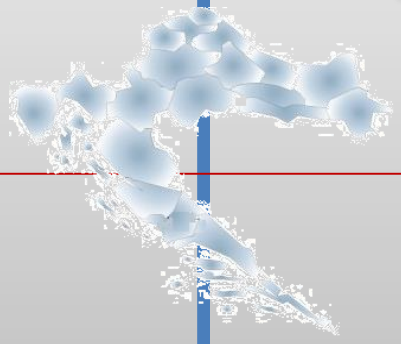
Broadband mapping and Electronic Communication Infrastructure – Croatian Model

Danko Čurepić

CROATIAN REGULATORY AUTHORITY FOR NETWORK INDUSTRIES (HAKOM)



INFOFEST
Budva, Montenegro
September 27th, 2016

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1. INTRODUCTION
2. HAKOM'S GIS PORTAL
3. BROADBAND MAPPING IN CROATIA
4. ELECTRONICAL COMMUNICATION INFRASTRUCTURE IN CROATIA
5. GIS FOR ECI
6. CONCLUSION

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INTRODUCTION

HAKOM - Croatian Regulatory Authority for Network Industries is a legal entity with public authority within the scope and competence prescribed by the Electronic Communications Act and a special law regulating the field of postal services and the field of railway services.

HAKOM – shall be obliged to take all the appropriate measures which are aimed at achieving the regulatory principles and objectives in particular in the following way:

- Encouraging efficient investment into infrastructure and promoting innovation and to allow different cooperation agreements between investors in infrastructure and by ensuring the protection of competition and respecting the principle of non-discrimination
- Protection of competition to the benefit of end-users

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Interactive GIS portal

Includes views of data by topics:

- availability of broadband access
- consolidated plan of mobile communications operators
- areas of intended deployment (construction) of the optical distribution network
- data speeds used in broadband access
- radio stations
- measurements of levels of electromagnetic field

INTEGRATED VIEWER

View of all thematic sections, i.e. data on the availability and usage of broadband access speeds, consolidated plan of mobile communications operators and areas of intended deployment of the optical distribution network, radio stations and measurements of levels of electromagnetic field. Areas of availability of broadband access and information on the radio stations are also available through the WFS service. All inquiries concerning the availability and use of speed can be submitted to hakom-mapiranje@hakom.hr and inquiries concerning radio stations and measurements of levels of electromagnetic field to radijske-postaje@hakom.hr.
Instructions for using the application can be downloaded here.

RUN

Broadband access availability

Includes display of information about broadband access speeds availability (2 Mbps and higher), primarily intended for local governments for the purpose of analysis of the availability of broadband access speeds.

RUN

The consolidated plan of mobile communications operators

Under the Regulation on standards on development of electronic communications infrastructure and other related equipment (OG 13/12), article 14, paragraph 1, HAKOM is publishing graphic part of a unified plan of all mobile communications operators

RUN

Publication of intent of deployment (construction) the optical distribution network

In accordance with article 8, paragraph 4 of the Ordinance on the optical fibre distribution networks (OG 57/14), HAKOM announces intent of building optical distribution network.

RUN

View of data speeds used in broadband access

Includes the display of data on percentages of using fixed broadband access speeds (households) 2 Mbps and higher, primarily intended for local governments in order to analyze the broadband connections per contracted speeds

RUN

Radio stations

Interactive map contains information about the locations and basic technical characteristics of base stations in public mobile communications networks and radio stations in broadcasting service.

RUN

EMF Measurements

Contains information on the results of measurements of electromagnetic field performed by HAKOM in order to verify compliance of a particular radio station with prescribed limits

RUN

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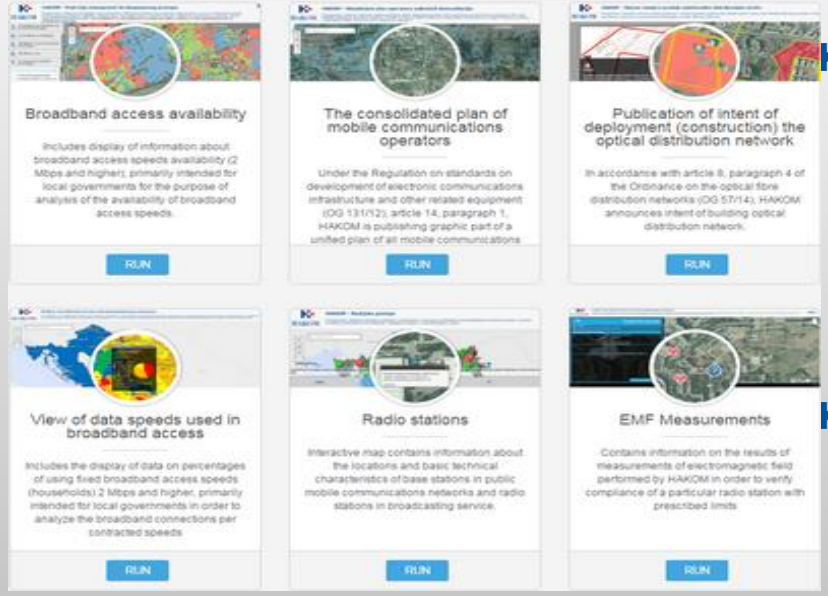
BROADBAND MAPPING IN CROATIA

- HAKOM acquire data from infrastructure operators to map areas with availability of broadband infrastructure which allows broadband access with download speeds of 2-30 Mbit/s, 30-100 Mbit/s and more than 100 Mbit/s.
- The result is a publicly available interactive map representing areas with available broadband infrastructure which allows the corresponding broadband speed and GIS application with more functionalities for internal use.
- Besides availability of BB, interactive map has been upgraded with data on take up rate for each city/municipality/county (subscribers according to access speeds).



- The publicly available interactive map of broadband areas is intended to represent initial broadband service mapping as a basis for public consultations process (according to State Aid rules)
  - local authorities are granted (via WFS service) access to the polygon layer
- The interactive map of broadband areas could also be used by operators for identifying unserved areas and to ease processes of making investment decisions

BROADBAND MAPPING IN CROATIA

- Operators are obliged to deliver data on object level - residential and business premises, which are homes passed by broadband infrastructure as well as data on the number of households at some address which are subscribed to corresponding speed category.
- Alphanumeric data supplied by operators are paired with corresponding geo-referenced addresses (obtained by State Geodetic Administration) of the objects
- Then, points representing objects with identical data are created.
- Finally, on the basis of adjacent points representing objects with identical data, polygons, representing broadband areas of corresponding available broadband speed category, are created.
- Mobile network operators are obliged to submit data on mobile networks indoor coverage with defined signal levels criteria polygons in shp file format

BROADBAND MAPPING IN CROATIA

Methodology of polygon creation

- Operators delivered the broadband data on object level (residential and business)
  - Spatial data – coordinates
  - Alpha-numeric data on speed range and access technology
- Official Streets & home address spatial register
  - Provided by State Geodetic Administration for the teritory of Republic of Croatia
- GIS tools
  - were used for polygon creation
  - used for visualisation on interactive map
  - enable WFS service availability
- Quarterly updates will be made based on the changes provided by operators for the past 3 months

BROADBAND MAPPING IN CROATIA

- First, alphanumeric data supplied by operators are paired with corresponding geo-referenced addresses (obtained by State Geodetic Administration) of the objects

+

						Mogućnost pružanja širokopojasno pristupa	
Županija	Grad/općina	Naselje	Ulica	kućni broj	broj korisničkih jedinica	30 Mbit/s - 100 Mbit/s [DA/NE]	više od 100 M [DA/NE]
Bjelovarsko-bilogorska							
Bjelovarsko-bilogorska	Berek						
Bjelovarsko-bilogorska	Berek	Begovača	ulica1	1	1		
				2	2		
				3	1		
				4	3		
			ulica2	1	1		
				2	1		
				3	5		
			ulica3	1	1		
				2	1		
Bjelovarsko-bilogorska		Berek	ulica1	1	5		
				2	3		
				3	2		
				3A	1		
			ulica2	1	5		
				2	5		
				3	5		
				4	5		
			ulica3	1	4		
				2	4		
				3	4		
				4	4		
			ulica4	1	8		
				2	8		
				3	8		
				4	8		
				5	8		
Bjelovarsko-bilogorska		Gornja Garešnica					
Bjelovarsko-bilogorska		Kostanjevac					
Bjelovarsko-bilogorska		Krivaja					
Bjelovarsko-bilogorska		Novo Selo Garešničko					
Bjelovarsko-bilogorska		Oštri Zid					
Bjelovarsko-bilogorska		Podgarić					
Bjelovarsko-bilogorska		Potok					
Bjelovarsko-bilogorska		Ruškovac					
Bjelovarsko-bilogorska		Šimljana					

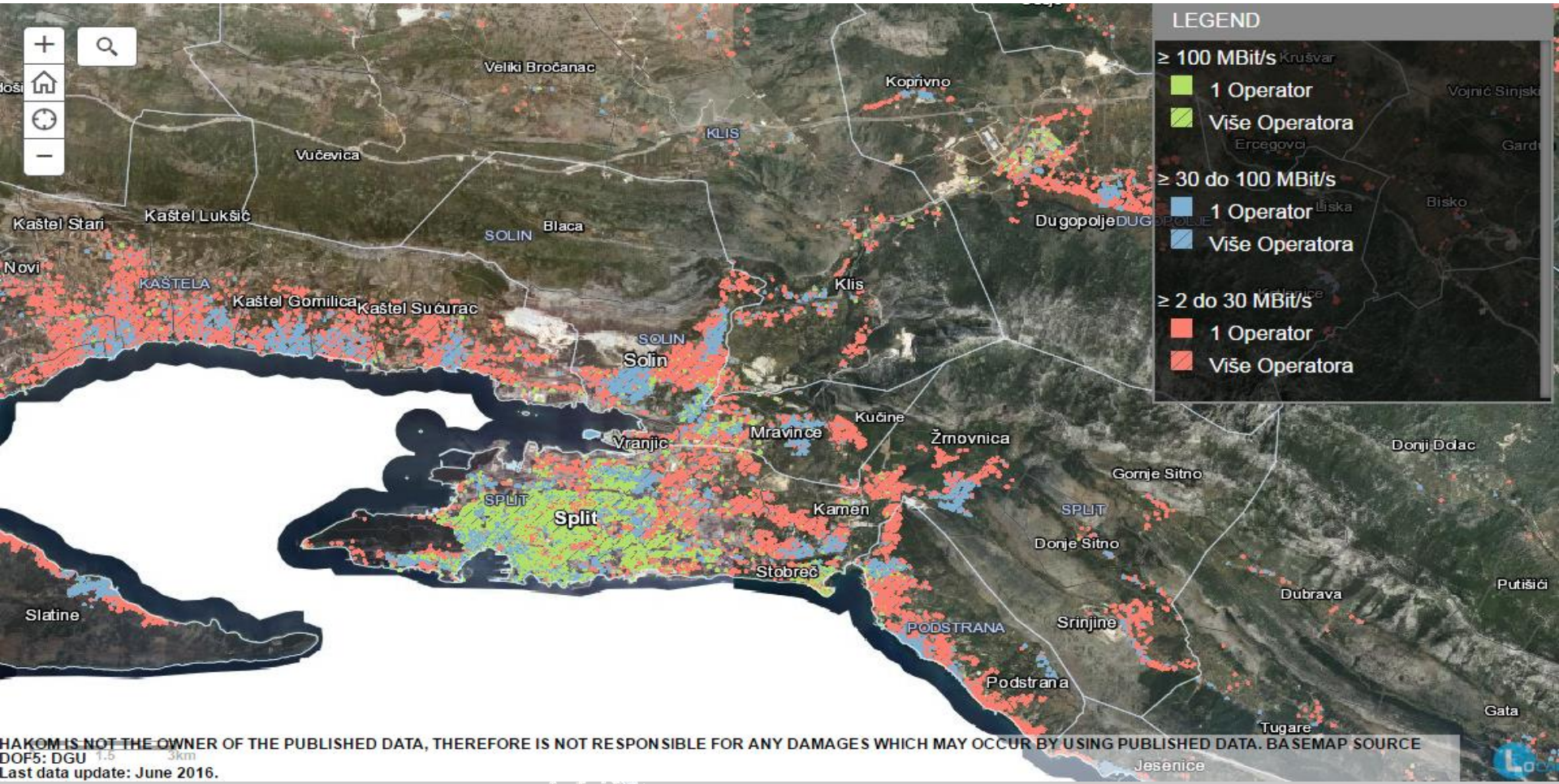
Sheet2 Sheet3

BROADBAND MAPPING IN CROATIA

- Finally, on the basis of adjacent points representing objects with identical data, polygons, representing broadband areas of corresponding available broadband speed category, are created.

BROADBAND MAPPING IN CROATIA

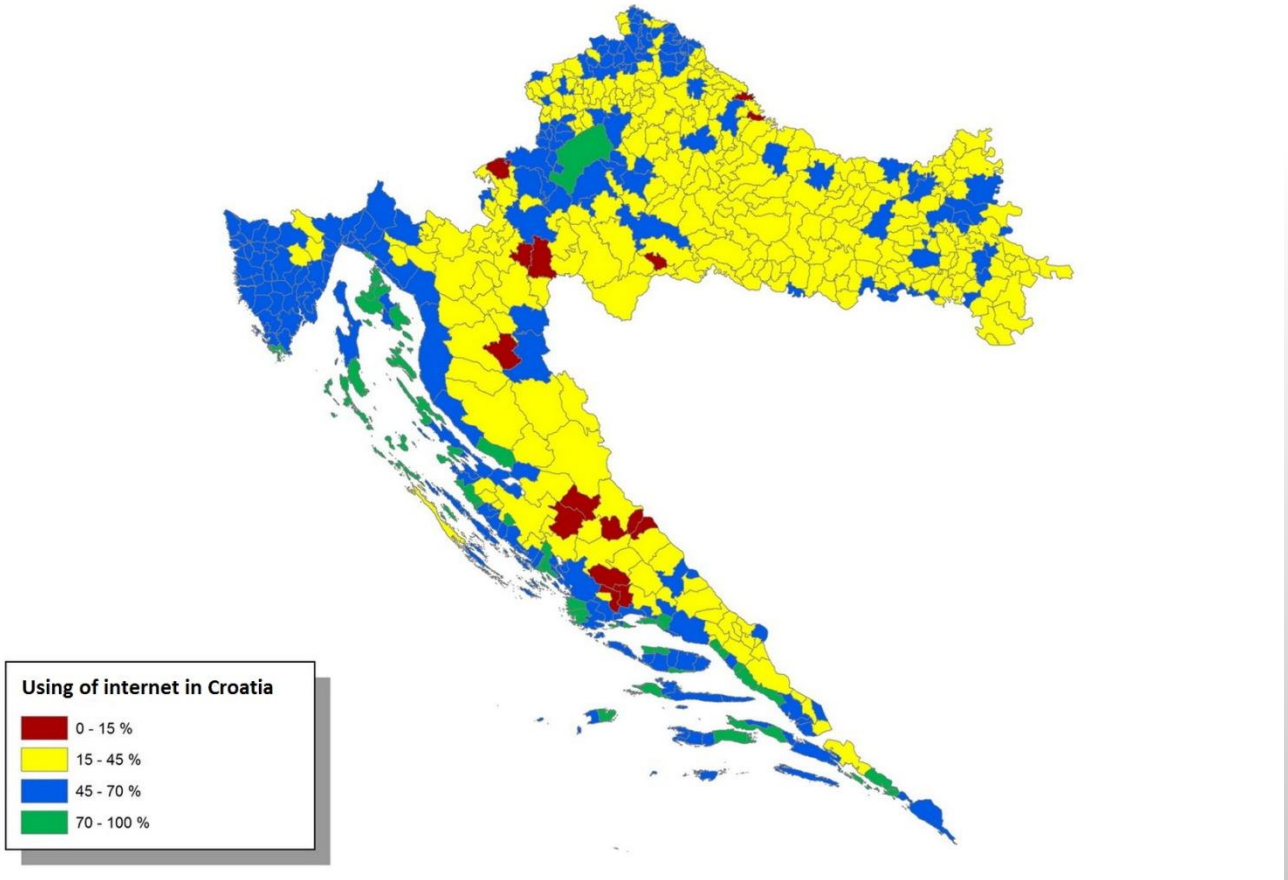
- Data are publicly available in form of an interactive map at HAKOM's web site*.

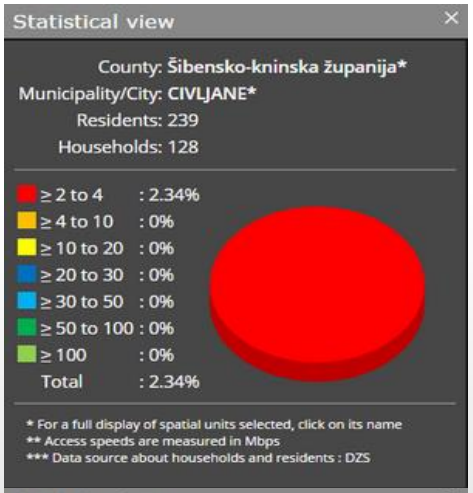


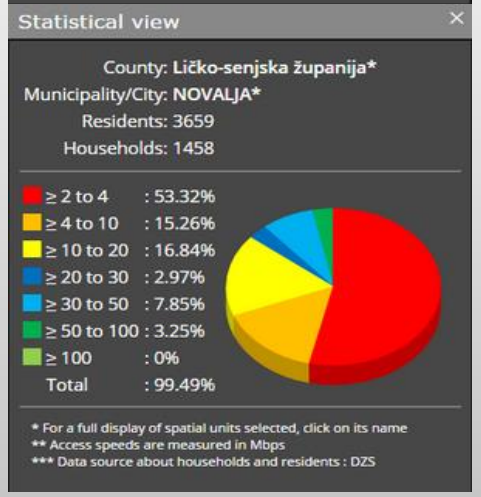
* http://bbzone.hakom.hr/

Digital divide

- The range of use of 2,34% (Municipality Civljane) to 99,49% (Municipality Novalja)







* Data source: http://bbzone.hakom.hr/hr-HR/StatistickiPrikaz

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ELECTRONICAL COMMUNICATION INFRASTRUCTURE IN CROATIA

- **Types of infrastructure and attributes:**
  - In accordance with the INSPIRE Directive and Generic Conceptual Model (GCM), developed by the European Commission through the Data Specifications, we propose that the i_VOD Cadastre contains the types of infrastructure as follows:

- **Utility infrastructure/themes:**
  - electric energy infrastructure (Phase I),
  - natural gas infrastructure (Phase I),
  - heating infrastructure (Phase I),
  - oil transport infrastructure (Phase I),
  - water distribution system(Phase I),
  - sewage system(Phase I),
  - telecommunication networks (Phase I),
  - waste management infrastructure (Phase II).
  - Traffic infrastructure: railways (phase I)

- **Types of geometry:**
  - points,
  - lines,
  - polygons.
- **Technical attributes:**
  - common attributes (equal for all types of infrastructure and for all types of layers) ,
  - additional attributes (specifics for different types of infrastructure and different types of object group).

Source: Contractor of the project - Geodetski zavod Celje, d.o.o.,SLOVENIA

ELECTRONICAL COMMUNICATION INFRASTRUCTURE IN CROATIA

- **Object catalog and additional technical attributes:**
  - based on INSPIRE code list register (utility infrastructure, http://inspire.ec.europa.eu/codelist/)

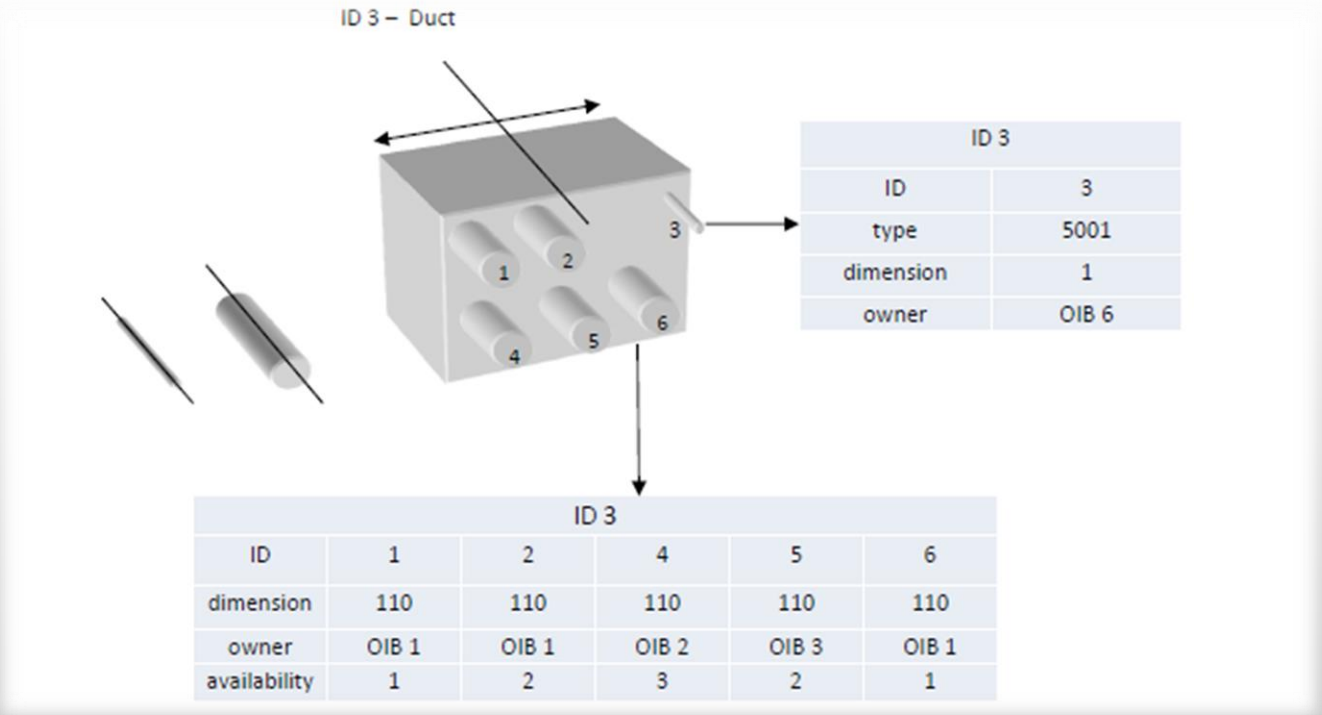
- **Object catalog and additional technical attributes:**
  - based on INSPIRE code list register (utility infrastructure, http://inspire.ec.europa.eu/codelist/)
- **Objects of the electronic communications:**
  - cable duct system,
  - electronic communication pipe,
  - electronic communication line (cable),
  - manhole,
  - pole,
  - exchange object (commutation),
  - colocation,
  - connection box (self-standing cabinet),
  - antenna tower,
  - the object of base stations,
  - radio station,
  - antenna,
  - public elec. comm. terminal device,
  - The area of elec. comm. object,
  - other objects

- **The main additional attributes are:**
  - pipe and cable type, pipe material, the type of (manhole, radio station and base station), construction year…
- **Individual properties (for example):**
  - Radio diffusion, mobile and microwave networks. Those are further sub listed in:
    - sub code list 1; (DVB-T, DVB-H, DAB/DMB, DRM, FM Radio (UKV)), middle wave (SV), shortwave (KV),
    - sub code list 2; (GSM, UMTS (WCDMA), LTE, PMR),
    - sub code list 3; (point to point and point to multipoint conn.).

Source: Contractor of the project - Geodetski zavod Celje, d.o.o.,SLOVENIA

ELECTRONICAL COMMUNICATION INFRASTRUCTURE IN CROATIA

- **Object catalog and additional technical attributes:**
  - Directive 2014/61/EC the data on the availability of individual pipe should be registered.
  - A duct can contain other multiple objects.
  - Three main levels could be defined: 1- occupied, 2- empty, 3- partly occupied.



ID 3	
ID	3
type	5001
dimension	1
owner	OIB 6

ID 3					
ID	1	2	4	5	6
dimension	110	110	110	110	110
owner	OIB 1	OIB 1	OIB 2	OIB 3	OIB 1
availability	1	2	3	2	1

Source: Contractor of the project - Geodetski zavod Celje, d.o.o.,SLOVENIA

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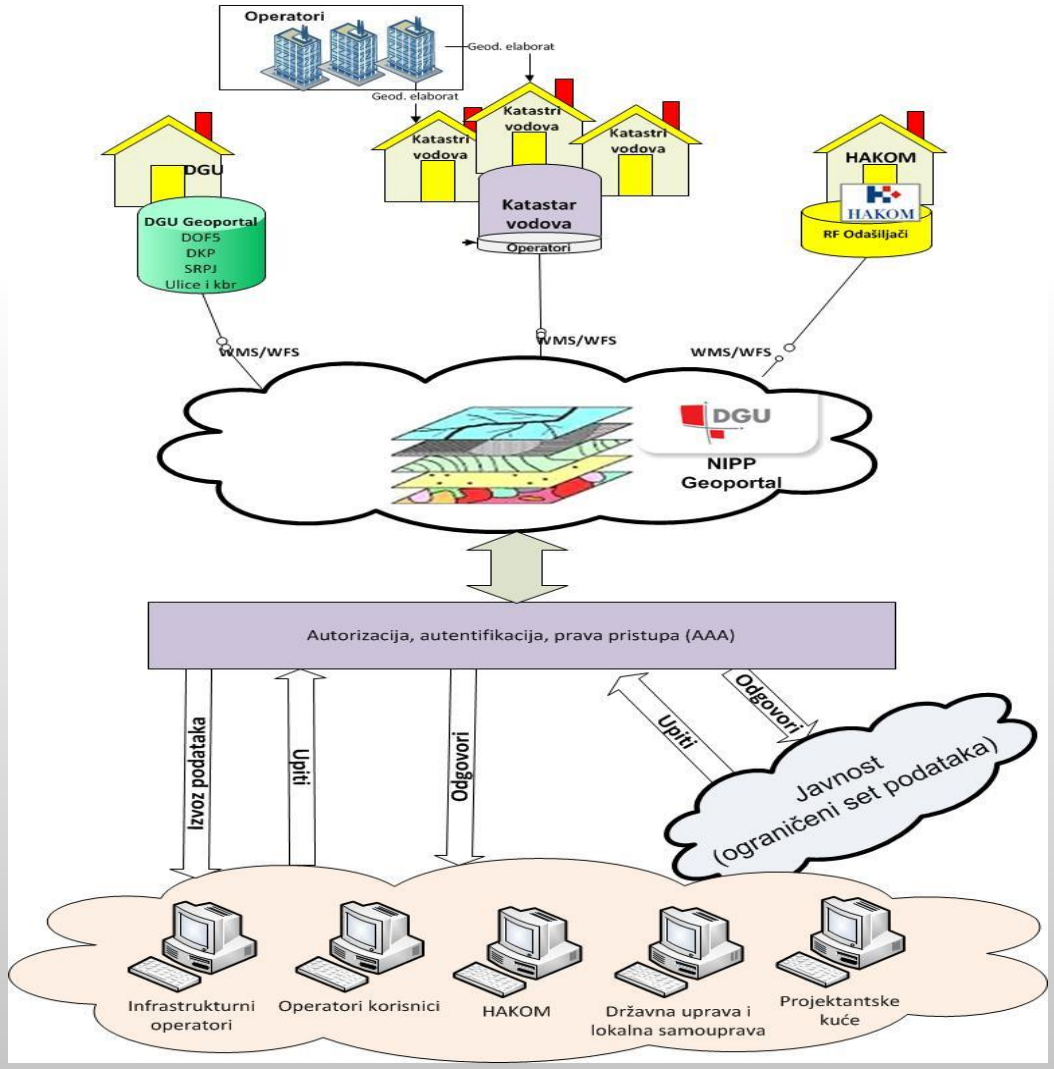
GIS FOR ECI



- State Geodetic Administration is responsible for the establishment of spatial database for electronic communication infrastructure,
- The database has to be harmonized with National Spatial Data Infrastructure (NSDI), and will be a part of European spatial data infrastructure defined by INSPIRE directive.

GIS FOR ECI

- National Spatial Data Infrastructure is defined as a set of technologies, measures, standards, implementation rules, services, human resources and other factors enabling efficient integration, management and maintenance of the sharing of spatial data,

- It will be an integral part of the European Spatial Data Infrastructure defined by the INSPIRE Directive.

- The Croatian NSDI has to be harmonized with the development of spatial data infrastructures on the European (INSPIRE) and global (GSDI, UN-GGIM) levels, but beside the development at national levels, it has to influence the development of spatial data infrastructures at a local level.

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CONCLUSION

- Broadband density increase has direct positive impact on economy growth Government, counties and communities, as well as national regulatory, authority, have to enable preconditions for a faster growth of broadband access density.
- Establishing national GIS database in SGA (State Geodetic Administration), visualized on an interactive map which will provide an insight into electronic communications infrastructure such as cable, ducts routes, pipes, manholes, locations of antennae masts will be more, challenging.
- Development of spatial data base is one of preconditions in order to fullfil the targets and goals set by Digital Agenda 2020, Single Telecommunication market in EU and „ConnectedContinent”
- GIS projects for electronic communications market in Republic of Croatia are one of the preconditions for investments worth millions €.

Danko Čurepić, Ph.D.
Senior expert for infrastructure

HAKOM

CROATIAN REGULATORY AUTHORITY
FOR NETWORK INDUSTRIES

ROBERTA FRANGEŠA MIHANOVIĆA 9
HR-10110 Zagreb, CROATIA
Tel: +385 (0)1/7007 007
Fax: +385 (0)1/7007 070
www.hakom.hr