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Fax: 01/ 3640 817



TKO SMO

• Djelatnosti

- Projektiranje IT sustava
- Integracija IT opreme i sustava
- Projektiranje GIS orijentiranih IT rješenja
- Razvoj programskih GIS sustava
- Konzultacije i obuka korisnika



ORACLE



MULTISOFT I GIS

- Sustav za dokumentiranje i projektiranje (DDS)**

- u UPRAVI**

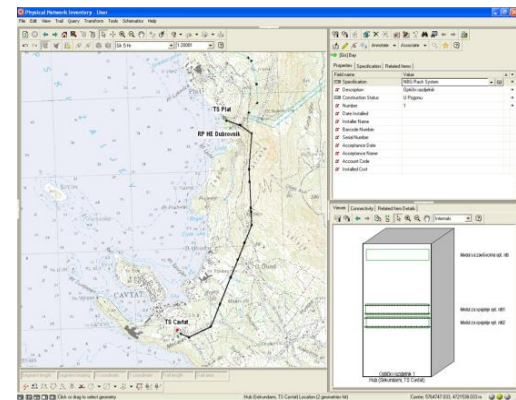
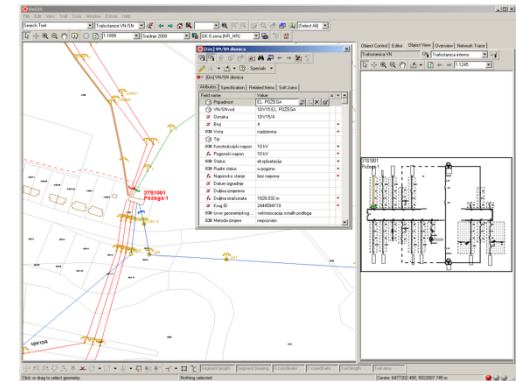
Sustav za osnivanje, vođenje i arhiviranje podataka katastra komunalnih vodova i obuhvaća instalaciju, implementaciju, obuku korisnika i održavanje programskog sustava

- u ELEKTROENERGETICI**

Sustav za dokumentiranje, projektiranje, planiranje i nadzor elektroenergetskog sustava i obuhvaća instalaciju, implementaciju, obuku korisnika, održavanje programskog sustava

- u TELEKOMUNIKACIJAMA**

Sustav za dokumentiranje, projektiranje i planiranje telekomunikacijskog sustava i obuhvaća instalaciju, implementaciju, obuku korisnika, održavanje programskog sustava



GEOINFORMACIJSKI SUSTAVI

- **NA FER-u**

- ZAVOD ZA VISOKI NAPON (GIS)
- ZAVOD ZA PRIMJENJENO RAČUNARSTVO (BP)

- **PRIMJENA**

- INFRASTRUKTURA U PROSTORU
- SMALLWORLD → Tehnička infrastruktura
ENERGETIKA (STRUJA, PLIN, VODA)
TELEKOMUNIKACIJE (BAKAR, OPTIKA)

PREZENTACIJE

- **MILOŠ MUŽINIĆ**

- Smallworld Core Spatial Technology Physical Network Inventory

- **MARTIN MARTIĆ**

- FME u GIS okruženju

Smallworld Core Spatial Technology Physical Network Inventory

milos.muzinic@multisoft.hr

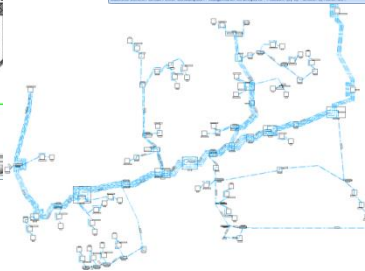
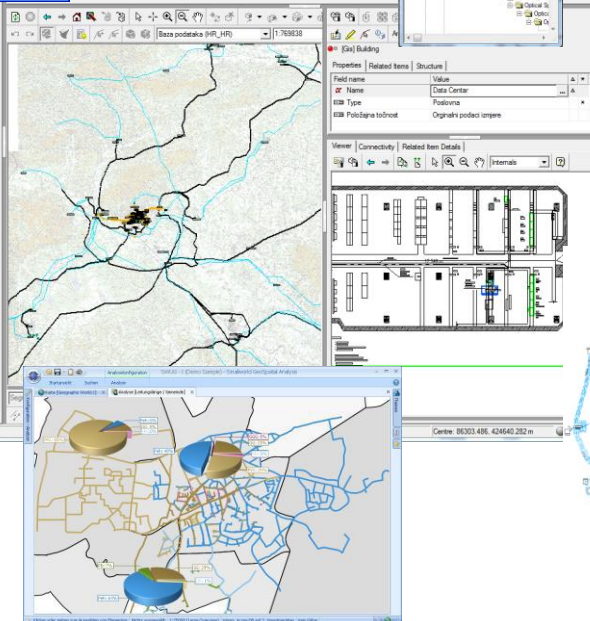
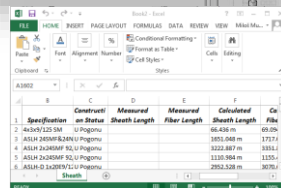
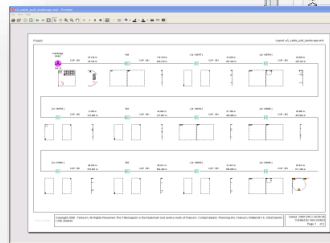
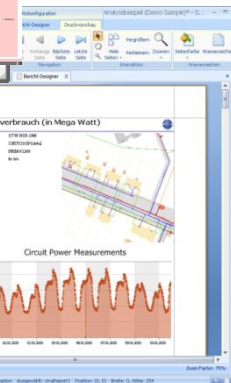
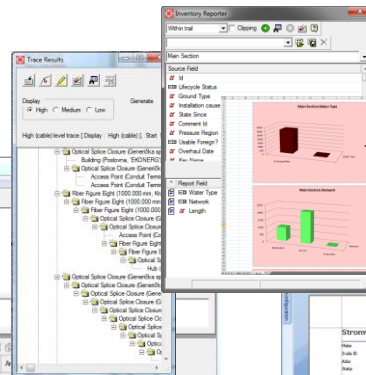
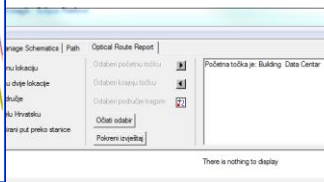
Pristup u GIS-u

Kartografski pristup

- orijentiran prvenstveno prema podacima
- vezanost uz kartografsku podjelu
- postojanje zasebnih fondova podataka
- odvojenost geografskog i topološkog fonda podataka
- primjenjivost :
 - statičko prikazivanja sustava
 - dokumentacijske svrhe
 - tematski kartografski prikaze
 - WEB prezentacije

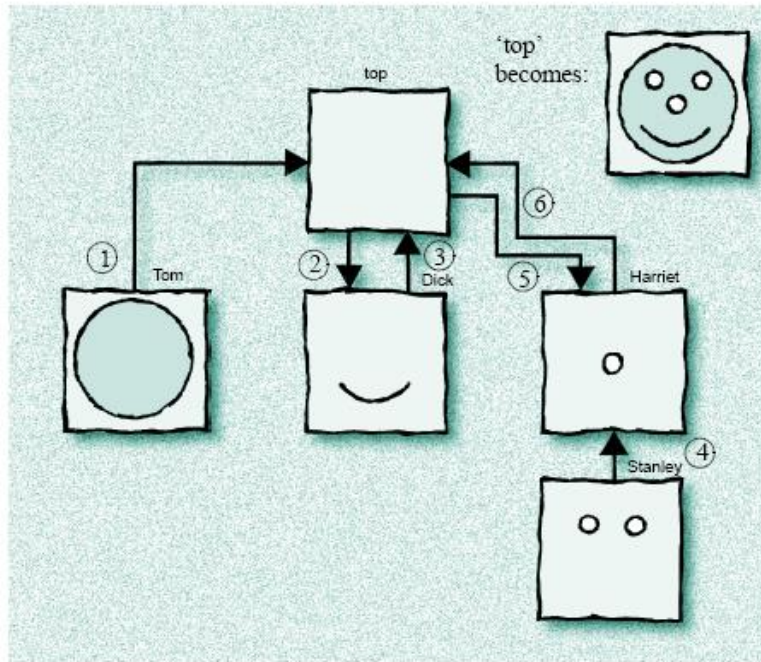
Funkcionalni pristup

- orijentiran prvenstveno prema poslovnim procesima
- jedinstveni fond podataka s obzirom na prostor ali i funkcionalnost
- objedinjeni geografski i topološki podaci
- povezivanje s drugim sustavima
- primjenjivost - plus
 - u dinamičkom prikazivanju stanja
 - upravljanju i operativnom vođenju
 - održavanju
 - WEB podrška poslovnih procesa



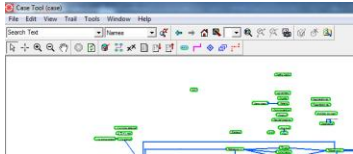
KAKO?

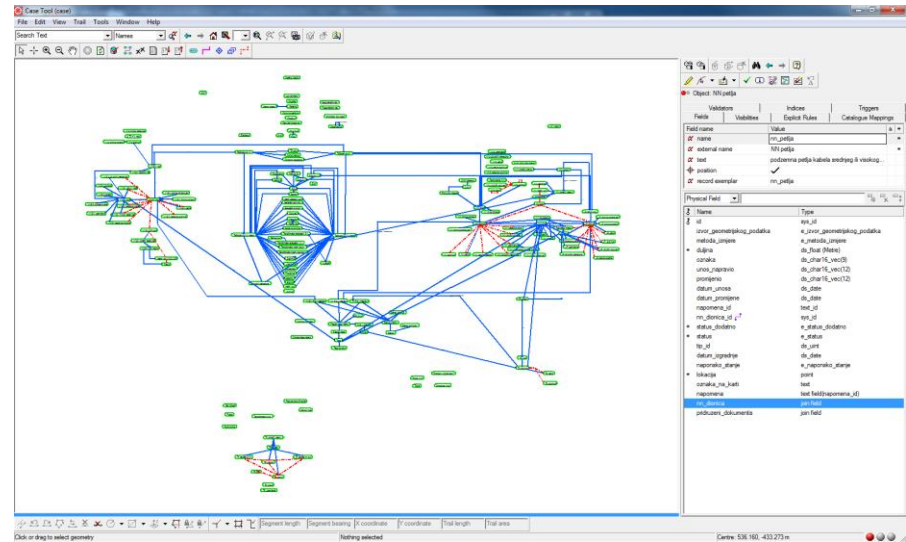
- Baza podataka VMDS
Objektno orijentirana



- Alternative:
 - . jedinstvena baza podataka
 - . inicijalno prazna
 - . spremaju se samo promjene
 - . novi objekti
 - . promjene
 - . brisani objekti
- Razrješavanje konflikata
- Rješenje problema dugih transakcija
- Više korisnika na istom prostoru
- Različita stanja objekta u bazi podataka

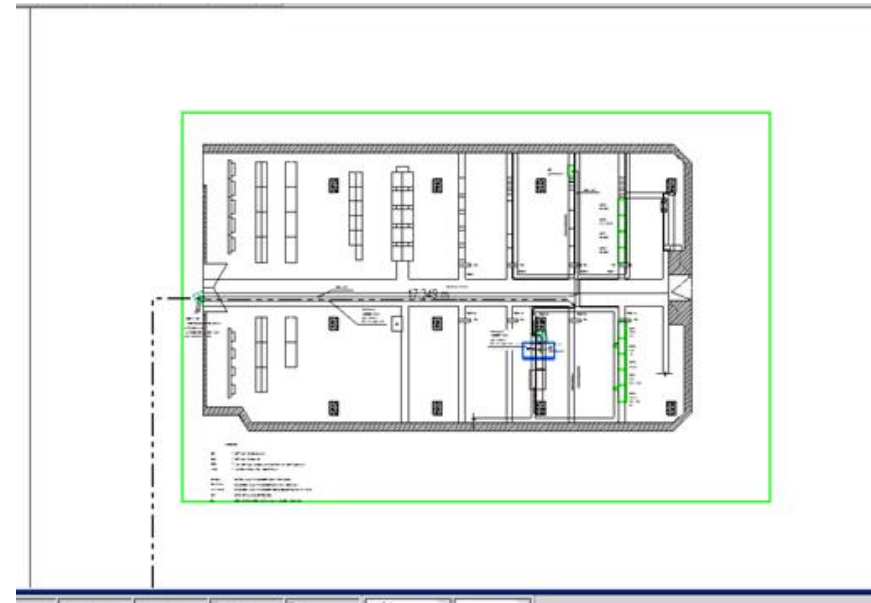
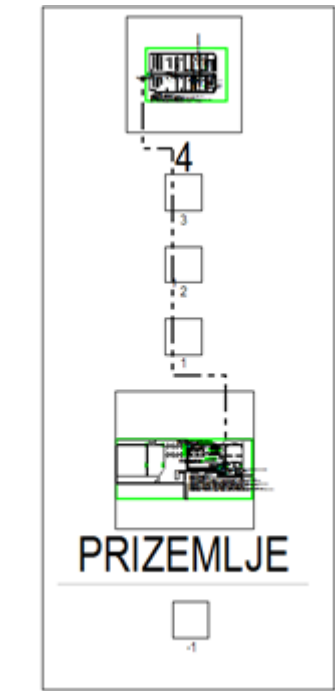
KAKO?

- Magik – Objektno orijentirani jezik; Java
 - izgradnja plugin-ova i funkcionalnosti
 - XML Konfiguracija – izgradnja sučelja aplikacije
 - Case – modeliranje baze podataka
 - Otvorenost sustava
 - Kompatibilnost sa Industrijskim standardima
- 

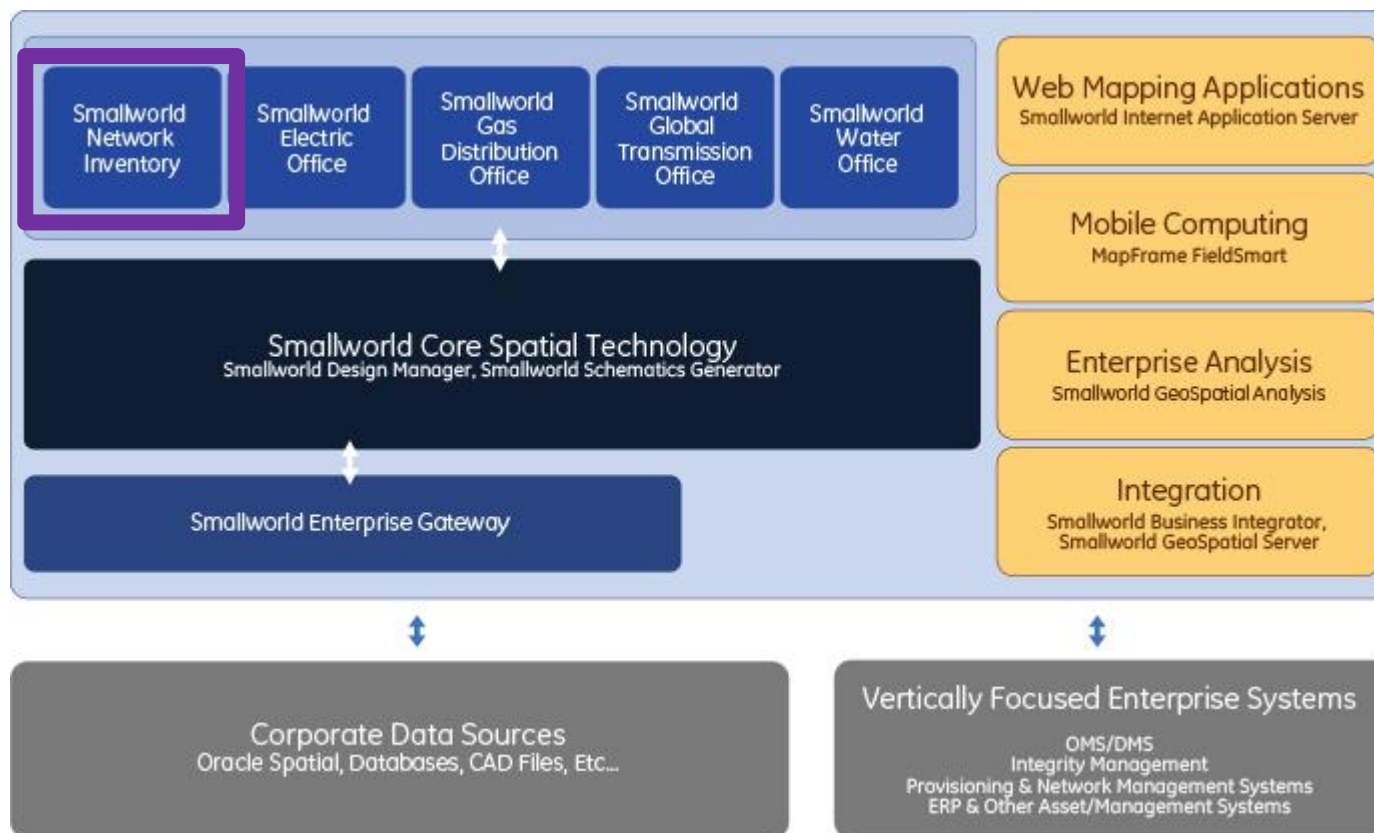


KAKO?

- Prijenos realnog svijeta u model informacijskog sustava
 - Koncept višestrukih svjetova
 - Objekti sa više geometrija (geometrija kao atribut)
 - Aktivna višestruka topologija



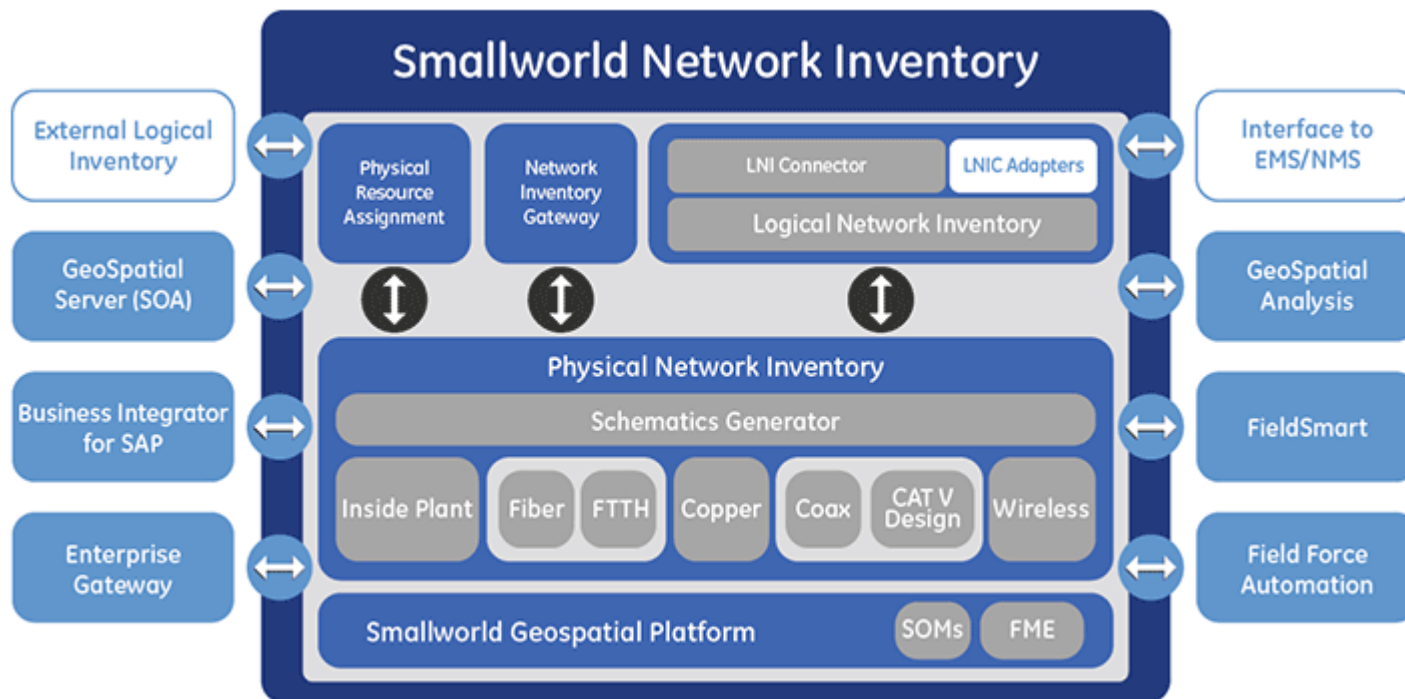
Smallworld CST i produkti



Physical Network Inventory

DDS – Documentation and Design System

Prostorno planiranje, dokumentiranje i upravljanje telekomunikacijskom mrežom



Sučelje

Physical Network Inventory (FTTH) - User

File Edit View Trail Query Transform Tools Schematics Migracija Export/Import ADM Help

Project FTTH Find Map Favorites Workspace Activity Connectivity Cable Conduit RME

Project Favorites Object Control

1:1250

Properties Specification Related Items

Field name Value

Human ID	S_10_11_46_294
Designation	10_11_46
Name	294
Specification	Nepoznato/Nepoznato
Construction Status	In Service
Construction Type	Existing
Type	breaking
Installed Cost	
Vlasnik	T-HT

Viewer Connectivity Related Item Details

Underground Utility Box (769,Manhole)

Diagram showing connections between nodes 772, 770, 758, 294, and 59368857.

Connections:

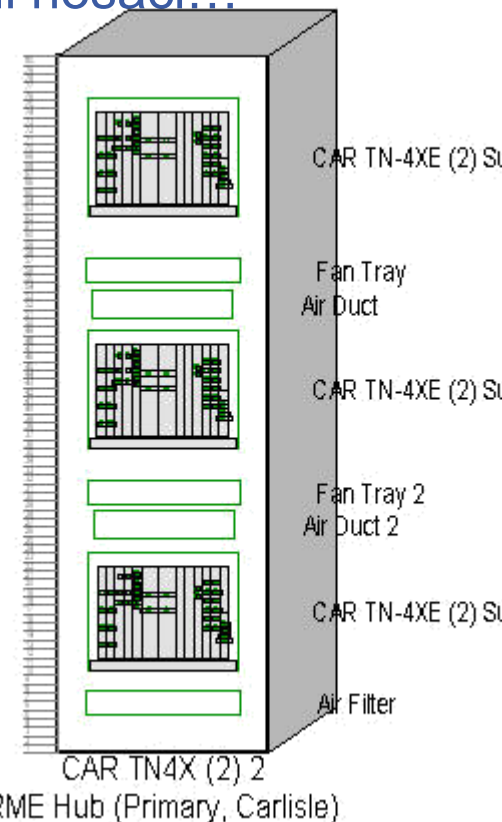
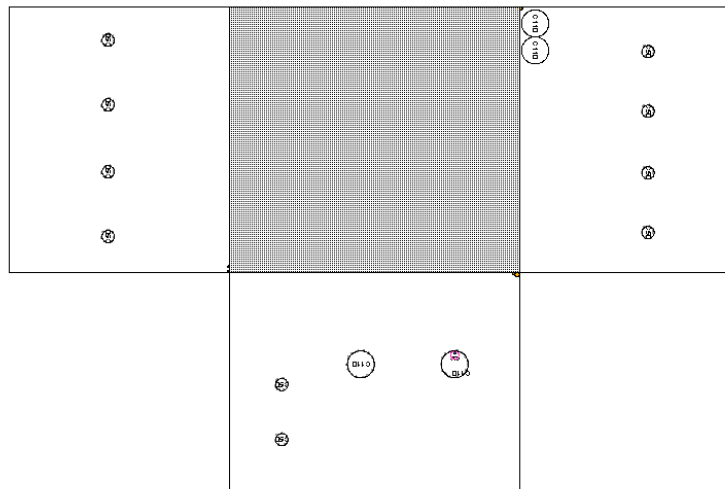
- 772 to 294: Copper Cable 048 TK 59 GM 150x4x0.4
- 770 to 294: Copper Cable 048 TK 59 GM 150x4x0.4
- 758 to 294: Copper Cable 134 TK 59-50 GM 50x4x0.4
- 294 to 59368857: Copper Cable 292 TK 59 M 5x4x0.4

Object Control List:

- Presentation Obj
- Anchor
- Riser
- Extension Arm
- Midspan Junction
- Swept Tee
- Cable Marker
- Ground
- Conduit
- Conduit Adapter
- Point Of Attachm
- PSK
- Poklopac zdenice
- Opce
- Vanjski prikaz zd
- Vanjski prikaz zd
- Vanjski prikaz zd
- Vanjski prikaz zd
- Anotacije opreme
- Service Area
- Service Node
- Designation
- Related Docume
- HFC Port
- Dozvola
- ? Zemljiste
- DXF objekti
- Skiciranje/Crtanje/D
- Upravljanje dizajnom
- Design_admin (Smallwo
- Kalastar (Smallworld Da
- Migracija (Smallworld D
- Adm_dds (Smallworld D
- adm_insync (Oracle)
- Plaster_25000 (Smallwo
- ? Raster (Smallworld Data
- Dis (Smallworld Datastor
- Plaster_htrs96 (Smallwo
- ? wms (Universal Dataset)
- Uds_schematics (Univer

Model podataka

- Outside plant
 - Infrastrukturni objekti – zgrade, kabelski zdenci, pristupne točke, mjesta spojnica, samostojeći ormarići, podzemne trase, stupovi, zračne trase, spojne kutije, krovni nosači...
- Inside plant
 - Optička, Bakrena, RF/Koaksijalna mreža
 - Oprema (RME\
 - kabeli,
 - spojnice,
 - cijevi....



Design manager

Design Browser (No Active Design)

File View Search Organisation Administration Help

Project: Field n... Value
ID: AXE DUBRAVA
Status: Design Layout

Design: Owner: ext_tpaksec
Status: Completed

Phase: Field... Value
Name

Advanced Query...

Project Name	Full Design Name	Set	Phase Name	Status	Project Title
27028113	27028113			Design Finished	27028113
ab_22_b10_1_zrak	Design 1			Design Layout	Vodice_dio1
ab_23_X_2015_01	Design 1			Design Layout	zdenci
AB_ISPRAVAK_18_II_2015	Design 1			Design Layout	ISPRAVAK
ARENA_novo	Design 1			Design Layout	zdenci
AXE DUBRAVA	Design 1 / Pk01_068_017			Completed	AXE DUBRAVA
AXE DUBRAVA	Design 1 / PK01_068_027			Completed	AXE DUBRAVA
AXE DUBRAVA	Design 1 / Pk01_068_028			Completed	AXE DUBRAVA
AXE DUBRAVA	Design 1 / PK01_068_030			Completed	AXE DUBRAVA
AXE DUBRAVA	Design 1 / Pk01_068_032			Completed	AXE DUBRAVA
AXE DUBRAVA	Design 1 / Pk01_068_037			Completed	AXE DUBRAVA
AXE DUBRAVA	Design 1			Design Layout	AXE DUBRAVA
BJELOVAR	Design 1 / Nadzemna_EKI_0...			Completed	BJELOVAR
BJELOVAR	Design 1 / PK_43_A60_001			Completed	BJELOVAR
BJELOVAR	Design 1 / PK_43_A60_002			Completed	BJELOVAR
BJELOVAR	Design 1 / PK_43_A60_003			Completed	BJELOVAR
BJELOVAR	Design 1			Design Layout	BJELOVAR
BOSO_INDZONA	BOSO_INDZONA			Design Layout	BOSO_INDZONA
CAKOVEC	Design 1			Design Layout	CAKOVEC CENTAR

Design Hierarchy | Dependencies | Related Projects/Designs | Associated Documents

AXE DUBRAVA * (Design Layout)

- Design 1 (Design Layout)
 - Pk01_068_017 (Completed)
 - Pk01_068_027 (Completed)
 - Pk01_068_028 (Completed)
 - Pk01_068_030 (Completed)
 - Pk01_068_032 (Completed)
 - Pk01_068_037 (Completed)

OK

Project | Favourites | Object Control

Field name | Value

ID | AXE DUBRAVA

Title | AXE DUBRAVA

Type | DDS Migracija

Start Date | 03/09/2015

End Date

Comment

Design

Field name | Value

Name | Pk01_068_028

Status | Completed

Owner | ext_tpaksec

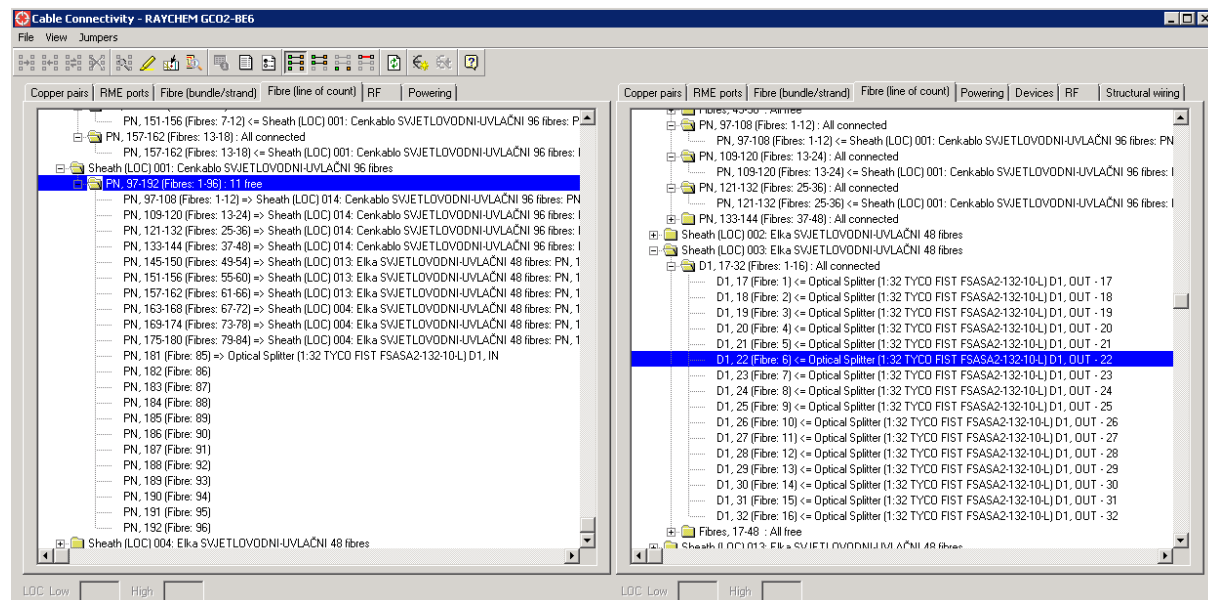
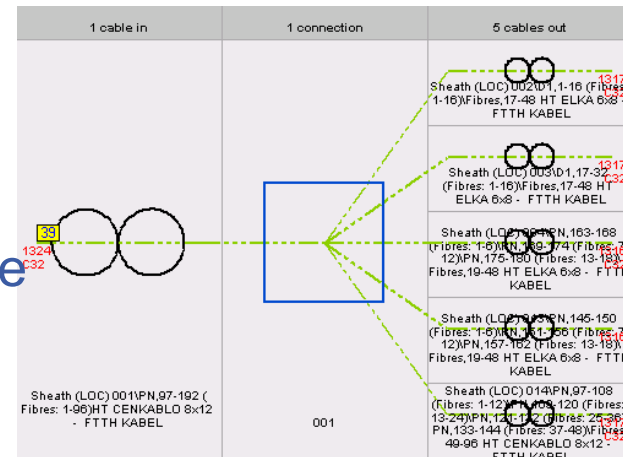
Comment

Components

- Design - Pk01_068_028
 - Access Point
 - Bay
 - Building
 - Conduit Route Face
 - Copper Cable
 - Copper Splice
 - Copper Terminal
 - Floor
 - Line of Count
 - Multi-port
 - Network Connection
 - Point Of Interest
 - Pole
 - Shelf
 - Slot
 - Underground Route
 - 01_068_2732
 - 01_068_2732
 - 01_068_2732
 - 01_068_2732
 - 01_068_2732

Connectivity

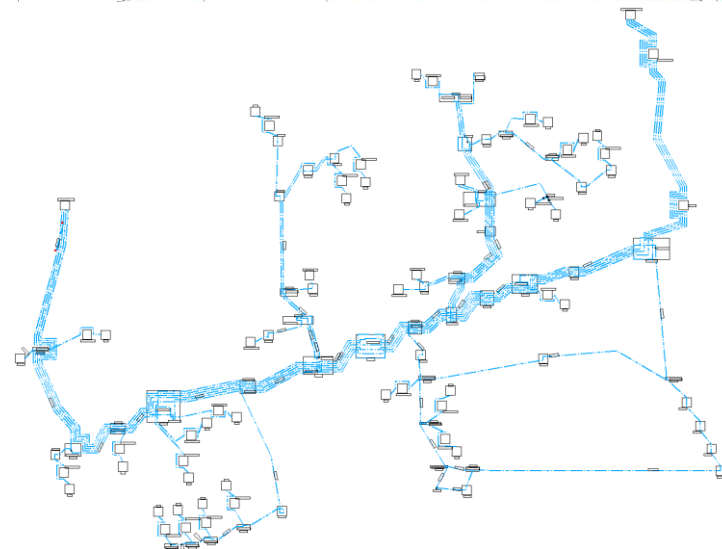
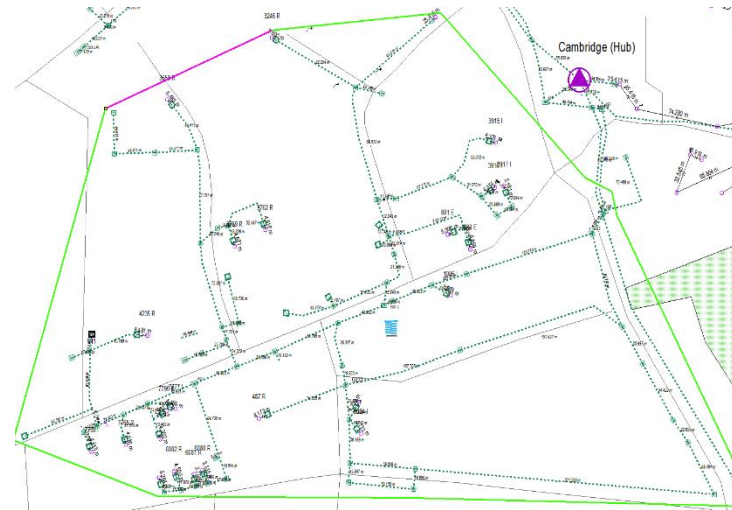
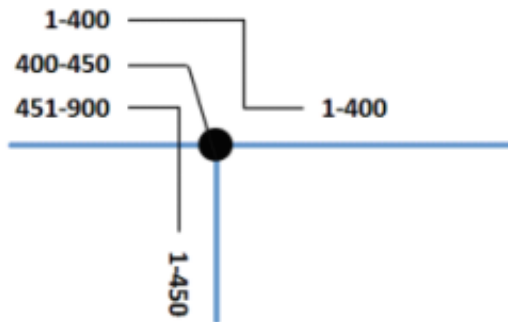
- Dokumentiranje prospoja niti/parica od porta glavnog razdjelnika do terminalne opreme krajnjeg korisnika
- Grupiranje parica/niti u logičke skupove (skup parica koje napajaju isti izvod)



Shematika

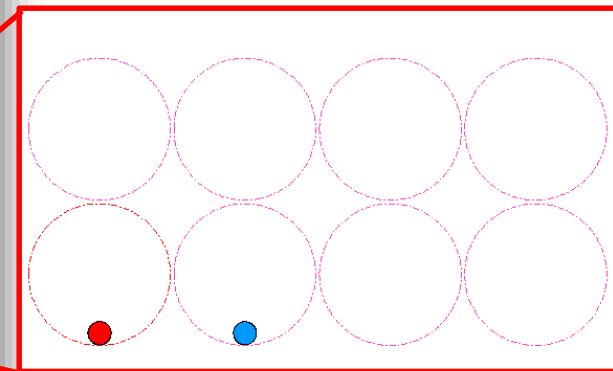
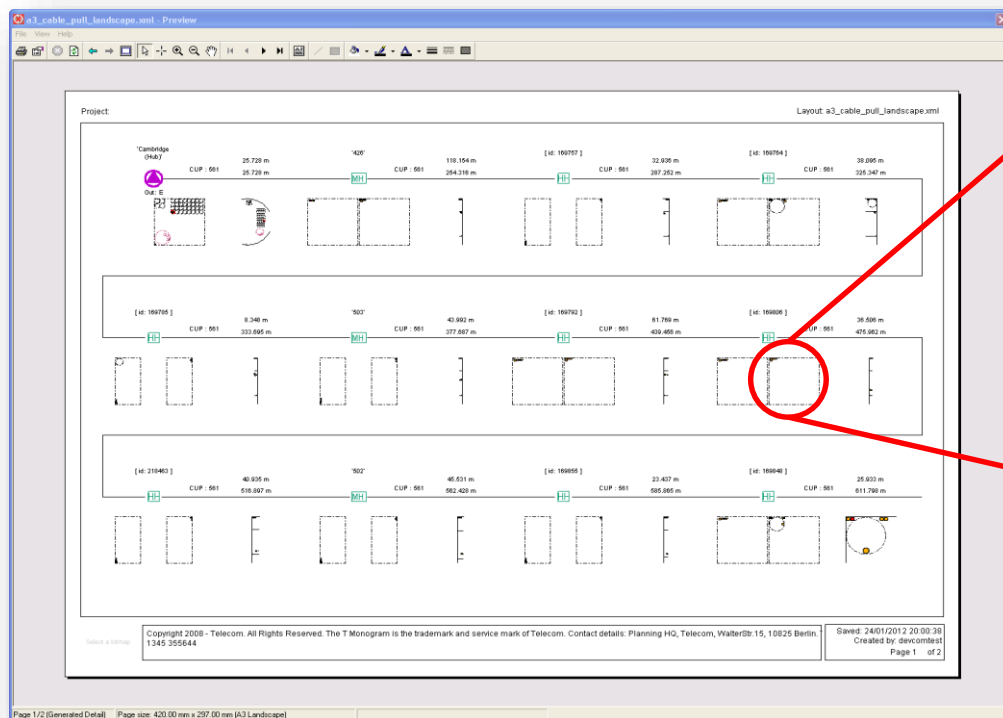
Cable	Incoming Fibres	Outgoing Fibres	Cable
Matuli-Plomin 11	Bez oznake, #1, BL, #4	BL, #1, BR, #4	UK7
Matuli-Plomin 11	Bez oznake, #1, GR, #2	BL, #1, OR, #2	UK7
Matuli-Plomin 11	Bez oznake, #1, BR, #7	RD, #2, BL, #7	UK7
Matuli-Plomin 11	Bez oznake, #1, Siva, #6	BL, #1, VH, #6	UK7
Matuli-Plomin 11	Bez oznake, #1, VH, #8	RD, #2, OR, #8	UK7
Matuli-Plomin 11	Bez oznake, #1, RD, #1	BL, #1, BL, #1	UK7
Matuli-Plomin 11	Bez oznake, #1, BK, #10	RD, #2, BR, #10	UK7
Matuli-Plomin 11	Bez oznake, #1, VL, #3	BL, #1, GR, #3	UK7
Matuli-Plomin 11	Bez oznake, #1, VI, #5	BL, #1, Siva, #5	UK7
Matuli-Plomin 11	Bez oznake, #1, RO, #9	RD, #2, GR, #9	UK7

SC



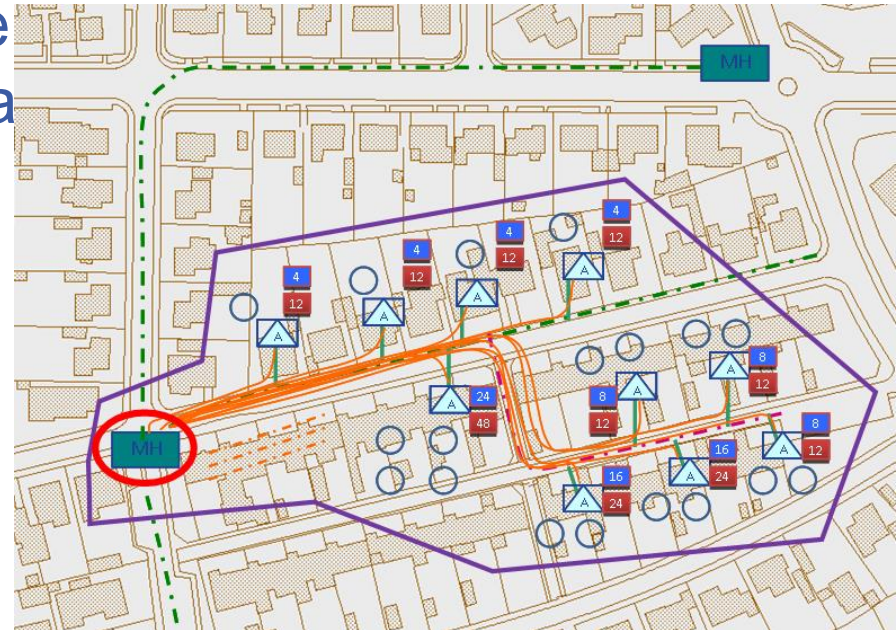
Dijagram povlačenja kabela

- Generiranje ispisa koji na presjecima trasa i stranica kabelaških zdenaca prikazuju smještaj određenog postojećeg ili planiranog kabela

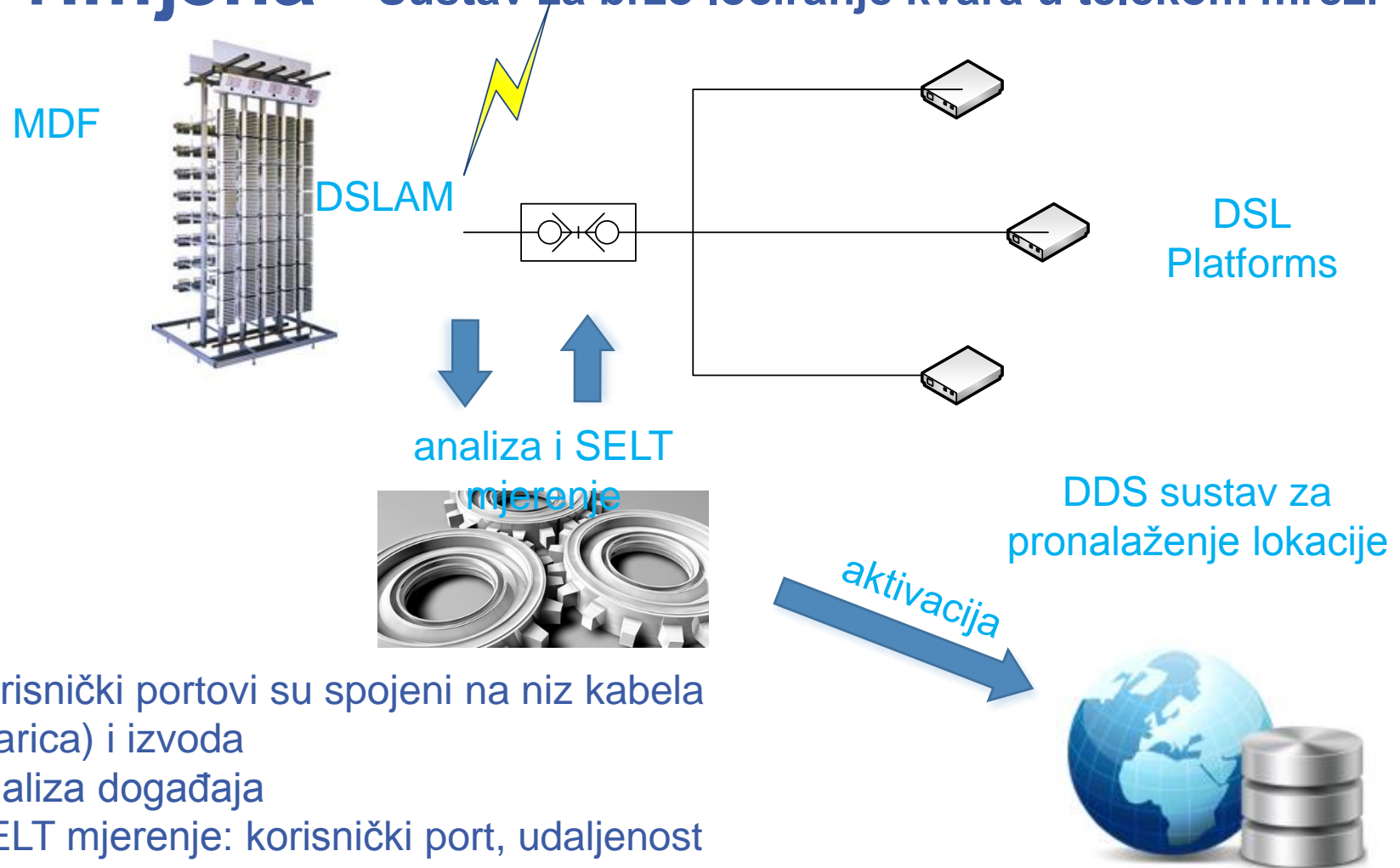


FTTH modul

- Automatizirano modeliranje različitih tipova FTTx mreža (FTTN, FTTC, FTTB, FTTH)
- Modeliranje različitih topologija
 - aktivne point-to-point mreže (Ethernet, WDM)
 - pasivne point-to-multipoint mreže (GPON) sa sprežnicima
- Troškovnici



Primjena – Sustav za brzo lociranje kvara u telekom mreži



- korisnički portovi su spojeni na niz kabela (parica) i izvoda
- analiza događaja
- SELT mjerenje: korisnički port, udaljenost
- aktivacija DDS sučelja za lociranje kvara

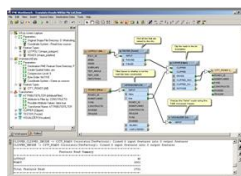
Primjena – Sustav za brzo lociranje kvara u telekom mreži

- aktivacija sučelja na DDS strani

e-mail



Server



REST/ HTTP



DDS server za
obradu lokacije
prekida

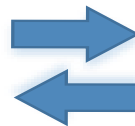
```
<?xml version="1.0" encoding="UTF-8"?>
<prekid>
  <id>11369</id>
  <timestamp>2015-8-03 11:48:27</timestamp>
  <nadkabel>305_306</nadkabel>
  <email>odgovorna_osoba@domena.hr</email>
  <mjerenja>
    <selt>
      <port>PARICA-00046</port>
      <udaljenost>1318.0</udaljenost>
    </selt>
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      <port>PARICA-00054</port>
      <udaljenost>1327.0</udaljenost>
    </selt>
  </mjerenja>
</prekid>
```

Primjena – Sustav za brzo lociranje kvara u telekom mreži

- obrada ulaznih informacija

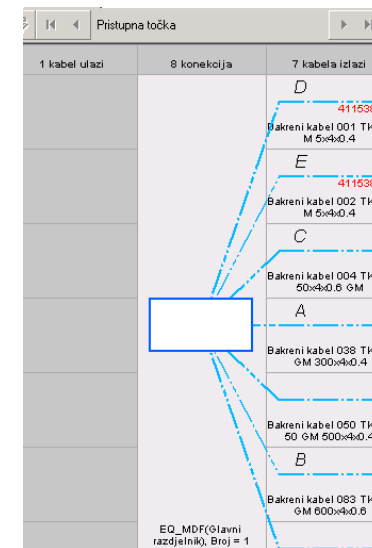
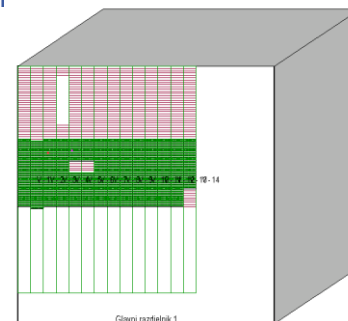
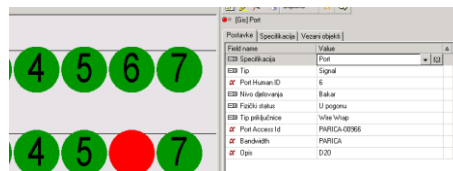


DDS server za obradu
lokacije prekida



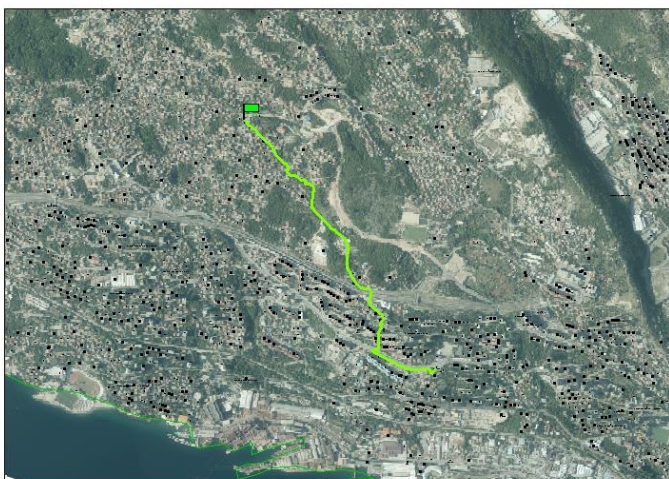
DDS klijent

- pronalazak glavnog razdjelnika
- pronalazak porta na glavnom razdjelniku
- izvođenje trace-a za paricu spojenu na port
- pronalaženje lokacija prekida na zadanim udaljenostima

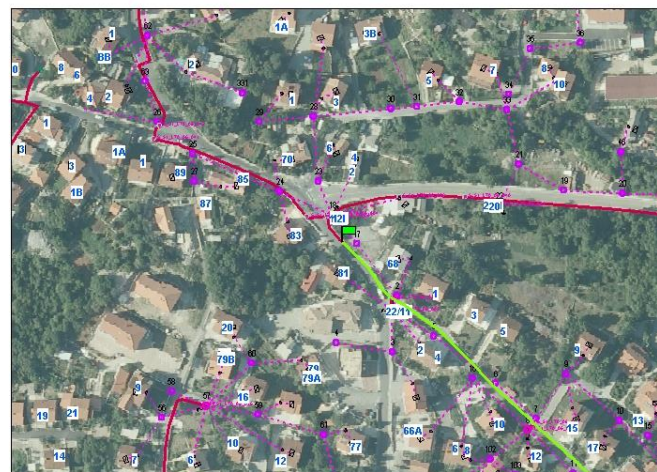


Primjena – Sustav za brzo lociranje kvara u telekom mreži

- kreiranje odlaznih informacija



prostiranje kabela



lokacija prekida

- Google link
 - <https://www.google.hr/maps/dir/45+30+11.74+15+32+11/45+30+12.7+15+32+5.811>
- Navigacija
 - E: 15st. 32min. 11sek. N: 45st. 30min. 11.74sek.
 - E: 15st. 32min. 5.811sek. N: 45st. 30min. 12.7 sek.
- Adrese unutar 100 metara
- Kabelski zdenci unutar 100 metara

Primjena – Sustav za brzo lociranje kvara u telekom mreži

- slanje odlaznih informacija



DDS klijent

json
datotek

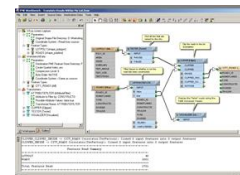


REST/ HTTP

DDS server za
obradu lokacije
prekida

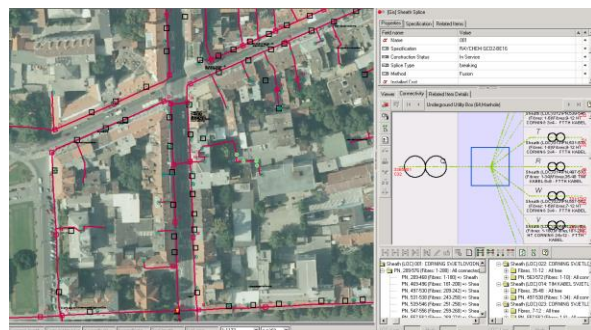


e-mail

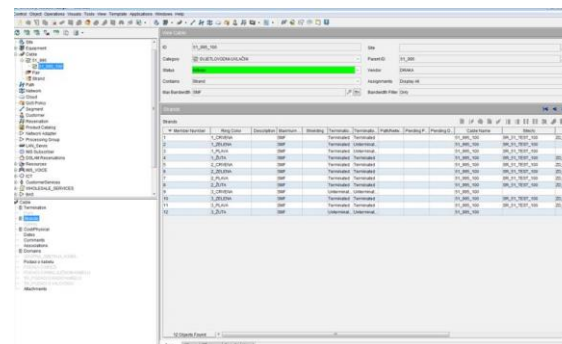


Primjena – integracija sa sustavima za provisioning

- GE Physical Network Inventory
- Prostorni prikaz



- Oracle
- Tablični prikaz

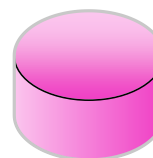


DDS

Insert

Update

Delete



DIS

Primjena – integracija sa sustavima za provisioning

DDS

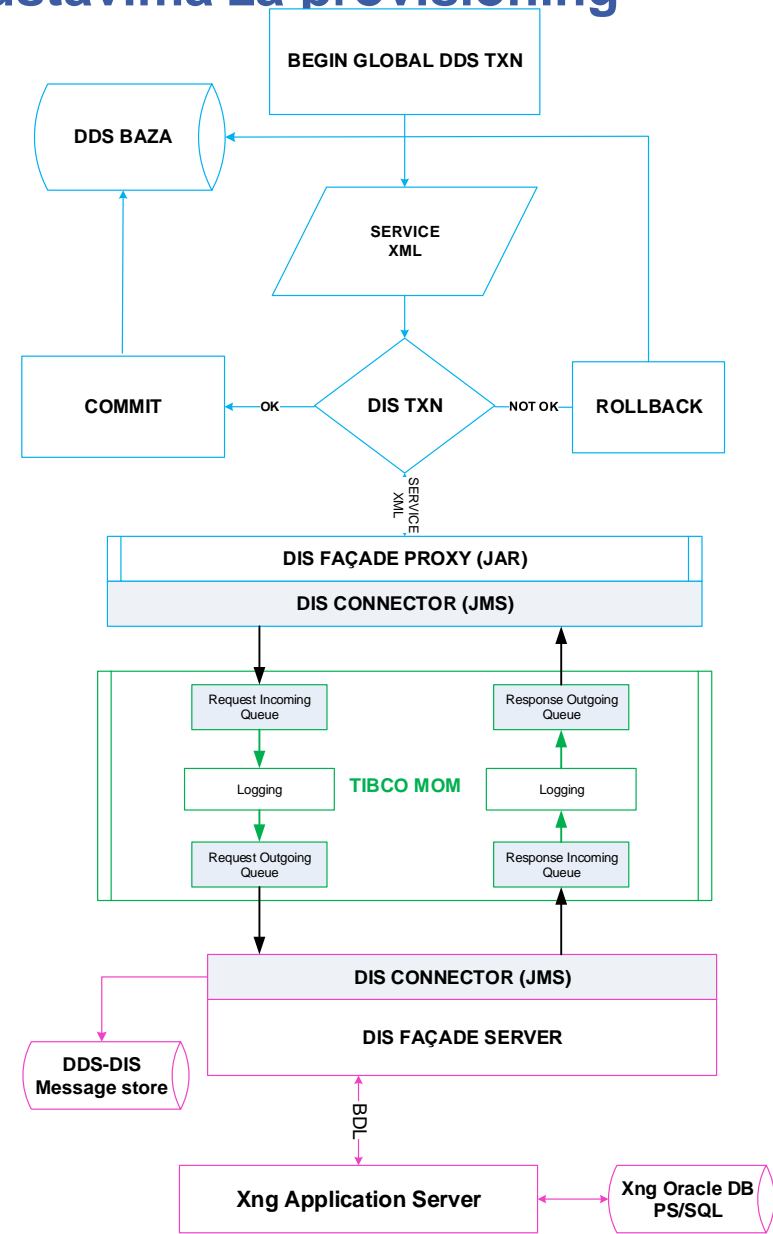
- priprema podataka za transakciju
- pokretanje DDS-DIS klijentske aplikacije
- logiranje i obrada odlaznih i povratnih poruka

TIBCO

- poveznica između DDS-DIS
klijentske i serverske aplikacije
- parsiranje dolaznih xml poruka,
prosljeđivanje poruka prema DIS-u
i vraćanje odgovora DDS-u

DIS

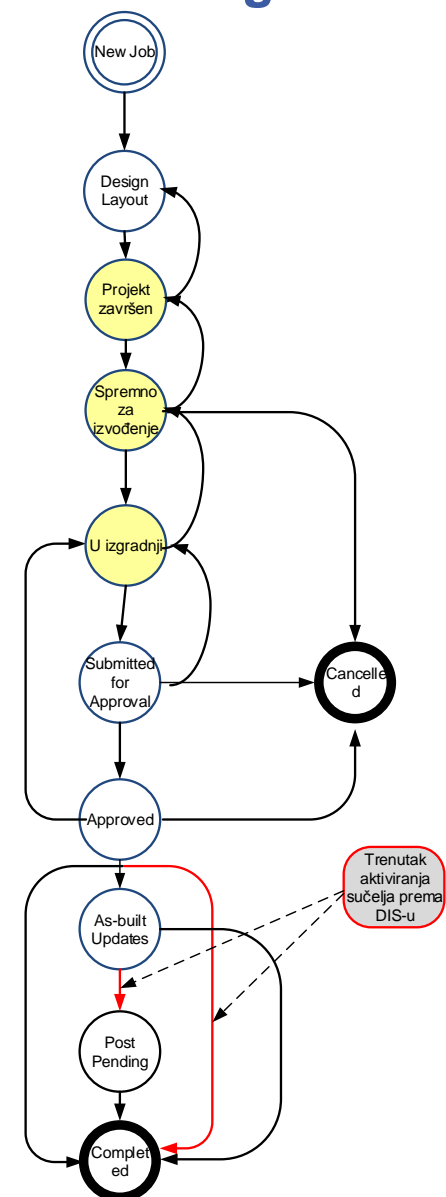
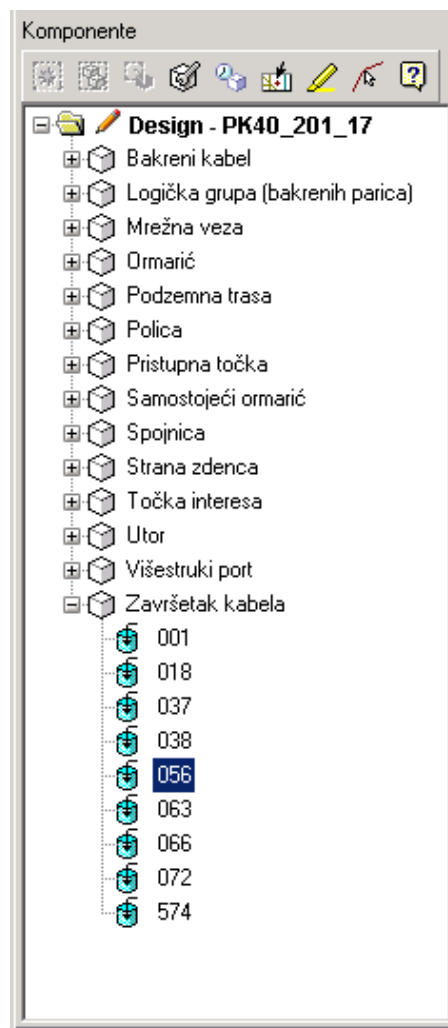
- DDS-DIS serverska aplikacija obrađuje poruke i vrši izmjene u podacima na DIS strani



Primjena – integracija sa sustavima za provisioning

Priprema podataka i pokretanje sučelja

- Smallworld Magik – dohvat podataka iz završenog dizajna i kreiranje informacija za slanje
- DDS – DIS Java pod sučelja za slanje poruka
 - Site
 - Equipment
 - Slot
 - Card
 - Cable
 - Connection
- preko 100 poruka:
 - modificirajAdresuKorisnickaLokacija
 - dodajBkrStalakRazdjelnika
 - modificirajBkrKarticaObrisiPortove
 - obrisiSvkPolicaRazdjelnika
 - dodajSvkSekundarnaRezerva
 - modificirajSvkKabelskiSegmentSpojiA
 - dodajSvkProspoj
 - ...



Primjena – integracija sa sustavima za provisioning

dodajSvkKabelskiSegment

```
<?xml version="1.0" encoding="UTF-16"?>
```

```
<design_message>
```

```
  <header><from>DDS</from><to>DIS</to><design_id>107916</design_id><user_name></user_name>
  <sequence_size>3</sequence_size><dis_component></dis_component><dis_service>dodajSvkKabelskiSegment</dis_
  _service>
  <transaction_id>0</transaction_id><source_address></source_address><return_code></return_code><replay><
  status></status><error_code>0</error_code><error_message></error_message></replay></header>
```

```
<body>
```

```
  <mns_long_name>51_995_100</mns_long_name>
  <spec_manufacturer>DRAKA</spec_manufacturer><spec_model>SVJETLOVODNI-UVLAČNI</spec_model>
  <spec_size>12</spec_size><sheath_length>38.320</sheath_length><construction_status>In Service</construction_status>
  <a_equip_data>
    <a_hum_id>LOK_51_TEST_100</a_hum_id>
    <a_equip_mns_long_name>SR_100</a_equip_mns_long_name>
    <a_equip_type>SVK_RAZDJELNIK</a_equip_type>
  </a_equip_data>
  <z_equip_data>
    <z_equip_mns_long_name>N_50</z_equip_mns_long_name>
    <z_hum_id>ZD_51_D10_50</z_hum_id>
    <z_equip_type>SVK_SPOJNICA</z_equip_type>
  </z_equip_data>
  <fiber_data>
    <fiber bundle_number="1" fiber_color="RD" fiber_number="1"/>
    <fiber bundle_number="1" fiber_color="GR" fiber_number="2"/>
    <fiber bundle_number="1" fiber_color="BL" fiber_number="3"/>
    <fiber bundle_number="1" fiber_color="YL" fiber_number="4"/>
    <fiber bundle_number="2" fiber_color="RD" fiber_number="5"/>
    <fiber bundle_number="2" fiber_color="GR" fiber_number="6"/>
    <fiber bundle_number="2" fiber_color="BL" fiber_number="7"/>
    <fiber bundle_number="2" fiber_color="YL" fiber_number="8"/>
    <fiber bundle_number="3" fiber_color="RD" fiber_number="9"/>
    <fiber bundle_number="3" fiber_color="GR" fiber_number="10"/>
    <fiber bundle_number="3" fiber_color="BL" fiber_number="11"/>
    <fiber bundle_number="3" fiber_color="YL" fiber_number="12"/>
  </fiber_data>
</design_message>
```

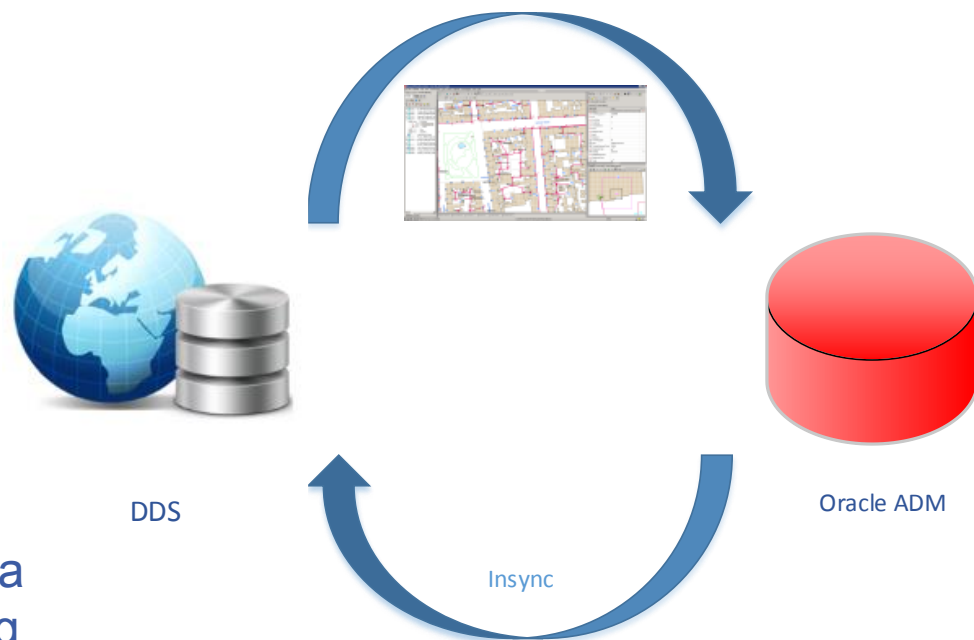
Primjena – integracija sa Adresnim sustavima

DDS promjene

- formiran adresni model
 - Županija
 - Grad Općina
 - Naselje
 - Ulica
 - Kućni broj
- formirane pomoćne tablice prema modelu iz ADM-a
- formirane relacije i način uparivanja informacija iz DDS i ADM adresnog modela

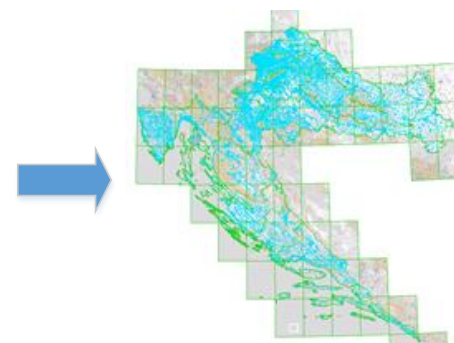
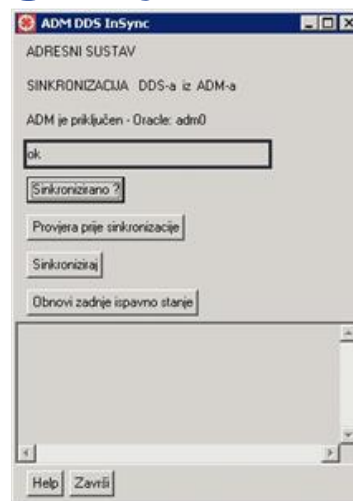
ADM-u (Oracle) promjene

- formirane transakcijske i sinkronizacijske tablice
- postavljeni triggeri na tablice od interesa



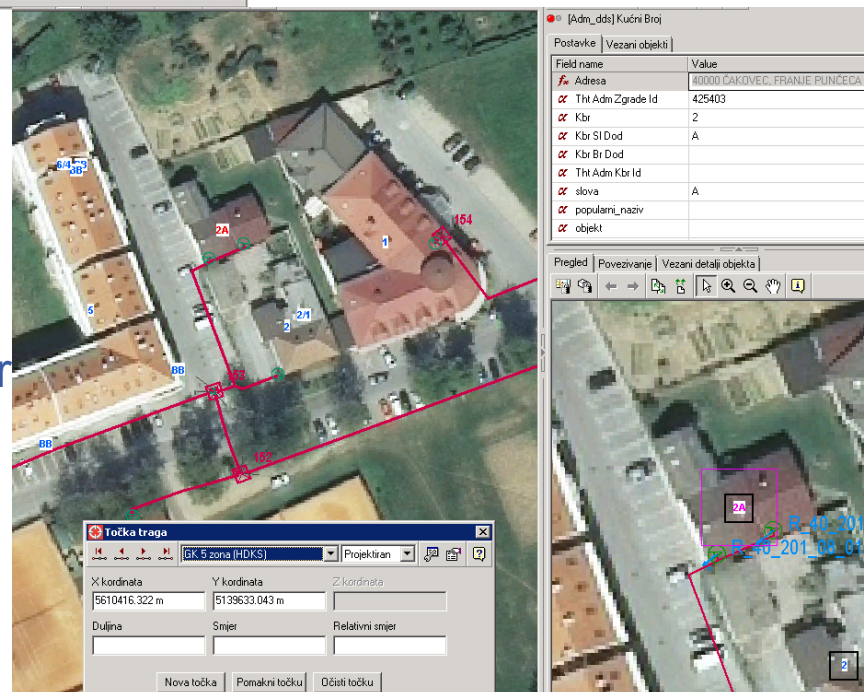
Primjena – integracija sa Adresnim sustavima

- dohvat kućnih brojeva i promjena u ADM-u se vrši preko Smallworld Insynca



Unutar DDS aplikacije

- insertiranje novih kućnih brojeva
- dodjeljivanje koordinata kućnim brojevima
 - upisom koordinate
 - pomicanjem kućnog broja na kartu
 - određivanje projekcije u kojoj će se prenijeti koordinata kućnog broja



Primjena – pretvaranje u poznate izlazne formate

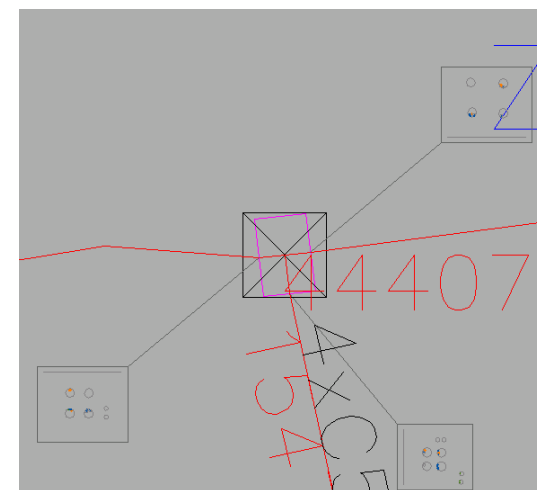
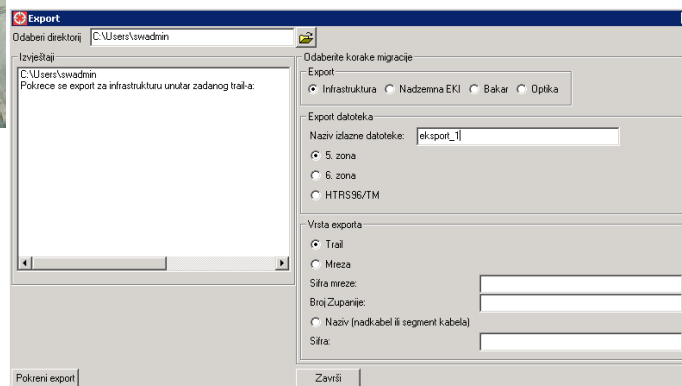
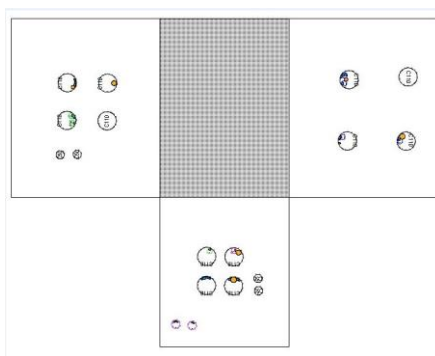
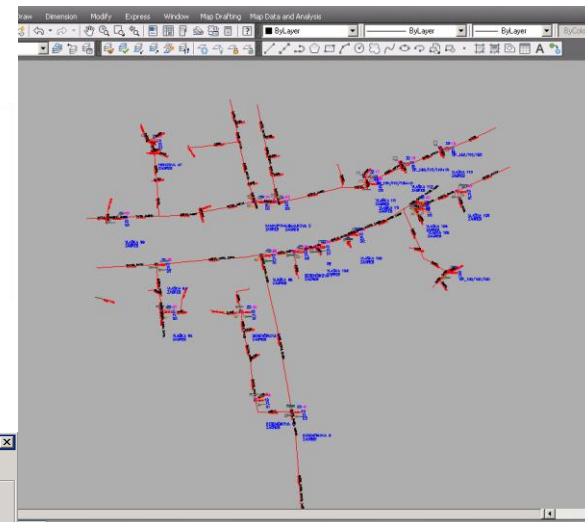
- definiran izlazni format svakog objekta iz DDS-a prema standardu
- eksport internog svijeta



DDS



FME Server



FME u GIS okruženju

Martin Martić

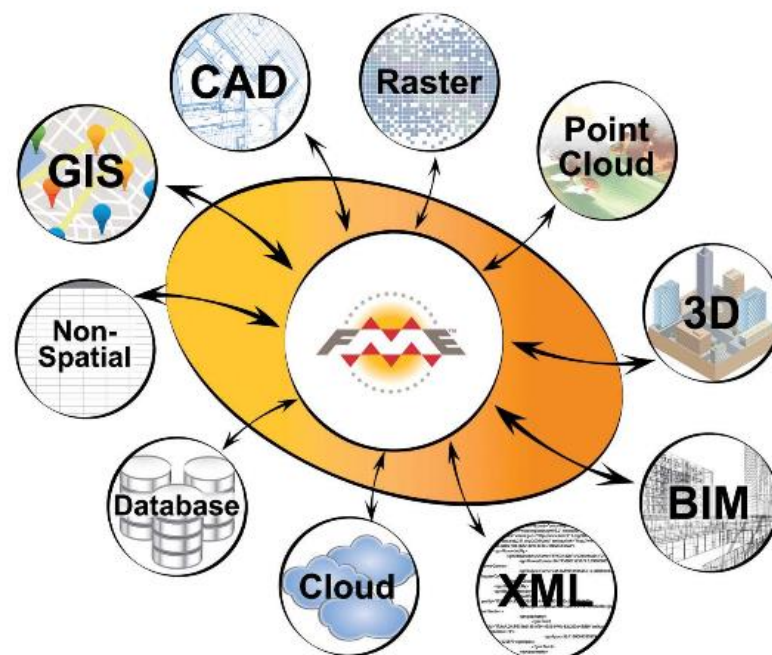


SILVER
PARTNER



ETL – „Extract, Transform & Load”

- Konverzija podataka
- Translacija podataka
- Integracija podataka
- Dijeljenje podataka
- ✓ Validacija podataka
- + ...



Safe Software produkti

- FME Desktop
- FME Server
- FME Cloud

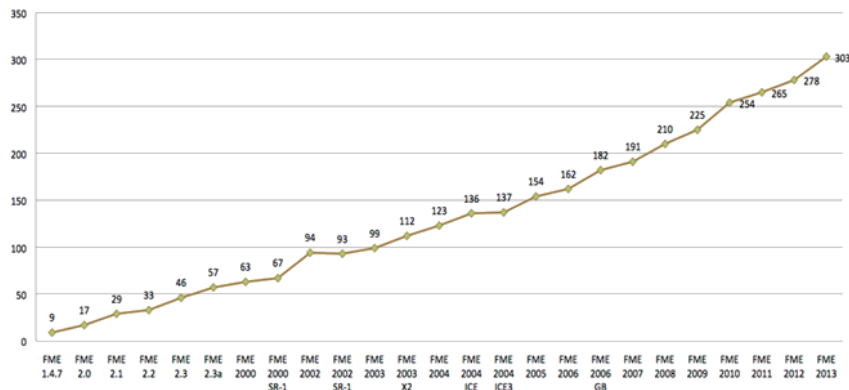


Desktop



Server

FME Supported Formats by Release



Professional	Esri* / Intergraph	Database Editions	Smallworld
275+ formats (view) 400+ transformers (view)	300+ formats (view) 400+ transformers (view)	300+ formats (view) 400+ transformers (view)	300+ formats (view) 400+ transformers (view)
Read from Databases:	Read from Databases:	Read from Databases:	Read from Databases:
<ul style="list-style-type: none"> Esri Geodatabase (File/Personal) Microsoft SQL Server Oracle PostGIS 	<ul style="list-style-type: none"> Esri Geodatabase (File/Personal) Esri Geodatabase (Enterprise/ArcSDE) Microsoft SQL Server Oracle PostGIS Teradata 	<ul style="list-style-type: none"> Esri Geodatabase (File/Personal) Esri Geodatabase (Enterprise/ArcSDE) Microsoft SQL Server Microsoft SQL Server Spatial Oracle Oracle Spatial PostGIS Teradata 	<ul style="list-style-type: none"> Esri Geodatabase (File/Personal) Esri Geodatabase (Enterprise/ArcSDE) GE Smallworld Microsoft SQL Server Microsoft SQL Server Spatial Oracle Oracle Spatial PostGIS Teradata
Write to Databases:	Write to Databases:	Write to Databases:	Write to Databases:
<ul style="list-style-type: none"> Esri Geodatabase (File/Personal) PostGIS 	<ul style="list-style-type: none"> Esri Geodatabase (File/Personal) Esri Geodatabase (Enterprise/ArcSDE) PostGIS 	<ul style="list-style-type: none"> Esri Geodatabase (File/Personal) Esri Geodatabase (Enterprise/ArcSDE) Microsoft SQL Server Microsoft SQL Server Spatial Oracle Oracle Spatial PostGIS Teradata 	<ul style="list-style-type: none"> Esri Geodatabase (File/Personal) Esri Geodatabase (Enterprise/ArcSDE) GE Smallworld Microsoft SQL Server Microsoft SQL Server Spatial Oracle Oracle Spatial PostGIS Teradata

Desktop rješenje

- Instalacije na svakom korisničkom računalu
- Broj licenci (fiksne/plutajuće) ovisno broju korisnika i upotrebi
- Dijeljenje radne plohe
- Promjene radne plohe (da li korisnik ima zadnju verziju)
- Dolazak nove verzije
- Edukacija korisnika



Konverzija prostornih podataka na server-u

FME Desktop

Izrada procedura
transformacije prostornih
podataka



FME Server

Izvođenje procedura
mogućnosti
transformacije prostornih
podataka

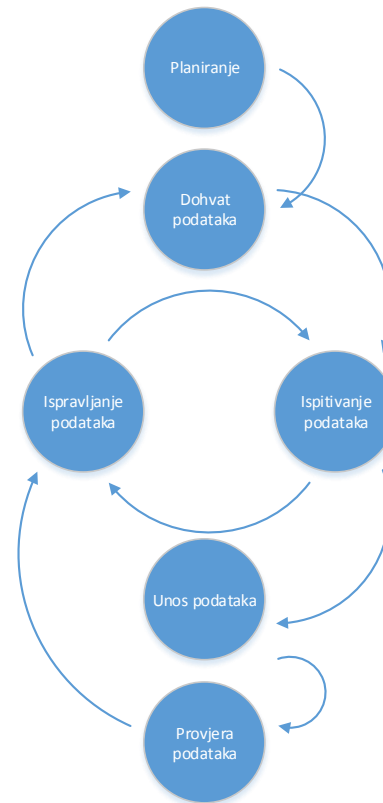
Od migracije k aplikacijama

- Migracija je jedan od ključnih koraka u stvaranju aplikacije
- Osnovna uloga je prijenos podataka iz jednog ili više izvora
- Prilika za procjenu i poboljšanje kvalitete podataka
- Uspješna migracija osigurava ispravnost i dostupnost podataka potrebnih za odlučivanje i upravljanje stvarnim objektima na ter

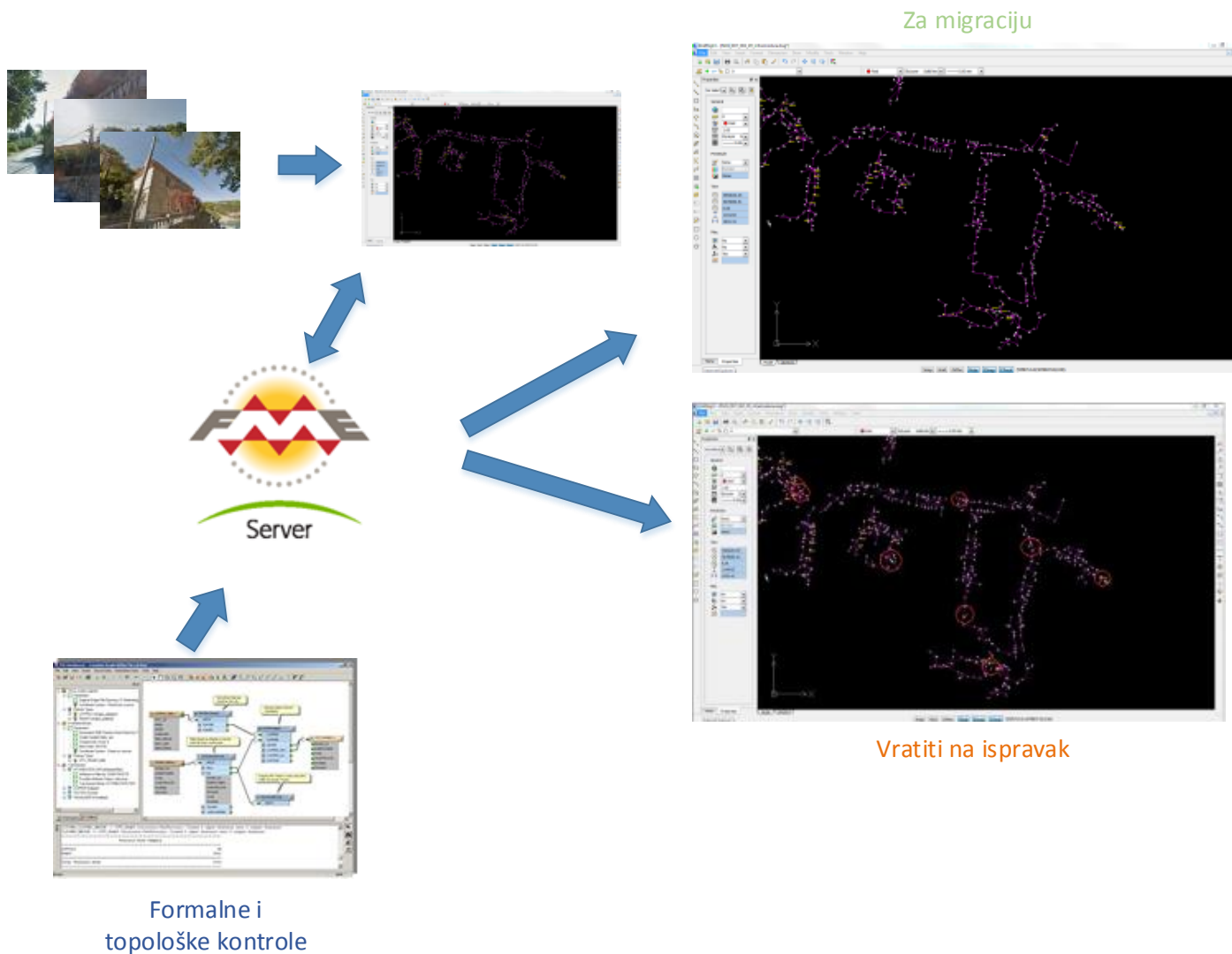


Migracija podataka

- Proces prijenosa podataka između različitih sustava pohrane podataka, formata ili informatičkih sustava
- Planiranje
- Dohvat podataka
- Ispitivanje podataka
- Ispravljanje podataka
- Unos podataka
- Provjera podataka



Kontrola snimljenih podataka



Dokumentiranje mreže



Snimanje zračne mreže

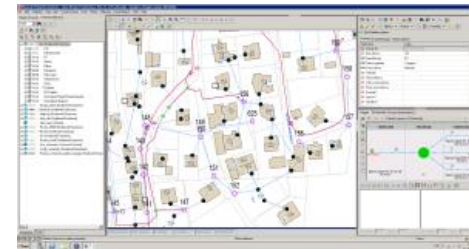


Kontrola na FME serveru

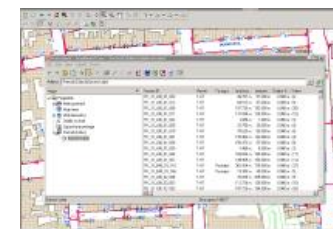
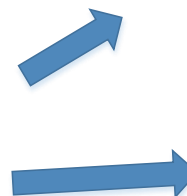
Automatska migracija



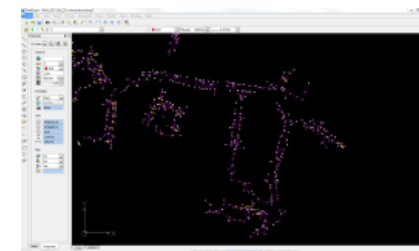
DDS



Pregled i ažuriranje

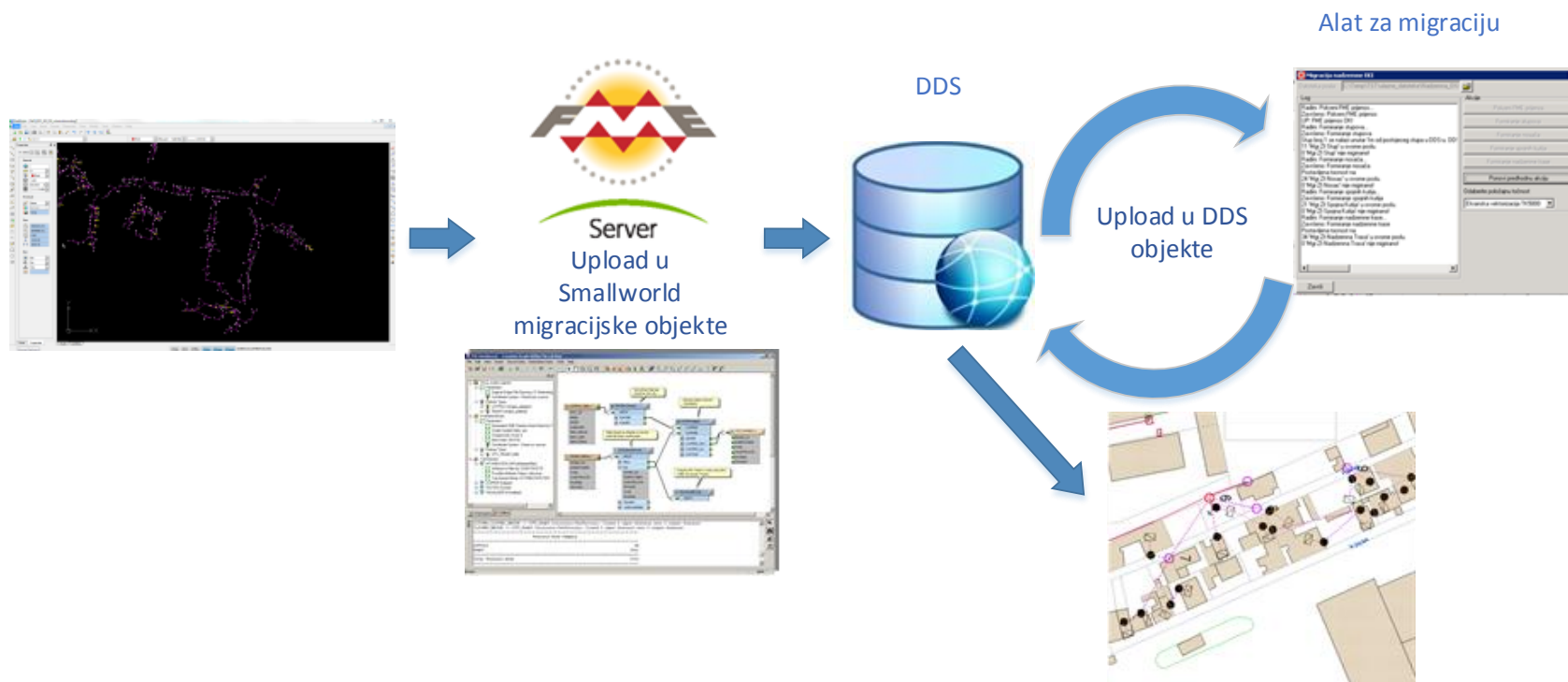


Izveštaji



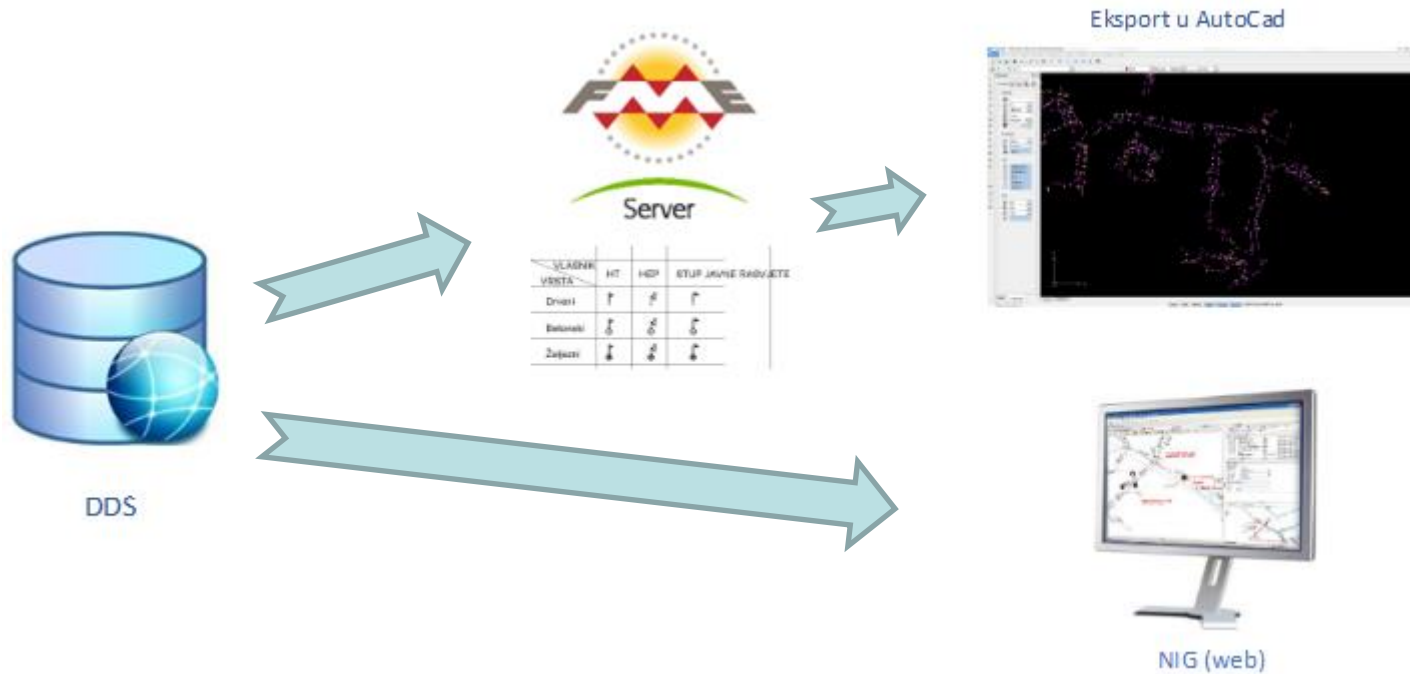
Eksport u AutoCad

Automatska migracija mreže u DDS



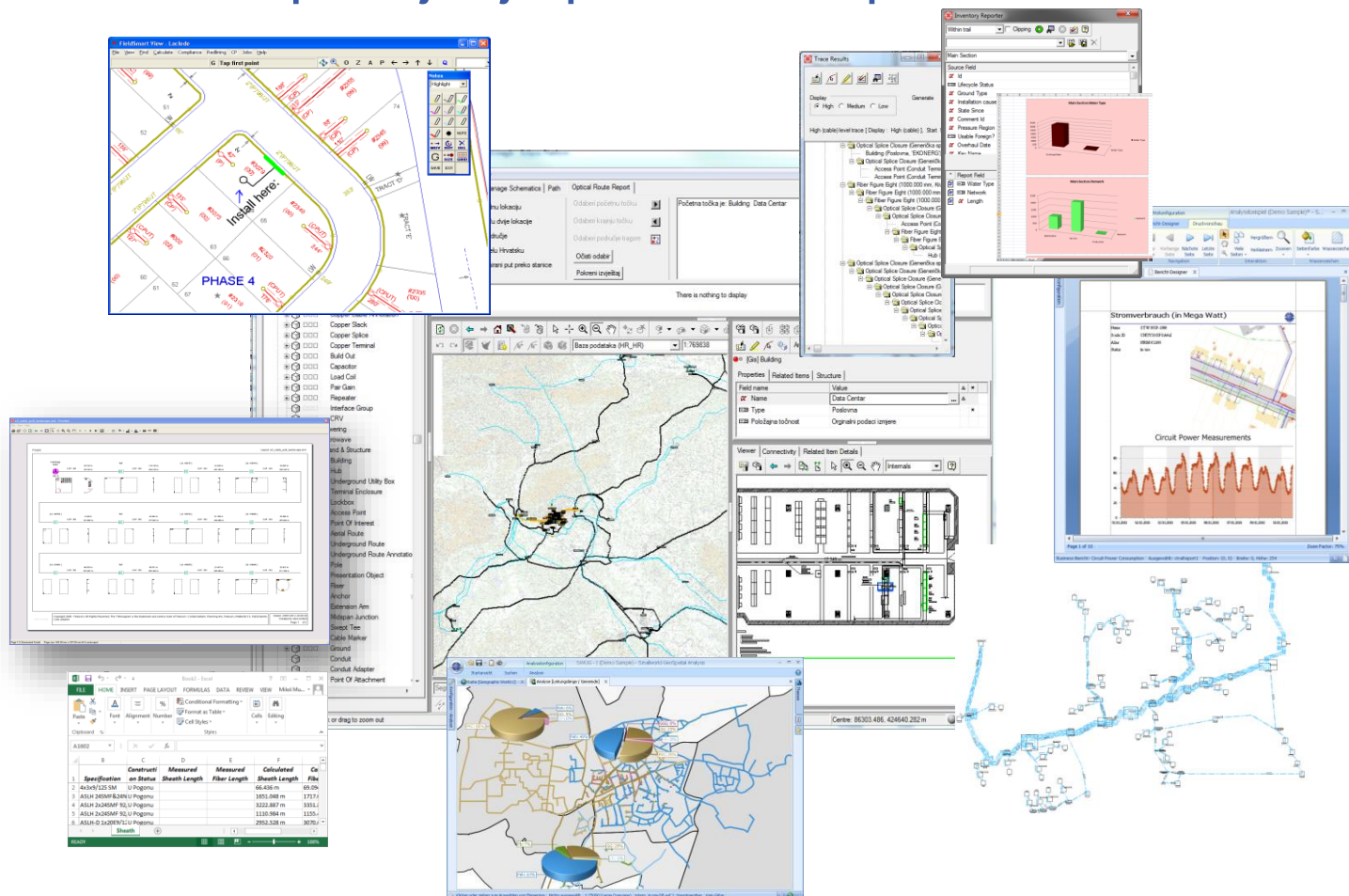
Korištenje podataka o mreži

- Uvid u podatke



Geoprostorni sustavi

- Sustavi za upravljanje prostornim podacima



Hvala na pažnji!

