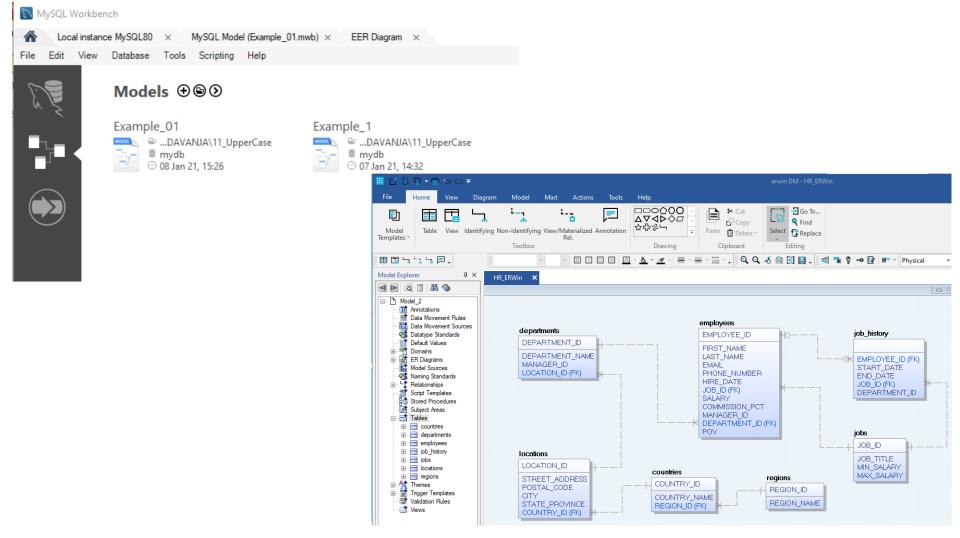


# UpperCASE alati za modeliranje podataka (primjeri alata: ERwin & Workbench)

Primjeri uporabe Upper Case alata bit će prikazani u alatima:

- Erwin Data Modeler
- MySQL Workbench

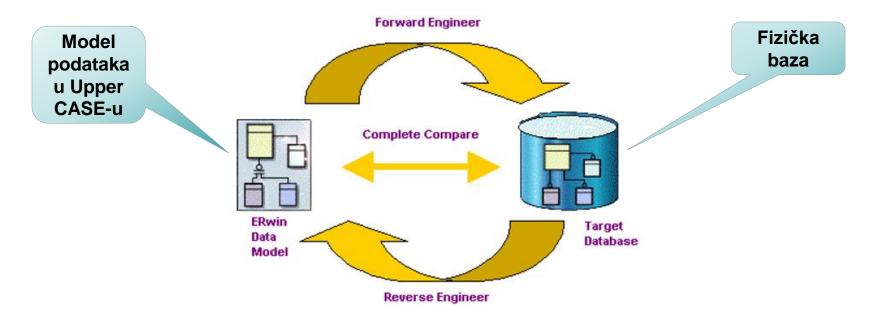


# UpperCASE alati za modeliranje podataka (primjeri alata: ERwin & Workbench)

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

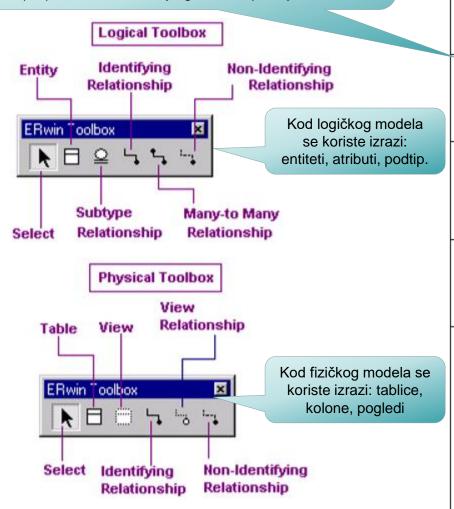


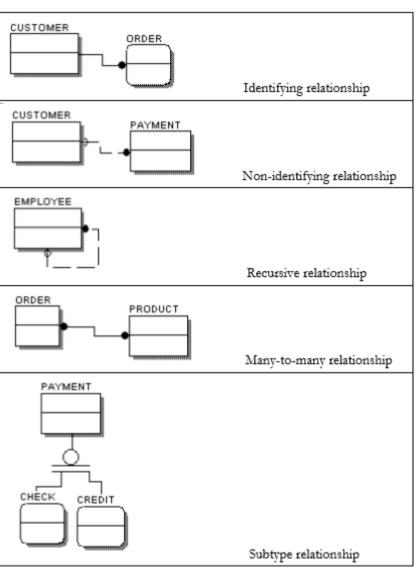
# Grafički primitivi (vizuali) za kreiranje modela podataka (Erwin)

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.





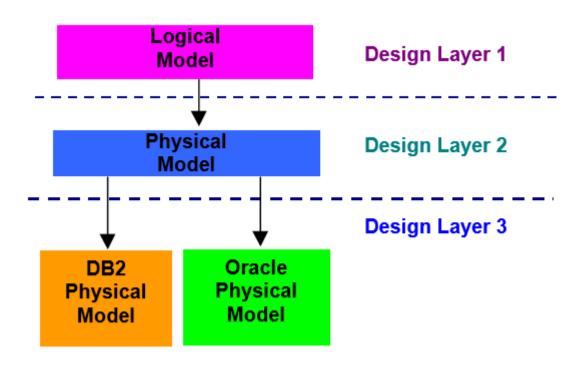
### Grafički primitivi (vizuali) za kreiranje modela podataka (Workbench)

Za prikaz objekata u podatkovnom modelu se koriste grafički primitivi / vizuali koji imaju svoje semantičku određenost. Veza 1:1 Postoji nekoliko poznatijih notacija: Information Engineering Non-identifying (IE) tzv. Crow's foot, IDEF1X, UML. Na slici se koristi IE notacija. Veza 1:n Non-identifying **-**OSOBA MJESTO 勵 💡 idOSOBA 💡 idMJESTO. Naziv\_mjesta Ime\_Prezime Veza 1:1 idMJESTO\_rodj □ br 1:1 Identifying 1:1 Veza 1:n 1:n Identifying n:m PREBIVALISTE 71:n idOSOBA Veza n:m idMJESTO

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.

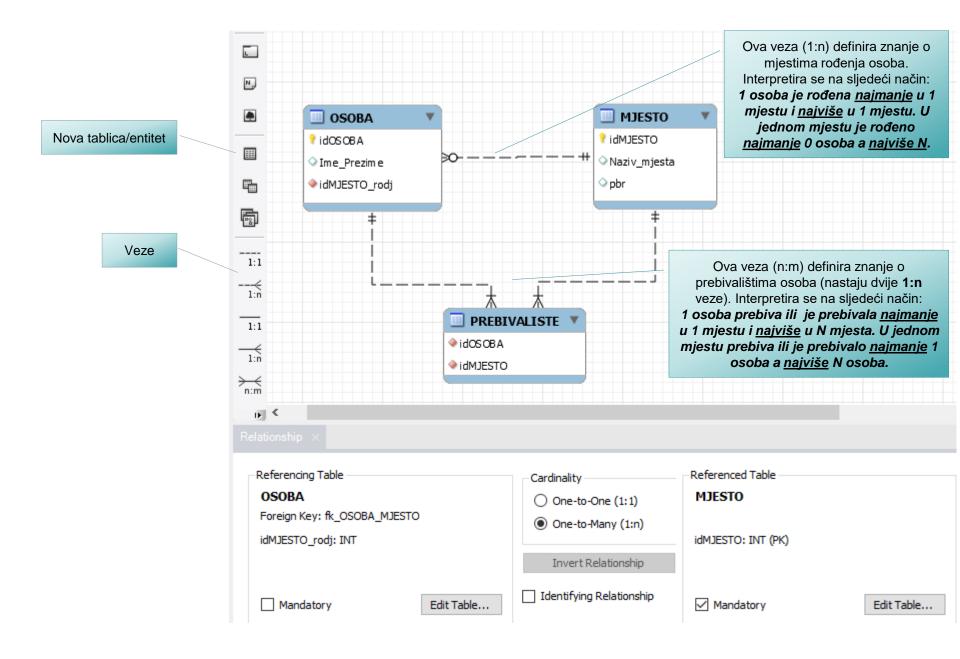


# PRIMJER izrade konceptualnog / logičkog modela i generiranje fizičkog modela u shemu (FE)

#### **ZADATAK:**

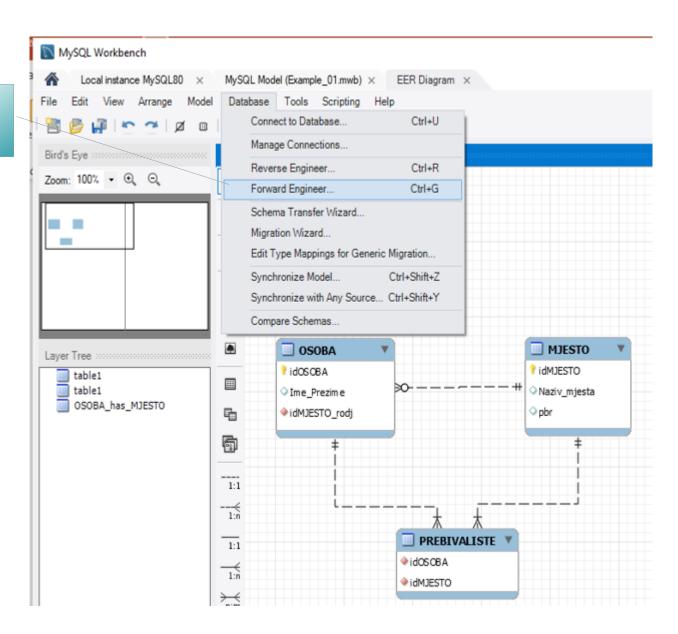
- 1. Izraditi segment logičkog modela podataka koji treba omogućiti prikazivanje sljedećih znanja:
  - Podaci o mjestima rođenja osoba u RH
  - Podaci o prebivalištima osoba u RH (trenutno prebivalište i povijest promjena prebivališta)
- 2. Koristeći funkcionalnost FE (Forward Engineeringa) generirati fizički model u shemu mydb.

### 1. Izrada konceptualnog / logičkog modela u WB-u

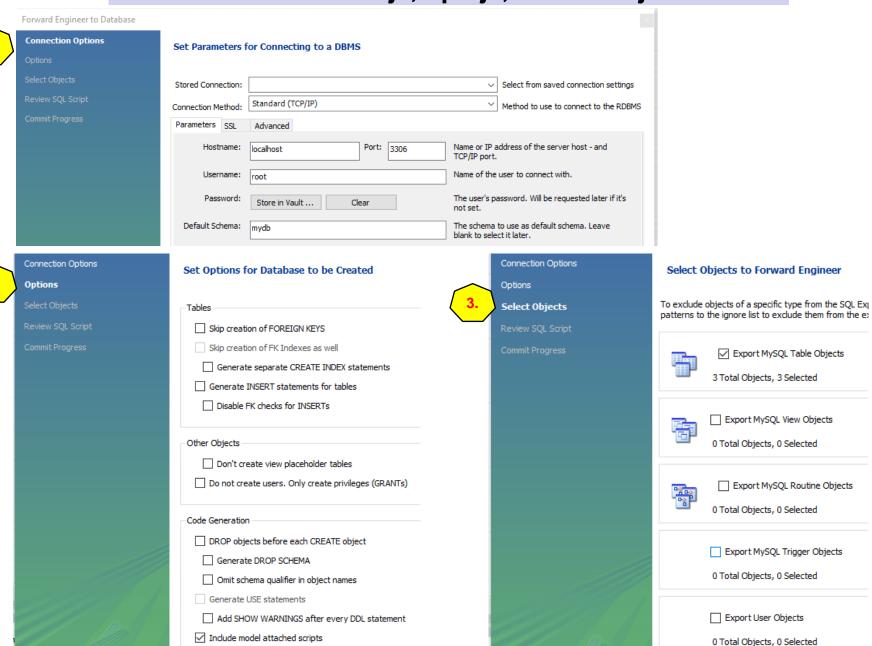


# 2. Pokretanje funkcionalnosti Forward Engineering (FE)

Odabrati: Database / Forward Enginner



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



### Generiranje SQL skripte

Forward Engineer to Database

Connection Options

Review SQL Script

Options
Select Objects



Review the SQL Script to be Executed

This script will now be executed on the DB server to create your databases. You may make changes before executing.

```
-- MySQL Workbench Forward Engineering
 2
 3
       SET @OLD_UNIQUE_CHECKS=@@UNIQUE_CHECKS, UNIQUE_CHECKS=0;
       SET @OLD_FOREIGN_KEY_CHECKS=@@FOREIGN_KEY_CHECKS, FOREIGN_KEY_CHECKS=0;
 4
 5
       SET @OLD_SQL_MODE=@@SQL_MODE, SQL_MODE='ONLY_FULL_GROUP_BY,STRICT_TRANS_TABLES,NO
 8
       -- Schema mydb
10
11
12
       -- Schema mydb
13
       CREATE SCHEMA IF NOT EXISTS 'mydb' DEFAULT CHARACTER SET utf8;
14
15
       USE 'mydb';
16
17
        -- Table `mydb`.`MJESTO`
18
19
     ○ CREATE TABLE IF NOT EXISTS `mydb`.`MJESTO` (
20
        'idMJESTO' INT NOT NULL,
21
22
        `Naziv_mjesta` VARCHAR(45) NULL,
23
        'pbr' VARCHAR(45) NULL,
24
        PRIMARY KEY ('idMJESTO'))
25
       ENGINE = InnoDB;
26
27
28
29
       -- Table `mydb`.`OSOBA`
30
31

    ○ CREATE TABLE IF NOT EXISTS `mydb`.`OSOBA` (
32
        'idOSOBA' INT NOT NULL,
        'Ime_Prezime' VARCHAR(45) NULL,
33
        'idM1ESTO_rodi' INT NOT NULL
Save to File...
                 Copy to Clipboard
```

Back

Next

Cancel

### Izvršavanje SQL skripte



Forward Engineer to Database

Connection Options

Options

Select Objects

Review SQL Script

**Commit Progress** 

#### Forward Engineering Progress

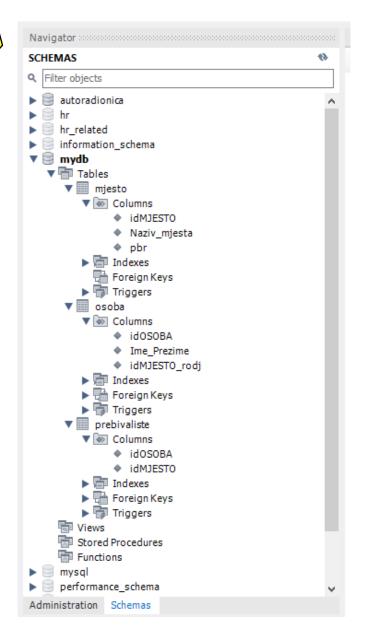
The following tasks will now be executed. Please monitor the execution. Press Show Logs to see the execution logs.

- Connect to DBMS
- Read Back Changes Made by Server
- Save Synchronization State

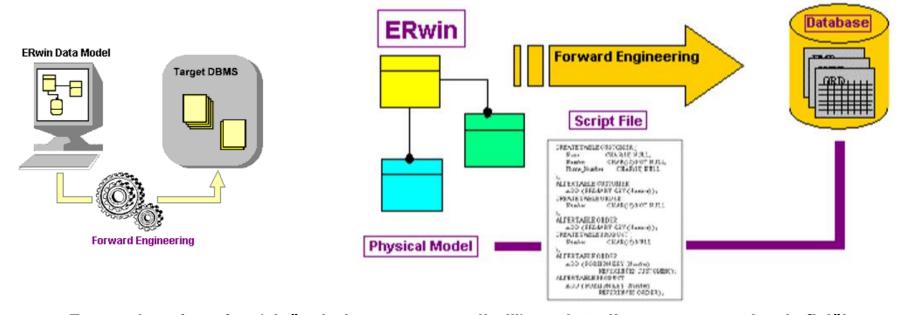
Forward Engineer Finished Successfully

### Prikaz fizičke baze nakon SQL skripte





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



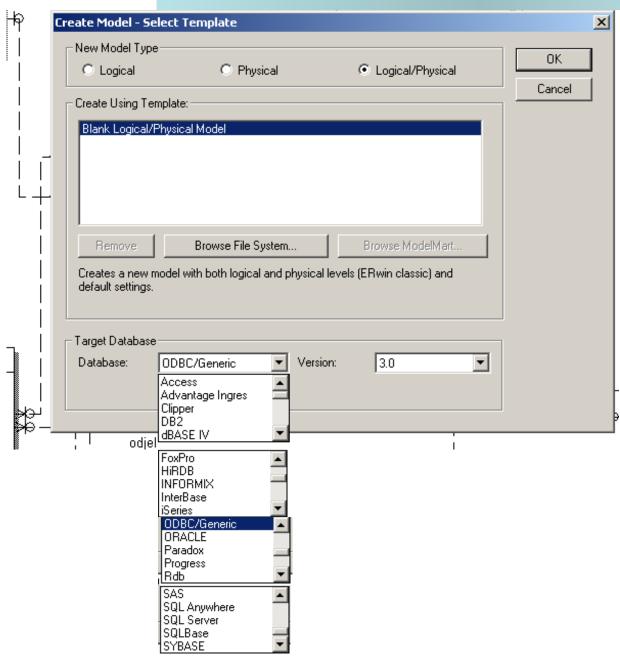
Forward engineering ("Inženjering prema naprijed") predstavlja proces generiranja fizičke baze podataka iz logičkog modela.

Pogodnost se ogleda u brzini kreiranja objekata baze i to u željenoj bazi (Oracle, DB2, SQL Server, ..)

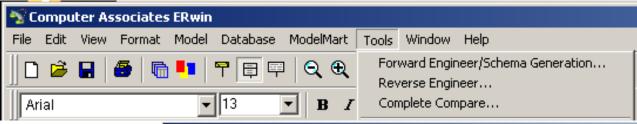
Moguće je odabrati koji objekti će biti kreirani:

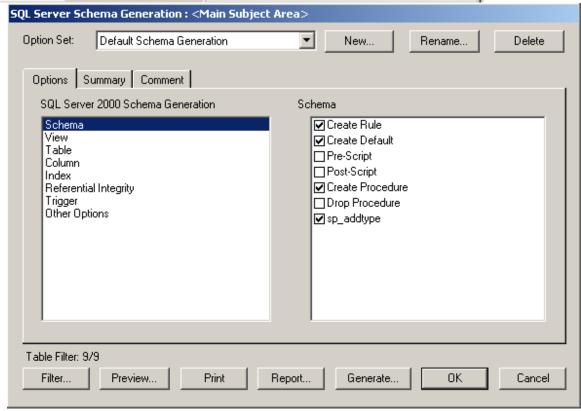
- Tablice
- Indeksi
- Triggers
- Pohranjene procedure
- Constraints
- Drugi objekti, ovisno o target bazi.

### FORWARD ENGINEERING u ERwin-u Prikaz formata baze



### FORWARD ENGINEERING u Erwin-u Odabir postavki za import





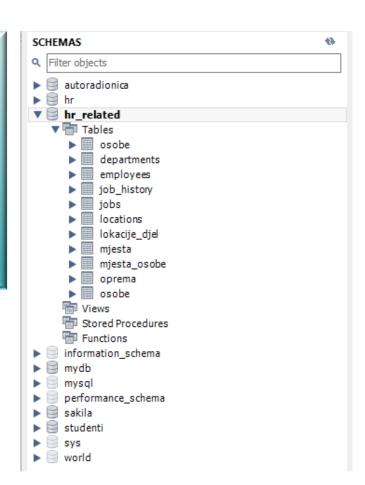
### FORWARD ENGINEERING u Erwin-u Generiranje skripte

```
SQL Server Schema Generation Preview
                                                                 CREATE TABLE klijent (
         imeKlijent
                               varchar(255) NULL,
         prezimeKlijent
                               varchar(255) NULL,
         pbrKlijent
                               integer NULL,
                               integer NULL,
         pbrReq
         datUnosKlijent
                               date NULL,
         jmbgKlijent
                               varchar(50) NULL,
         sifKlijent
                               integer NOT NULL,
         pbrMjesto
                               INTEGER NULL
 |go
 CREATE INDEX NewIndex1 ON klijent
         pbrKlijent
                                          ASC
 qo
 CREATE INDEX NewIndex2 ON klijent
                                          ASC
         pbrReg
 Table Filter: 9/9
                                                                Close
                                                  Generate...
```

# PRIMJER Generiranja logičkog modela iz fizičke baze (RE)

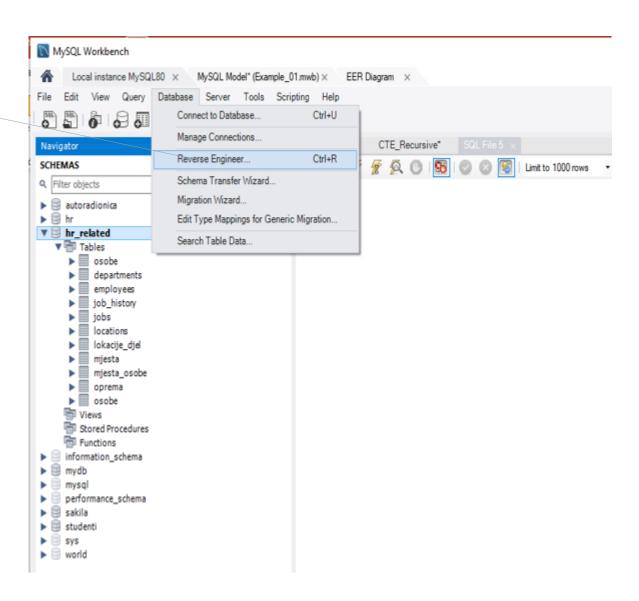
#### **ZADATAK:**

Koristeći funkcionalnost RE (Reverse Engineeringa) generirati logički model koristeći željenu shemu hr\_related.

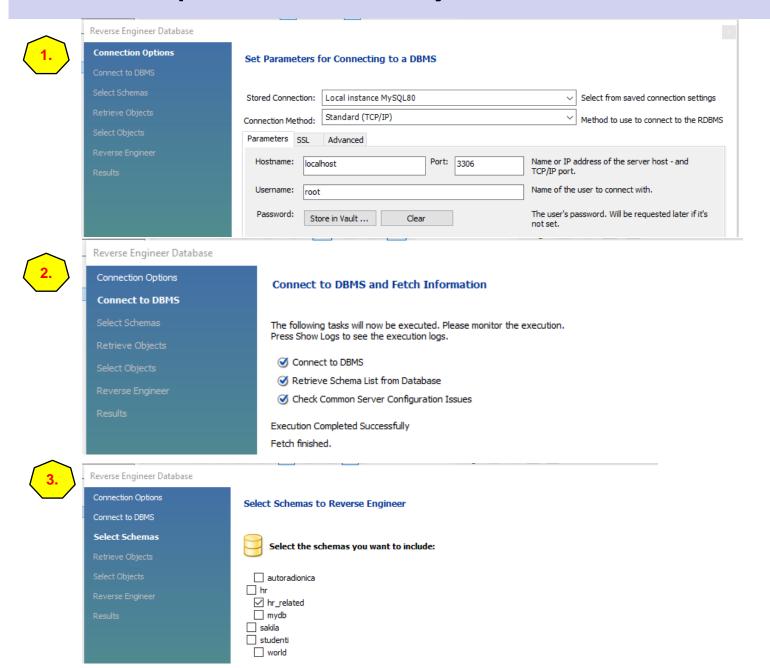


### Pokretanje Reverse Engineering (RE)

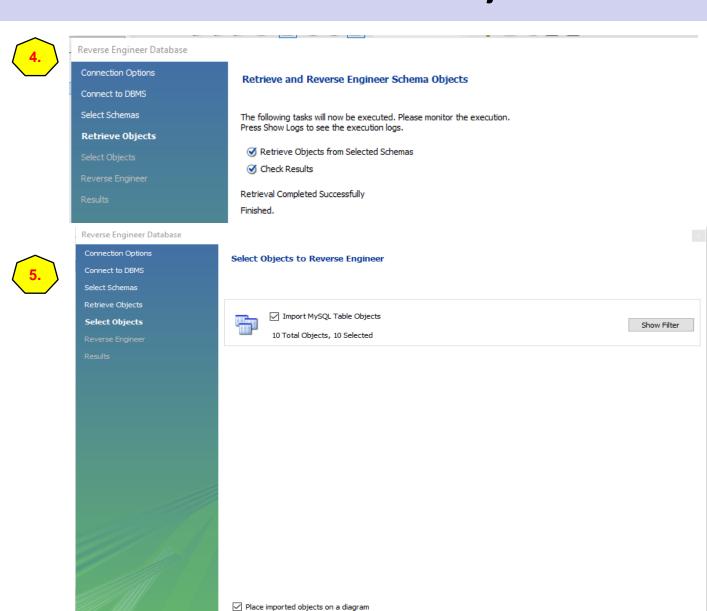
Odabrati: Database / Reverse Enginner



### Odabir parametara, konekcija na bazu, odabir sheme



### Dohvat i odabir objekata



Execute >

Cancel

### Prikaz opcija izvršenja i rezultata



Reverse Engineer Database

Connection Options

Connect to DBMS

Select Schemas

Retrieve Objects

Select Objects

Reverse Engineer

Daculto

#### **Reverse Engineering Progress**

The following tasks will now be executed. Please monitor the execution. Press Show Logs to see the execution logs.

- ✓ Reverse Engineer Selected Objects
- Place Objects on Diagram

Operation Completed Successfully



Reverse Engineer Database

Connection Options

Connect to DBMS

Select Schemas

Retrieve Objects

Select Objects

Reverse Engineer

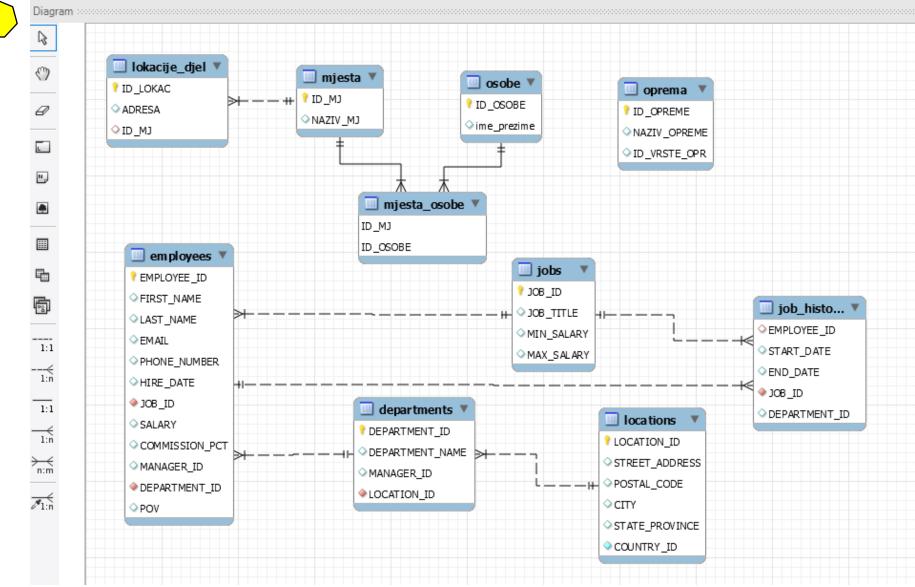
Results

Reverse Engineering Results

Summary of Reverse Engineered Objects:

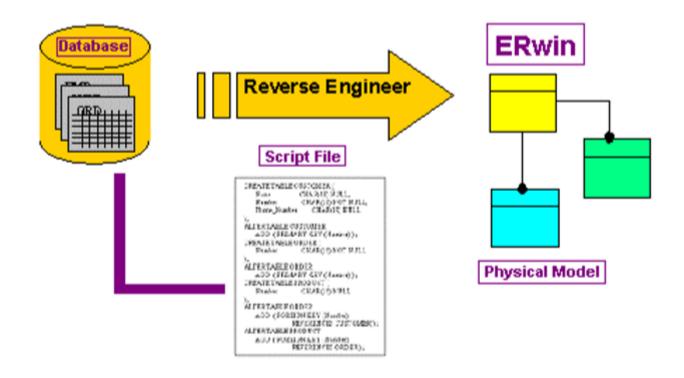
- 10 tables from schema 'hr\_related'

### Odabir parametara, konekcija na bazu, odabir sheme



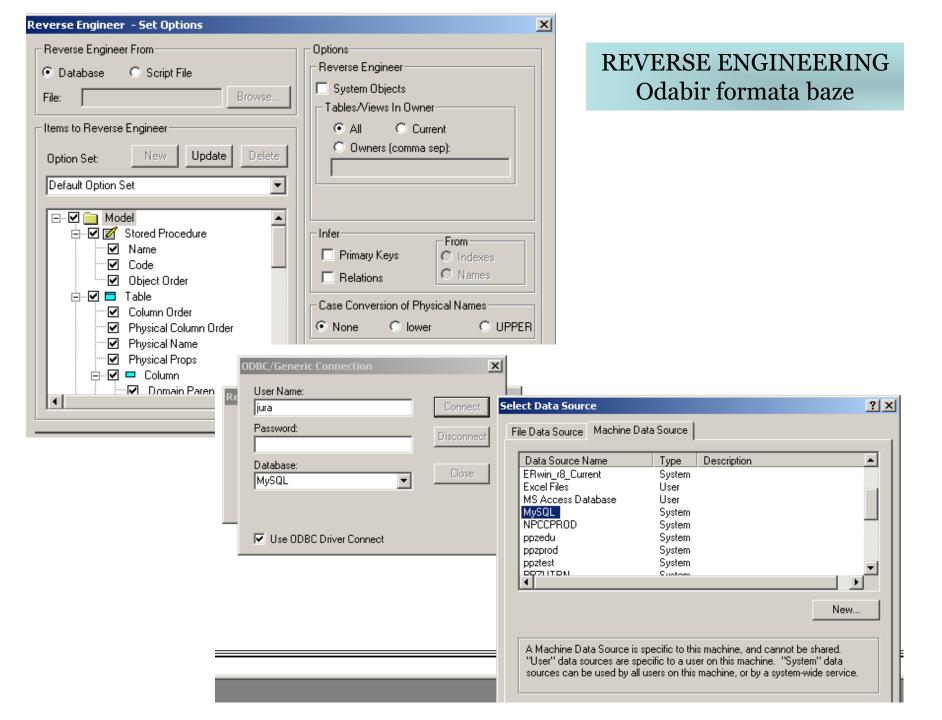
8.

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

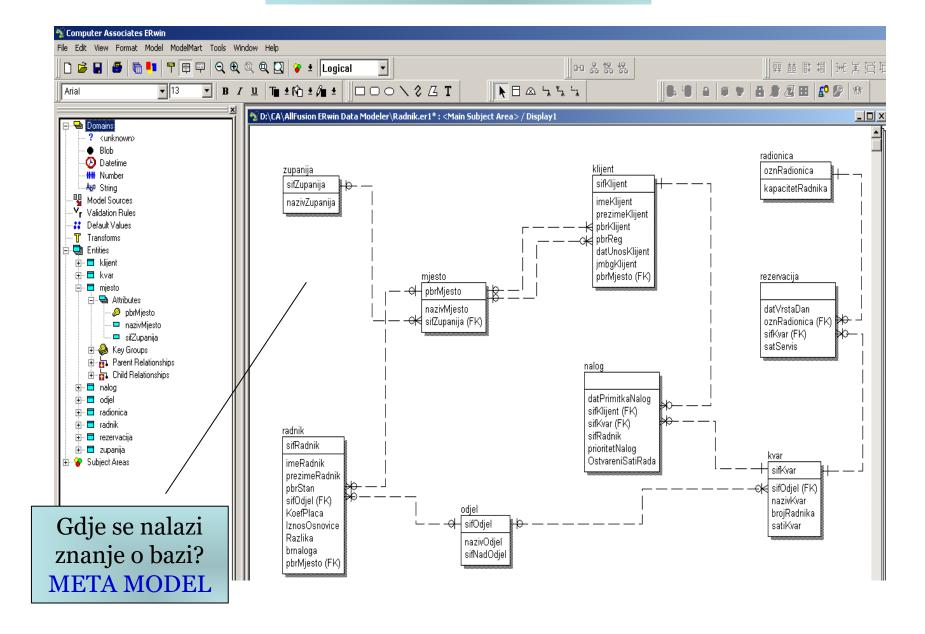


Reverse Engineering ("Reverzni Inženjering") predstavlja proces generiranja logičkog modela iz fizičke baze podataka.

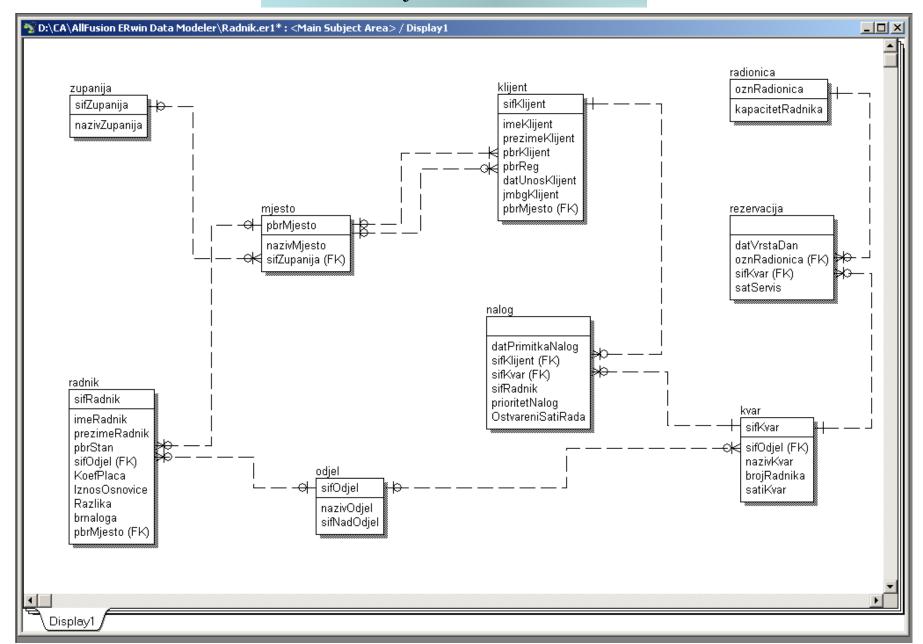
Pogodnost se ogleda u velikoj brzini kreiranja logičkog modela i to iz željene baze (Oracle, DB2, SQL Server, ..) što značajno štedi vrijeme kod spoznavanja strukture neke fizičke baze.



### REVERSE ENGINEERING Generirani entiteti



### REVERSE ENGINEERING Relacijski model baze

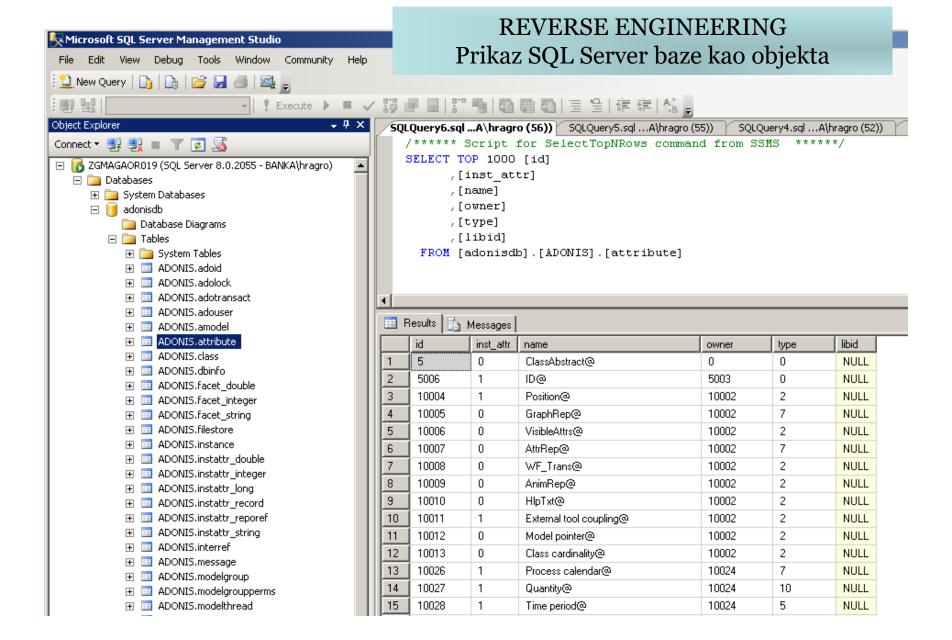


#### MIGRACIJA MODELA BAZE PODATAKA

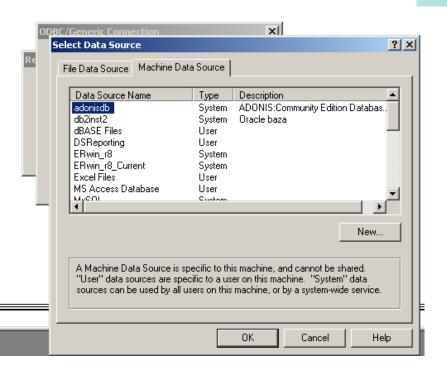
### Primjer SQL SERVER → MySql

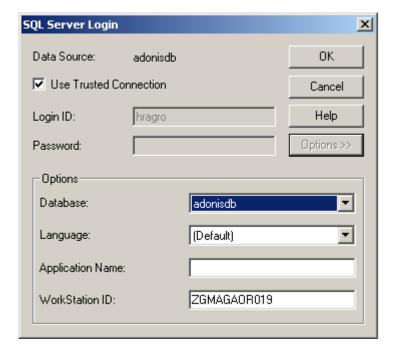
#### Aktivnosti za izvođenje migracije modela:

- 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.

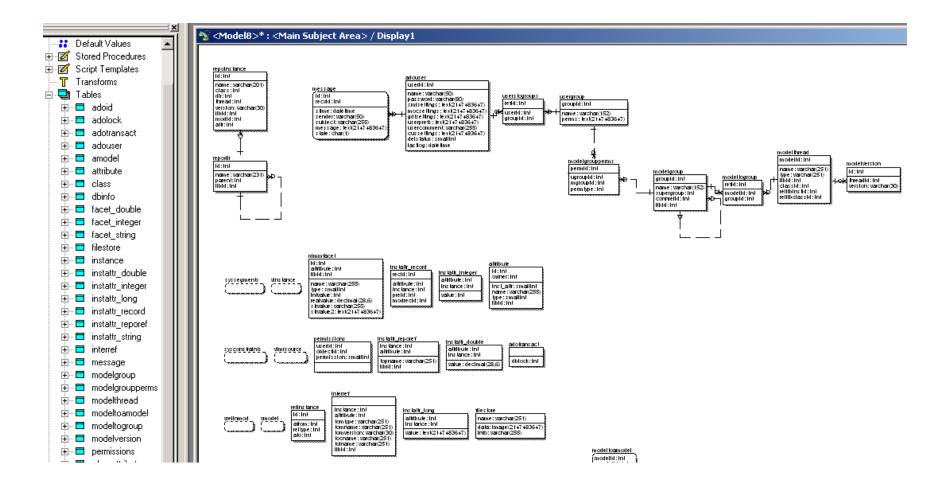


### ODBC postavke SQL Server baze

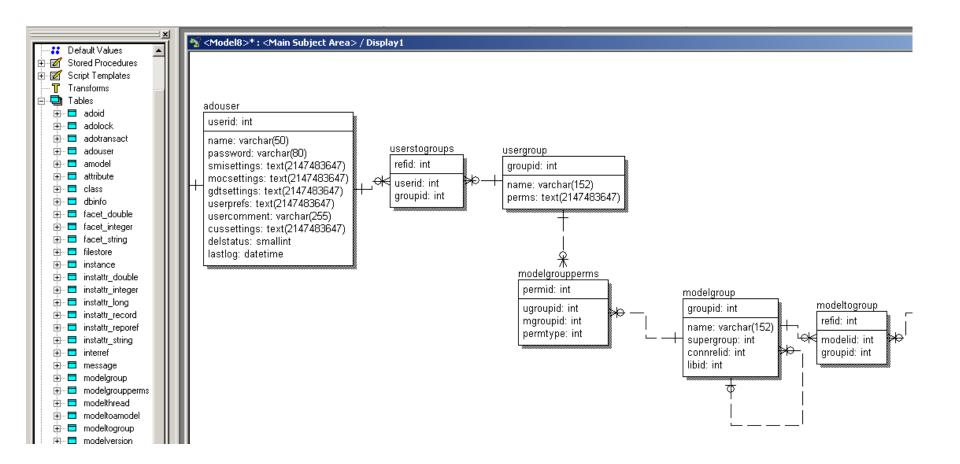




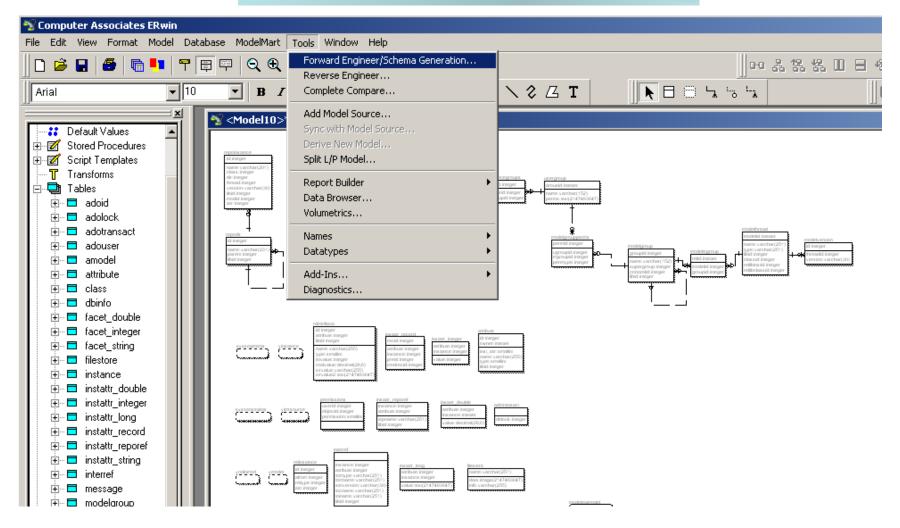
### REVERSE ENGINEERING Importirane tablice sada postaju to entiteti u Erwin-u



### REVERSE ENGINEERING Segment modela - detalji



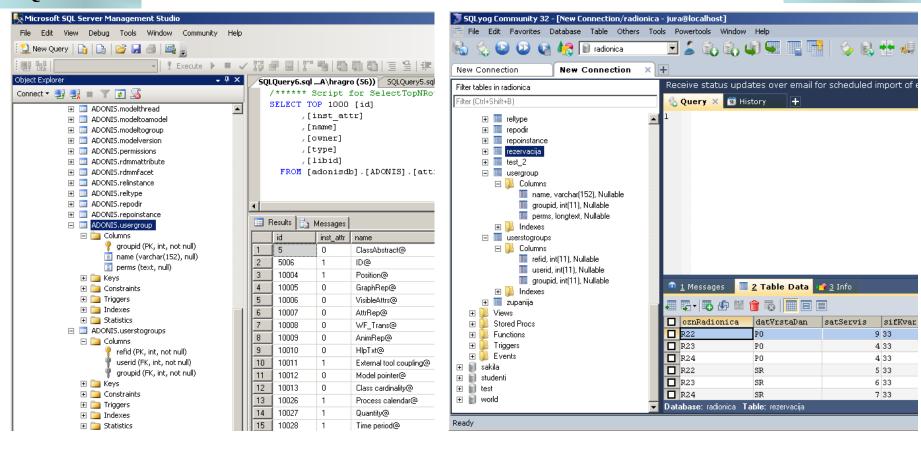
### FORWARD ENGINEERING logičkog modela u fizičku MySQL bazu



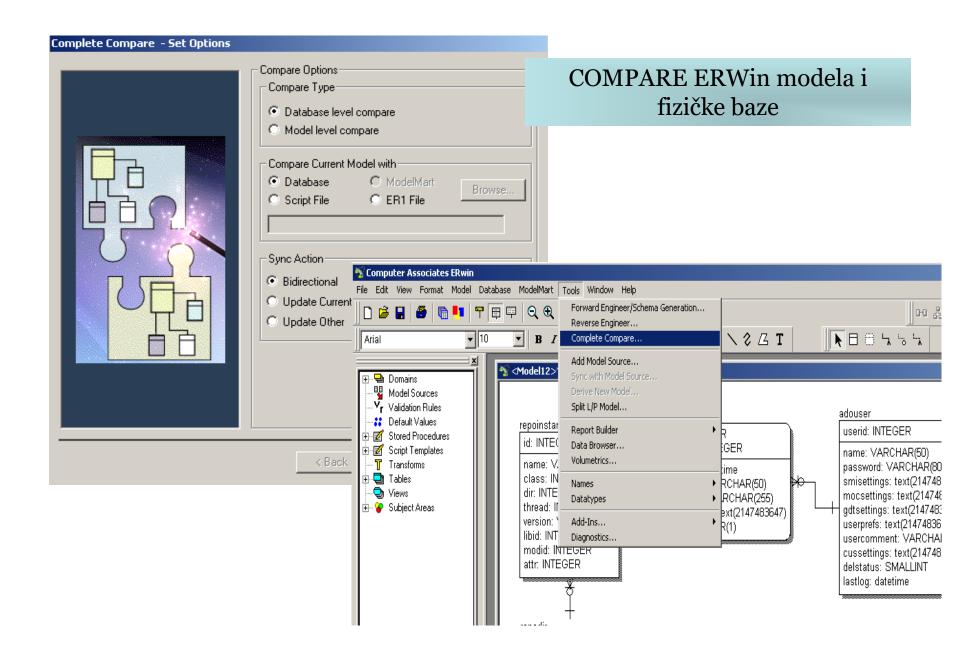
### **SQL** Server

### FORWARD ENGINEER Komparacija izvorne i odredišne baze

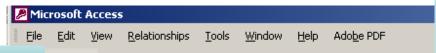
MySQL



# KOMPARACIJA / SINKRONIZACIJA MODELA I FIZIČKE BAZE PODATAKA ERWin → MsAccess

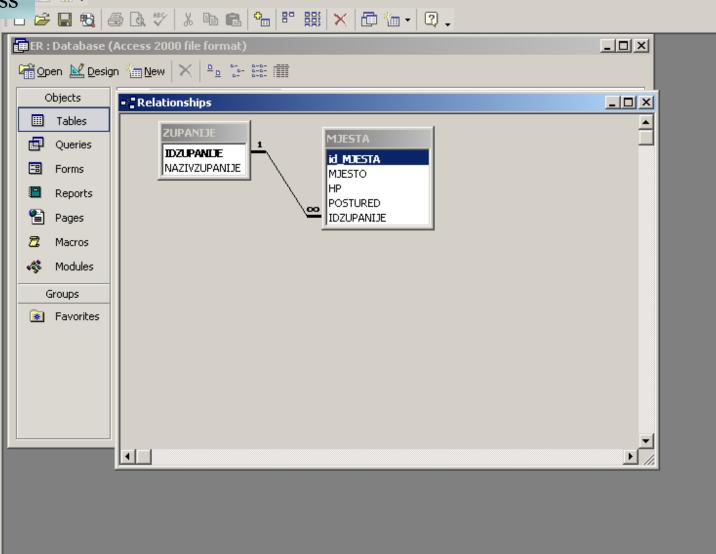


#### COMPARE ERWin modela i Complete Compare - Resolve Differences fizičke baze <Model12> ODBC/Generic □**및**<Model12> 🔲 🗏 🗖 ODBC/Gene... — <u>□</u> ables — <u>—</u> Tables ■ADONIS.adouser ■ADONIS.message ■ADONIS.modelgroup ■ADONIS.modelgroupperms **----**■ADONIS.modelthread ■ADONIS.modeltogroup **----**■ADONIS.modelversion ■ADONIS.repodir ■ADONIS.repoinstance **----**■ADONIS.usergroup Alignment ■ADONIS.userstogroups **■**MJESTA **■**MJESTA2 HATCH <del>-----</del> modelgroup ■ modelgroupperms modelthread ■ modeltogroup ■ modelversion □ repodir ☐ repoinstance **.** userstogroups ⊟XX **■**ZUPANIJE ERWin model **MS** Access ▼ Show Only Differences Report... Preview k Back Next> Cancel



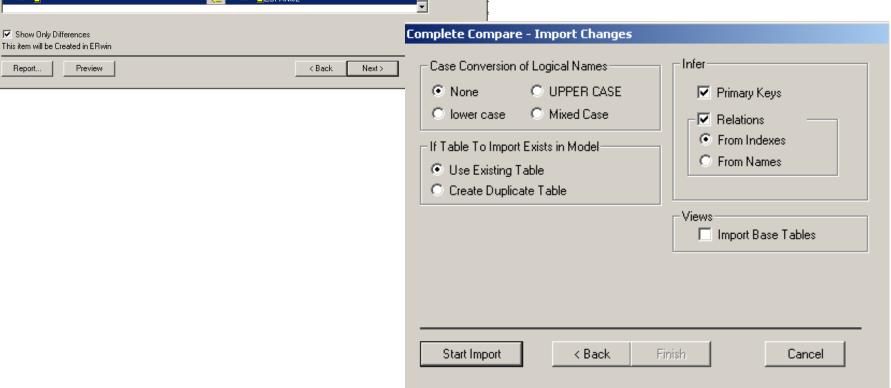
### FORWARD ENGINEER Prikaz odredišne baze

#### MS Access

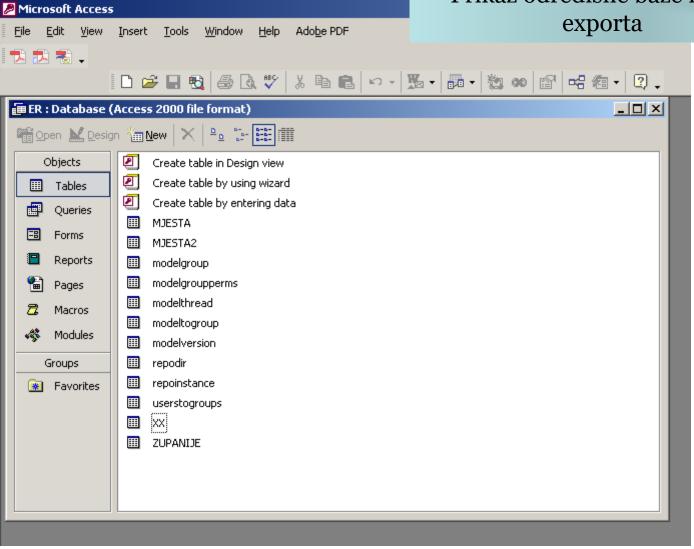




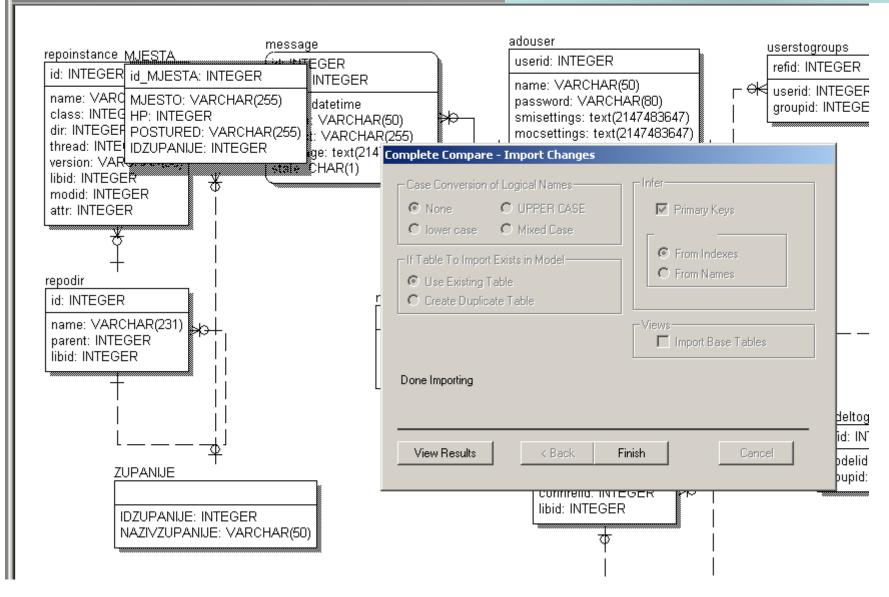
### COMPARE ERWin modela i fizičke baze – odabir promjena



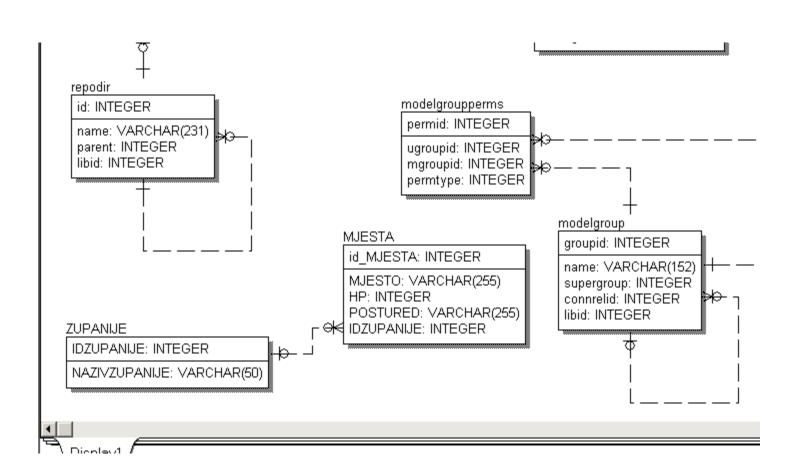
### FORWARD ENGINEERING Prikaz odredišne baze nakon exporta



### 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

