Mora li Oracle BI doista biti tako skup?

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Rovinj

multicom
INFORMACIJSKI SUSTAVI

O Multicomu

Vodeća tvrtka za poslovno savjetovanje i implementacije u područjima telekomunikacija, financija i javne uprave u Hrvatskoj i regiji.

- **Glavna područja ekspertize**
  - Upravljanje odnosima s korisnicima (**CRM**)
  - Upravljanje procesima (**BPM**)
  - Obračun i naplata (**Billing**)
  - Upravljanje matičnim podacima (**MDM**)
  - Skladišta podataka (**DWH**)
  - Poslovna Inteligencija (**BI**)
  - Upravljanje performansama (**CPM**)

- Oracle Certified Advantage Partner (Oracle baze, Siebel, Hyperion)
- Microsoft Gold Partner
- Deloitte CE Technology Fast50 2009. – 'Rising Stars' category – prvo mjesto

- Suradnja na projektima s globalnim proizvođačina softvera i integratorima:
  - Oracle, Hewlett-Packard, Siemens, Highdeal (SAP)

Multicom je implementirao rješenja u:

Poslovni slučaj

- Prosječna hrvatska tvrtka želi uvesti BI sustav
- “Small & Medium Business”
- 30-40 potencijalnih korisnika
- Milijuni povijesnih transakcija
- Visoki zahtjevi za performansama
- Složeni sigurnosni zahtjevi
- Jednoprocesorski serveri
- Četverojezgreni Intel procesori

Oracle Enterprise Edition ponuda

Product	Named User Plus	Software License Update & Support
Database EE	950,00	209,00
x Broj procesora (1 x 4 x 0,5 = 2)	1.900,00	418,00
Partitioning	230,00	50,60
OBI EE Plus	2.000,00	440,00
Total (User)	4.130,00	908,60
User x 40	165.200,00	36.344,00
Grand Total (USD)		**201.544,00**

- Cca **5.040 USD** po korisniku (bez partnerskog popusta)

Oracle Standard Edition One ponuda

Product	Named User Plus	Software License Update & Support
OBI SE1	1.200,00	264,00
User x 40	48.000,00	10.560,00
Grand Total (USD)		**58.560,00**

- Cca **1460 USD** po korisniku (bez partnerskog popusta)
- Skoro **3,5 x povoljnije** od EE ponude

Oracle Business Intelligence Standard Edition One

- **OBI Server** – Napredni BI server, isti engine kao u OBI EE Plus (Enterprise Edition) paketu. Server također ima standardnu mogućnost direktne konekcije na datoteke (TXT, CSV, XLS, XML), te time i postavljanja upita i izrade izvještaja nad njima.
- **OBI Answers** – Web izvještajni alat za ad-hoc upite, 100% HTML tanki klijent.
- **OBI Publisher** – „Pixel-perfect“ web izvještajni alat. Za izvješća s precizno definiranim izgledom (margine, crte, tablice, fontovi, logo itd.) i slobodno pisanim SQL upitima, npr. za razne standardizirane obrasce, ispise računa itd. Predlošci za OBIP najčešće se izrađuju u MS Wordu od strane poslovnih korisnika.
- **OBI Interactive Dashboards** – Personalizirane web nadzorne ploče s Answers i Publisher izvješćima (tablice, pivot tablice, grafikoni, vanjski linkovi itd.). Izrada i uređivanje je bitno jednostavnije od bivše tehnologije (Oracle Portal s Discoverer izvješćima).
- **Oracle baza SE1** – Standard Edition One izdanje baze
- **Oracle Warehouse Builder** – ETL (Extraction, Transformation, Load) alat koji na temelju metapodataka (strukture datoteka, tablica, transformacijska logika) generira kod. Omogućuje potpunu transparentnost i dokumentiranost DW projekta u grafičkom okruženju, procesno upravljanje (Oracle Workflow), te detaljno logiranje svake izvršene aktivnosti.

Što se gubi?

- **OBI Server**
  - Spajanje na najviše dvije RDBMS baze (Oracle SE1 iz paketa + 1 dodatna, Oracle ili ne-Oracle)
  - Maksimalno 50 BI korisnika
  - Nema ograničenja na broj datoteka kao izvora podataka
- **BI Delivers (Alerts)** – Monitoriranje poslovnih pokazatelja i proaktivno upozoravanje
- **BI Disconnected Analytics** – Mobilna offline analitika
- **BI Briefing Books** – Snimke nadzornih ploča za offline analize
- **BI Microsoft Office Add-In** – Dodatak koji omogućuje konektiranje i analize direktno iz MS Office klijentskih aplikacija

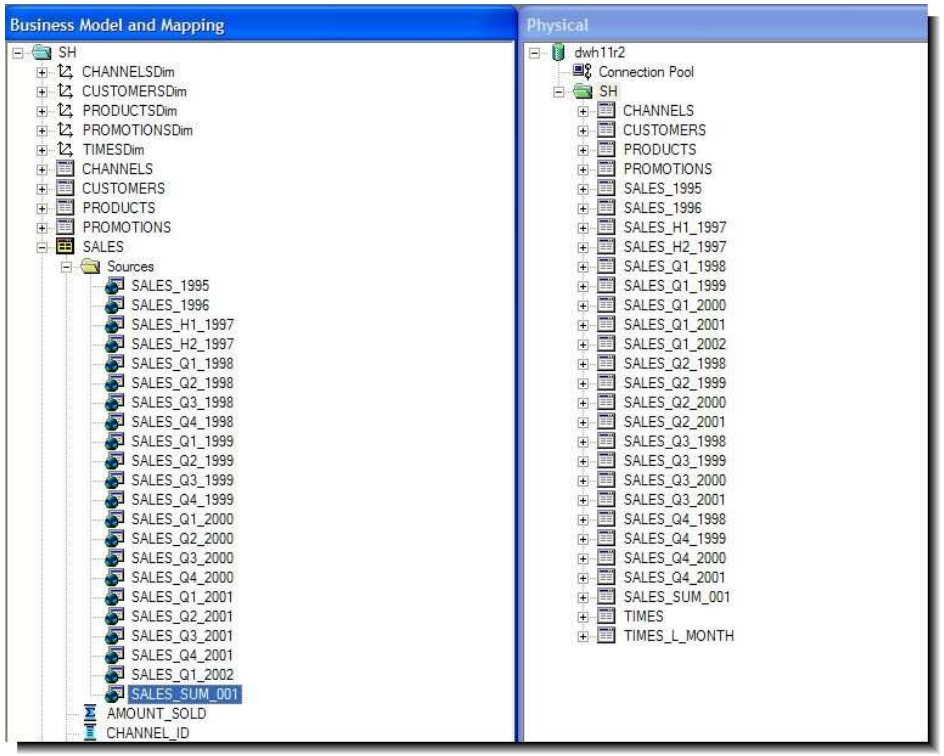
Što se gubi?

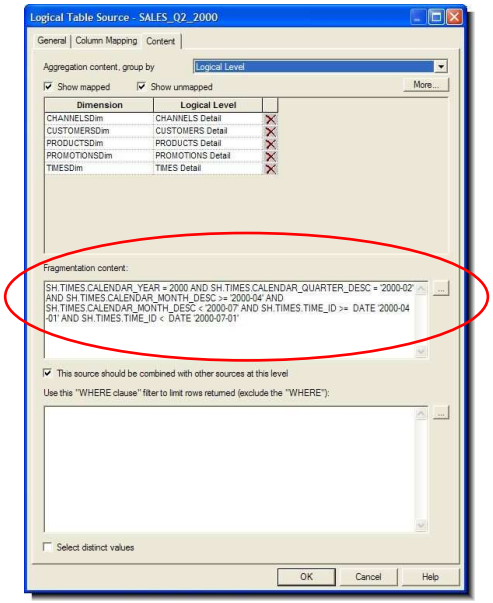
Mogućnost baze podataka	SE1	EE
CPU	2 utora	Neograničeno
RAM	OS Max	OS Max
Database Size	Neograničeno	Neograničeno
Oracle Partitioning	✗	✓ (Opcija)
Basic Table Compression	✗	✓
Bitmapped Index, Bitmapped Join Index, and Bitmap Plan Conversions	✗	✓
Parallel Query/DML	✗	✓
Summary management — Materialized View Query Rewrite	✗	✓
Asynchronous Change Data Capture	✗	✓
Virtual Private Database	✗	✓
Star Query Optimization	✓	✓
Java, PL/SQL Native Compilation	✓	✓
Application Express	✓	✓

Drugim putem do istog cilja

- Dio mogućnosti koje nema baza SE1 može se ostvariti na strani Oracle BI Servera
- Demonstracija:
  - Partitioning => **Fragmentation**
  - Materialized Views => **Summary Tables**
  - Virtual Private Database => **BI Security**

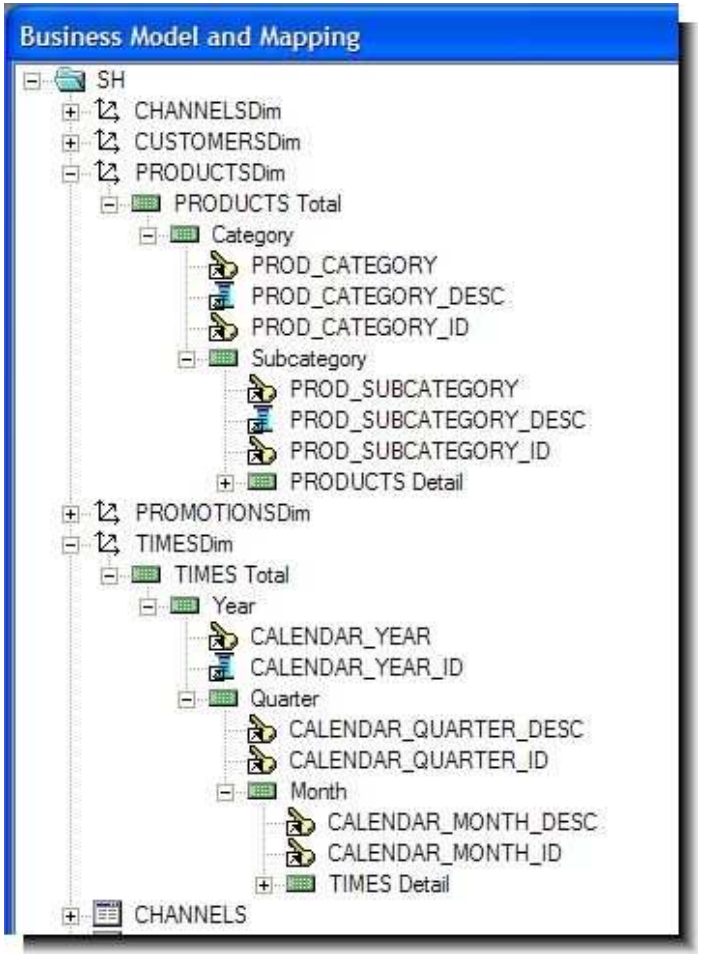
Fragmentacija





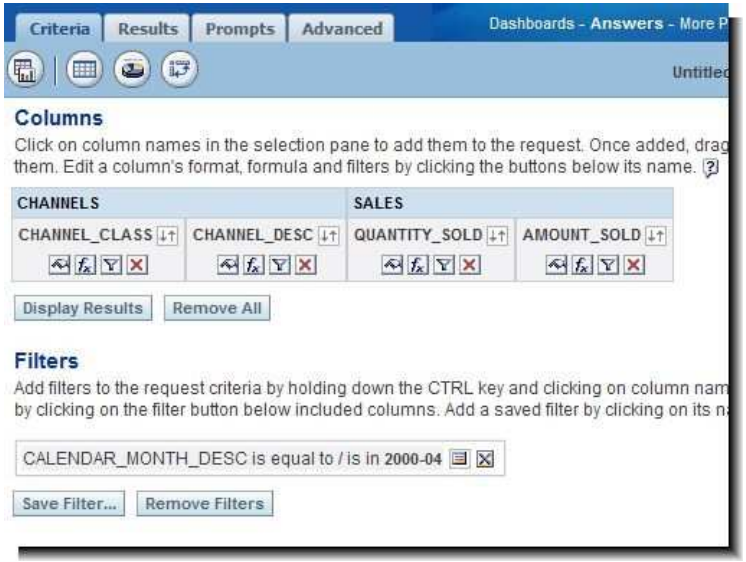
- Jedna logička tablica sastoji se od više fizičkih tablica
- Fragmentation Content: Definicija sadržaja fragmenta

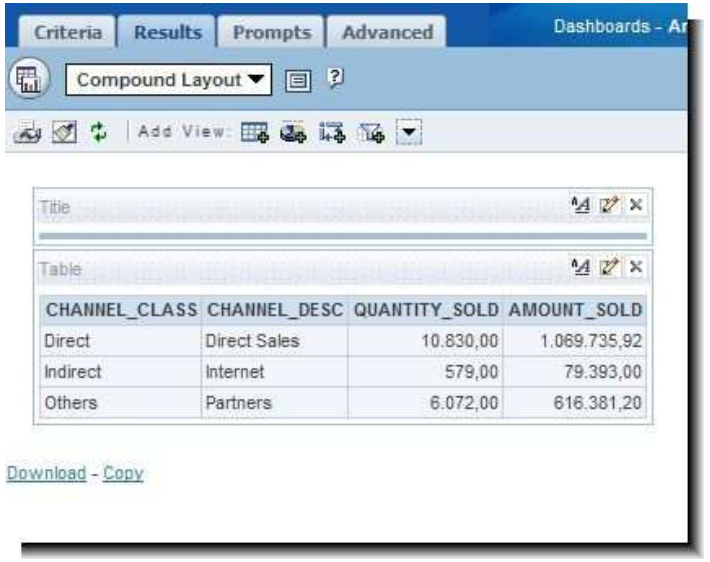
Logičke dimenzije



- Određuju putanje svrdlanja (Drill Paths)
- Preduvjet za ispravno generiranje upita (fragmentacija, sumarne tablice)
- Dimenzija može imati više hijerarhija
- Razina (Level) može biti prisutna u više hijerarhija
- Svaka razina hijerarhije mora imati definiran primarni ključ i granularnost (Number of Elements at Level)

Primjer 1: Fragmentacija





- Opseg upita (mjesec) manji je od opsega fragmenta (kvartal)
- BI server usmjerava upit na samo jednu fizičku tablicu koju dodatno filtrira

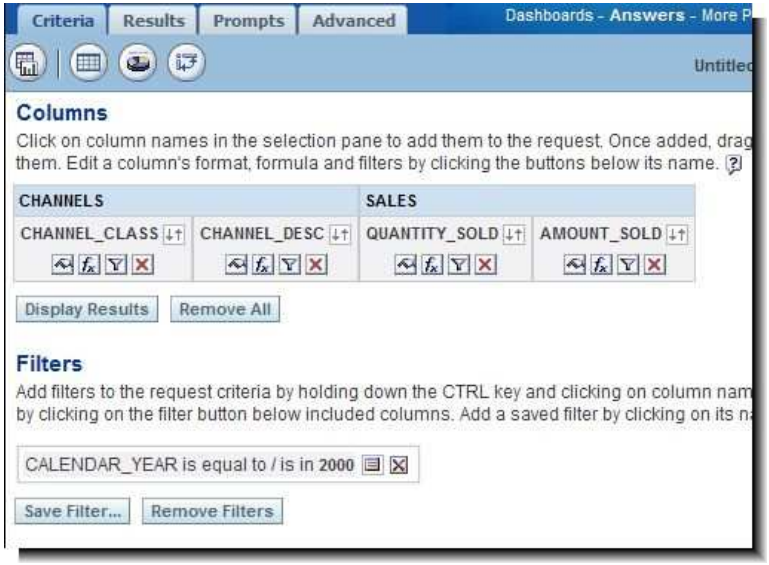
Primjer 1: Logički SQL

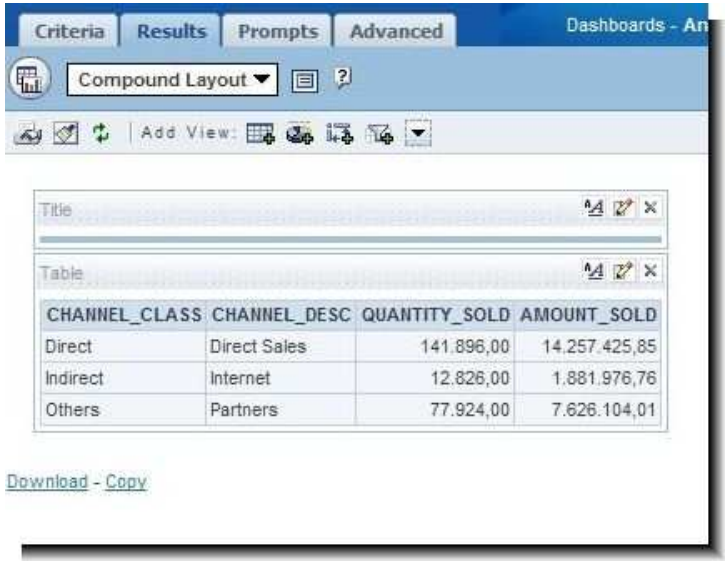
```
SELECT
   CHANNELS.CHANNEL_CLASS saw_0,
   CHANNELS.CHANNEL_DESC saw_1,
   SALES.QUANTITY_SOLD saw_2,
   SALES.AMOUNT_SOLD saw_3
FROM "Sales History"
WHERE
   TIMES.CALENDAR_MONTH_DESC = '2000-04‘
ORDER BY saw_0, saw_1
```

Primjer 1: Fizički SQL

```
SELECT   d1.c1 AS c1, d1.c2 AS c2, d1.c3 AS c3, d1.c4 AS c4
    FROM (SELECT   t136.channel_class AS c1,
                   t136.channel_desc AS c2,
                   SUM (t1132.quantity_sold) AS c3,
                   SUM (t1132.amount_sold) AS c4,
                   t136.channel_class_id AS c5,
                   t136.channel_id AS c6
              FROM times t206,
                   channels t136,
                   sales_q2_2000 t1132
             WHERE (    t136.channel_id = t1132.channel_id
                    AND t206.calendar_month_desc = '2000-04'
                    AND t206.time_id = t1132.time_id
                   )
          GROUP BY t136.channel_class,
                   t136.channel_class_id,
                   t136.channel_desc,
                   t136.channel_id) d1
ORDER BY c1, c2
```

Primjer 2: Fragmentacija





- Opseg upita (godina) veći je od opsega fragmenta (kvartal)
- BI server usmjerava upit na minimalan broj potrebnih fizičkih tablica i generira uniju

Primjer 2: Logički SQL

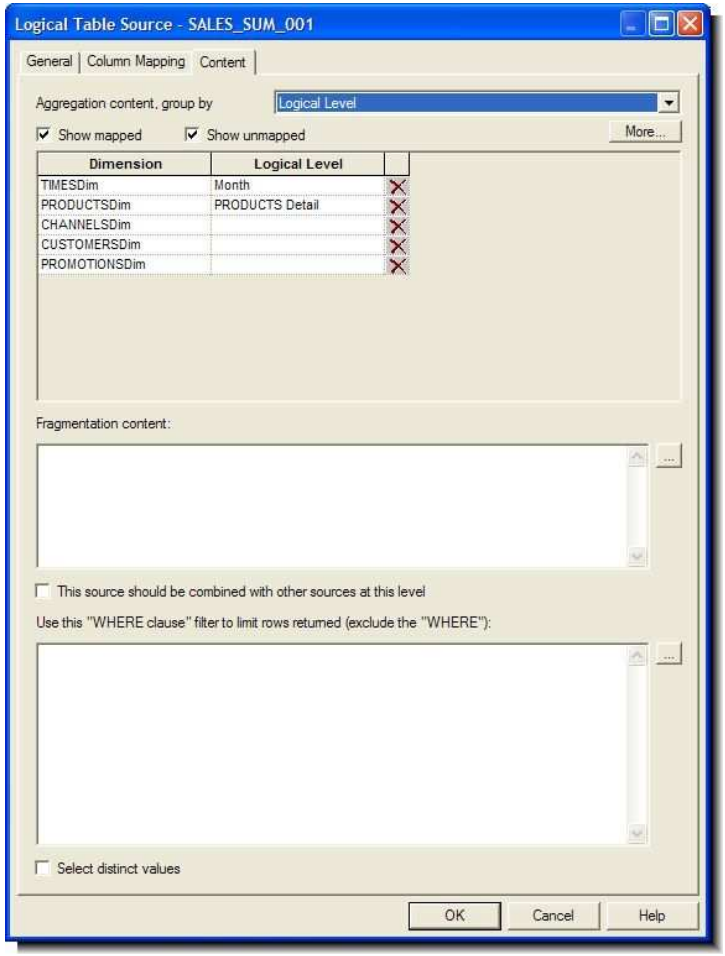
```
SELECT
   CHANNELS.CHANNEL_CLASS saw_0,
   CHANNELS.CHANNEL_DESC saw_1,
   SALES.QUANTITY_SOLD saw_2,
   SALES.AMOUNT_SOLD saw_3
FROM "Sales History"
WHERE
   TIMES.CALENDAR_YEAR = 2000
ORDER BY saw_0, saw_1
```

Primjer 2: Fizički SQL

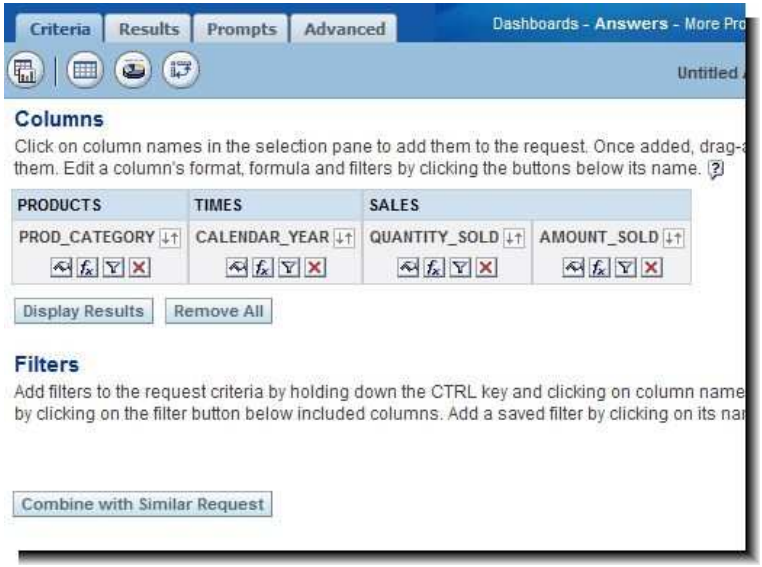
```
SELECT   d1.c1 AS c1, d1.c2 AS c2, d1.c3 AS c3, d1.c4 AS c4
    FROM (SELECT   d3.c3 AS c1, d3.c4 AS c2, SUM (d3.c8) AS c3,
                   SUM (d3.c7) AS c4, d3.c5 AS c5, d3.c6 AS c6
              FROM ((SELECT t136.channel_class AS c3, t136.channel_desc AS c4,
                            t136.channel_class_id AS c5,
                            t136.channel_id AS c6, t1145.amount_sold AS c7,
                            t1145.quantity_sold AS c8
                       FROM channels t136, sales_q1_2000 t1145
                      WHERE (t136.channel_id = t1145.channel_id)
                     UNION ALL
                     SELECT t136.channel_class AS c3, t136.channel_desc AS c4,
                            t136.channel_class_id AS c5,
                            t136.channel_id AS c6, t1132.amount_sold AS c7,
                            t1132.quantity_sold AS c8
                       FROM channels t136, sales_q2_2000 t1132
                      WHERE (t136.channel_id = t1132.channel_id)
                     UNION ALL
                     SELECT t136.channel_class AS c3, t136.channel_desc AS c4,
                            t136.channel_class_id AS c5,
                            t136.channel_id AS c6, t1119.amount_sold AS c7,
                            t1119.quantity_sold AS c8
                       FROM channels t136, sales_q3_2000 t1119
                      WHERE (t136.channel_id = t1119.channel_id)
                     UNION ALL
                     SELECT t136.channel_class AS c3, t136.channel_desc AS c4,
                            t136.channel_class_id AS c5,
                            t136.channel_id AS c6, t1000.amount_sold AS c7,
                            t1000.quantity_sold AS c8
                       FROM channels t136, sales_q4_2000 t1000
                      WHERE (t136.channel_id = t1000.channel_id))) d3
          GROUP BY d3.c3, d3.c4, d3.c5, d3.c6) d1
ORDER BY c1, c2
```

Sumarne tablice

- Jednako kao i fragment, registrira se kao dodatni izvor logičke činjenične tablice (Logical Table Source)
- Ovisno o razini agregacije, dimenzijske tablice također moraju imati dodatni LTS
- U agregacijskom sadržaju definira se razina agregacije za svaku dimenziju
- Za ispravno preusmjeravanje upita nužno je postojanje statistika:
  - Row Count (Fizičke tablice)
  - Number of Elements at Level (Logičke dimenzije)



Primjer 3: Sumarne tablice



Title

Table

PROD_CATEGORY	CALENDAR_YEAR	QUANTITY_SOLD	AMOUNT_SOLD
Electronics	1998	9.853,00	1.775.688,87
	1999	24.105,00	2.916.369,92
	2000	36.161,00	5.200.605,88
	2001	46.148,00	4.704.850,95
Hardware	1998	4.714,00	6.845.535,92
	1999	2.809,00	3.781.243,27
	2000	3.088,00	4.336.456,40
	2001	4.746,00	5.684.370,01
Peripherals and Accessories	1998	69.751,00	9.073.257,37
	1999	86.605,00	7.766.237,11
	2000	58.851,00	6.464.786,22
	2001	71.162,00	7.859.707,71
Photo	1998	9.283,00	3.414.323,88
	1999	23.394,00	3.884.664,22
	2000	28.045,00	4.329.248,89
	2001	34.787,00	6.333.628,91
Software/Other	1998	85.233,00	2.975.108,91
	1999	111.032,00	3.871.433,14
	2000	106.501,00	3.434.409,23
	2001	102.575,00	3.553.904,40

- Upit po dimenzijama Proizvoda (kategorija) i Vremena (godina): Razina agregacije veća je nego u sumarnoj tablici (pojedinačni proizvod, mjesec)
- BI server preusmjerava upit na sumarnu tablicu jer je to najjeftinije rješenje

Primjer 3: Logički SQL

```
SELECT
   PRODUCTS.PROD_CATEGORY saw_0,
   TIMES.CALENDAR_YEAR saw_1,
   SALES.QUANTITY_SOLD saw_2,
   SALES.AMOUNT_SOLD saw_3
FROM "Sales History"
ORDER BY saw_0, saw_1
```

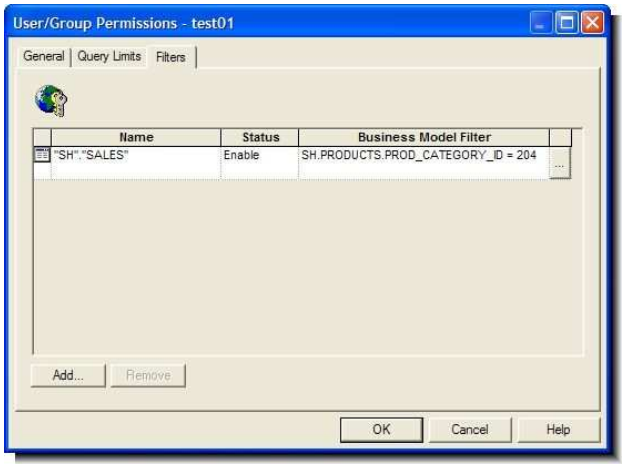
Primjer 3: Fizički SQL

```
SELECT   d1.c1 AS c1, d1.c2 AS c2, d1.c3 AS c3, d1.c4 AS c4
    FROM (SELECT   t169.prod_category AS c1,
                   t1512.calendar_year AS c2,
                   SUM (t1497.quantity_sold) AS c3,
                   SUM (t1497.amount_sold) AS c4,
                   t169.prod_category_id AS c5
              FROM times_l_month t1512,
                   products t169,
                   sales_sum_001 t1497
             WHERE (    t169.prod_id = t1497.prod_id
                    AND t1497.calendar_month_id = t1512.calendar_month_id
                   )
          GROUP BY t169.prod_category,
                   t169.prod_category_id,
                   t1512.calendar_year) d1
ORDER BY c1, c2
```

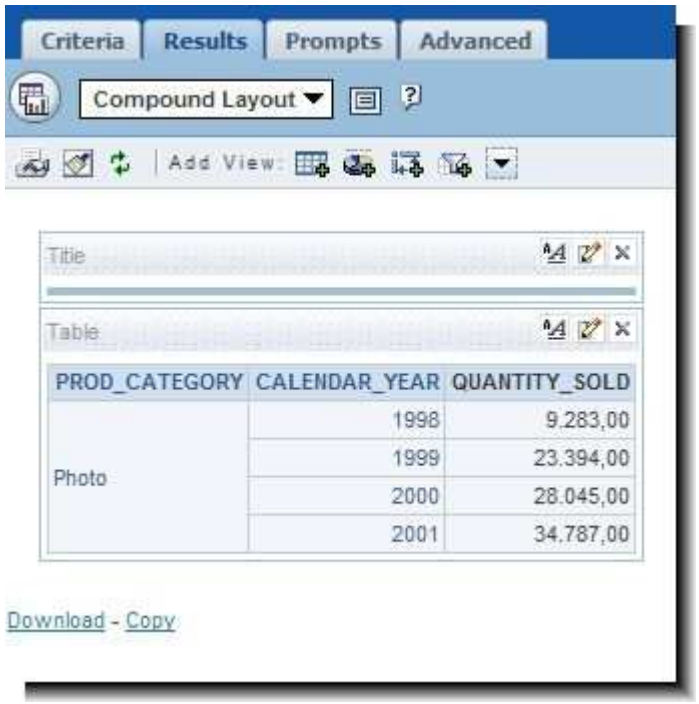
Sigurnost na BI Serveru

- Vertikalna sigurnost određuje pristup tablicama i kolonama u tablici
- Privilegije mogu biti aditivne ili restriktivne
- Određuje se na prezentacijskom sloju BI modela

- Horizontalna sigurnost određuje pristup retcima tablice
- Primjenjuje se u obliku implicitnih filtera u upitima
- Određuje se na razini logičkih tablica



Primjer 4: Sigurnost na BI Serveru



- Korisnik smije vidjeti količinu, ali ne i iznos (Amount Sold)
- Smije vidjeti prodajne transakcije koje se odnose samo na jednu kategoriju proizvoda (Photo)
- Isto izvješće iz primjera 3 (dizajn i logički SQL)
- Isti sigurnosni kriteriji primjenjuju se na sve sumarne i detaljne tablice (fragmente)

Primjer 4: Fizički SQL

```
SELECT   d1.c1 AS c1, d1.c2 AS c2, d1.c3 AS c3, d1.c4 AS c4
    FROM (SELECT DISTINCT d1.c2 AS c1, d1.c3 AS c2, d1.c1 AS c3,
                          CAST (NULL AS DOUBLE PRECISION) AS c4, d1.c4 AS c5
                     FROM (SELECT   SUM (t1497.quantity_sold) AS c1,
                                    t169.prod_category AS c2,
                                    t1512.calendar_year AS c3,
                                    t169.prod_category_id AS c4
                               FROM times_l_month t1512,
                                    products t169,
                                    sales_sum_001 t1497
                              WHERE (t169.prod_category_id = 204
                                     AND t169.prod_id = t1497.prod_id
                                     AND t1497.calendar_month_id =
                                           t1512.calendar_month_id
                                    )
                           GROUP BY t169.prod_category,
                                    t169.prod_category_id,
                                    t1512.calendar_year) d1) d1
ORDER BY c1, c2
```

Primjer 5: Svrdlanje (Drill Down)

PROD_CATEGORY	CALENDAR_YEAR	QUANTITY_SOLD
Photo	1998	9.283,00
	1999	23.394,00
	2000	28.045,00
	2001	34.787,00

PROD_CATEGORY	CALENDAR_YEAR	CALENDAR_QUARTER_DESC	QUANTITY_SOLD
Photo	2000	2000-01	6.501,00
		2000-02	7.213,00
		2000-03	7.526,00
		2000-04	6.805,00

PROD_CATEGORY	CALENDAR_YEAR	CALENDAR_QUARTER_DESC	CALENDAR_MONTH_DESC	QUANTITY_SOLD
Photo	2000	2000-02	2000-04	2.320,00
			2000-05	2.492,00
			2000-06	2.401,00

PROD_CATEGORY	CALENDAR_YEAR	CALENDAR_QUARTER_DESC	CALENDAR_MONTH_DESC	TIME_ID	QUANTITY_SOLD
Photo	2000	2000-02	2000-04	02.04.2000	85,00
				03.04.2000	90,00
				05.04.2000	196,00
				06.04.2000	204,00
				08.04.2000	24,00
				10.04.2000	28,00
				11.04.2000	242,00
				13.04.2000	16,00
				15.04.2000	209,00
				16.04.2000	147,00
				18.04.2000	528,00
				20.04.2000	13,00
				21.04.2000	15,00
				22.04.2000	389,00
				24.04.2000	20,00
				25.04.2000	34,00
				26.04.2000	41,00
				28.04.2000	11,00
				30.04.2000	28,00

Primjer 5: Fizički SQL (Drill Down)

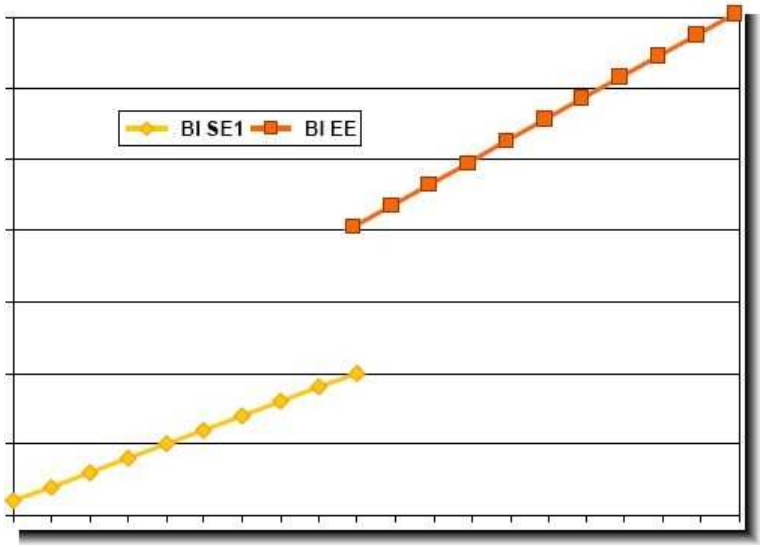
```
SELECT   d1.c1 AS c1, d1.c2 AS c2, d1.c3 AS c3, d1.c4 AS c4, d1.c5 AS c5,
         d1.c6 AS c6, d1.c7 AS c7
    FROM (SELECT DISTINCT d1.c2 AS c1, d1.c3 AS c2, d1.c4 AS c3, d1.c5 AS c4,
                          d1.c6 AS c5, d1.c1 AS c6,
                          CAST (NULL AS DOUBLE PRECISION) AS c7, d1.c7 AS c8,
                          d1.c8 AS c9, d1.c9 AS c10
                     FROM (SELECT   SUM (t1132.quantity_sold) AS c1,
                                    t169.prod_category AS c2,
                                    t206.calendar_year AS c3,
                                    t206.calendar_quarter_desc AS c4,
                                    t206.calendar_month_desc AS c5,
                                    t206.time_id AS c6,
                                    t169.prod_category_id AS c7,
                                    t206.calendar_month_id AS c8,
                                    t206.calendar_quarter_id AS c9
                               FROM times t206,
                                    products t169,
                                    sales_q2_2000 t1132
                              WHERE (    t169.prod_id = t1132.prod_id
                                     AND t169.prod_category_id = 204
                                     AND t206.calendar_month_desc = '2000-04'
                                     AND t206.calendar_quarter_desc = '2000-02'
                                     AND t206.calendar_year = 2000
                                     AND t206.time_id = t1132.time_id
                                    )
                           GROUP BY t169.prod_category,
                                    t169.prod_category_id,
                                    t206.calendar_month_desc,
                                    t206.calendar_month_id,
                                    t206.calendar_quarter_desc,
                                    t206.calendar_quarter_id,
                                    t206.calendar_year,
                                    t206.time_id) d1) d1
ORDER BY c1, c2, c3, c4, c5
```

Oracle DB vs OBI Server

- Fragmentacija, sumarne tablice i sigurnost implementirane na strani BI servera funkcioniraju samo za BI upite
- DML operacije i ETL nad više tablica znatno složeniji nego kada je na raspolaganju Oracle Partitioning
- Ručne metode osvježavanja sumarnih tablica znatno složenije nego kada se koriste ugrađene (DBMS_MVIEW, Materialized View Logs)
- BI Server **ne može** nadomjestiti:
  - Basic Table Compression
  - Bitmapped index, Bitmapped Join Index, and Bitmap Plan Conversions
  - Parallel Query/DML
  - Asynchronous Change Data Capture

Zaključak

- “Think big, but start small”
- Uz dobro poznavanje korisničkih zahtjeva i tehnoloških mogućnosti, SE1 može pružiti kvalitetan BI sustav
- Proširenje licenci prema mogućnostima i zahtjevima za novim funkcionalnostima
- Baza EE i OBI EE zasnivaju se na istoj tehnologiji, što čini kasniju nadogradnju neprimjetnom za krajnjeg korisnika
- Oracle BI nije namijenjen samo “velikima”



Pitanja?

HVALA!