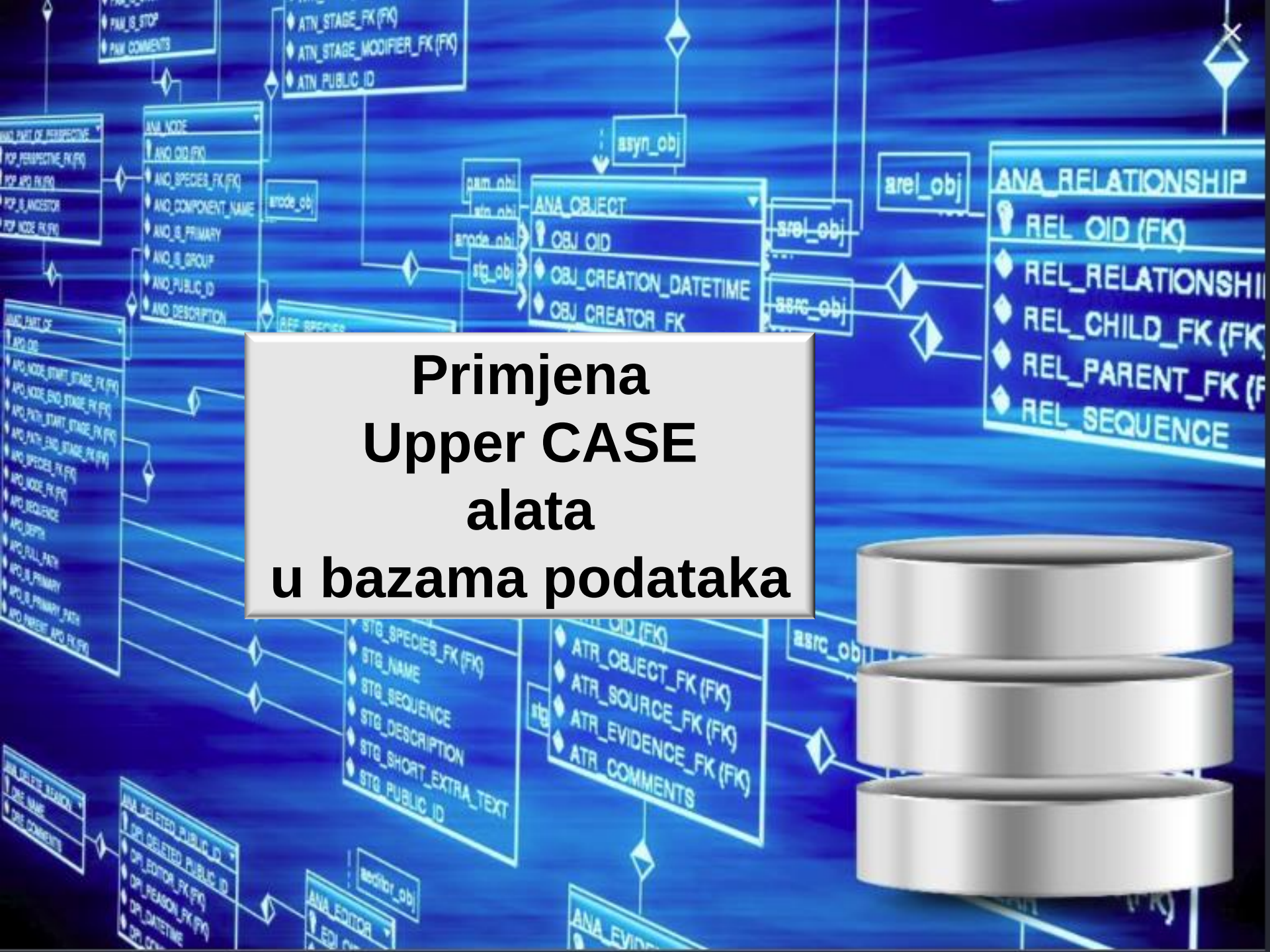
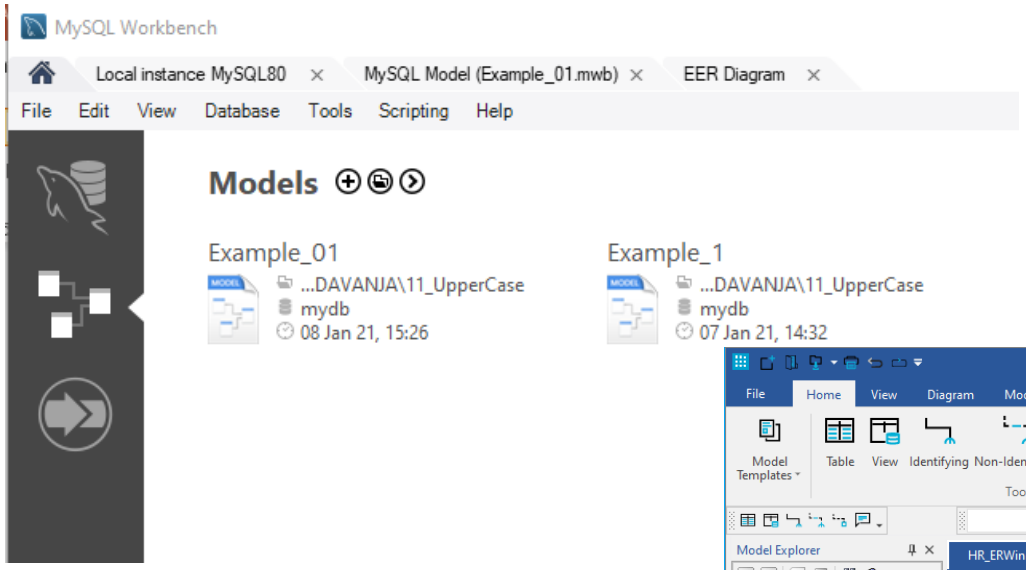
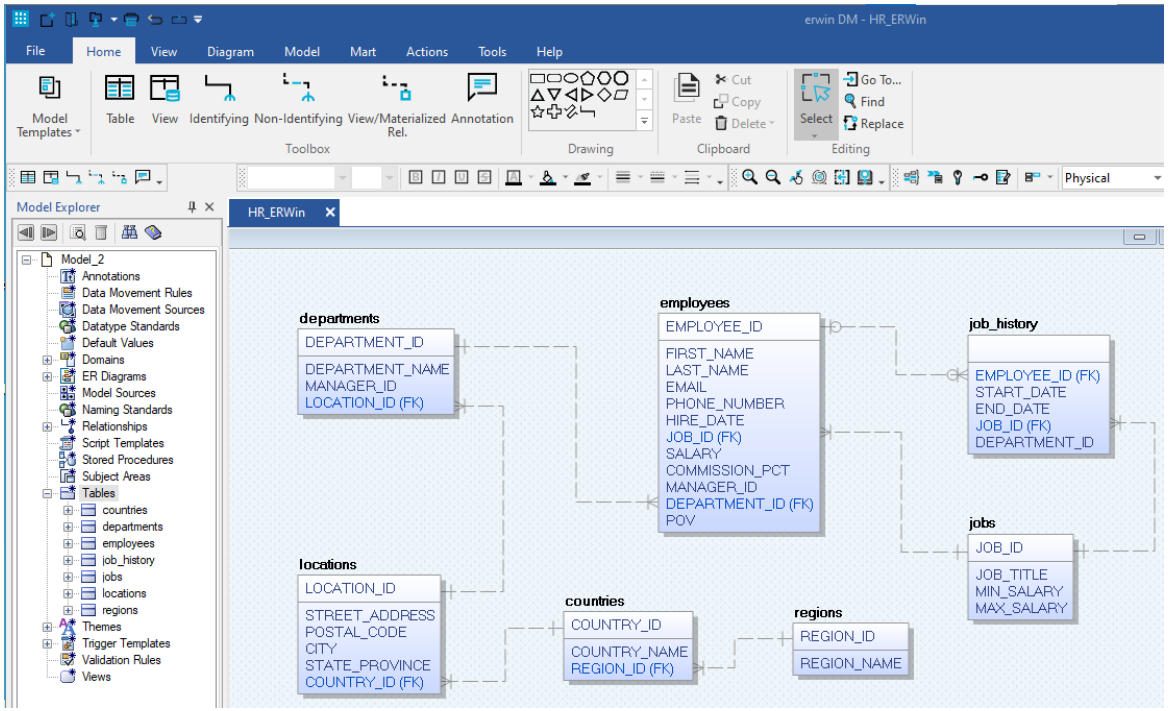

Primjena
Upper CASE
alata
u bazama podataka

UpperCASE alati za modeliranje podataka (primjeri alata: ERwin & Workbench)

Primjeri uporabe Upper Case alata bit će prikazani u alatima:

- **Erwin Data Modeler**
- **MySQL Workbench**



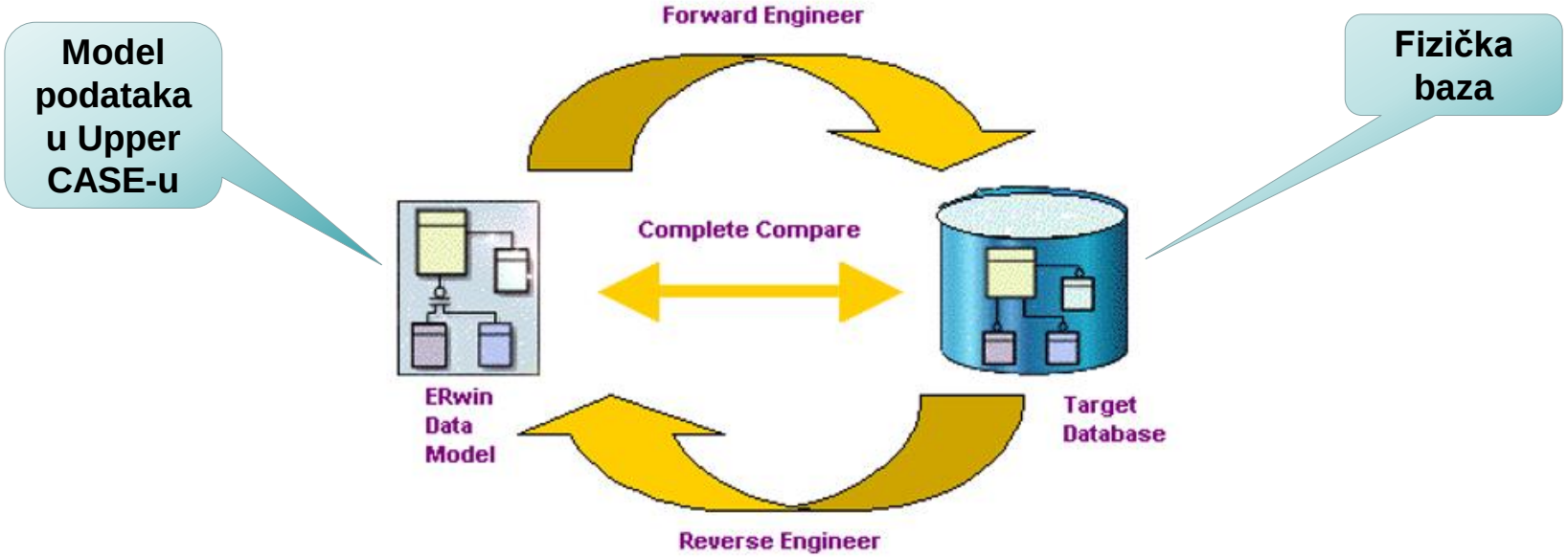


UpperCASE alati za modeliranje podataka (primjeri alata: ERwin & Workbench)

UpperCASE alati predstavljaju visoko sofisticirane programske sustave za kreiranje modela podataka, kreiranje fizičke baze podataka, održavanje njihove strukture.

Najvažnije funkcionalnosti su sljedeće:

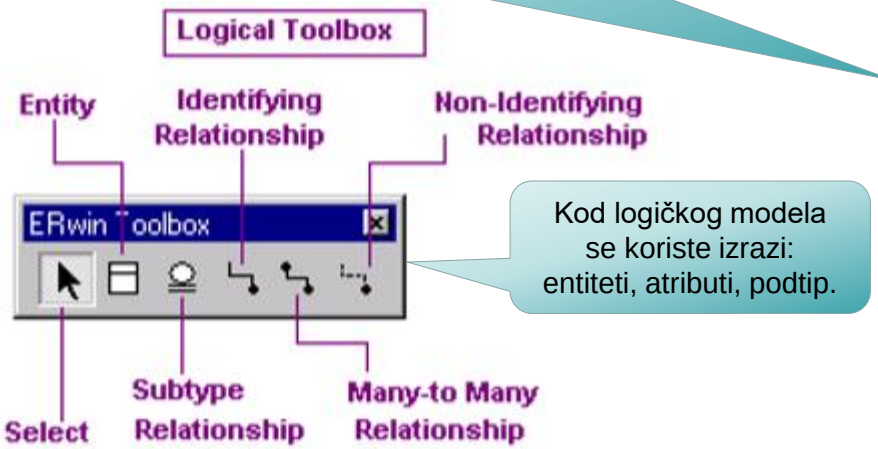
- **Izrada konceptulanog/logičkog modela**
- **Reverse Engineering (RE) - generiranje logičkog modela iz fizičke baze**
- **Forward Engineering (FE) – generiranje fizičke baze iz logičkog modela**
- **Komparacija i sinkronizacija modela podataka**



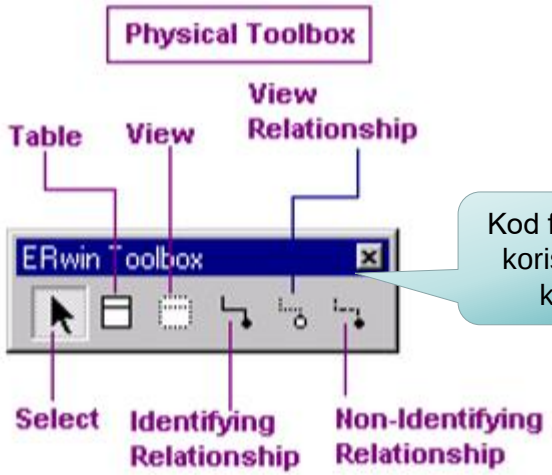
Grafički primitivi (vizuali) za kreiranje modela podataka (Erwin)

Veze mogu biti s obzirom na ulogu PK u child entitetu/tablici:
- Identifying
- Non-identifying

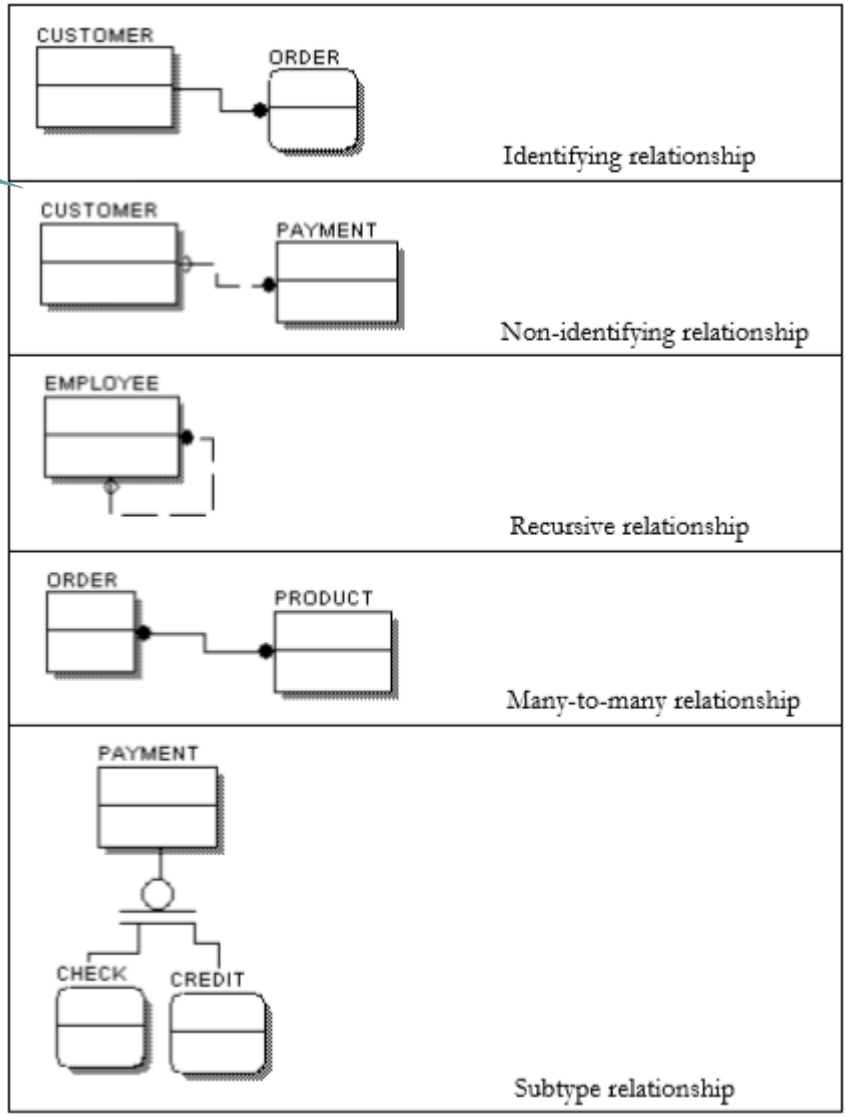
Kod Identifying veze FK (Foreign Key) postaje dio primarnog ključa (PK) a kod Non-identifying veze ne postaje dio PK-a.



Kod logičkog modela se koriste izrazi: entiteti, atributi, podtip.



Kod fizičkog modela se koriste izrazi: tablice, kolone, pogledi



Grafički primitivi (vizuali) za kreiranje modela podataka (Workbench)

Za prikaz objekata u podatkovnom modelu se koriste grafički primitivi / vizuali koji imaju svoje semantičku određenost. Postoji nekoliko poznatijih notacija: Information Engineering (IE) tzv. Crow's foot, IDEF1X, UML.
Na slici se koristi IE notacija.

Veza 1:1 Non-identifying

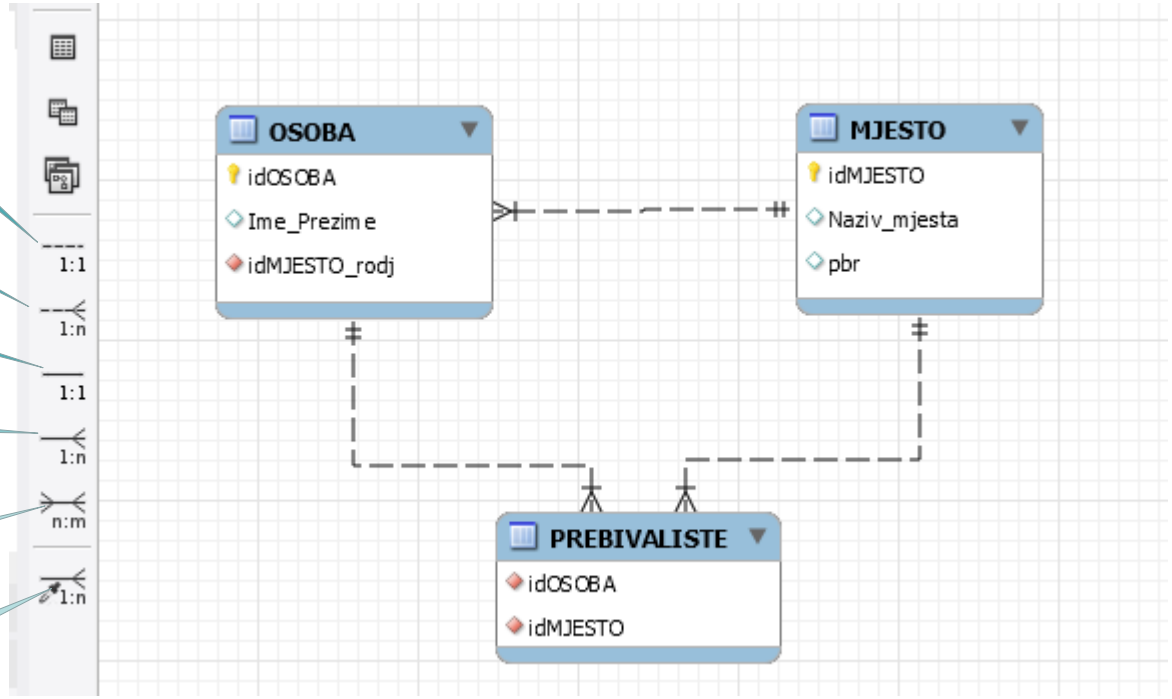
Veza 1:n Non-identifying

Veza 1:1 Identifying

Veza 1:n Identifying

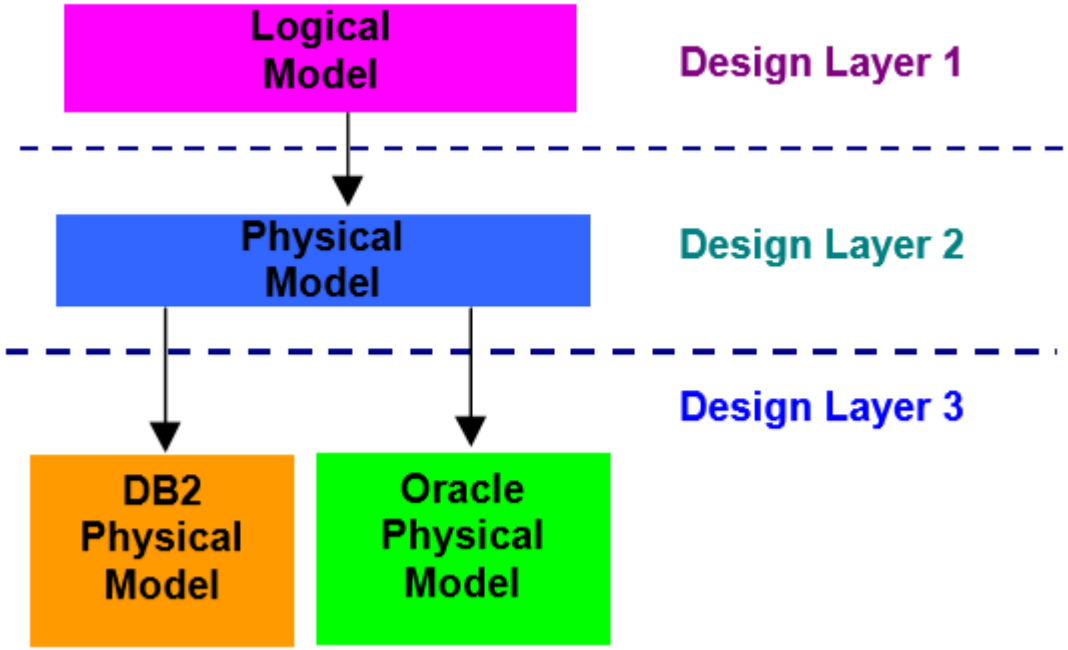
Veza n:m

Veza 1:n Identifying (ne generira FK već koristi postojeće atribute)



Izrada konceptualnog / logičkog modela

Kod izrade modela podataka postoji određen slijed aktivnosti (faza) i u svakoj fazi nastaje određen tip modela.



PRIMJER izrade konceptualnog / logičkog modela i generiranje fizičkog modela u shemu (FE)

ZADATAK:

1. Izraditi segment logičkog modela podataka koji treba omogućiti prikazivanje sljedećih znanja:

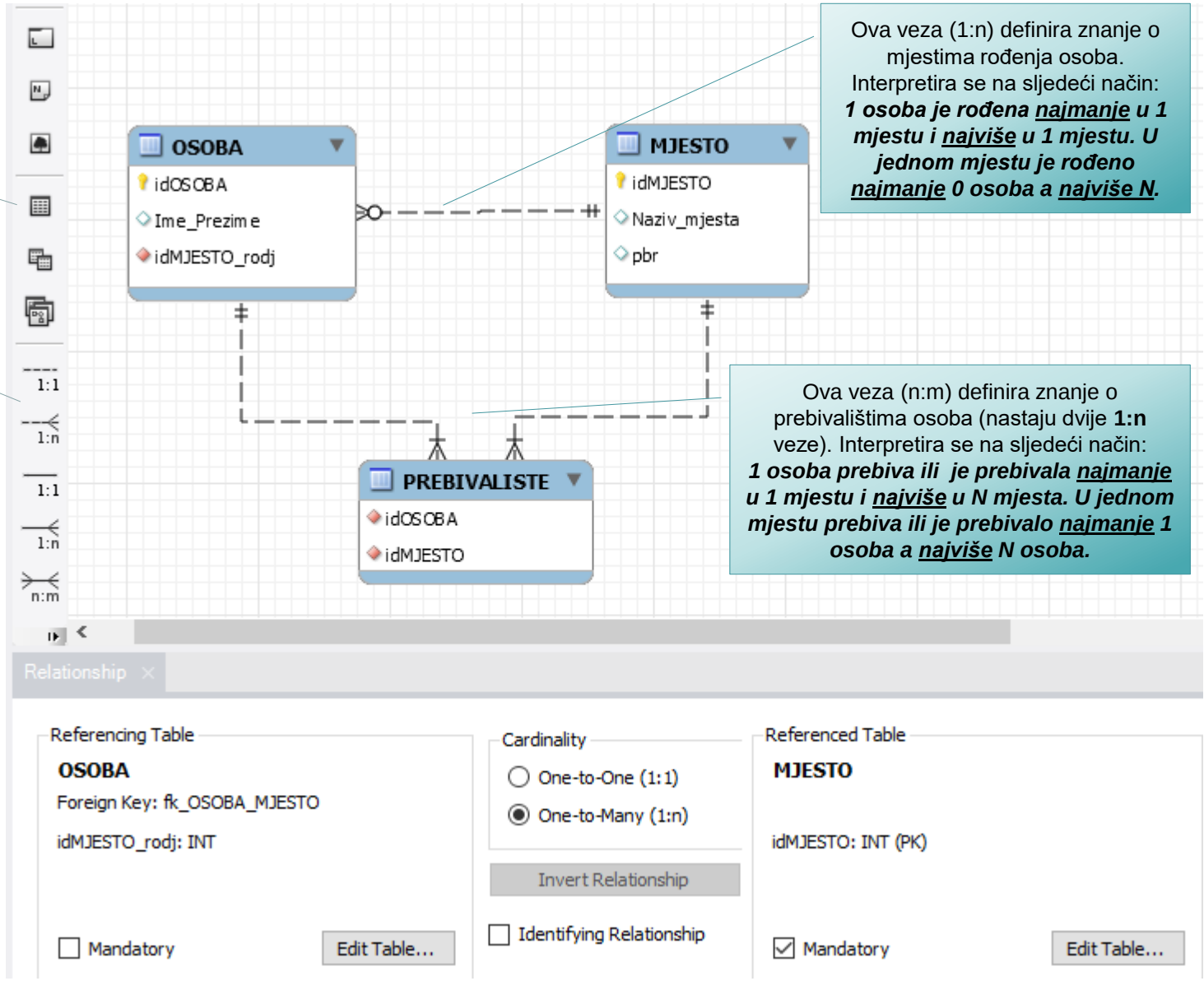
- **Podaci o mjestima rođenja osoba u RH**
- **Podaci o prebivalištima osoba u RH (trenutno prebivalište i povijest promjena prebivališta)**

2. Koristeći funkcionalnost FE (Forward Engineeringa) generirati fizički model u shemu mydb.

1. Izrada konceptualnog / logičkog modela u WB-u

Nova tablica/entitet

Veze

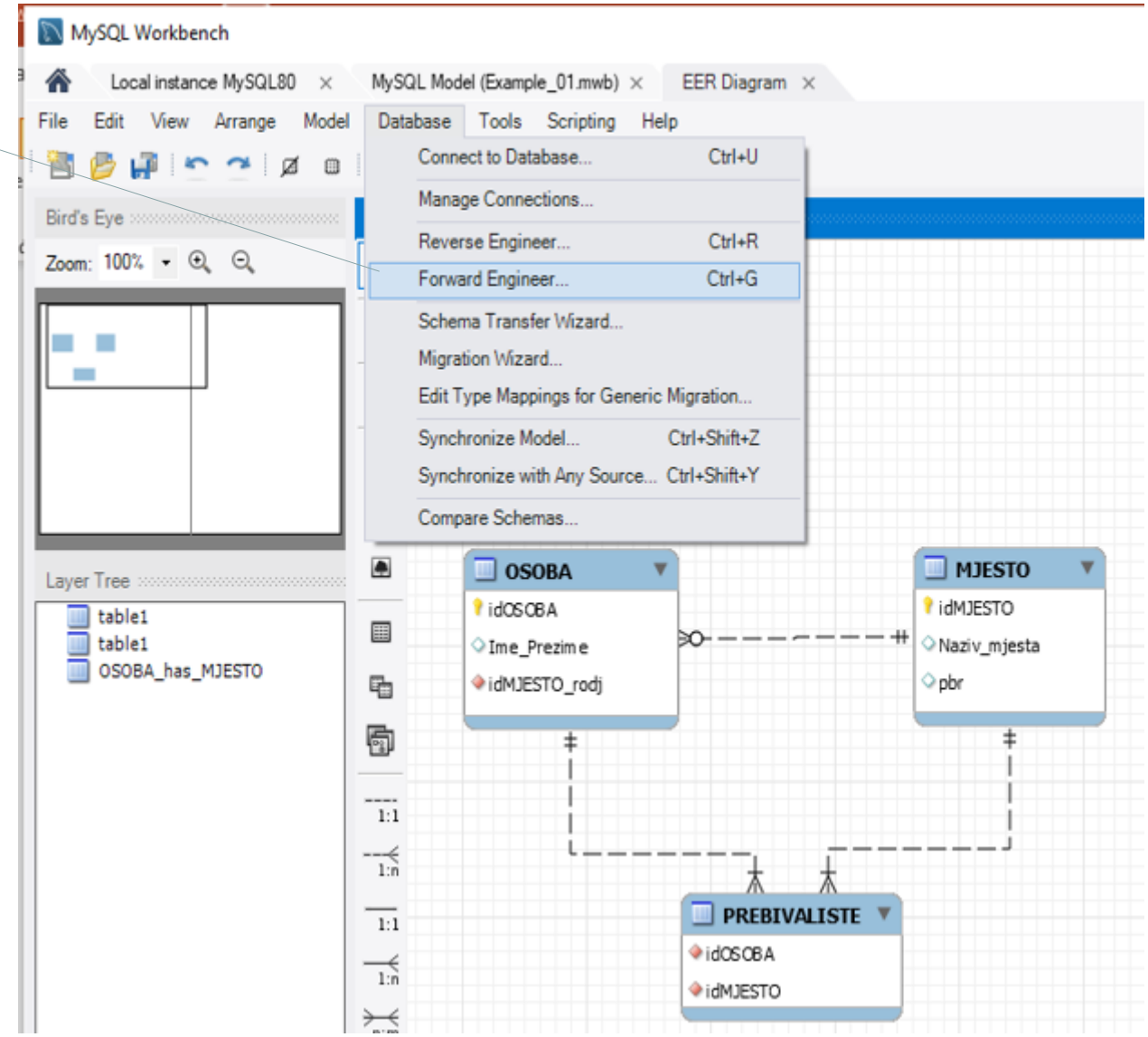


Ova veza (1:n) definira znanje o mjestima rođenja osoba. Interpretira se na sljedeći način: ***1 osoba je rođena najmanje u 1 mjestu i najviše u 1 mjestu. U jednom mjestu je rođeno najmanje 0 osoba a najviše N.***

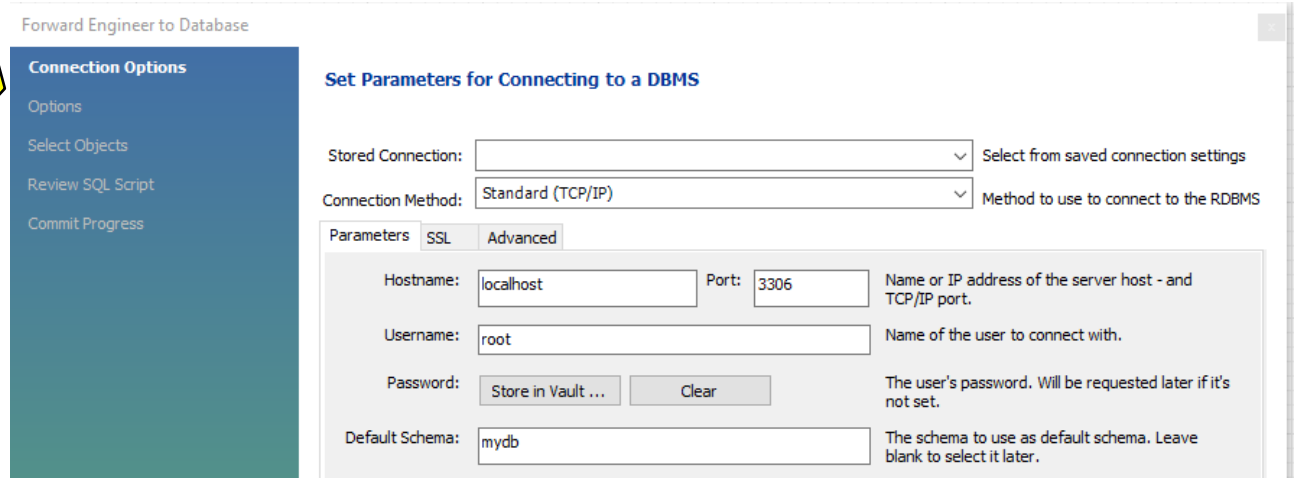
Ova veza (n:m) definira znanje o prebivalištima osoba (nastaju dvije **1:n** veze). Interpretira se na sljedeći način: ***1 osoba prebiva ili je prebivala najmanje u 1 mjestu i najviše u N mjesta. U jednom mjestu prebiva ili je prebivalo najmanje 1 osoba a najviše N osoba.***

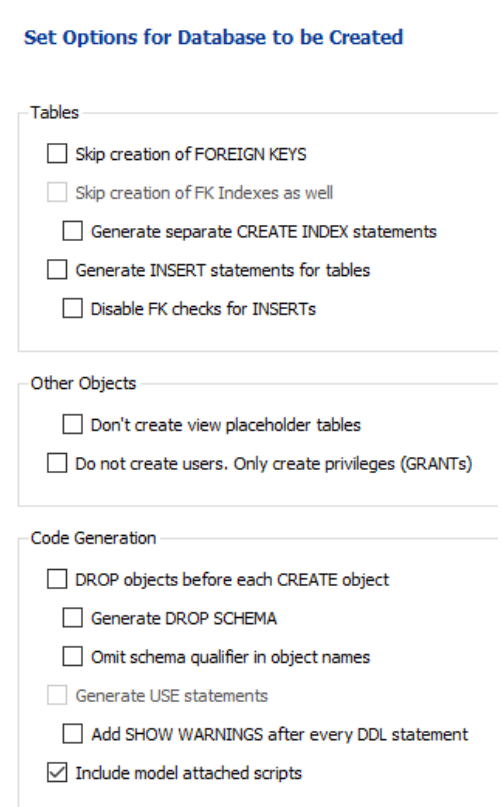
2. Pokretanje funkcionalnosti
Forward Engineering (FE)

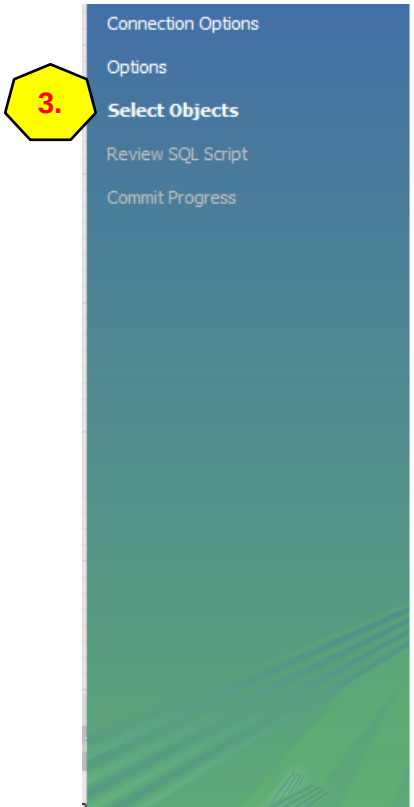
Odabrati:
Database /
Forward Enginner

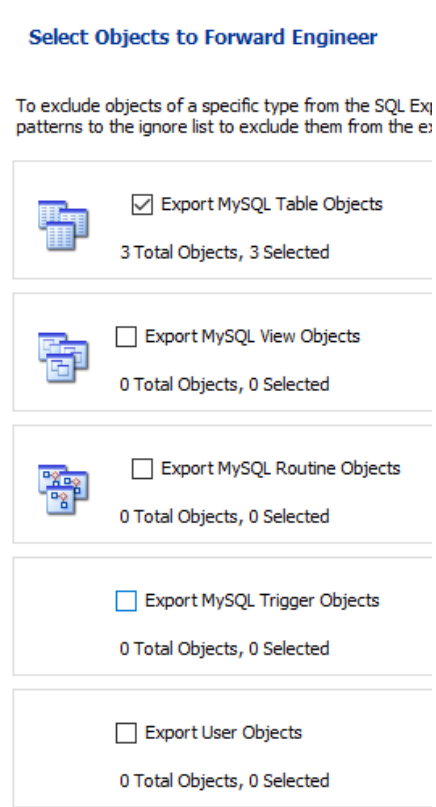


Izrada konceptualnog / logičkog modela u WB-u
- odabir konekcije, opcije, odabir objekata



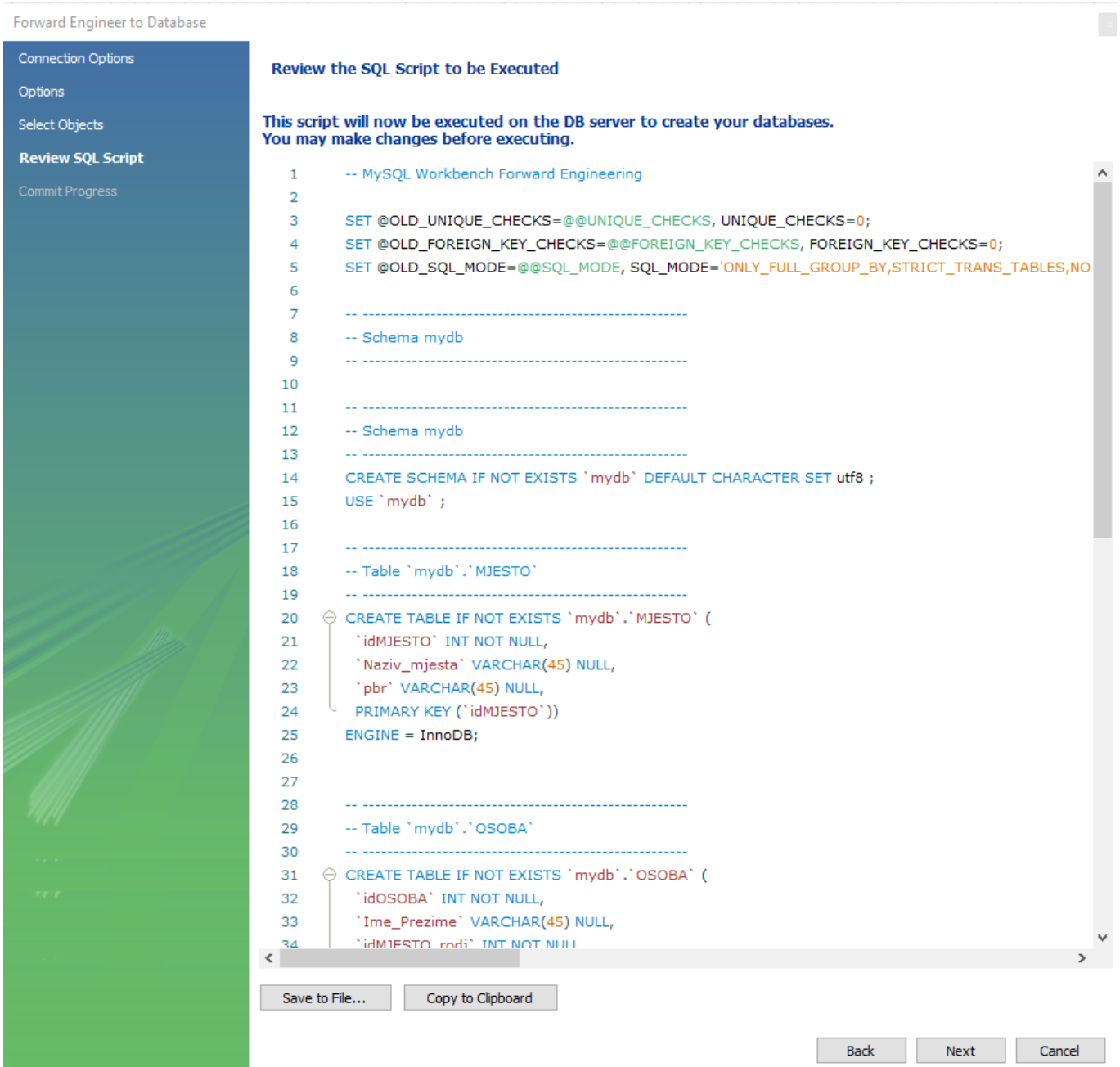






Generiranje SQL skripte

4.

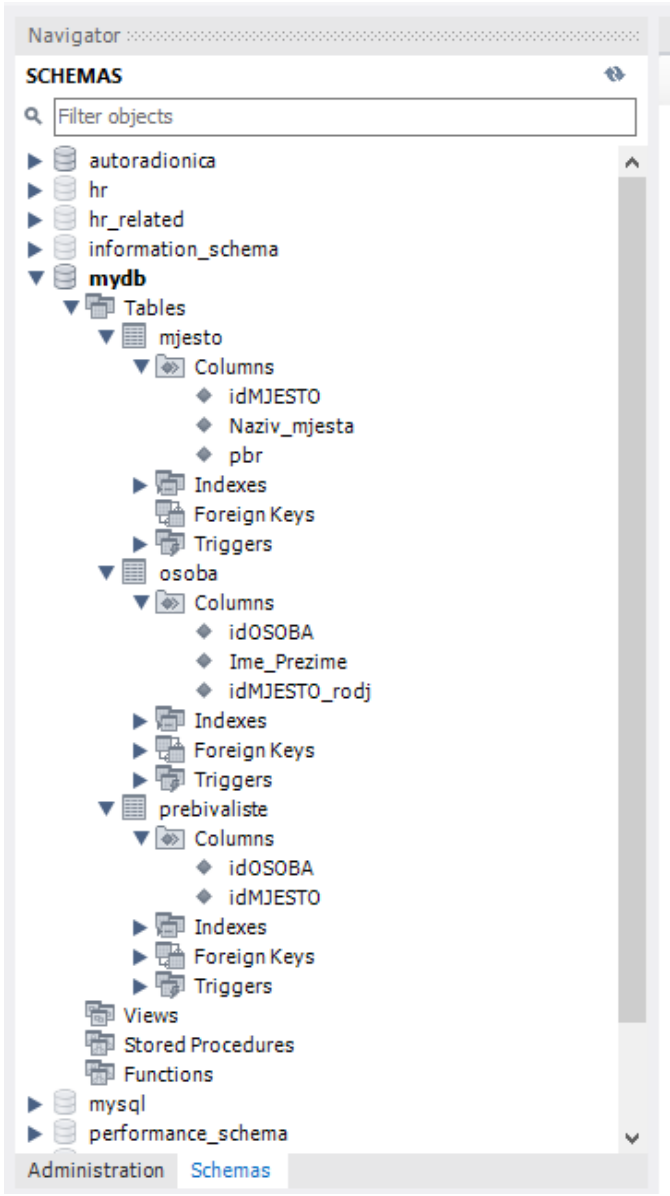


Izvršavanje SQL skripte

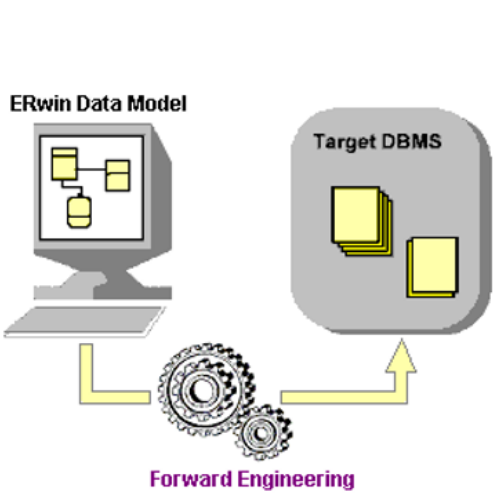
5.

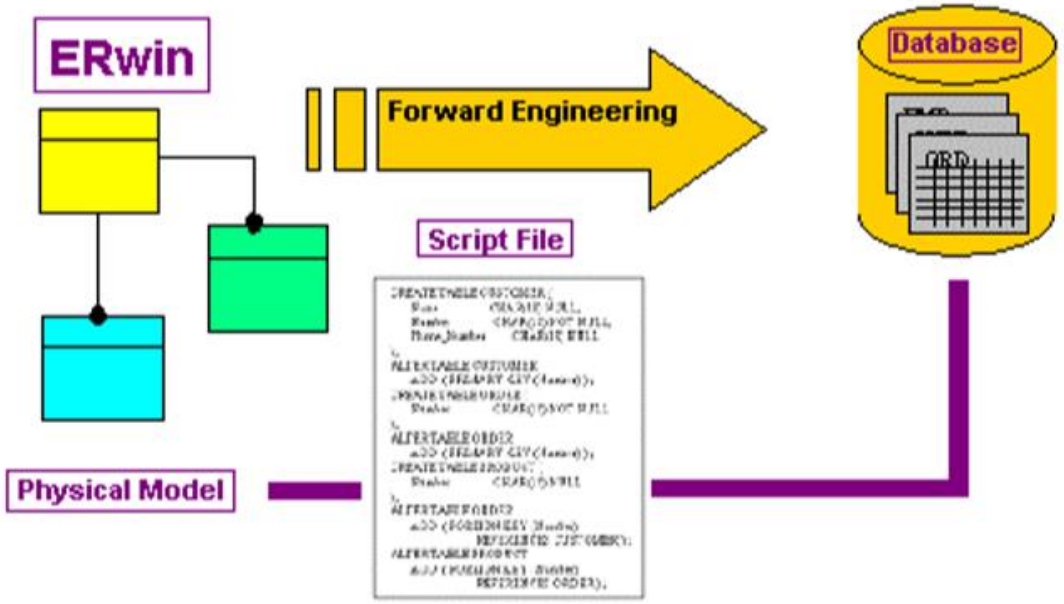
Prikaz fizičke baze nakon SQL skripte

6.



Forward Engineering (FE)
generiranje fizičkog modela iz logičkog u Erwin-u

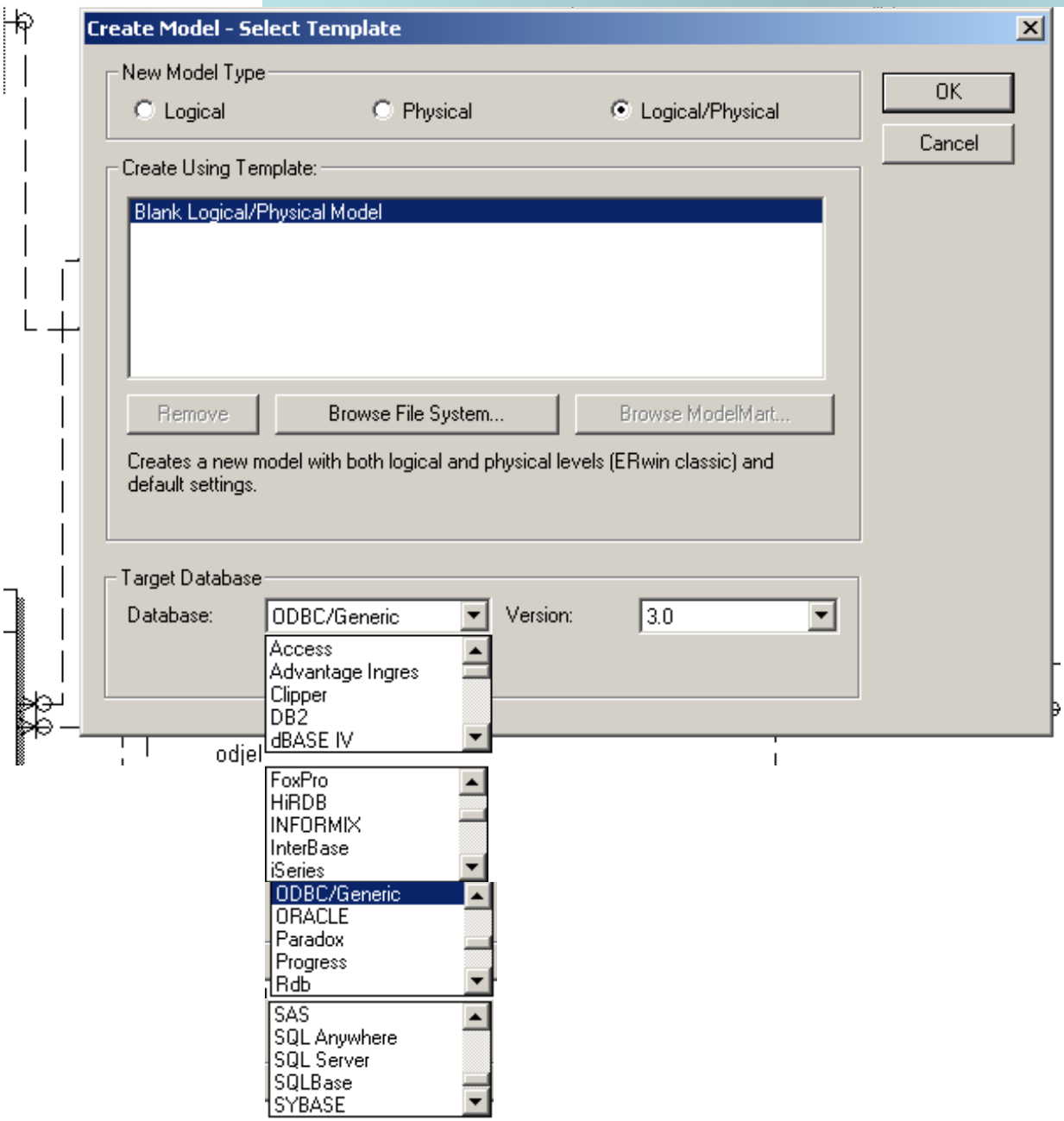




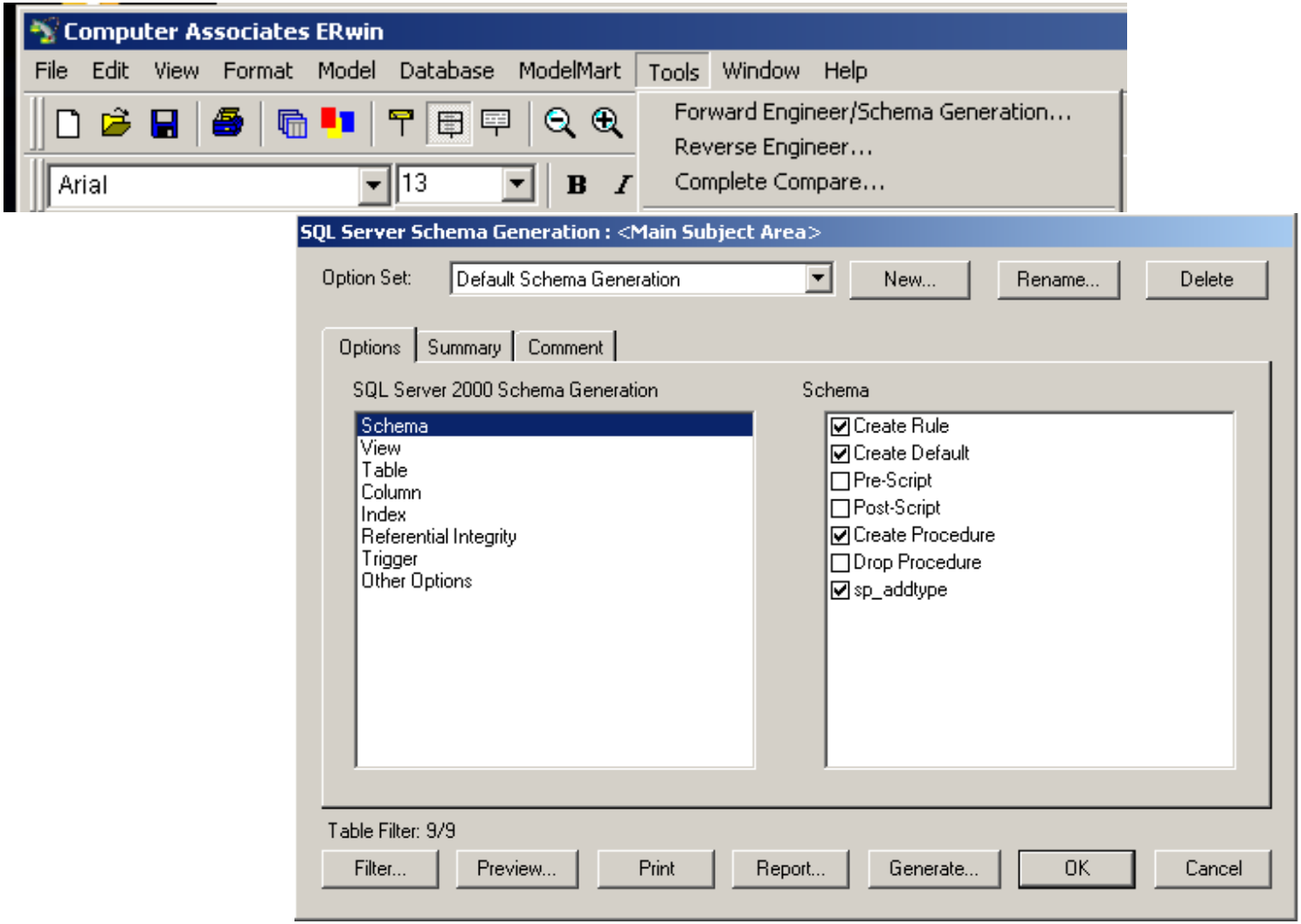
Forward engineering („Inženjering prema naprijed”) predstavlja proces generiranja fizičke baze podataka iz logičkog modela.
Pogodnost se ogleda u brzini kreiranja objekata baze i to u željenoj bazi (Oracle, DB2, SQL Server, ..)
Moguće je odabrati koji objekti će biti kreirani:

- **Tablice**
- **Indeksi**
- **Triggers**
- **Pohranjene procedure**
- **Constraints**
- **Drugi objekti, ovisno o target bazi.**

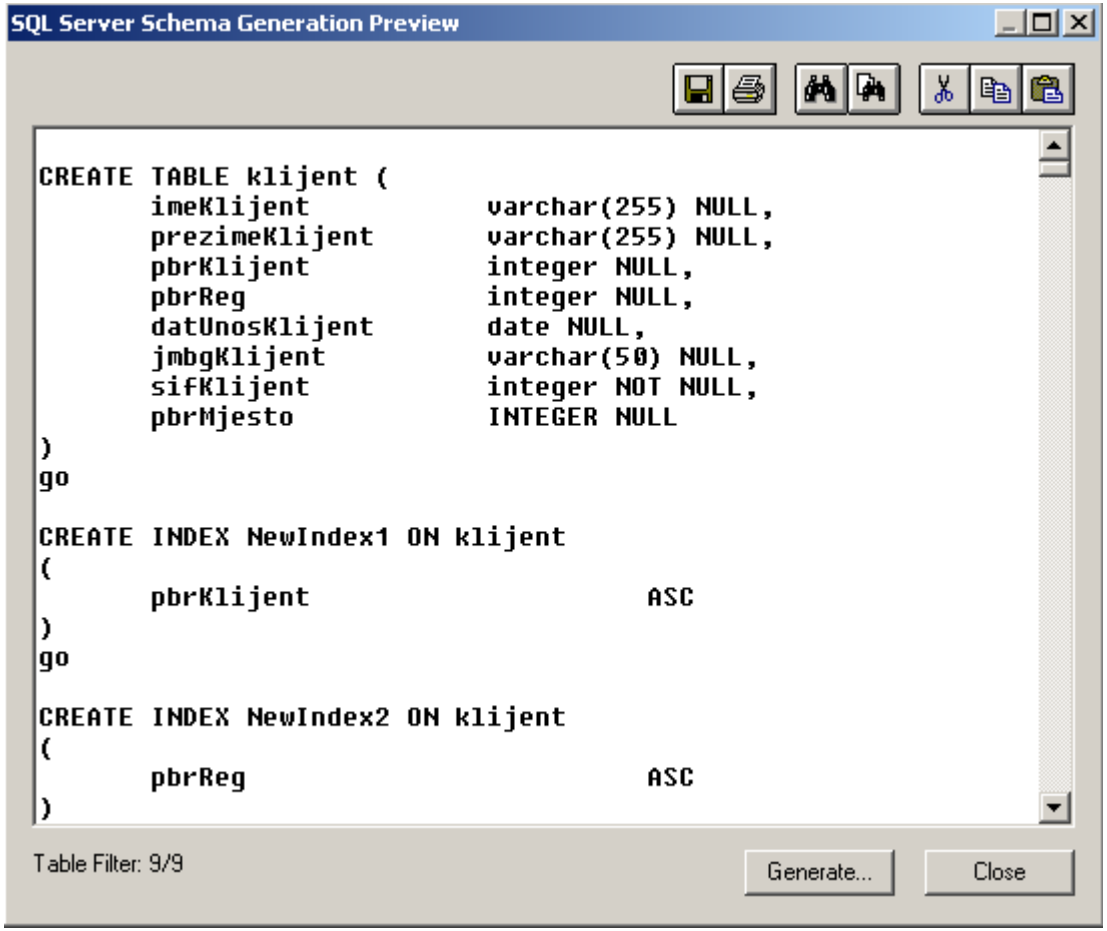
FORWARD ENGINEERING u ERwin-u
Prikaz formata baze



FORWARD ENGINEERING u Erwin-u
Odabir postavki za import



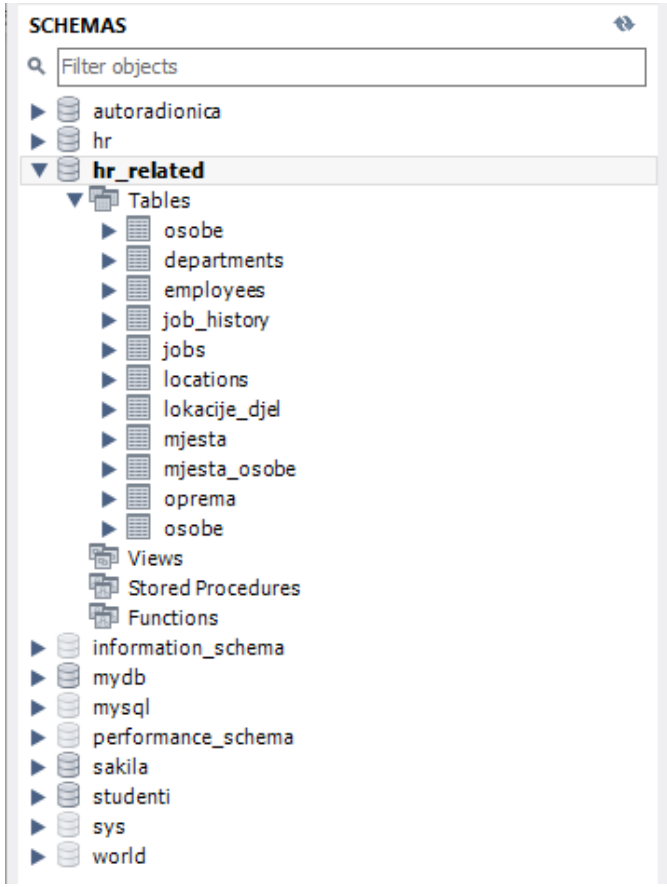
FORWARD ENGINEERING u Erwin-u
Generiranje skripte



PRIMJER Generiranja logičkog modela iz fizičke baze (RE)

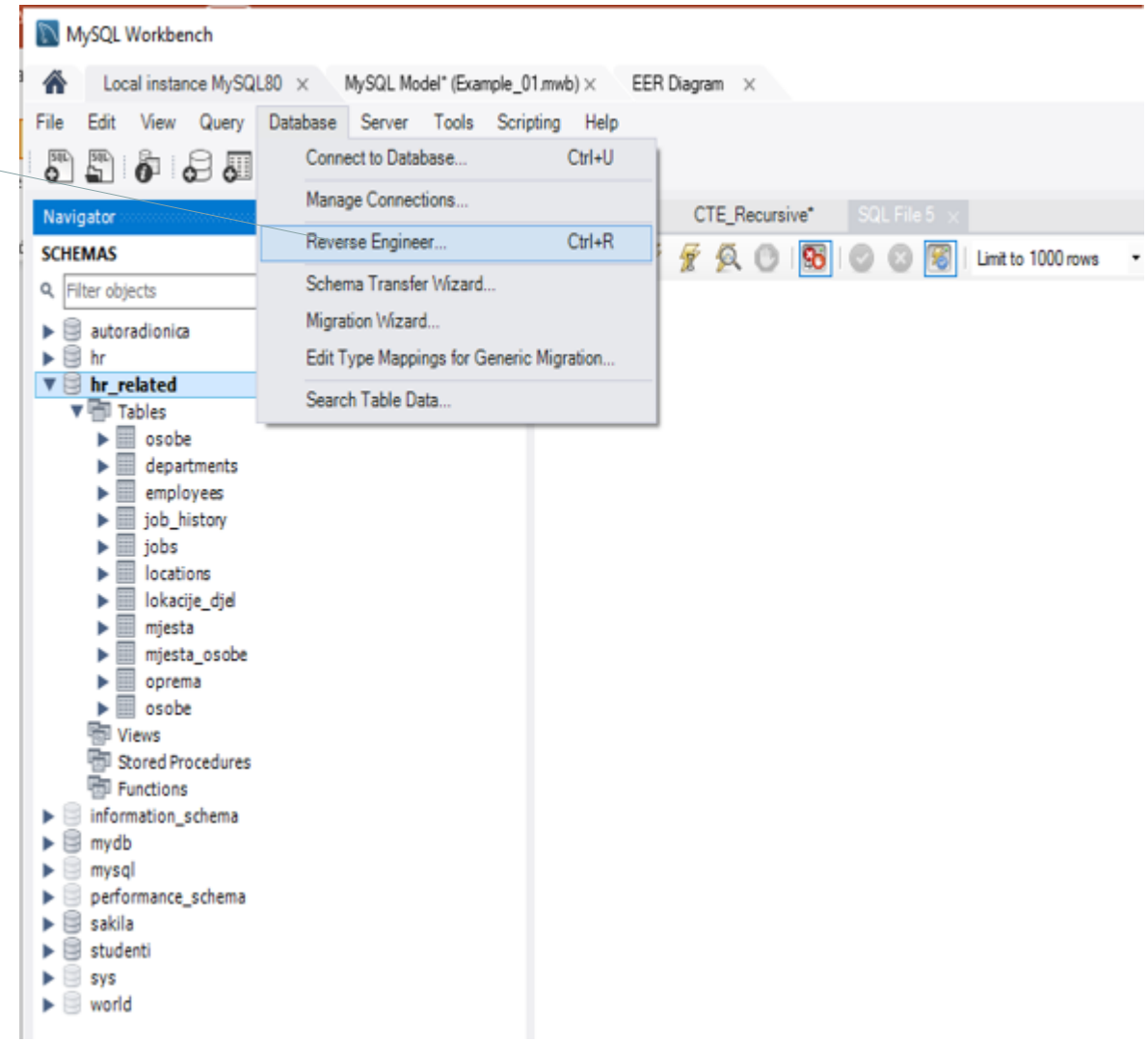
ZADATAK:

Koristeći funkcionalnost RE (Reverse Engineeringa) generirati logički model koristeći željenu shemu hr_related.



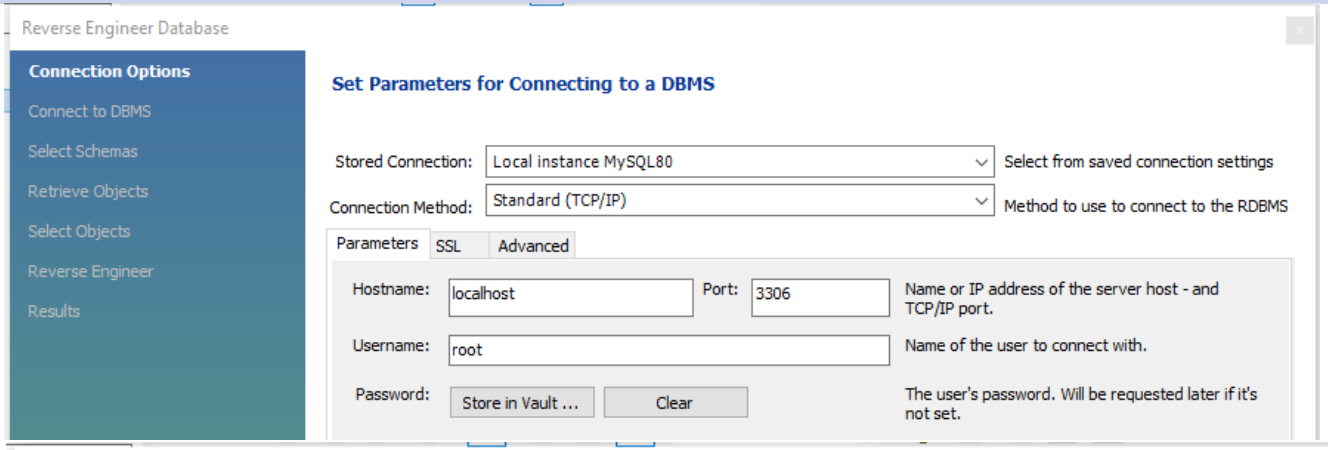
Pokretanje Reverse Engineering (RE)

Odabrati:
Database /
Reverse Enginner

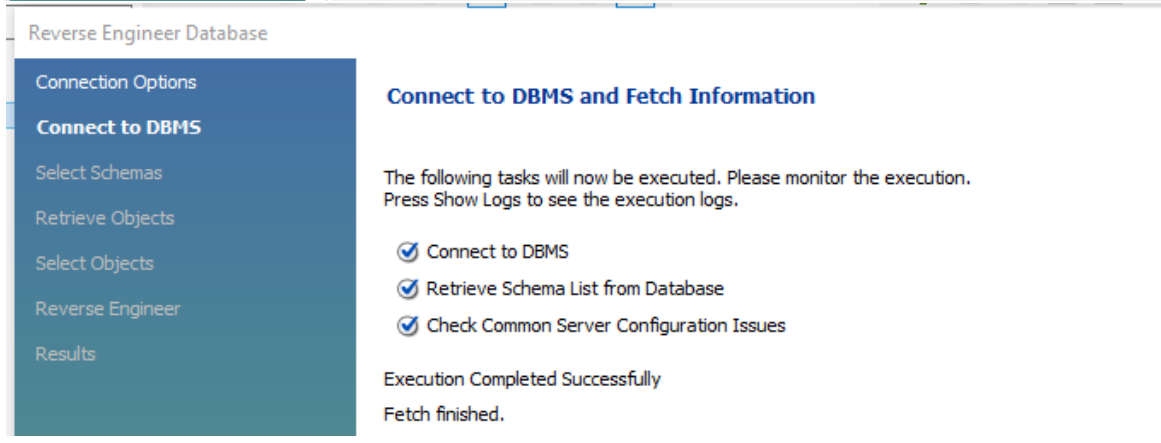


Odabir parametara, konekcija na bazu, odabir sheme

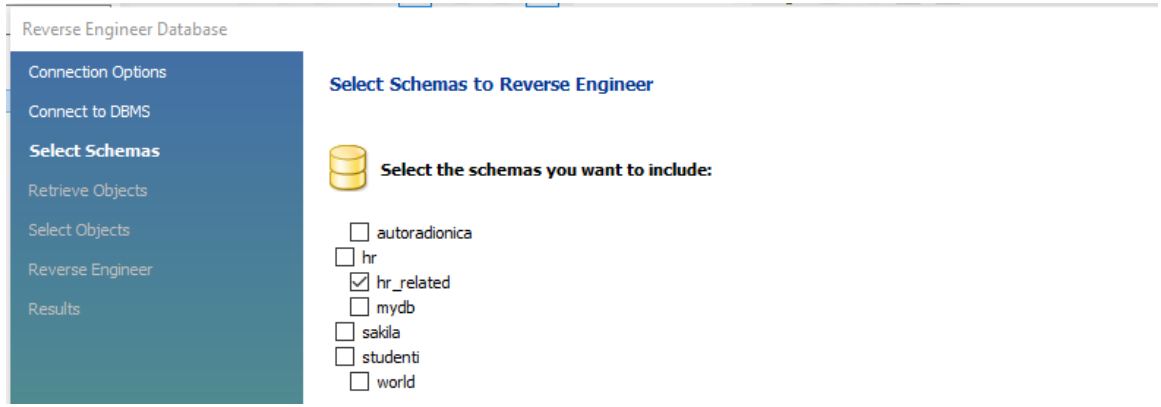
1.



2.

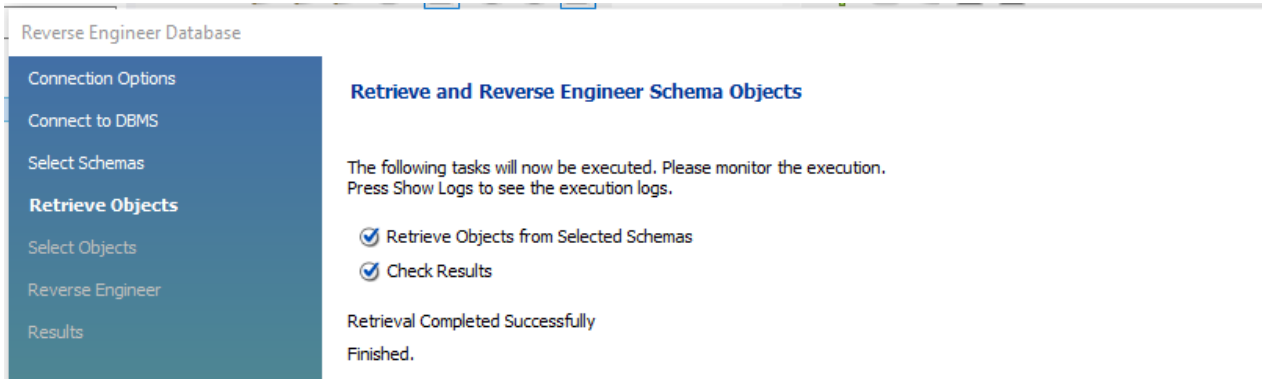


3.

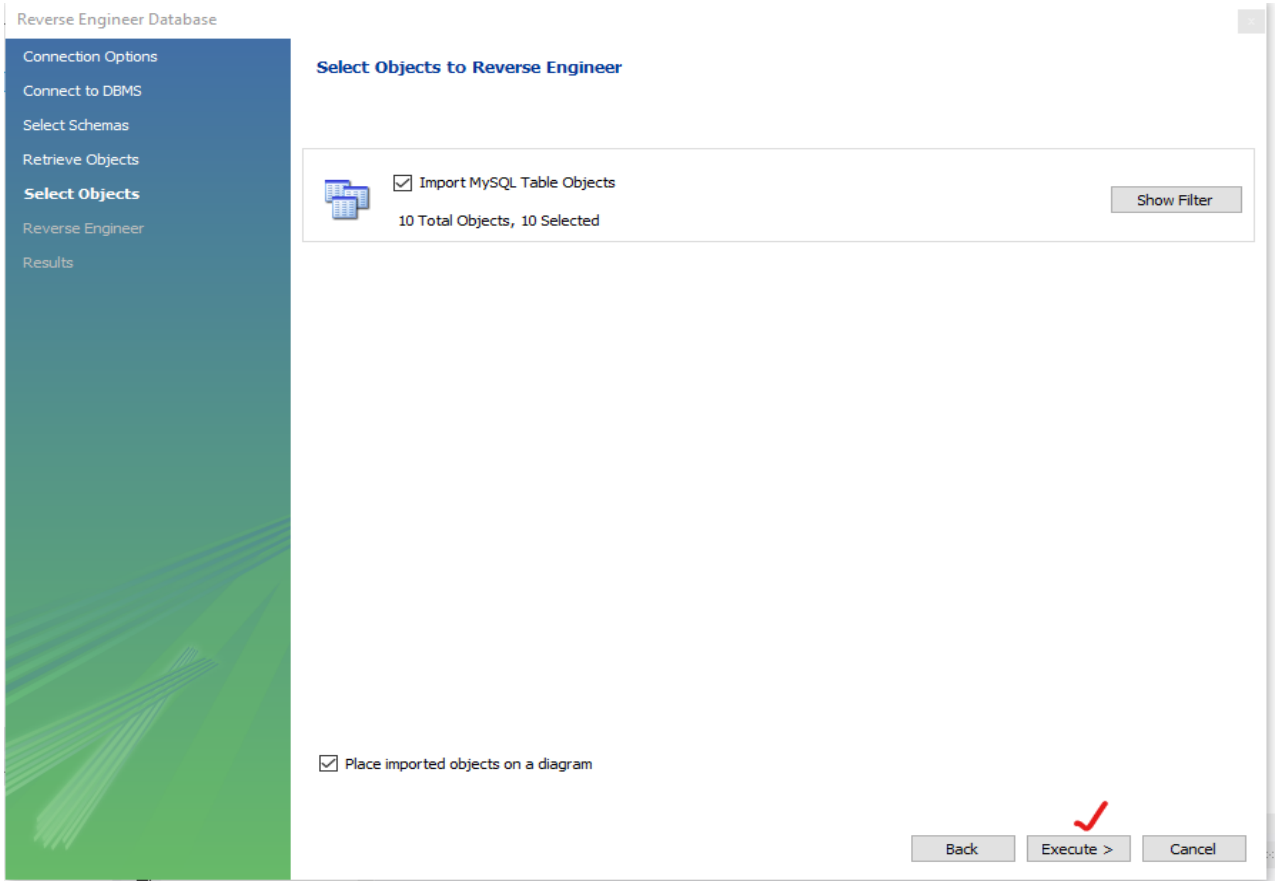


Dohvat i odabir objekata

4.

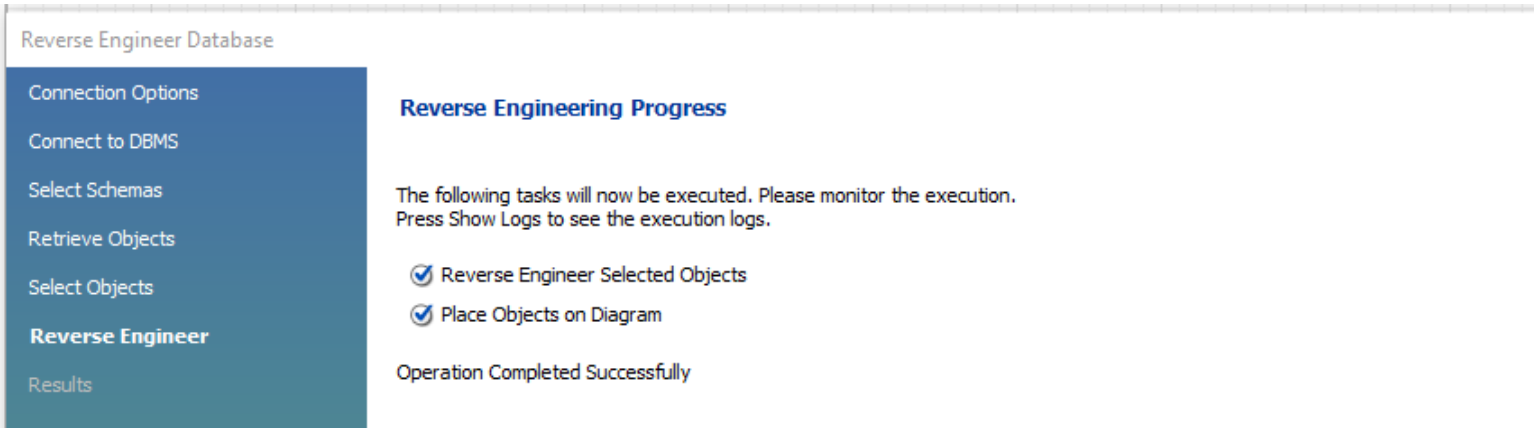


5.



Prikaz opcija izvršenja i rezultata

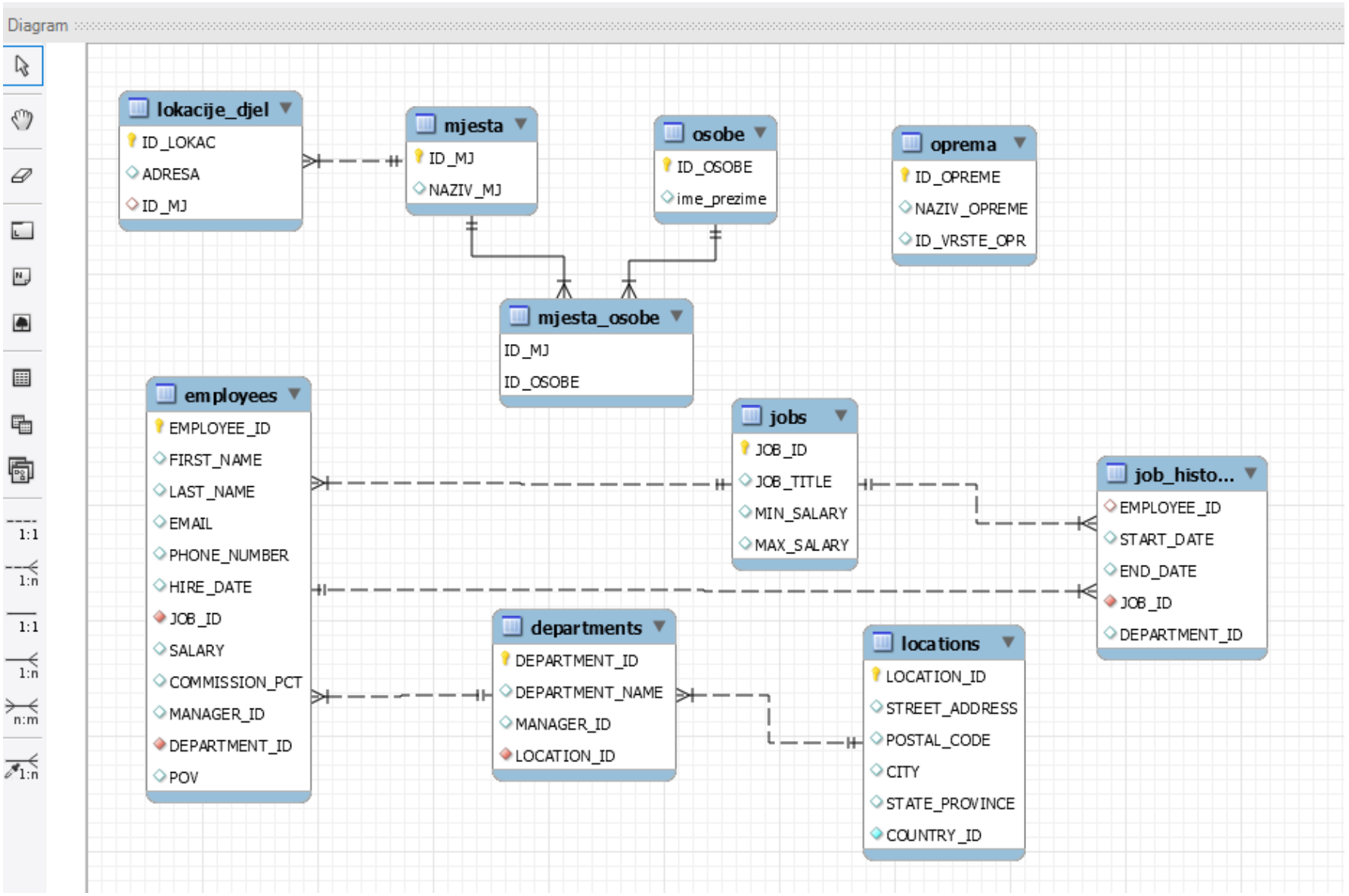
6.



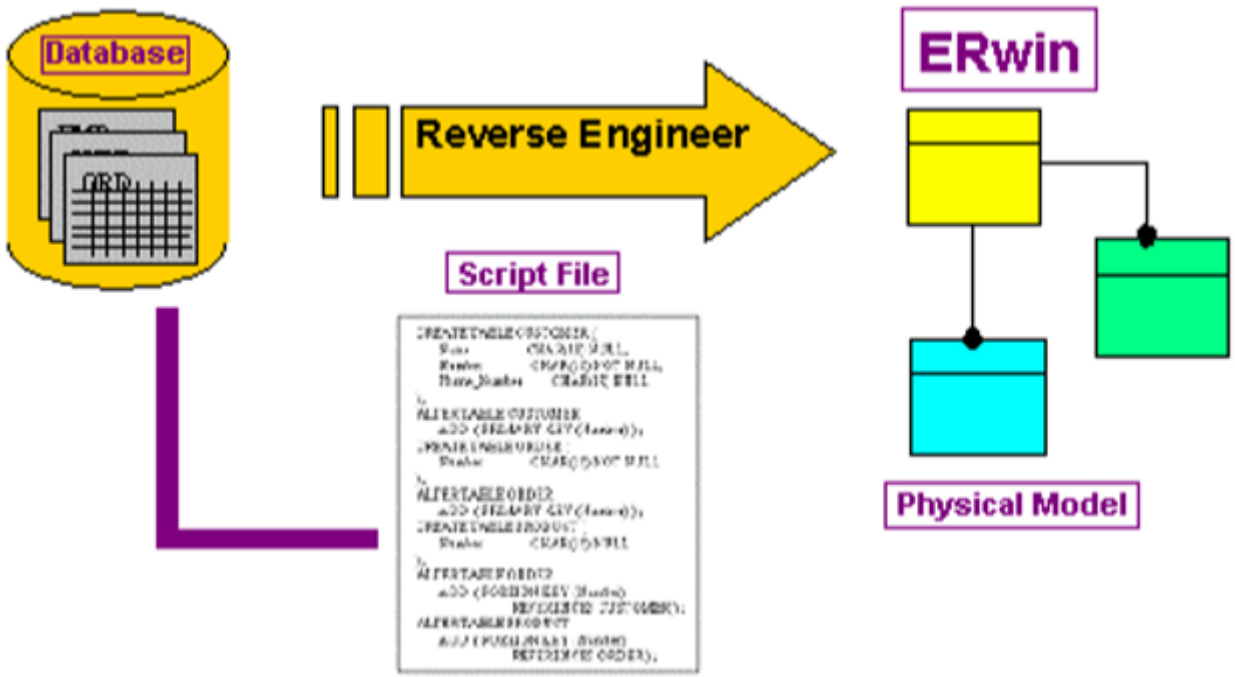
7.

Odabir parametara, konekcija na bazu, odabir sheme

8.

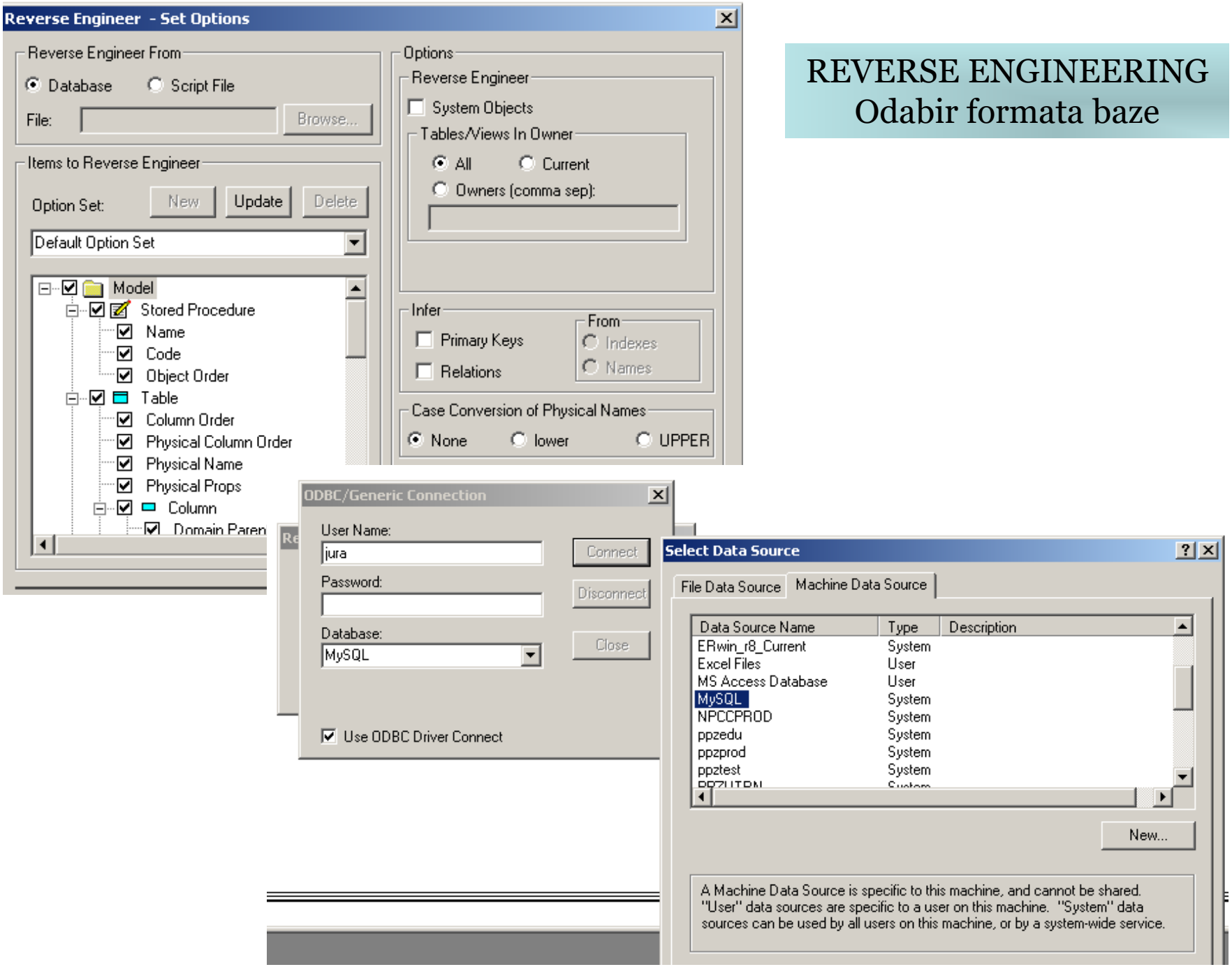


Reverse Engineering (RE) ERwin
- generiranje logičkog modela iz fizičkog

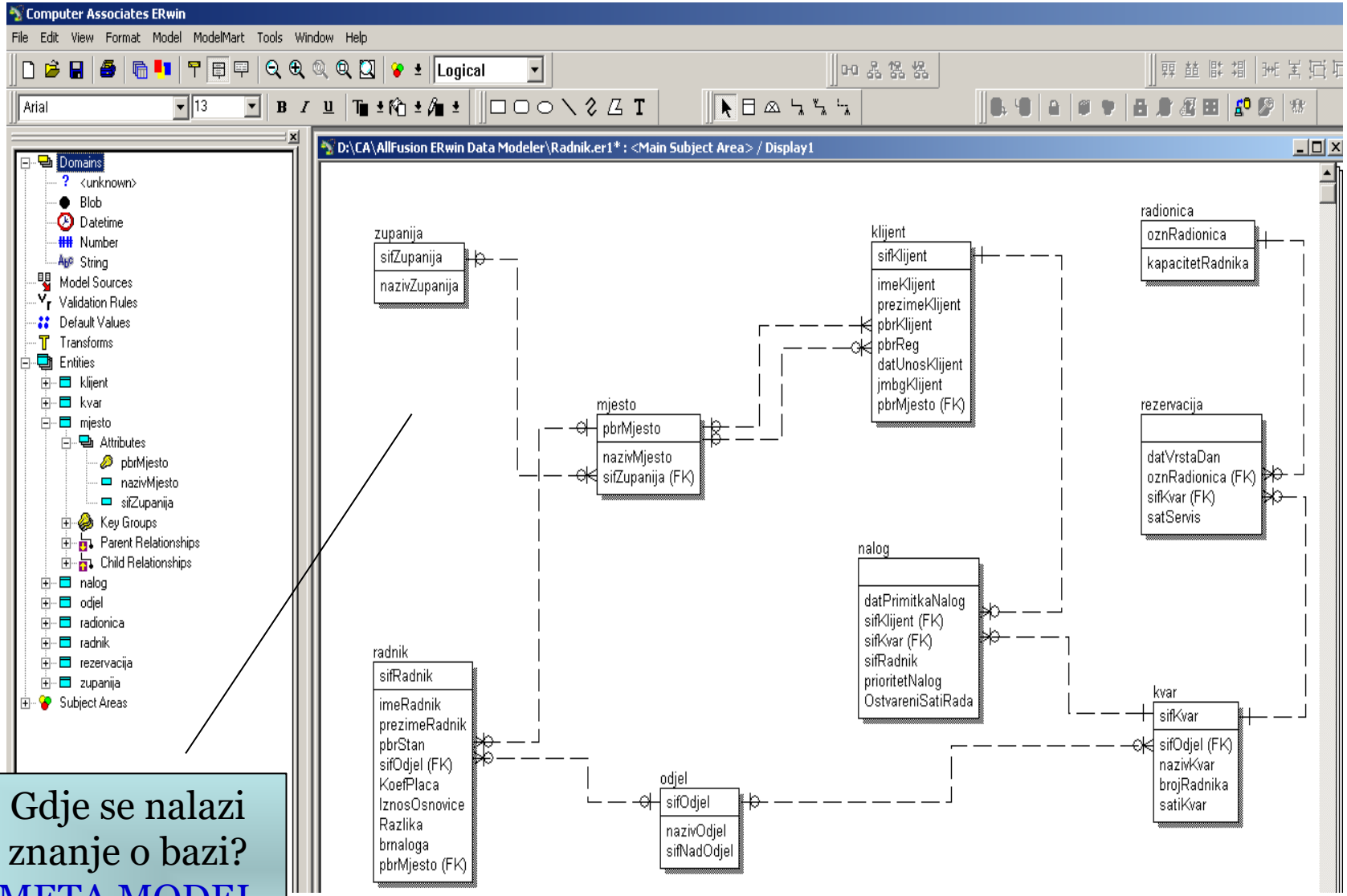


Reverse Engineering („Reverzni Inženjering”) predstavlja proces generiranja logičkog modela iz fizičke baze podataka.
Pogodnost se ogleda u velikoj brzini kreiranja logičkog modela i to iz željene baze (Oracle, DB2, SQL Server, ..) što značajno štedi vrijeme kod spoznavanja strukture neke fizičke baze.

REVERSE ENGINEERING
Odabir formata baze

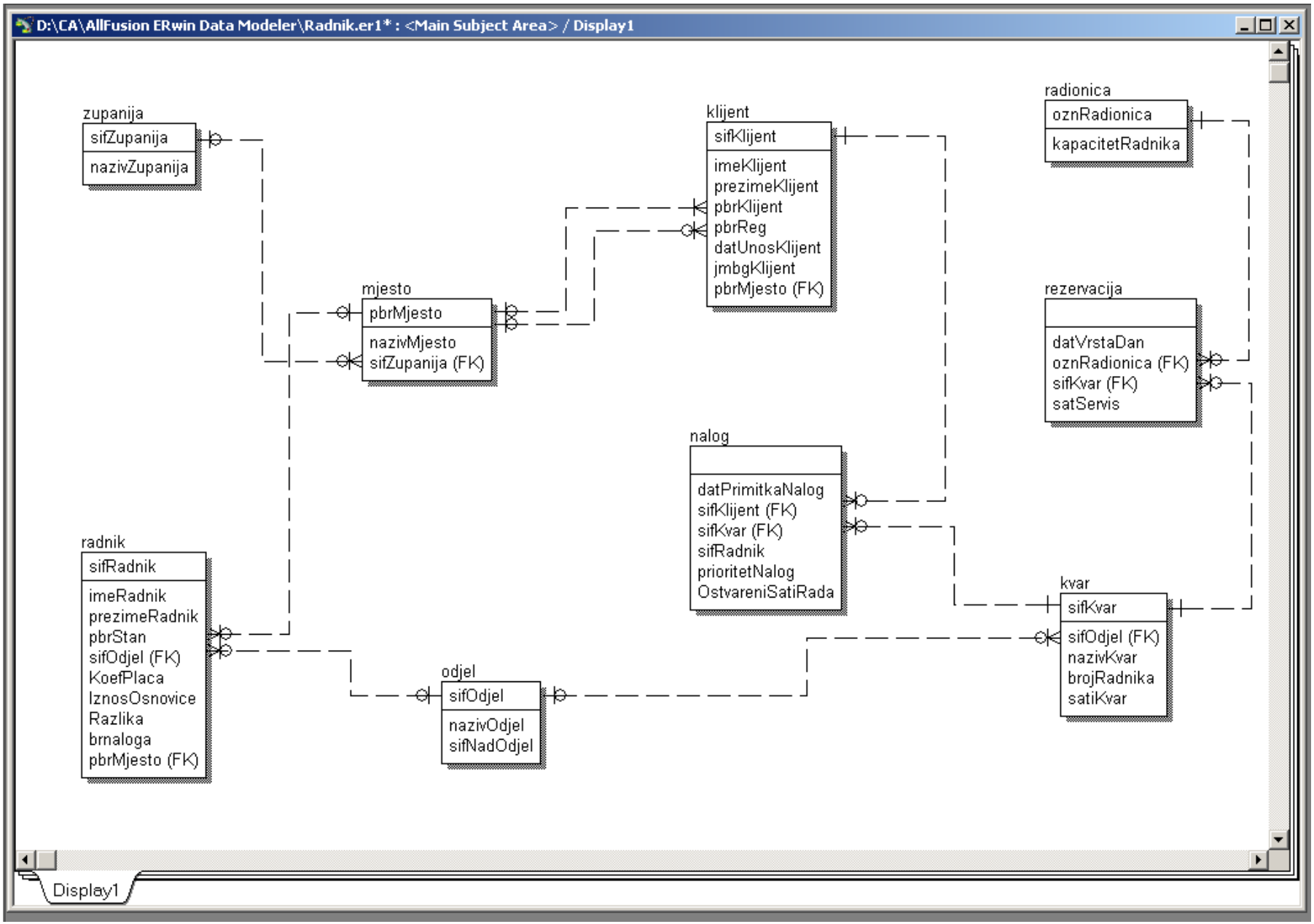


REVERSE ENGINEERING
Generirani entiteti



Gdje se nalazi znanje o bazi?
META MODEL

REVERSE ENGINEERING
Relacijski model baze



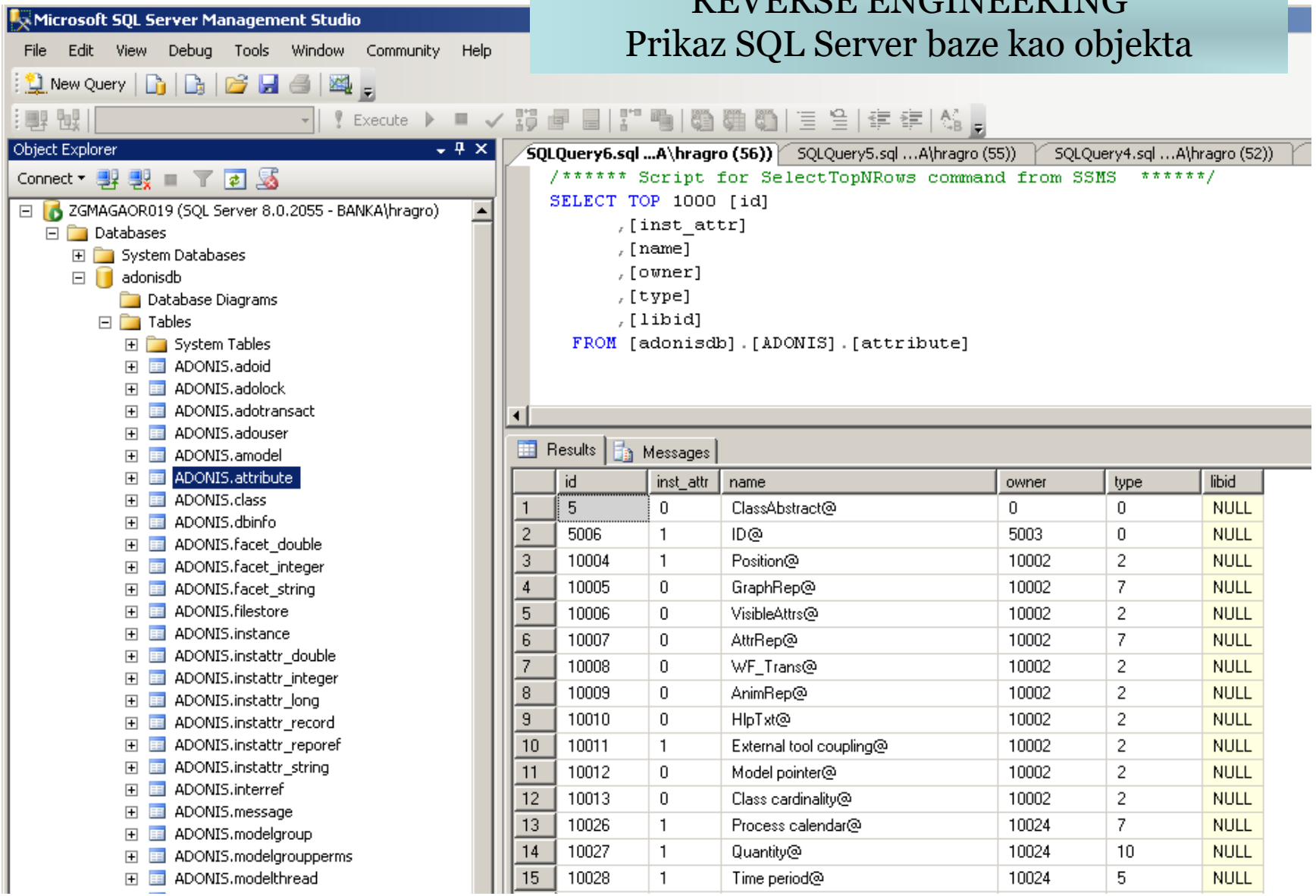
MIGRACIJA MODELA BAZE PODATAKA

Primjer SQL SERVER → MySql

Aktivnosti za izvođenje migracije modela:

- **Reverzni inženjering fizičke baze na SQL Serveru**
- **ERwin sadrži logički model koji se može mijenjati (dodati entitete, povezati ih, brisati entitete, stvoriti nove veze itd.)**
- **Forward inženjering logičkog modela u fizičku MySQL bazu.**

REVERSE ENGINEERING
Prikaz SQL Server baze kao objekta



	id	inst_attr	name	owner	type	libid
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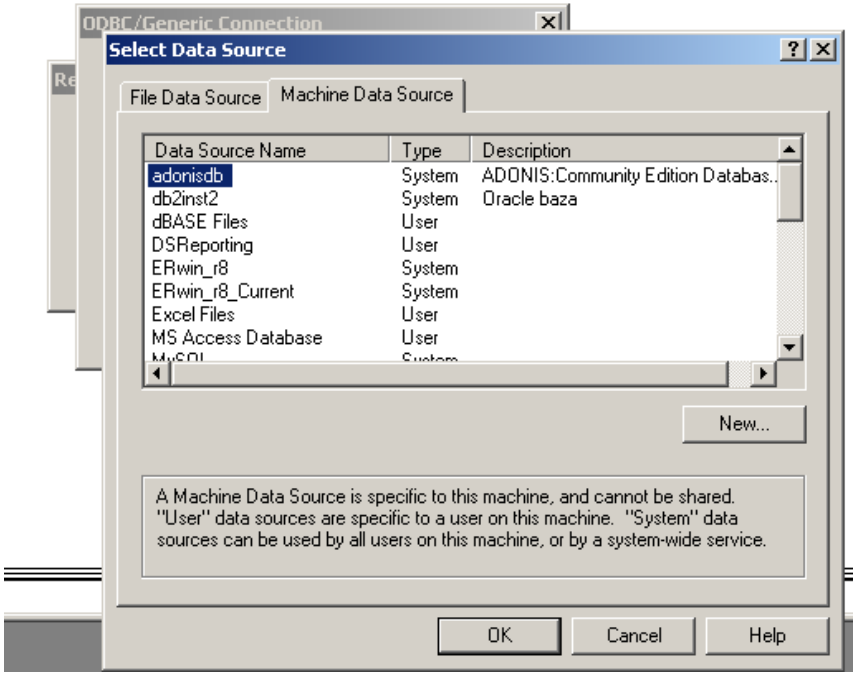
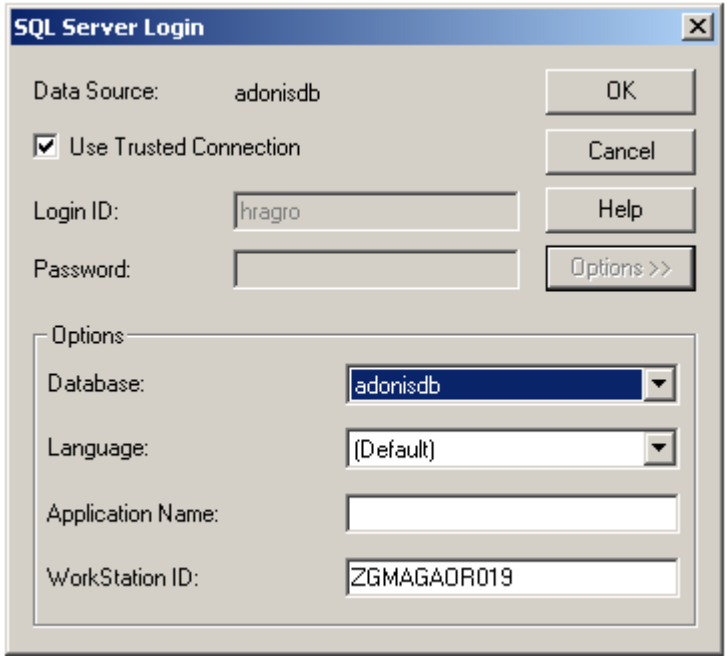
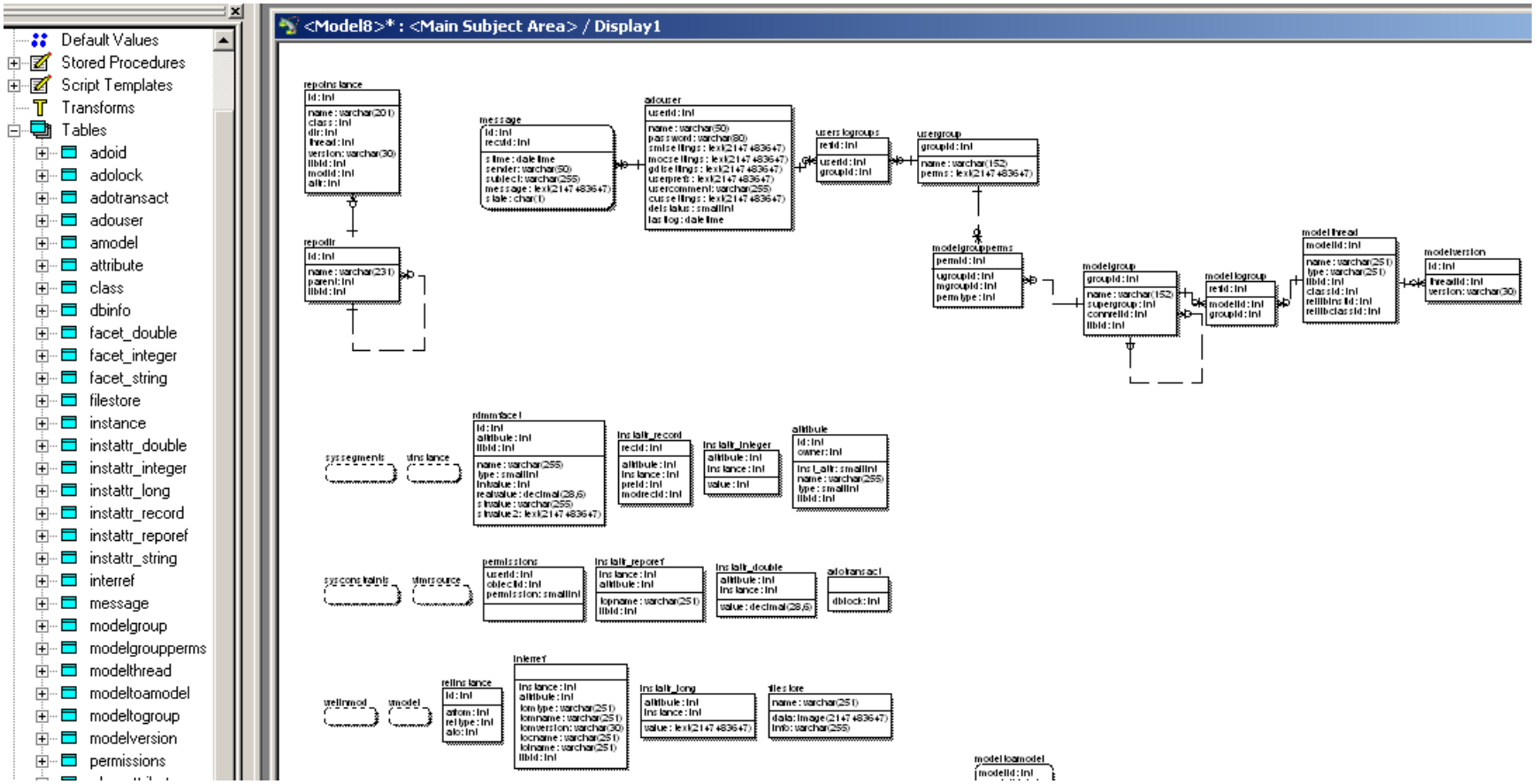
2	5006	1	ID@	5003	0	NULL
3	10004	1	Position@	10002	2	NULL
4	10005	0	GraphRep@	10002	7	NULL
5	10006	0	VisibleAttrs@	10002	2	NULL
6	10007	0	AttrRep@	10002	7	NULL
7	10008	0	WF_Trans@	10002	2	NULL
8	10009	0	AnimRep@	10002	2	NULL
9	10010	0	HlpTxt@	10002	2	NULL
10	10011	1	External tool coupling@	10002	2	NULL
11	10012	0	Model pointer@	10002	2	NULL
12	10013	0	Class cardinality@	10002	2	NULL
13	10026	1	Process calendar@	10024	7	NULL
14	10027	1	Quantity@	10024	10	NULL
15	10028	1	Time period@	10024	5	NULL

ODBC postavke SQL Server baze

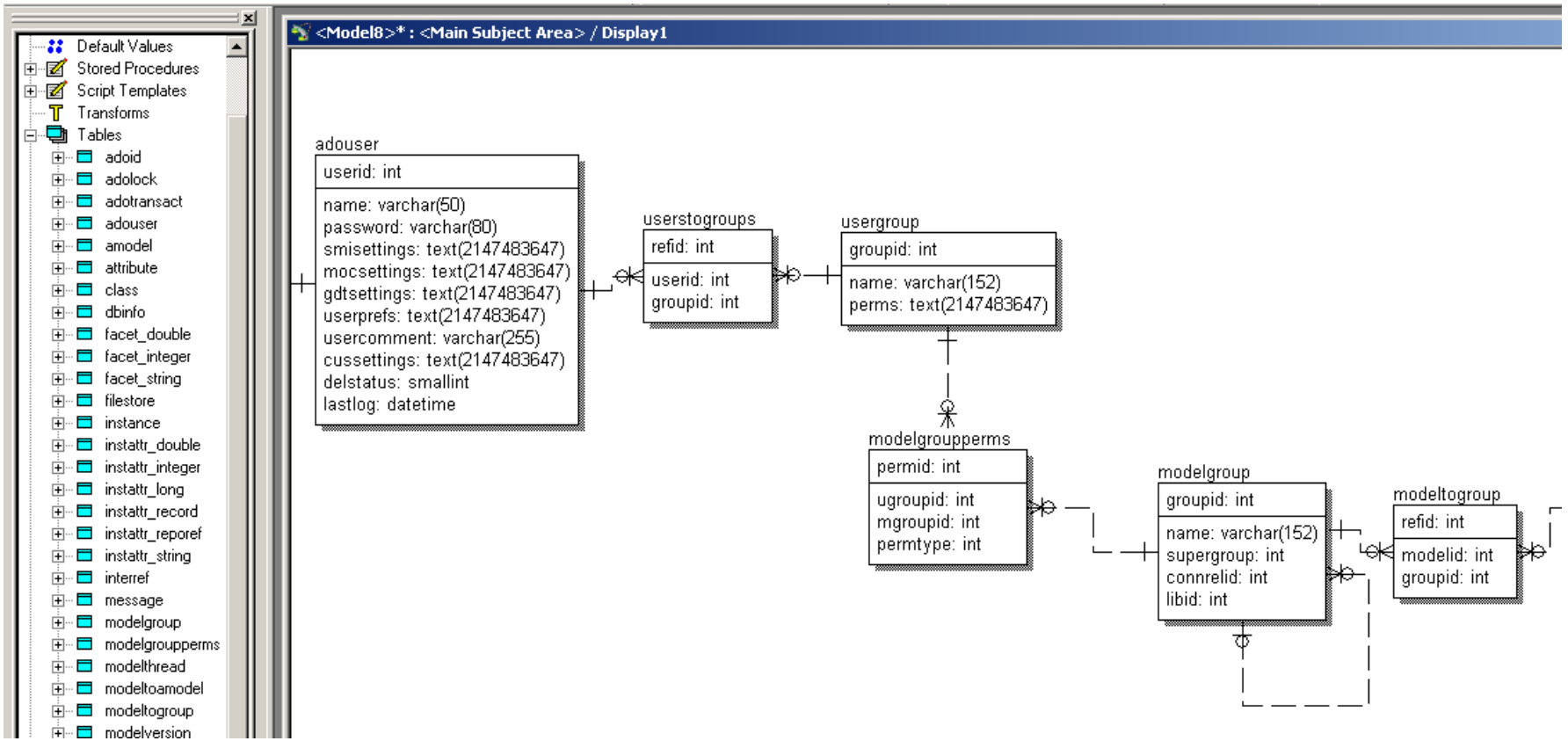




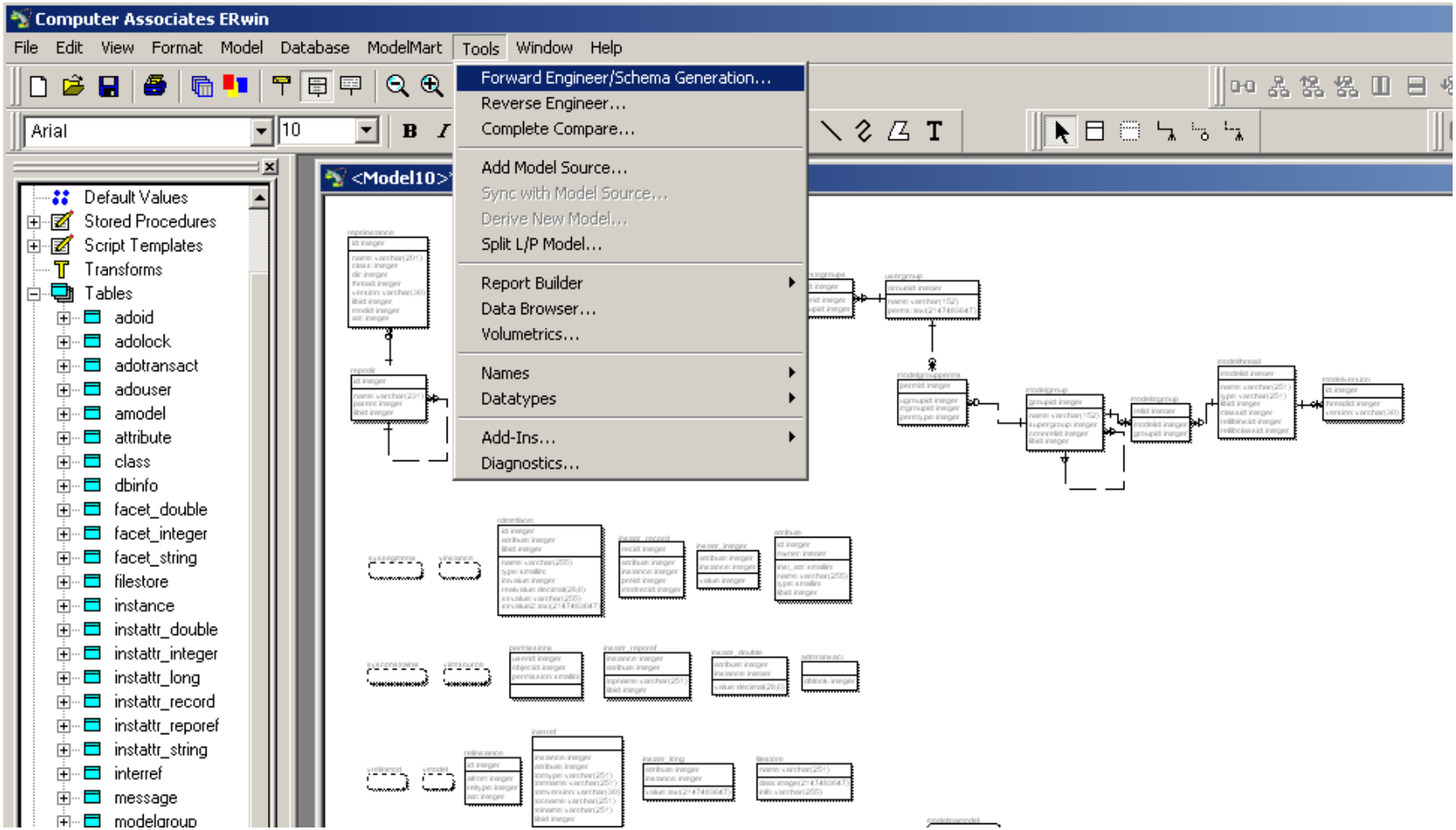
REVERSE ENGINEERING
Importirane tablice sada postaju to entiteti u Erwin-u



REVERSE ENGINEERING
Segment modela - detalji



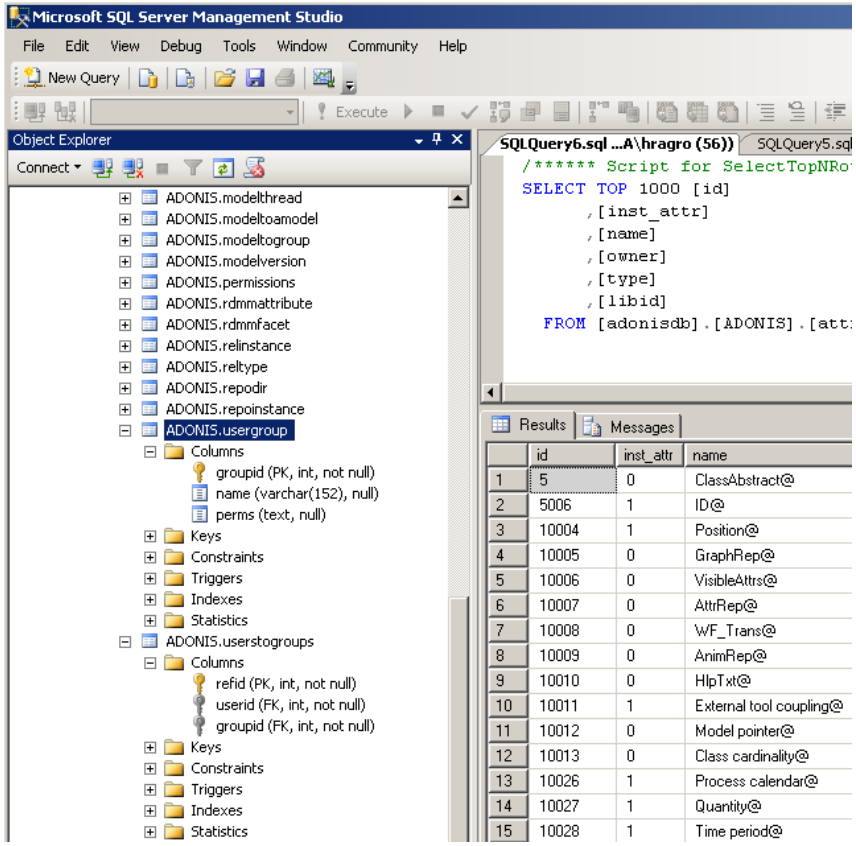
FORWARD ENGINEERING
logičkog modela u fizičku MySQL bazu

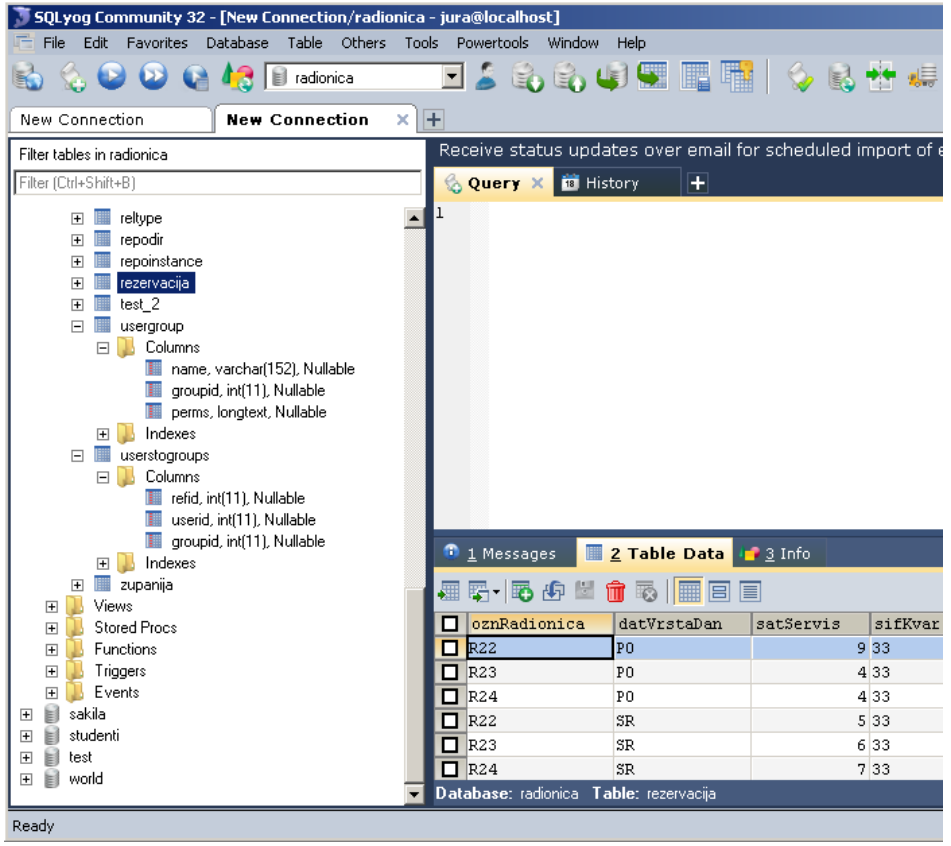


FORWARD ENGINEER
Komparacija izvorne i odredišne baze

SQL Server

MySQL



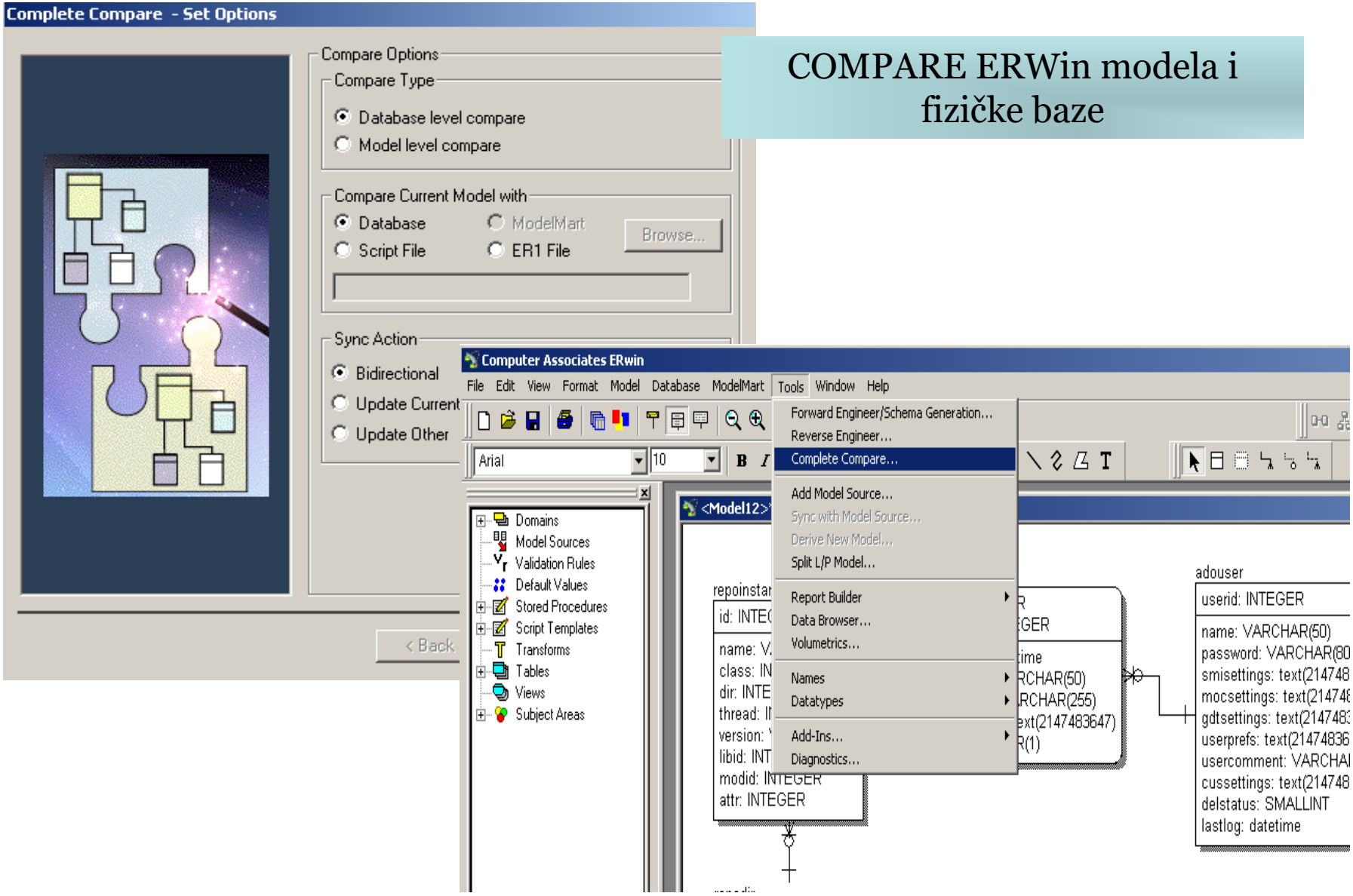


KOMPARACIJA / SINKRONIZACIJA

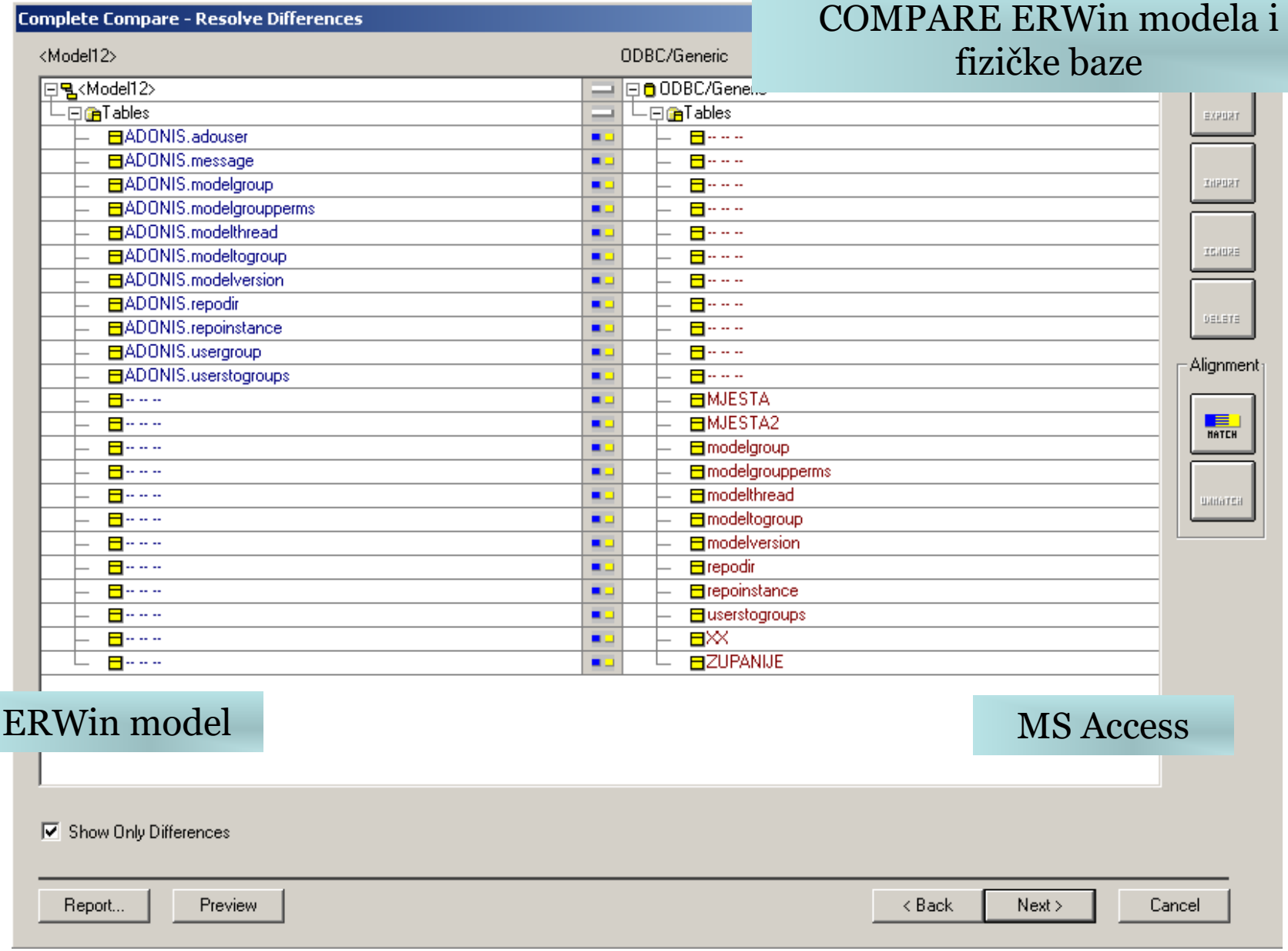
MODELA I FIZIČKE BAZE PODATAKA

ERWin → MsAccess

COMPARE ERWin modela i fizičke baze



COMPARE ERWin modela i fizičke baze

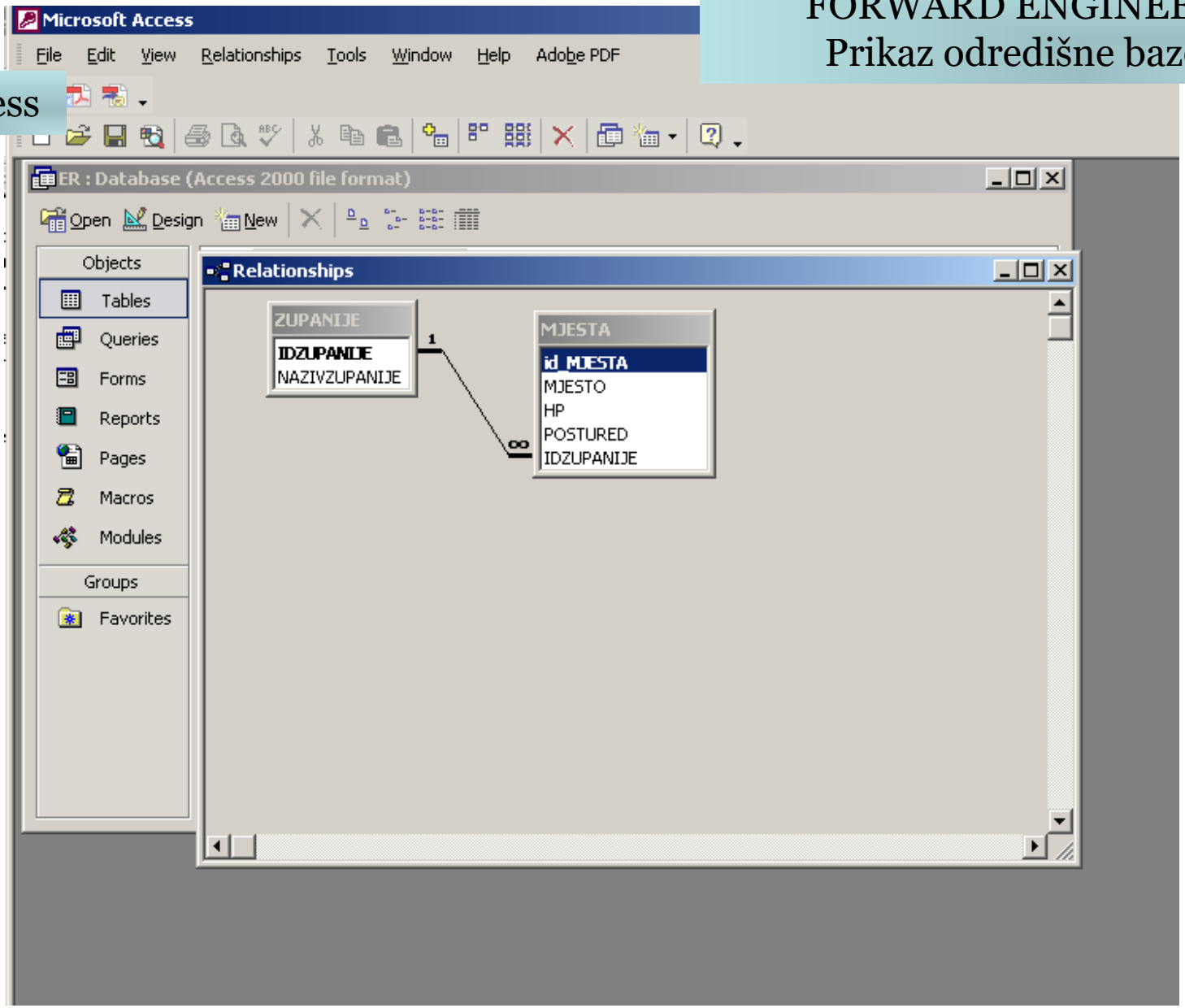


ERWin model

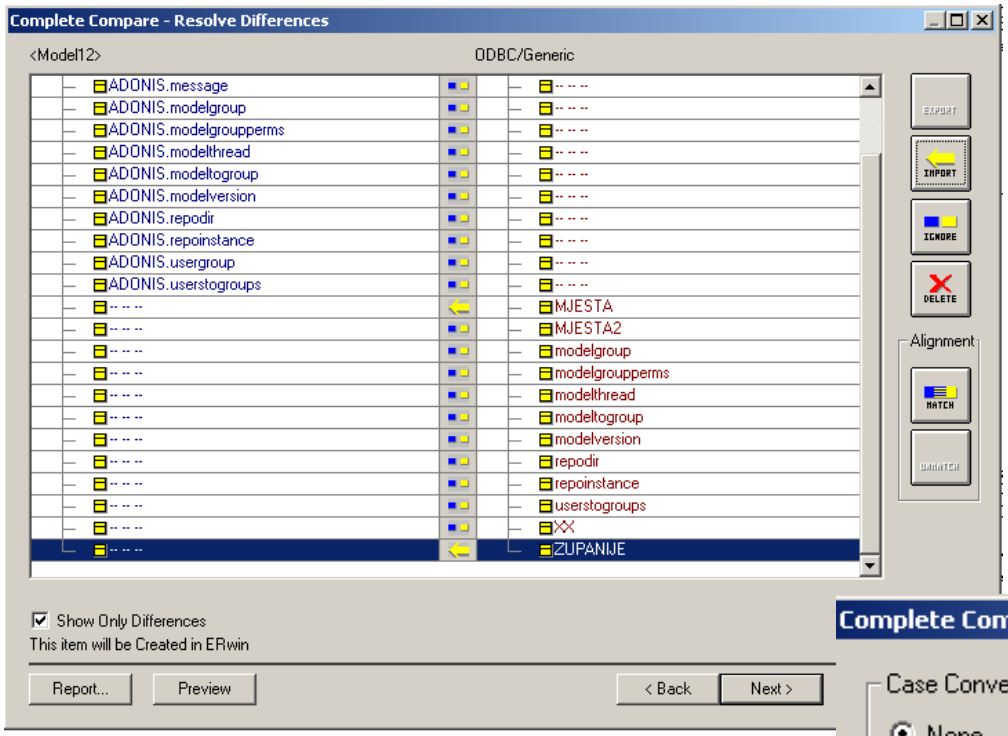
MS Access

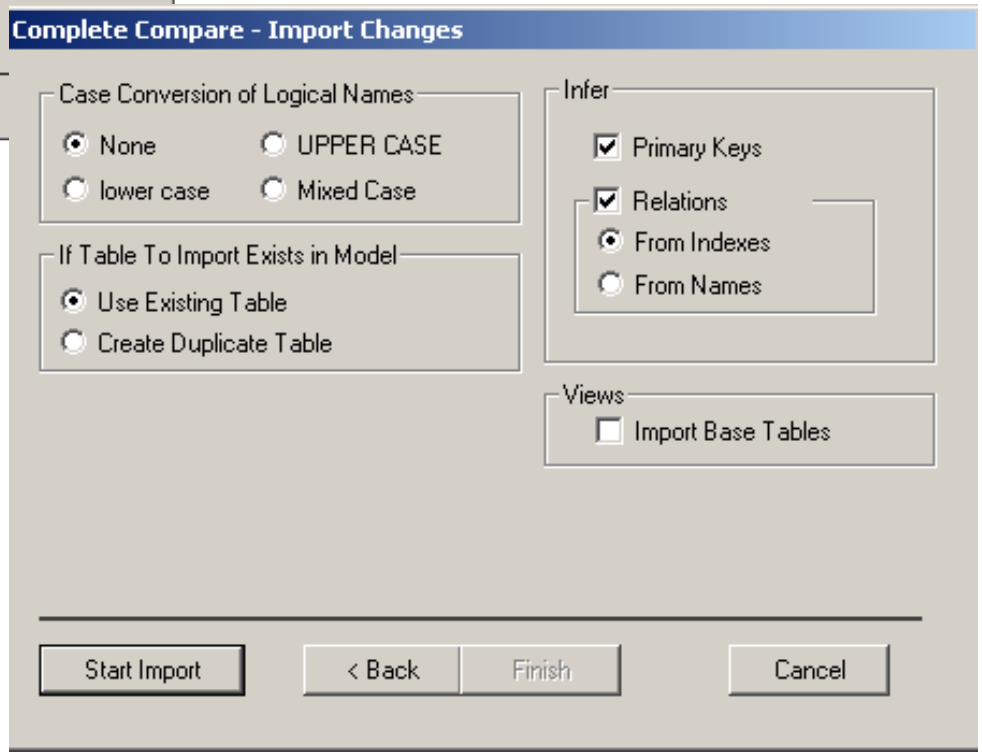
FORWARD ENGINEER
Prikaz odredišne baze

MS Access

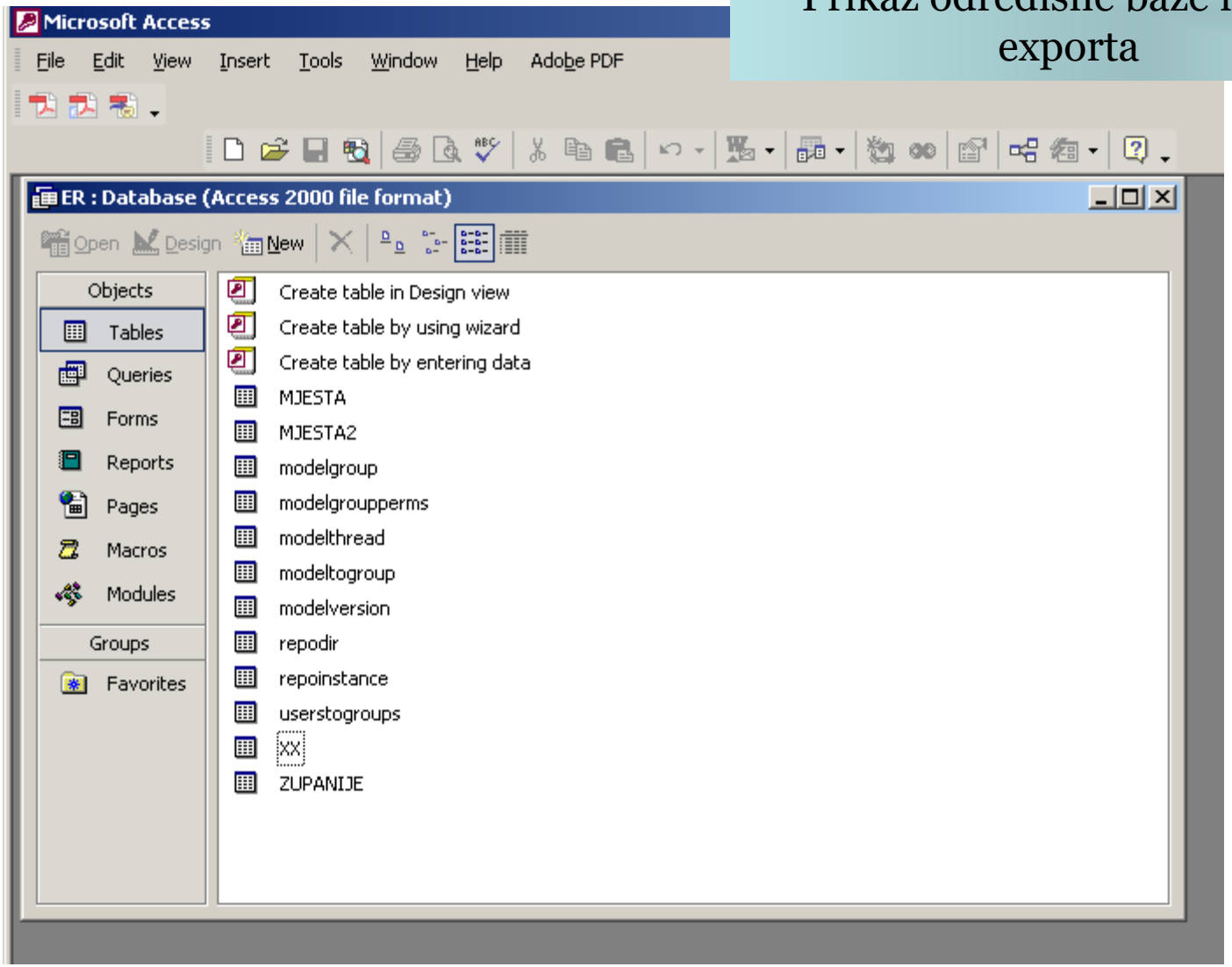


COMPARE ERWin modela i fizičke baze – odabir promjena

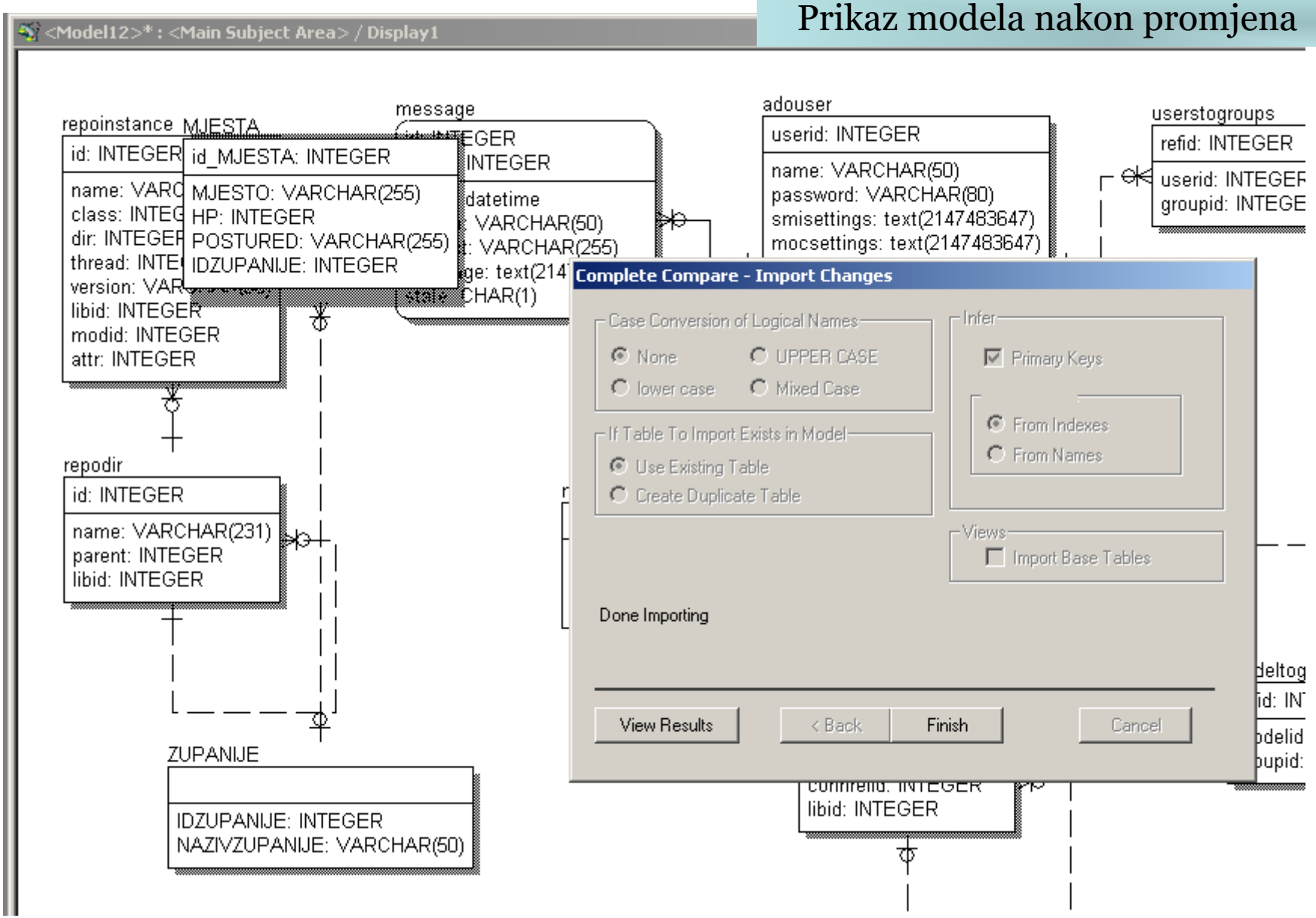




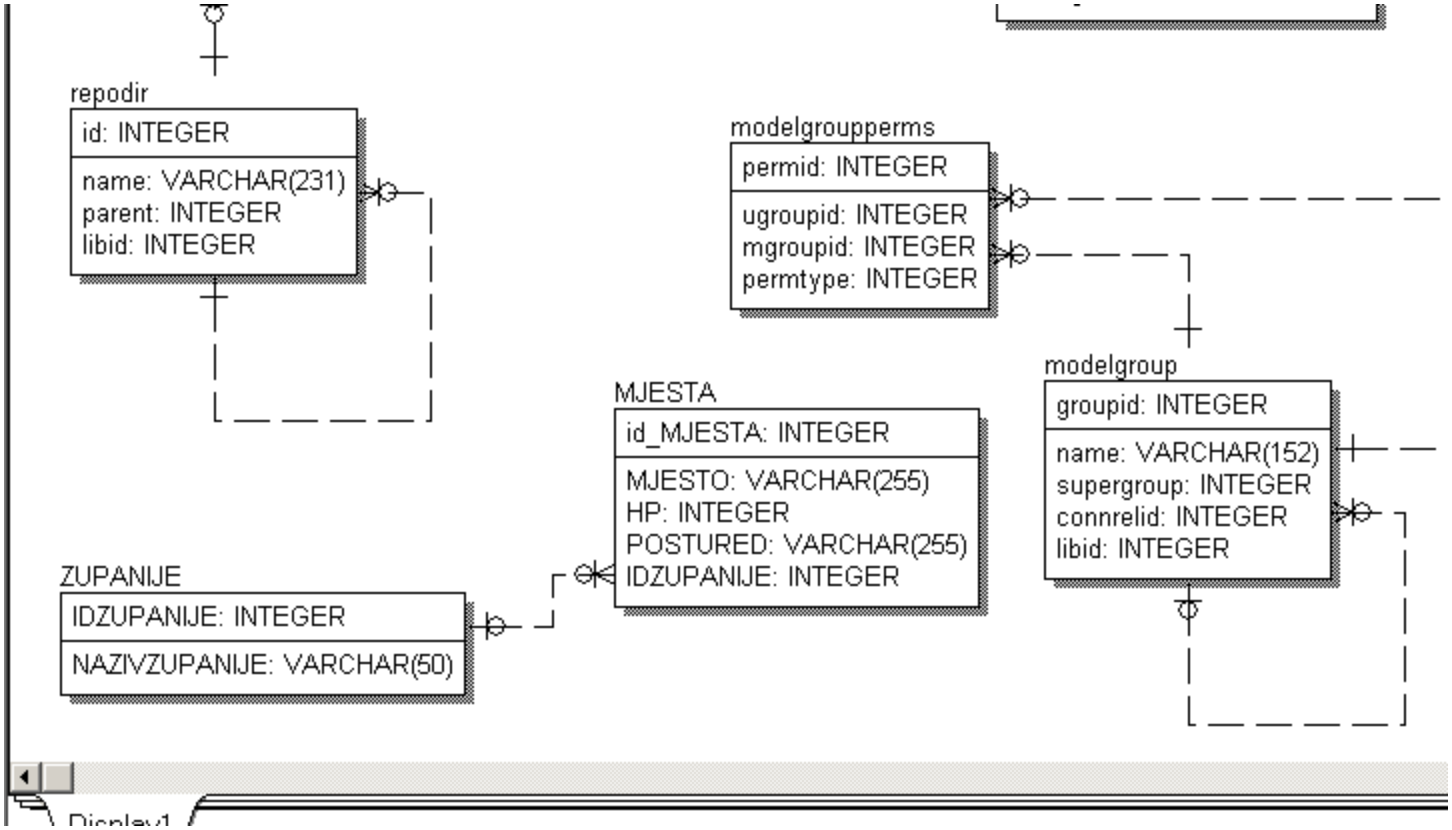
FORWARD ENGINEERING
Prikaz odredišne baze nakon exporta



Prikaz modela nakon promjena



Prikaz modela nakon promjena



REZIME

Najvažnije funkcionalnosti su sljedeće:

- **Izrada konceptulanog/logičkog modela**
- **Reverse Engineering (RE) - generiranje logičkog modela iz fizičkog**
- **Forward Engineering (FE) – generiranje fizičke baze iz logičke**
- **Komparacija i sinkronizacija modela podataka**