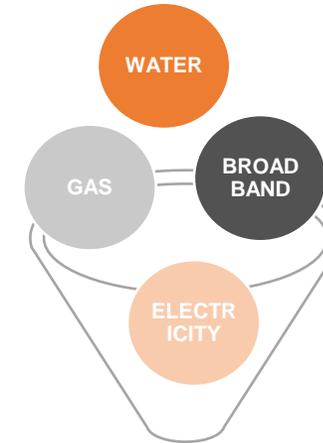
2012 REGIONAL LAW N° 7 PROCEDURES FOR ECONOMIC DEVELOPMENT AND OCCUPATION

THE UNDERGROUND CADASTRE IS DEFINED AS THE SET OF TABLES, MAPS, PLANIMETRY AND DOCUMENTS SUITABLE TO REPRESENT:

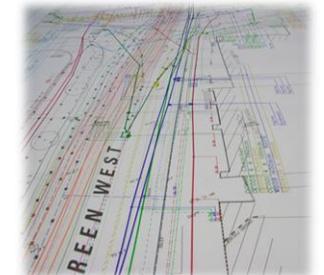
- THE UNDERGROUND STRATIGRAPHY
- LOCALIZATION AND SIZE OF INFRASTRUCTURES
- ATTRIBUTES RELATED TO THE PROPERTY (MATERIAL, AGE, STATE OF USE, ETC)

2014 DECREE OF GENERAL DIRECTOR N° 3095

TECHNICAL SPECIFICATIONS FOR SURVEYING AND MAPPING UNDERGROUND SERVICE NETWORKS



WHO? stakeholders	WHEN? periodic updates	HOW? Webgis portal https://www.multiplan.servizirl.it/
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<https://www.multiplan.servizirl.it/>



MULTIPLAN Sito di Pianificazione Territoriale



Introduzione

Benvenuto nella pagina di accesso agli applicativi di Pianificazione Territoriale di Regione Lombardia.

Attraverso il sito MULTIPLAN gli utenti possono accedere alle applicazioni RIMWEB (Archivio documentale relativo ai dati sul Reticolo Idrografico Minore), PGTWEB (Archivio documentale Piani di Governo del Territorio), PTCPWEB (Archivio documentale Piani Territoriali di Coordinamento Provinciale), PUGSSWEB (Archivio documentale Piani Urbani Generali dei Servizi del Sottosuolo) in base al profilo di accoglienza ottenuto in fase di registrazione

Accesso agli applicativi

Accesso in sola lettura a [PGTWEB](#)

Accesso in sola lettura a [PTCPWEB](#)

Accesso in sola lettura a [PUGSSWEB](#)

Accesso in sola lettura a [RIMWEB](#)

Accesso in sola lettura a [Mappa Reti Sottosuolo](#)

Accesso con Login

Puoi accedere al servizio:

utilizzando una SmartCard con il proprio PIN (CRS o altra CNS) dopo aver effettuato la registrazione online, utilizzando il codice utente e password forniti dal sistema

[Accedi](#)

THE WEBGIS PORTAL OF THE CADASTRE



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VIEWER GEOGRAFICO
Reti e Infrastrutture del sottosuolo
X:563.819,259 Y:5.035.279,824 - Scala: 1:1.000.000 - Sistema di riferimento: UTM32 WGS84

VIEWER GEOGRAFICO
Reti e Infrastrutture del sottosuolo
X:514.416,842 Y:5.034.563,575 - Scala: 1:5.000 - Sistema di riferimento: UTM32 WGS84

VIEWER GEOGRAFICO
Reti e Infrastrutture del sottosuolo
X:514.592,175 Y:5.034.592,612 - Scala: 1:5.000 - Sistema di riferimento: UTM32 WGS84

Gestisci Contenuto

- Visibilità livello
- Rete gas
- Rete elettrica
- Rete di approvvigionamento idr (...)
- Rete di smaltimento delle acque (...)
- Rete telecomunicazioni
- Rete teleriscaldamento

Legenda

Punti della rete di telecomunicazioni

- Pozzetto
- Centrale telefonica
- Non conosciuto
- Altro

Linee della rete di telecomunicazioni (scala da 50mila a 1000)

- Tratta dorsale
- Tratta di raccordo
- Tratta di distribuzione
- Non conosciuto

Mappe

Mappe: Rete telecomunicazioni
Strato: Linee della rete di telecomunicazioni (scala da 50mila a 1000)

CODICE DELLA CLASSE: 070701
DENOMINAZIONE DEL GESTORE: fastweb
POSIZIONE DELL'ELEMENTO RISPETTO ALLA SUPERFICIE: Non conosciuto
NOME DELLA STRADA: non conosciuto
IDENTIFICATIVO DEL NODO FINALE: 0
CODICE FISCALE/PARTITA IVA DEL GESTORE: 03
IDENTIFICATIVO UNIVOCO PROGRESSIVO PER LA CLASSE DI OGGETTI: 65421
STATO DELLA CONDOTTA: Non conosciuto

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Note Legali | Credits | Release 2.5.2

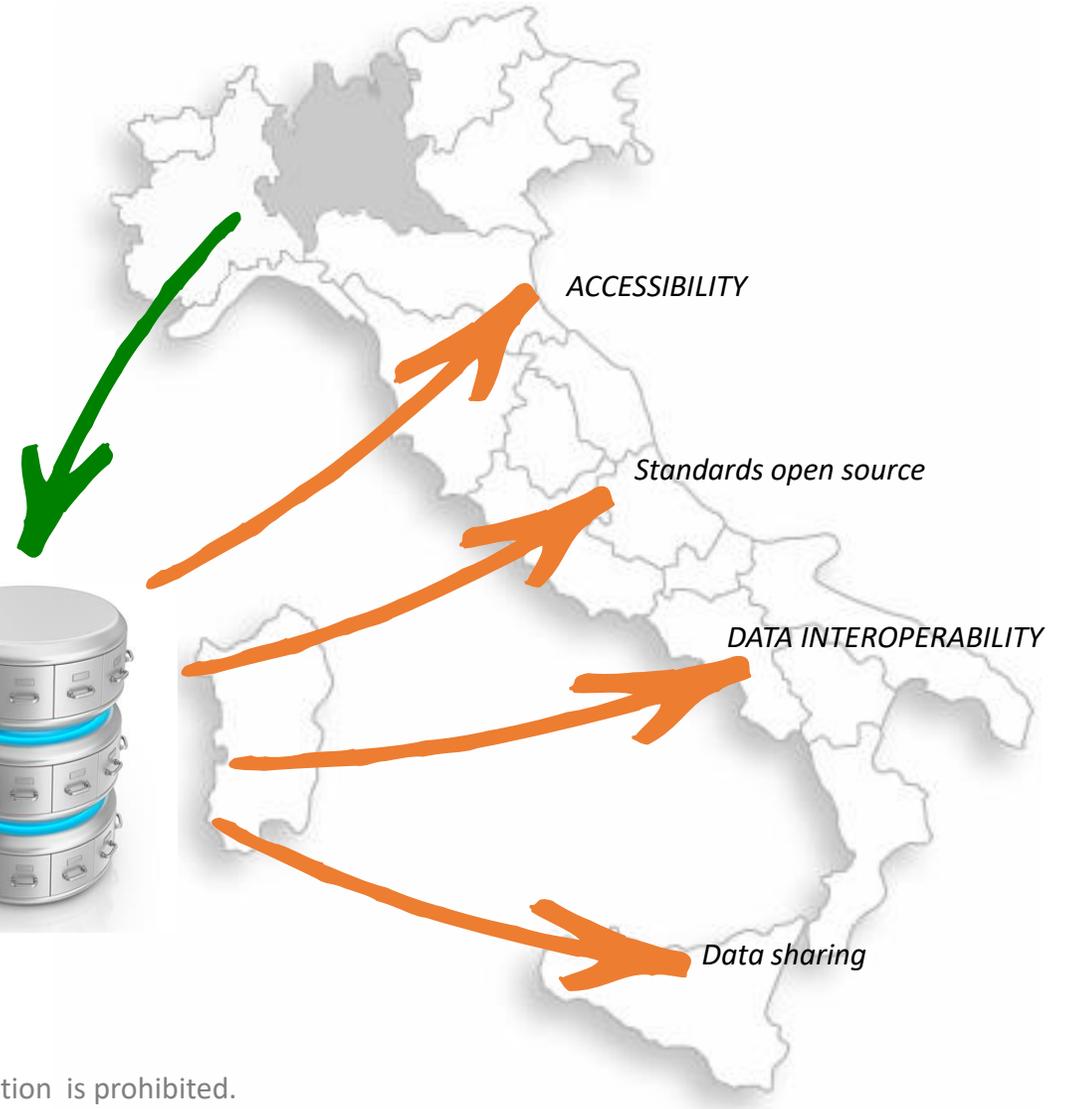
THE ITALIAN NATIONAL INFRASTRUCTURES INFORMATION SYSTEM (SINFI)



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AN EXAMPLE OF THE FEDERATION BETWEEN
THE REGIONAL CADASTRE OF REGIONE LOMBARDIA
AND THE NATIONAL ONE

*National Infrastructures
Information System (SINFI)*



FOR MORE INFORMATION



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assistance



catastosottosuolo@regione.lombardia.it



website



*www.reti.regione.lombardia.it
www.multipan.servizirl.it/it*

THANKS FOR YOUR ATTENTION



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