



Pilot project Establishment of Croatian Railways GIS

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Croatian Railways



- ▶ Croatian Railways Infrastructure Ltd. for management, maintenance and building of railway infrastructure
- ▶ Fully or predominantly owned by the Republic of Croatia



NSDI subject



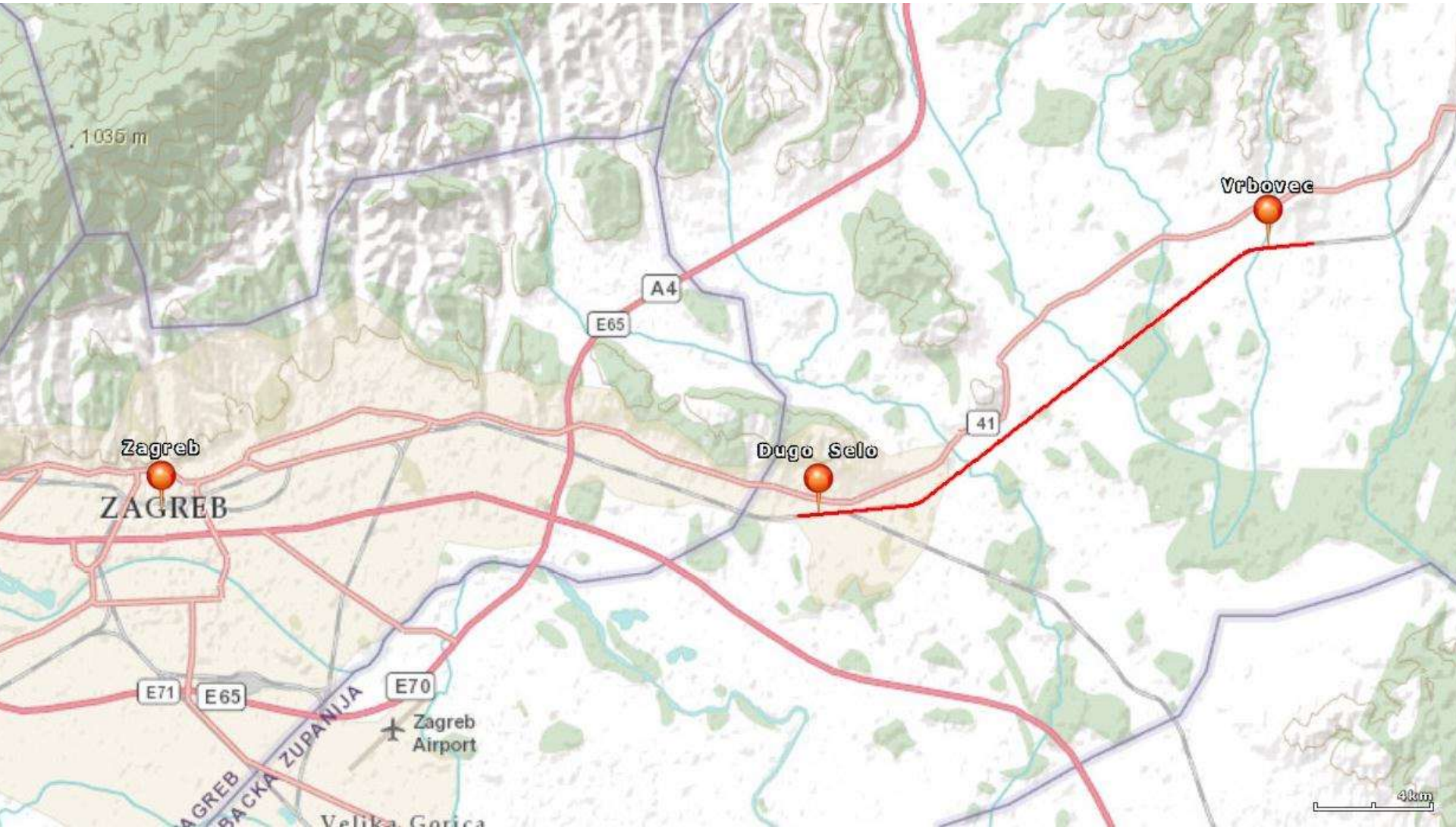
Croatian Law on State Survey and Real Estate Cadastre

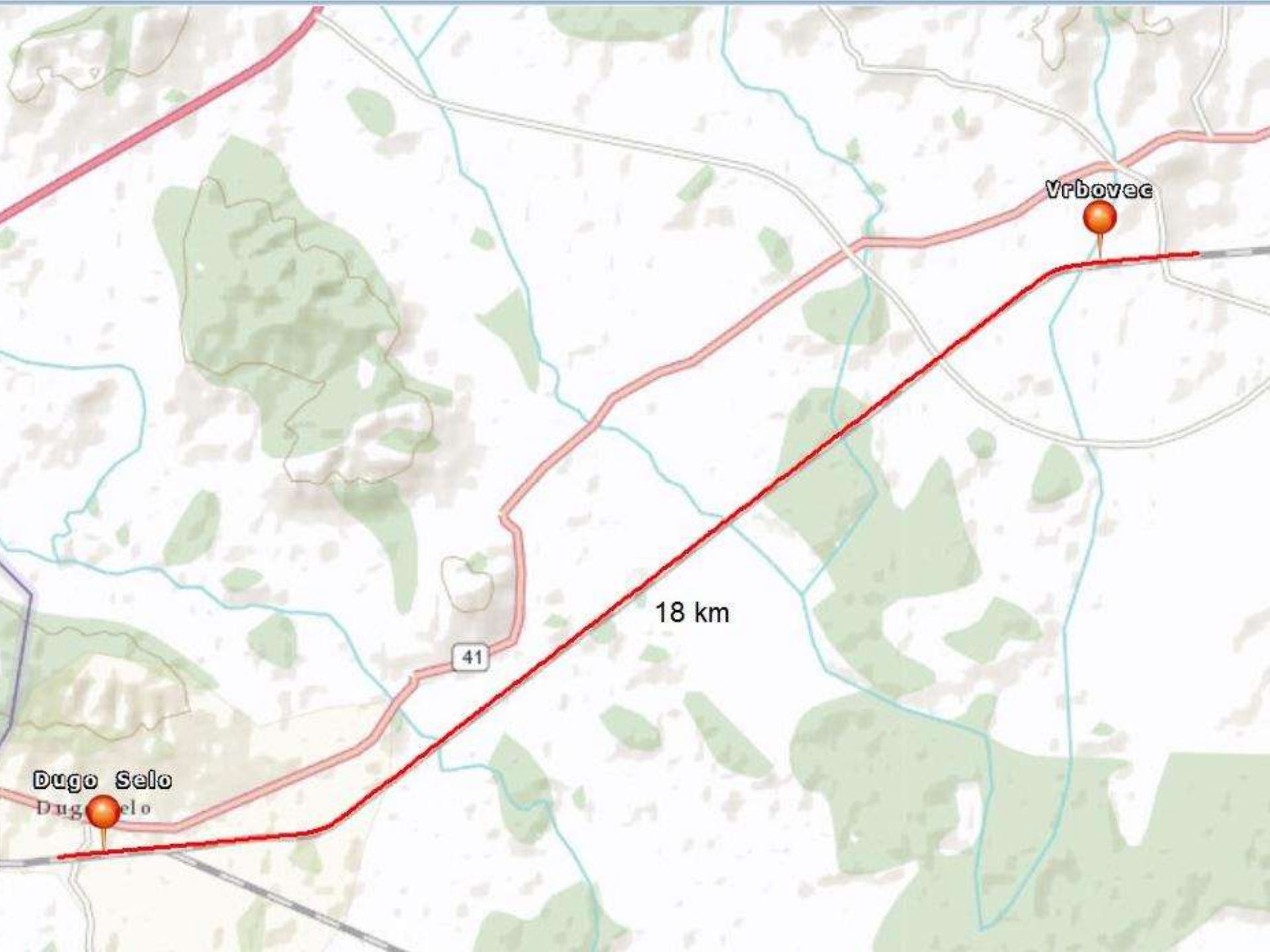
TOR



- ▶ Test availability of spatial data within Croatian Railway archives
- ▶ Analyze current condition and quality of available spatial data
- ▶ Prototyping geodatabase model
- ▶ Pilot railway section Dugo Selo - Vrbovec

Location





Vrbovec

18 km

41

Dugo Selo

Dugo Selo

Gathering data

The screenshot shows the AutoCAD interface with a technical drawing of a railway track on the left and a data table on the right. The table is titled "EVIDENCIJA TEHNIČKI KARAKTERISTIKA STANJA ELEMENATA GORNJEG USTROJA" and "GS 4". It contains columns for track type, length, and various technical specifications.

H2 - INFRASTRUKTURA GRAĐEVINSKI POSLOVI ODRŽAVANJA		EVIDENCIJA TEHNIČKI KARAKTERISTIKA STANJA ELEMENATA GORNJEG USTROJA																		GS 4
3 GODINA 2011		1 SEKCija ZA ODRŽAVANJE PRUGA - KOPRIVNICA																		4
4 PRUGA M201 Dg - Bobovo - Dugo Selo		2 NAJZORNiŠTVO - Dugo Selo, Vrbovec																		5
6 KOLOSLJEK		3 IZRADIO																		6
7 STANCIJE I OBJEKTI		DUGO SELO - B.KOL.																		7
8 SITUACIJA		ST. BOJAKOVINA																		8
9 TLOCRTNI ELEMENTI		DUGO SELO - B.KOL.																		9
10 OZNAKA KILOMETRA		DUGO SELO - B.KOL.																		10
11 OZNAKA MJERNOG POLJA		DUGO SELO - B.KOL.																		11
12 TIP		DUGO SELO - B.KOL.																		12
13 OZNAKA GRANICA		DUGO SELO - B.KOL.																		13
14 ČVRSTOĆA (KVALITETA) GRANICA		DUGO SELO - B.KOL.																		14
15 OZNAKA DULJINA [m]		DUGO SELO - B.KOL.																		15
16 OZNAKA DULJINA [m]		DUGO SELO - B.KOL.																		16
17 OZNAKA DULJINA [m]		DUGO SELO - B.KOL.																		17
18 GODINA PROIZVOĐNJE		DUGO SELO - B.KOL.																		18
19 OZNAKA		DUGO SELO - B.KOL.																		19
20 GODINA UGRADNJE		DUGO SELO - B.KOL.																		20
21 OZNAKA		DUGO SELO - B.KOL.																		21

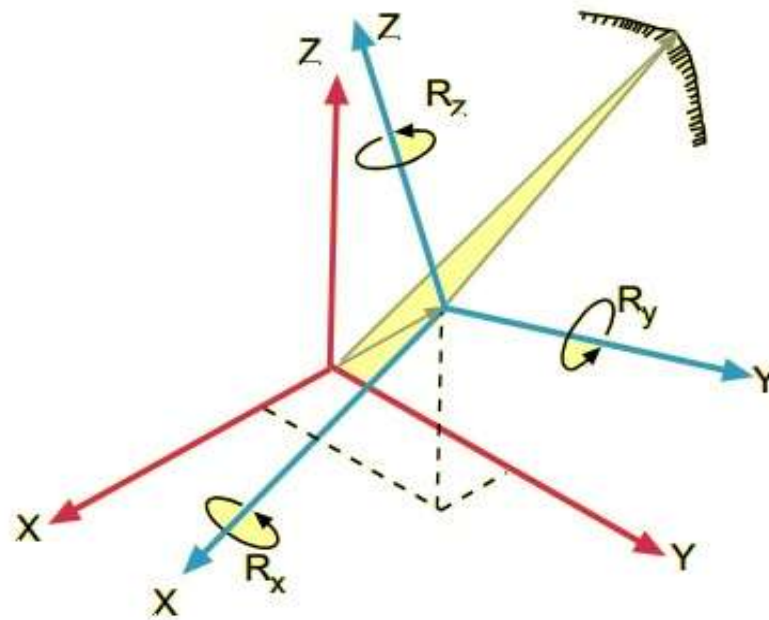
The technical drawing shows a cross-section of a railway track with various components labeled. Below the drawing is a table of contents (KAZALO) listing the drawing's sections and their corresponding page numbers.

KAZALO	
1. OBLASTI	1
2. OBLASTI	2
3. OBLASTI	3
4. OBLASTI	4
5. OBLASTI	5
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99. OBLASTI	99
100. OBLASTI	100

Coordinate system



- ▶ HDKS → HTRS96/TM
- ▶ 7-parameter Helmert method



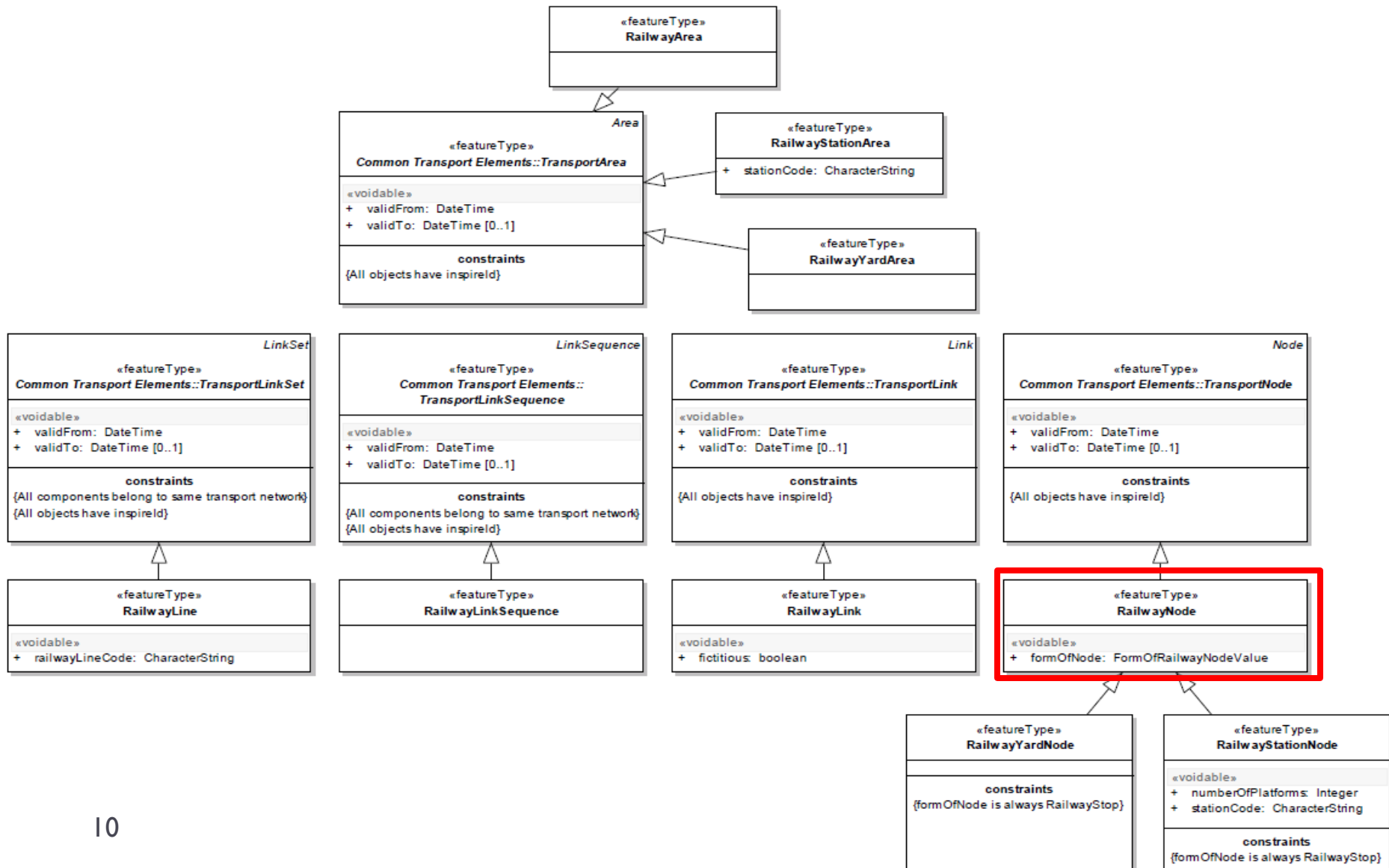
Conceptual database model



- ▶ Data for publishing with NSDI
- ▶ Data for internal use for all work processes of Croatian Railways
- ▶ Filtering data
- ▶ Coordination with experts from Croatian Railways

INSPIRE Data Specification on Transport Networks

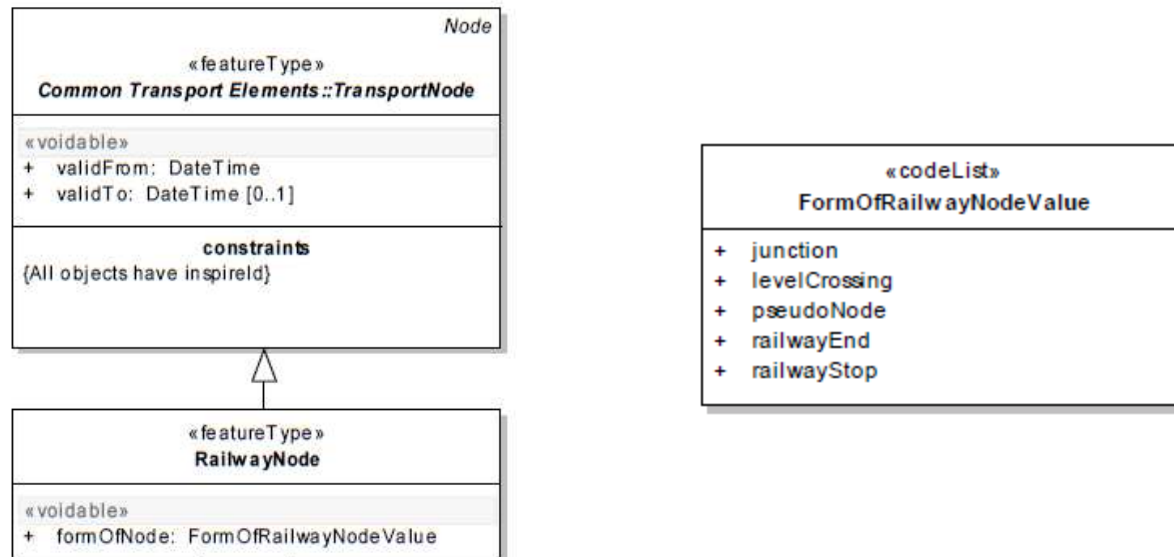
class Railway Transport Network: Spatial objects types - Links, Nodes and Areas



Example: RailwayNode



- ▶ Subtype of: TransportNode
- ▶ Definition: A point spatial object which represents a significant point along the railway network or defines an intersection of railway tracks used to describe its connectivity.



Example: RailwayNode



Simple feature class RailwayNode				Geometry	Point		
				Contains M values	No		
				Contains Z values	No		
Field name	Data type	Default value	Domain	Prec- ision	Scale	Length	
OBJECTID	Object ID						
Shape	Geometry						
ID	Long integer	0		0			
FormOfNode	Long integer		formOfRailwayNodes	0			
stacionaza	Double			0	0		
namespace	String					50	
InspireID	String					50	

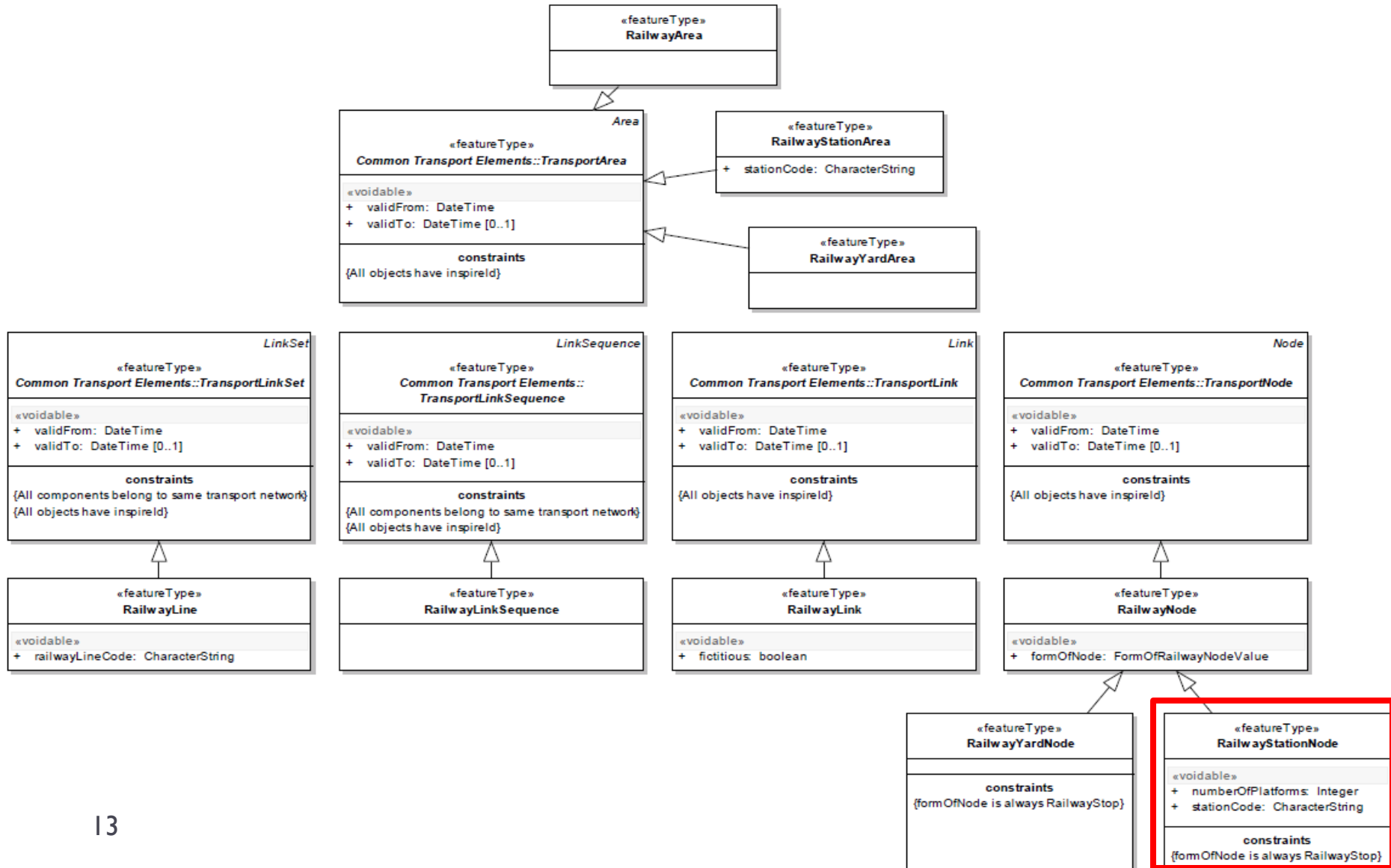
Coded value domain
formOfRailwayNodes

Description tipovi čvorova
Field type Long integer
Split policy Default value
Merge policy Default value

Code	Description
1	junction
2	levelCrossing
3	pseudoNode
4	railwayEnd
5	railwayStop

INSPIRE Data Specification on Transport Networks

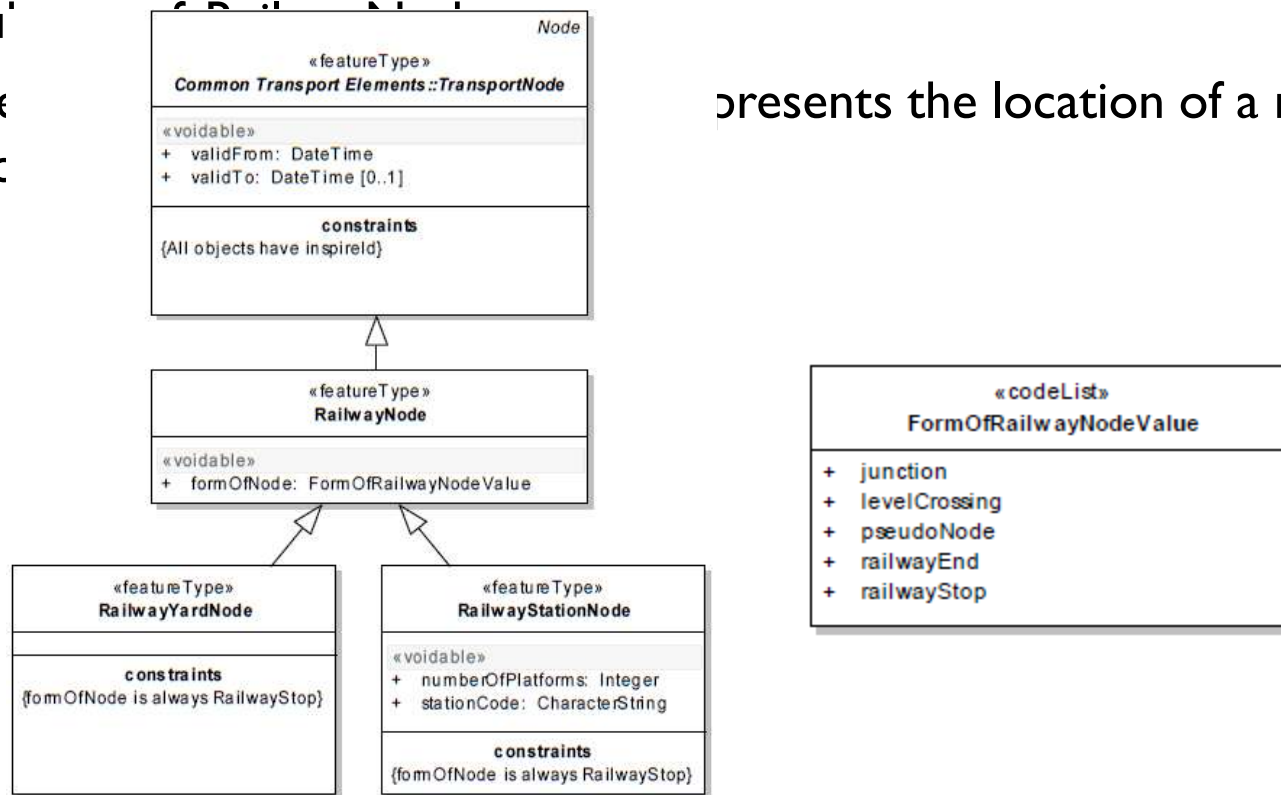
class Railway Transport Network: Spatial objects types - Links, Nodes and Areas



Example: RailwayStationNode



- ▶ Su
- ▶ De
- al



presents the location of a railway station

Example: RailwayStationNode



Simple feature class
RailwayStationNode

Geometry Point
Contains M values No
Contains Z values No

Field name	Data type	Default value	Domain	Prec-ision	Scale	Length
OBJECTID	Object ID					
Shape	Geometry					
FormOfNode	Long integer	5	formOfRailwayNodes	0		
railwayStationCode	Long integer			0		
stacionaza	Double			0	0	
ID	Long integer			0		
namespace	String					50
InspireID	String					50
numberOfPlatforms	Long integer			0		



Coded value domain
formOfRailwayNodes

Description tipovi čvorova
Field type Long integer
Split policy Default value
Merge policy Default value

Code	Description
1	junction
2	levelCrossing
3	pseudoNode
4	railwayEnd
5	railwayStop

Table
Sluzbena_mjesta

Field name	Data type	Default value	Domain	Prec-ision	Scale	Length
OBJECTID	Object ID					
ID	Long integer			0		
Naziv	String					50

Line geometry features



Table
RailwayLine

Field name	Data type	Default value	Domain	Precision	Scale	Length
OBJECTID	Object ID					
ID	Long integer			0		
nazivPruge	String					50
stareOznake	String					50
oznakaCl3	String					50
oznakaCl6	String					50
gradDuljina	Double			0	0	
nominalGauge	Double			0	0	
nominalGaugeCategory	Long integer		nominalGaugeCategory	0		
railwayType	Long integer		railwayType	0		
railwayUse	Long integer		railwayUse	0		
stacionazaPocetak	Double			0	0	
stacionazaKraj	Double			0	0	
namespace	String					50
InspireID	String					50

Simple feature class
RailwayLink

Geometry: Polyline
Contains M values: No
Contains Z values: No

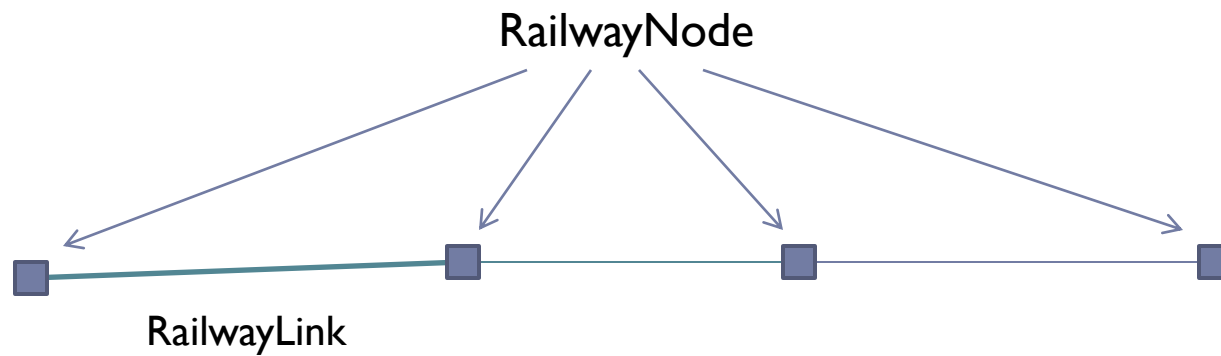
Field name	Data type	Default value	Domain	Precision	Scale	Length
OBJECTID	Object ID					
Shape	Geometry					
Shape_Length	Double			0	0	
ID	Long integer			0		
vrstaElementa	Long integer		vrstaElementa	0		
numberOffTracks	Long integer			0		
sljedPoveznica	Long integer			0		
stacionazaPocetak	Double			0	0	
stacionazaKraj	Double			0	0	
vrstaPragova	Long integer		vrstaPraga	0		
tipTracnica	Long integer		tipTracnica	0		
vrstaZastora	Long integer		vrstaZastora	0		
namespace	String					50
InspireID	String					50
visinaKraj	Double			0	0	
visinaPocetak	Double			0	0	



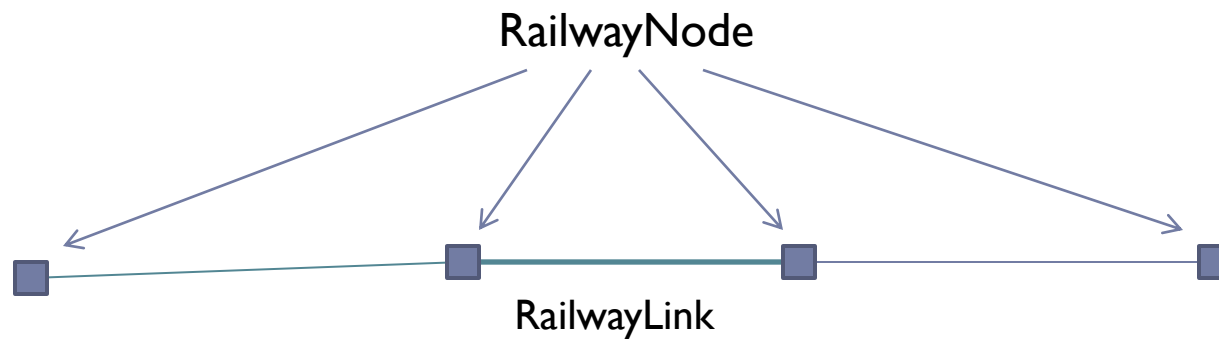
Table
RailwayLinkSequence

Field name	Data type	Default value	Domain	Precision	Scale	Length
OBJECTID	Object ID					
ID	Long integer			0		
nazivDionice	String					50
designSpeed	Double			0	0	
pruga	Long integer			0		
stacionazaPocetak	Double			0	0	
stacionazaKraj	Double			0	0	
zavareniKolosijek	Long integer		Boolean	0		
electrified	Long integer		Boolean	0		
namespace	String					50
InspireID	String					50

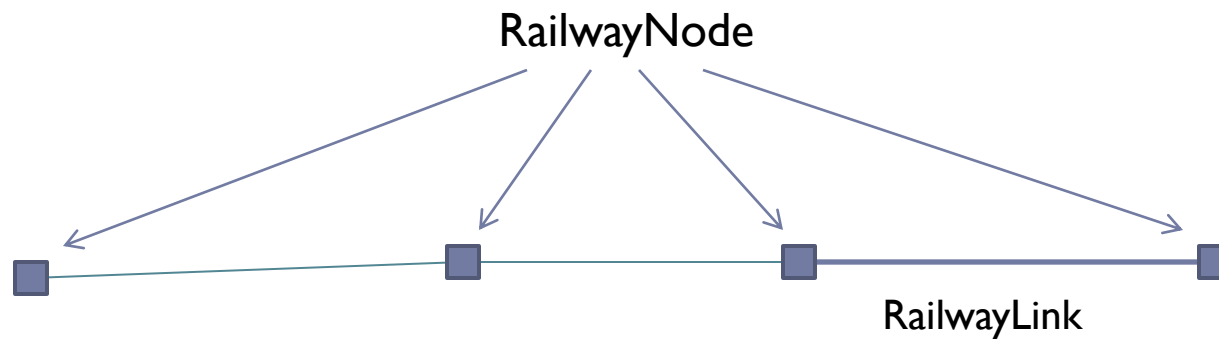
Visualization



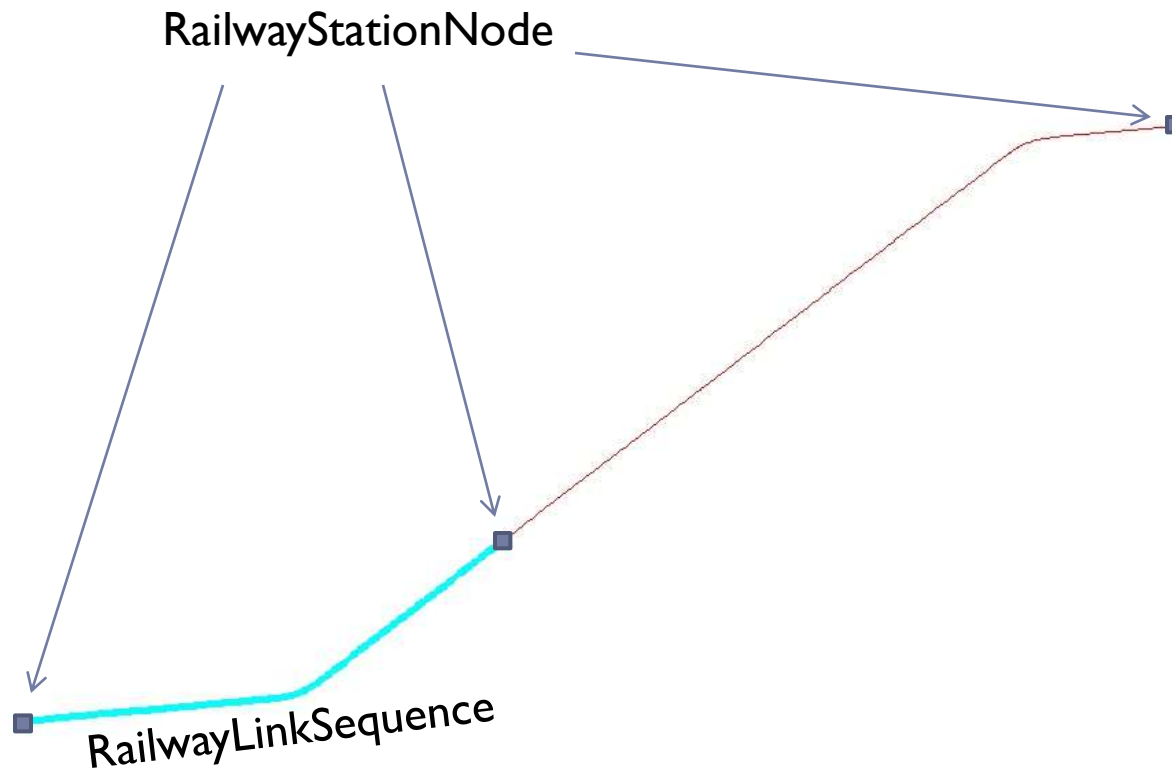
Visualization



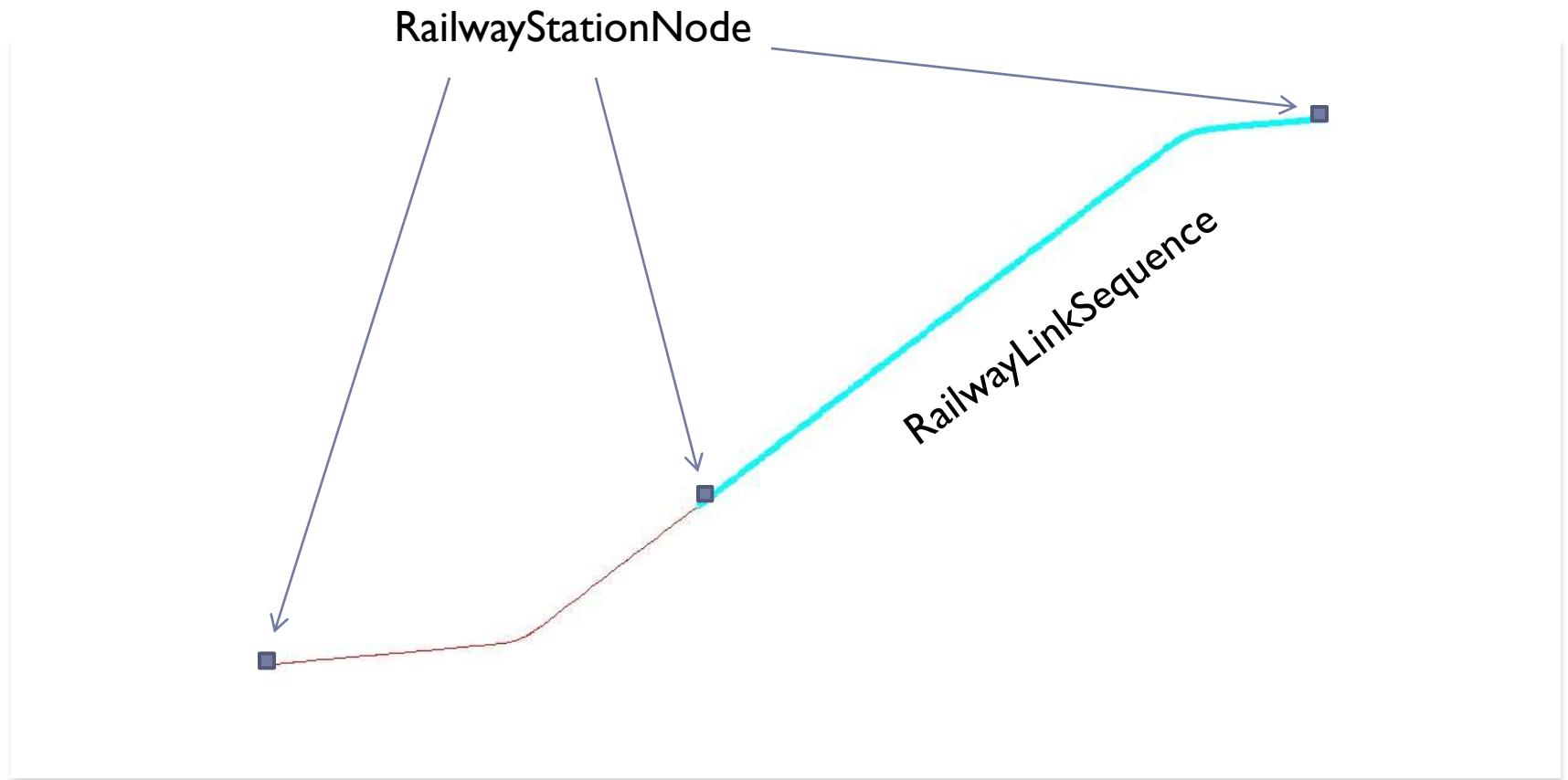
Visualization



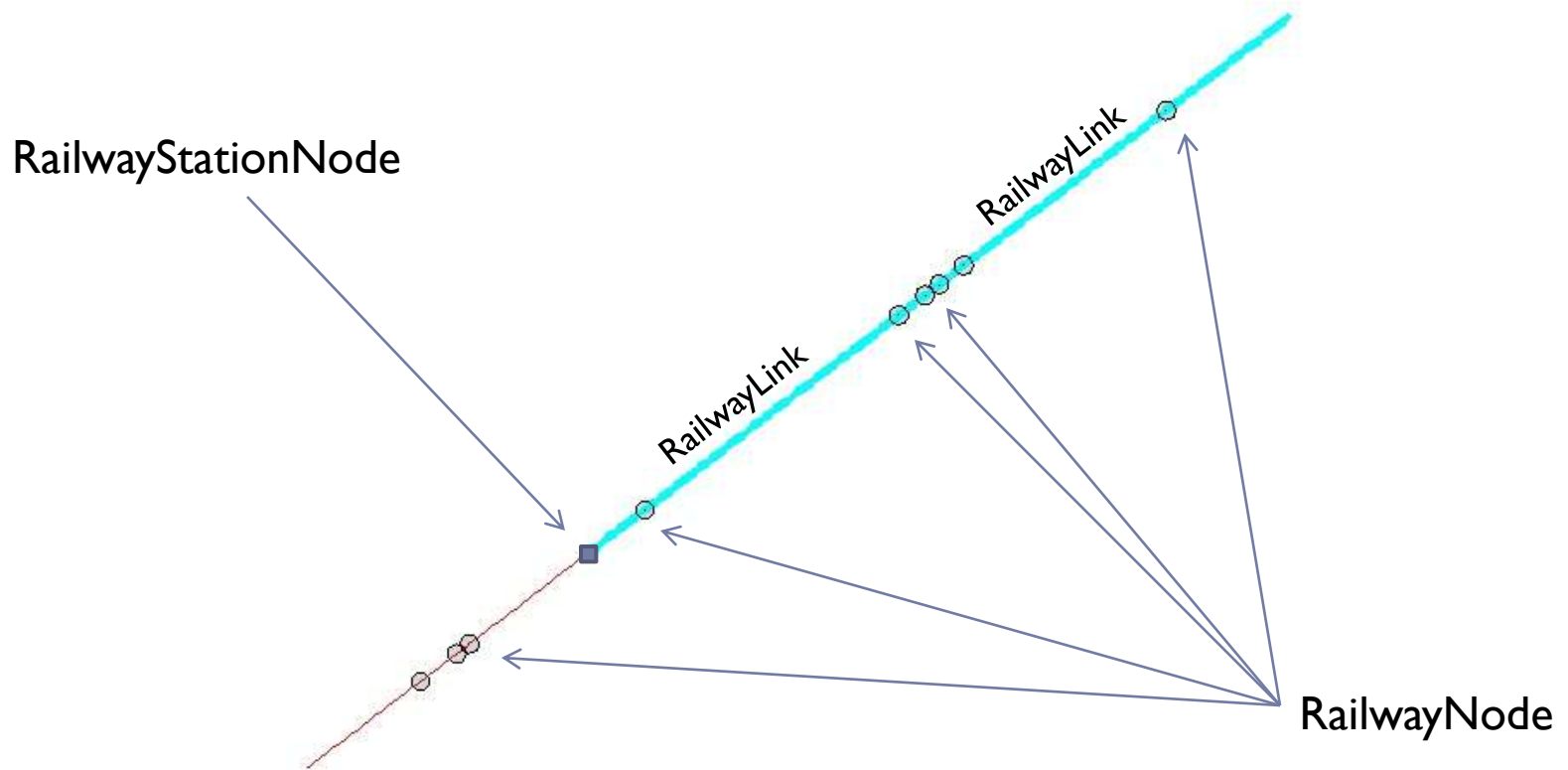
Visualization



Visualization



Visualization



Unique identifier management

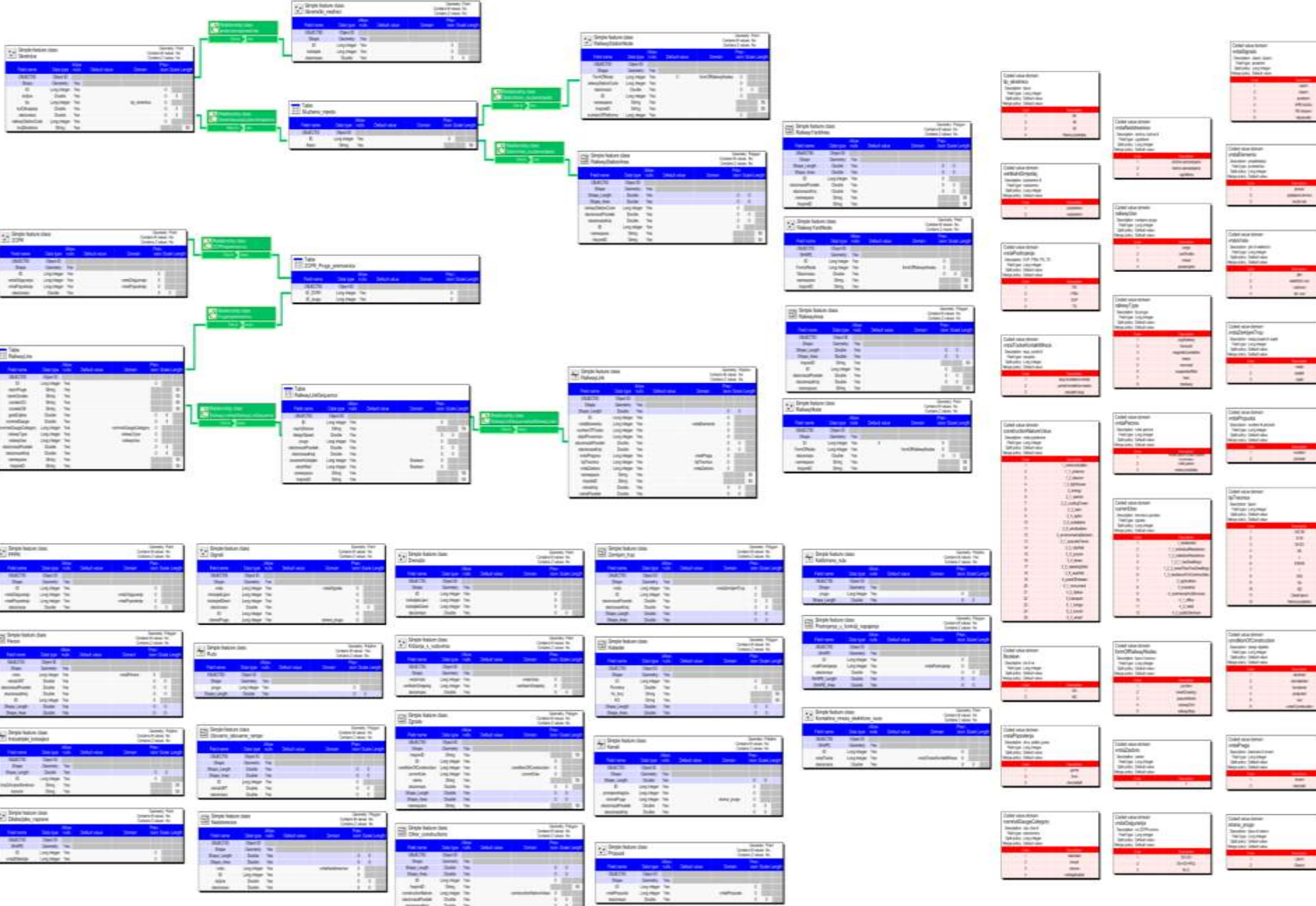


► InspireID

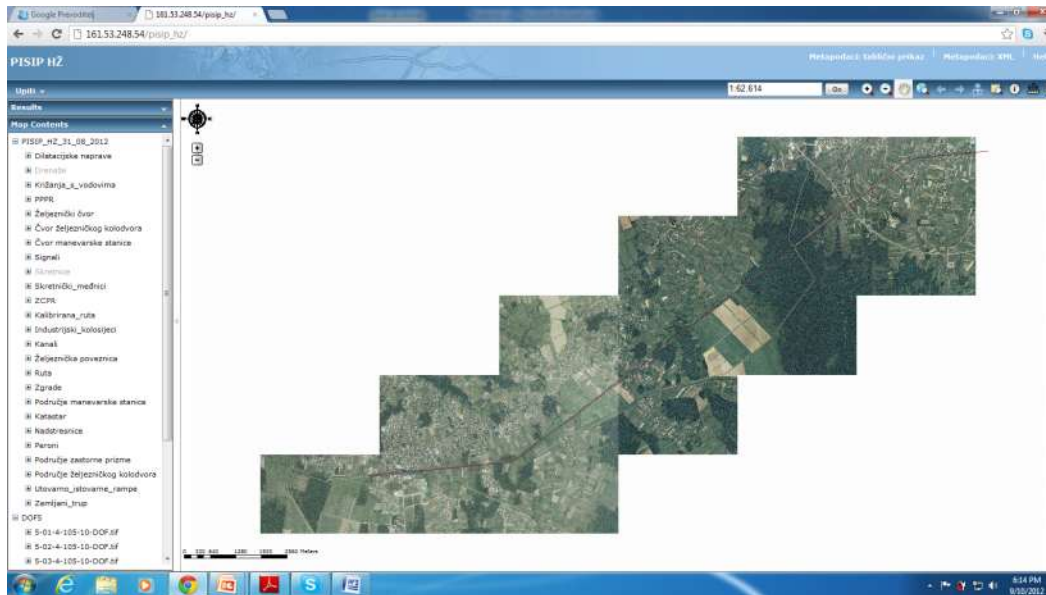
INSPIRE Feature Class	Namespace	Number of class within theme	Global InspireID
RailwayLink	HR.HZ.TN	01	HR.HZ.TN_01-local_database_ID
RailwayLinkSequence	HR.HZ.TN	02	HR.HZ.TN_02-local_database_ID
RailwayLine	HR.HZ.TN	03	HR.HZ.TN_03-local_database_ID
RailwayNode	HR.HZ.TN	04	HR.HZ.TN_04-local_database_ID
RailwayStationNode	HR.HZ.TN	05	HR.HZ.TN_05-local_database_ID
RailwayYardNode	HR.HZ.TN	06	HR.HZ.TN_06-local_database_ID
RailwayArea	HR.HZ.TN	07	HR.HZ.TN_07-local_database_ID
RailwayStationArea	HR.HZ.TN	08	HR.HZ.TN_08-local_database_ID
RailwayYardArea	HR.HZ.TN	09	HR.HZ.TN_09-local_database_ID

RailwayLink:

HR.HZ.TN_01-01



WEB APPLICATION



-metadata

- table and xml
- INSPIRE conformant

http://161.53.248.54/pisip_hz/

Results



- ▶ Inventarisation and analysis of available spatial data
- ▶ Spatial database prototype for Croatian Railways Infrastructure GIS
- ▶ Guidelines for implementing Croatian Railway GIS on entire railway network
- ▶ Guidelines for inclusion of spatial data to NSDI in conformity with the INSPIRE implementing rules
- ▶ Support for future application to European funds and tendering in order to establish a complete GIS

Q&A



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