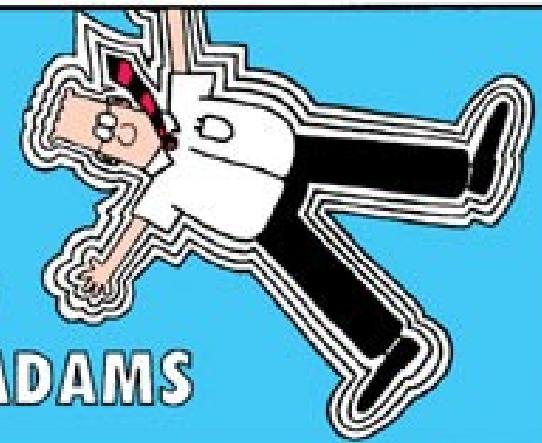




DILBERT[®]



BY
SCOTT ADAMS

THE SECURITY AUDIT ACCIDENTALLY LOCKED ALL OF THE DEVELOPERS OUT OF THE SYSTEM.



E-mail: SCOTTADAMS@AOL.COM

WELL, IT IS WHAT IT IS.



HOW DOES THAT HELP?



YOU DON'T KNOW WHAT YOU DON'T KNOW.



© 2008 Scott Adams, Inc./Dist. by UFS, Inc.

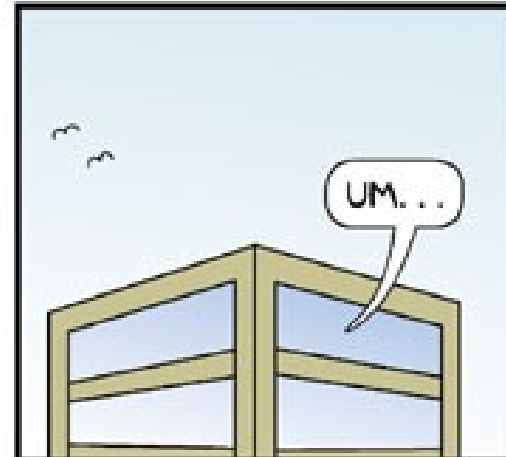
CONGRATULATIONS. YOU'RE THE FIRST HUMAN TO FAIL THE TURING TEST.



WHAT DOES THAT MEAN?



UM...



IT IS WHAT IT IS?

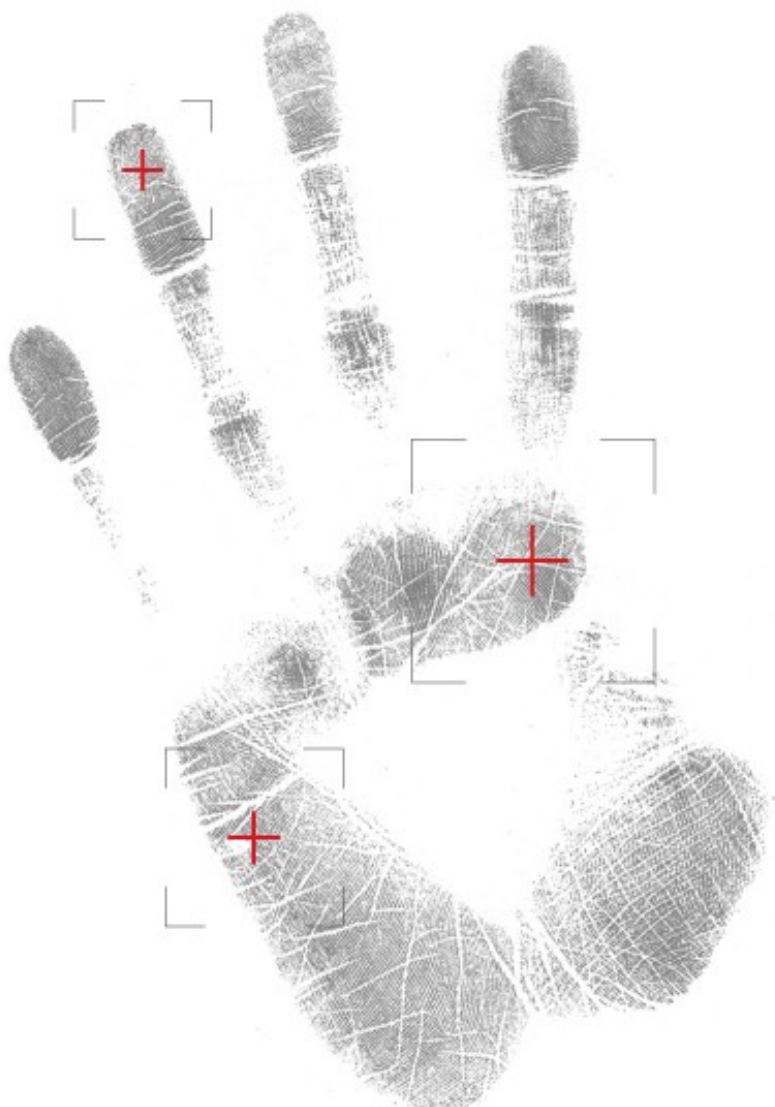
WHY DIDN'T YOU SAY THAT IN THE FIRST PLACE?



www.dilbert.com
3-20-08

**Tko sve je pregledavao ili
mjenjao moje podatke?**

Abakus **ARBITER**



Tatjana Dondur
Futura plus d.d.

Boris Oblak
Abakus plus d.o.o.

ORACLE | CERTIFIED
PROFESSIONAL



15. Konferencija hrvatske udruge Oracle korisnika
19.-23. listopada 2010. ROVINJ

Tragovi vrijedni povjerenja

O tvrtci

Povijest:

- od 1992, 20 zaposlenika
- Oracle zbirka podatkov, GNU/linux (1995)
- **dobitnici srebrnoga priznanja za inovacije** – Aerodrom Ljubljana: Flight Information System

Razvoj i održavanje:

- Razvoj visoko razpoloživih sustava sa OS GNU/linux
- Sistemska podrška i podešavanje sistema sa OS GNU/linux
- Podešavanje i administriranje Oracle baze podataka





Interni korisnik

- imaju samo pristup "iznutra",
- teško otkriti i spriječiti zloupotrebu internih korisnika (namjerni ili nenamjerni),
- 87 % unutarnjih incidenata uzrokuju ovlašteni ili
- tehnički (stručni) korisnici (vir Forrester Research 2006)
 - [http://www.tgdaily.com/security-features/42535-internal-users-
pose-severe-threat-to-public-sector-networks](http://www.tgdaily.com/security-features/42535-internal-users-pose-severe-threat-to-public-sector-networks)
 - [http://www.sans.org/reading_room/whitepapers/bestprac/inter
nal-threat-security-users-mess-things_856](http://www.sans.org/reading_room/whitepapers/bestprac/internal-threat-security-users-mess-things_856)



Otkrivanje incidenata

- **unutarnji incidenti,**
 - teško otkriti i sankcionirati,
 - postavlja pitanje privatnosti, međuljudskih odnosa
- **uključivanje vanjskih agencija za provedbu zakona,**
- **pitanje adekvatnosti dokaza.**



Revizijski trag

Revizijski trag je **skup svih informacija** potrebnih da se prikaže povijesni zapis o izvršenim događajima ili aktivnostima vezanim za pohranjene informacije u sustavima za prikupljanje, obradu i arhiviranje podataka. Revizijski trag mora omogućiti **prikaz vremenskog slijeda svih događaja** vezanih za poslovanje i pohranjene informacije. Informacije koje revizijski tragovi uključuju bi trebale biti dovoljne da se **dokaže integritet pohranjenih podataka**. Njihov nastanak i skladištenje moraju osigurati njihov integritet i primjenjivost u cijelom razdoblju pohranjivanja podataka, što dokazuje integritet.



Informacijski sustavi

- **dostupnost** (informacije dostupne kada su potrebne),
- **integritet** (podaci točni, nisu neovlašteno obrisani ili promijenjeni),
- **povjerljivost** (informacije motu pristupiti samo ovlaštene osobe),
- **sljedljivost** (formirani revizijski tragovi trebali bi potvrditi tošnost izvedbe i odstupanja).

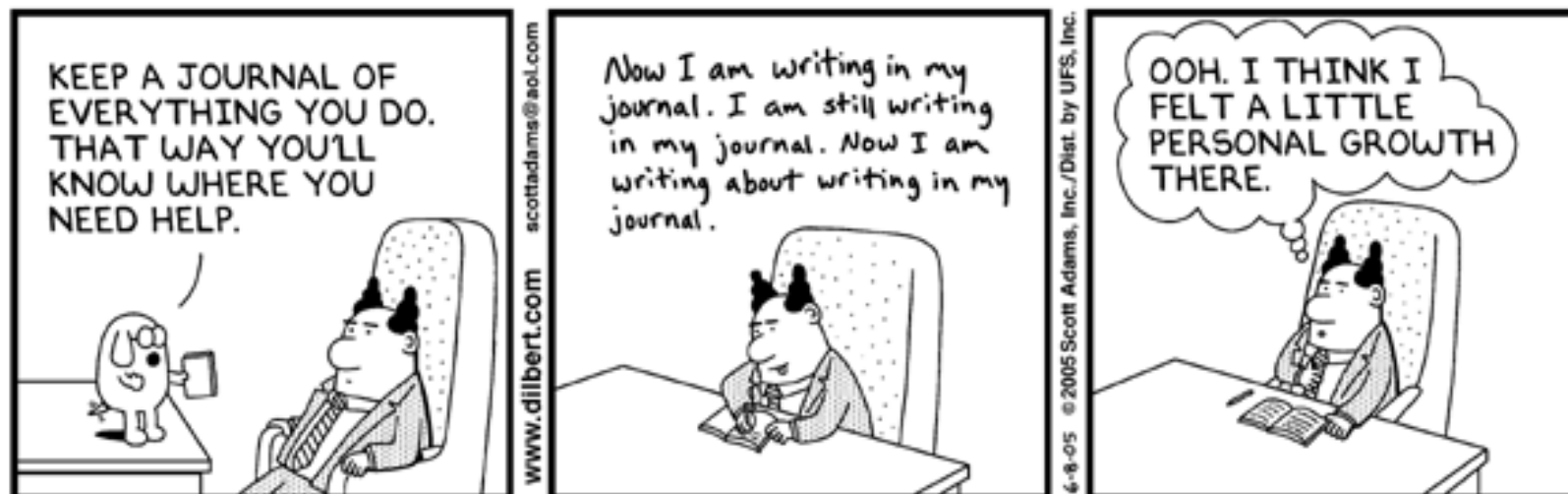


Namjena revizijskih tragova

- osiguravanje točnosti i nekrivotvorenosti podataka,
- dokumentiranje okruženja u kojem se transakcija dogodila,
- prikaz povijesni slijedi transakcija o nekom poslovnom događaju.



Revizijski trag



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- točan
- pravovremen
- ne smije ometati redovne procese



Vrste revizijskih tragova

- akcije nad objektima
- promjena podataka



Do you think you can hack into our company's computer system and delete and audit?!!



Revizijski tragovi - Oracle

- na nivou sesije ili svaki put,
- uspješne / neuspješne akcije,
- prijava i odjava,
- naredbe koje se odnose na privilegije,
- naredbe nad objektima.



Revizijski tragovi - podaci

- **upotreba baznih okidača:**
 - procedure koje se pokreću na određene akcije,
 - prije namjeravane izmjene pohranjivanje starih vrijednosti podataka,
 - akcije na sistemskim događajima.
- **potreban je pristup aplikaciji!**

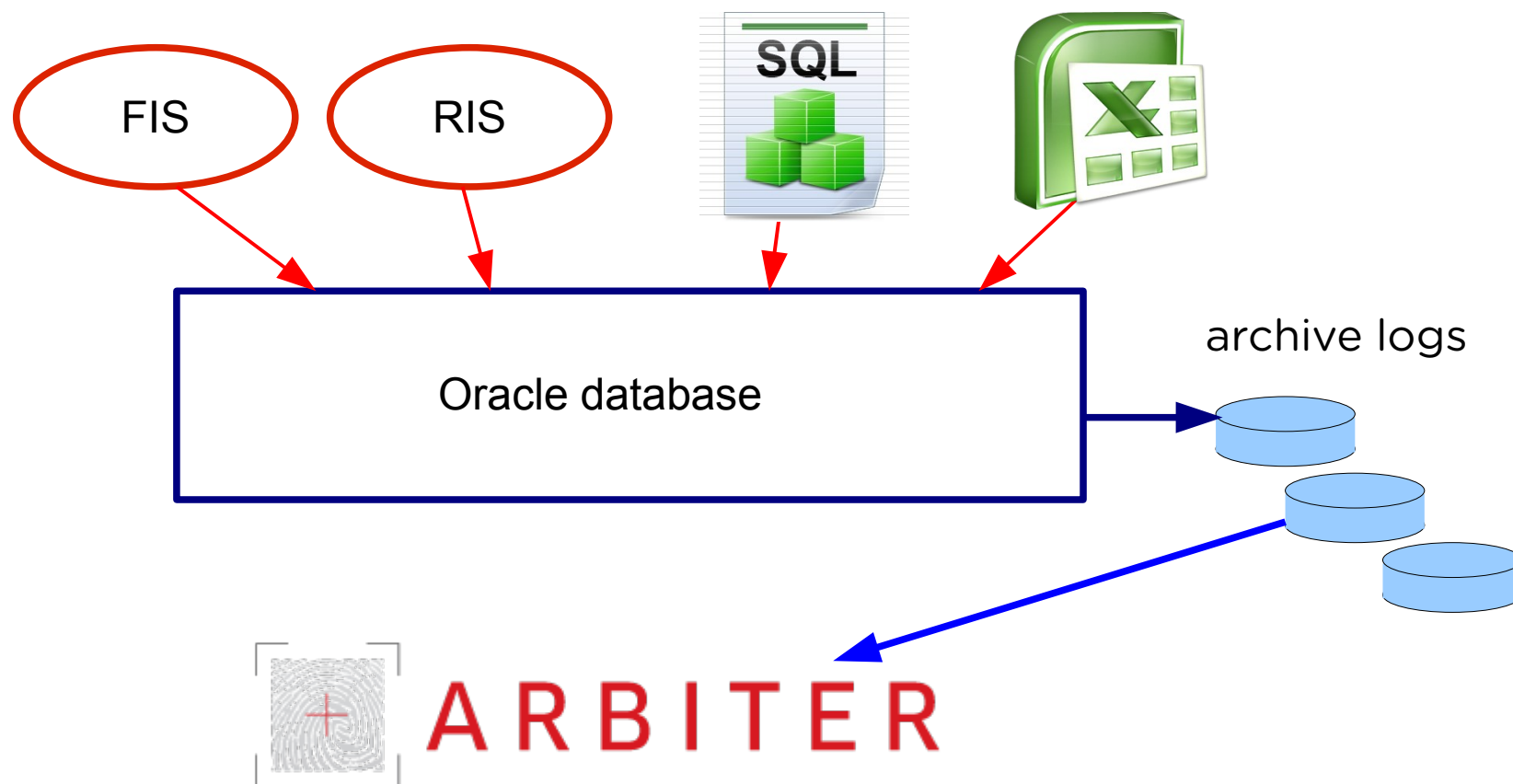


Revizijski tragovi - ARBITER

- koristi podatke log datoteka baze podataka,
- preuzima iz log datoteka pohranjene promjene vrijednosti podataka,
- neovisan je od aplikacije,
- revizijski tragovi se pohranjuju u svoju bazu ,
- **nije potreban pristup aplikaciji!**

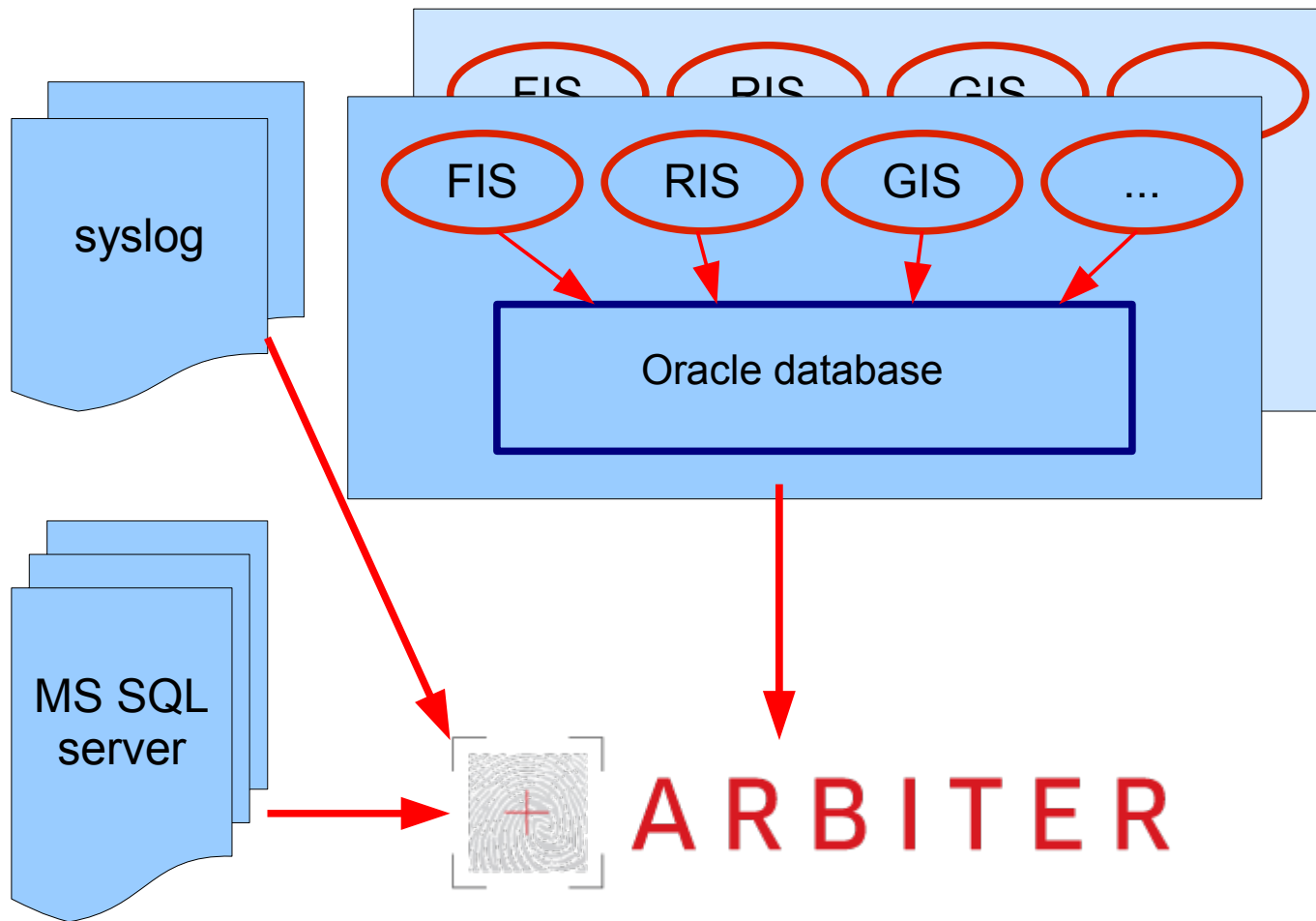


Revizijski tragovi - ARBITER





Revizijski tragovi - ARBITER





ARBITER

- **odgovor na pitanja**
 - Kada?
 - Tko? (Gdje?, Kako?)
 - Što?
- **analiza akcija i alarmiranje,**
- **promjena podataka (stare/nove vrijednosti,...)**



[#]ARBITER - Admin


Logout

ABAKUS  ARBITER

Select Database

ID	Name	DB Link	Scheme
There are no registered databases.			

Create new DB definition

ABAKUS  ARBITER




[#]ARBITER - Admin

ABAKUS  ARBITER

[Jobs](#) [User Settings](#) [Global Settings](#) [Logout](#)

Select Database

ID	Name	DB Link	Scheme
1362	AIROM	MORIA.ABAKUS.SI <input type="button" value="Search Audit"/> <input type="button" value="Search Audit Data"/> <input type="button" value="Search Access Log"/> 	MORIA_1362

Connect Parameters

TNS Connect String
Database Link Name
Remote Username

These fields will only be used for initial setup and will not be saved.

Remote Password
Confirm Remote Password
Remote SYSDBA Username
Remote SYSDBA Password

ABAKUS  ARBITER



[#]ARBITER - Admin

Connect Parameters

Creating Database Link COMPLETE ✔

Database Parameters

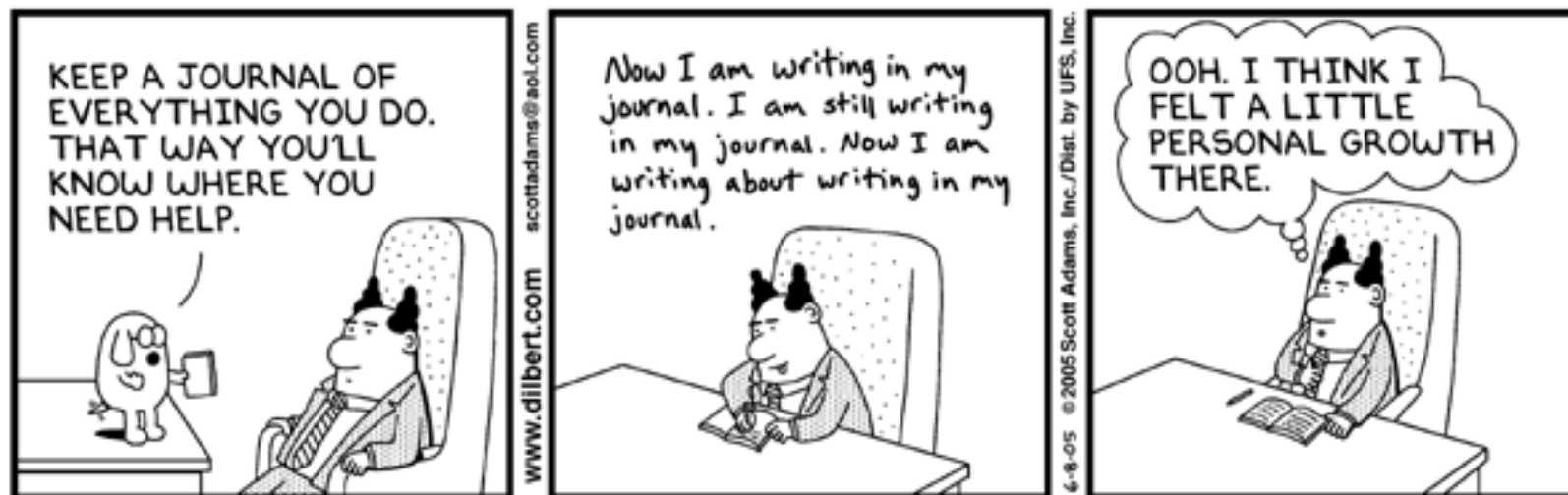
Inserting Database Definition COMPLETE ✔

Database Instance Parameters

	Inst.	Host	Dest.	DBMS Tran.	Dir. Object	Purge Logs	User
<input checked="" type="checkbox"/>	1.1	<input type="text" value="kastor"/>	/oradmin /orac/arch	<input checked="" type="checkbox"/>	<input type="text" value="REV_ARCHLOG_DIR"/>	<input type="checkbox"/>	<input type="text"/>
<input type="checkbox"/>	1.10	<input type="text" value="kastor"/>	+ABA/orac/arch	<input checked="" type="checkbox"/>	<input type="text" value="REV_ARCHLOG_DIR"/>	<input type="checkbox"/>	<input type="text"/>



Revizijski trag



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- točan
- pravovremen
- ne smije ometati redovne procese



[#]ARBITER - Admin

Select Schema Selected database: MORIA.ABAKUS.SI

Schema Tables Selected schema: SCOTT

Register Schema Unregister Schema Edit Schema Gap Schema Ungap Schema

REV_TESTER_ADMIN Select a group Grant Schema Revoke Schema

Enter search words to filter underlying contents.

FILTER

ID	Name	
	AA	✖
1891	BONUS	✔
1892	DEPT	✔
1893	DEPT_T4	✔
1894	DEPT_T5	✔
1895	DEPT_T6	✔
1927	EMP	✔
Register Table Unregister Table Edit Table Gap Table Ungap Table Grant Table Revoke Table		
1897	EMP_T4	✔
1898	EMP_T5	✔
1899	EMP_T6	✔
1900	EMP_T7	✔ ⚠
1901	SALGRADE	✔
1913	SALGRADE_T4	✔
	SALGRADE_T5	✖
1904	SALGRADE_T6	✔



[#]ARBITER - Admin

	MWTEST				[-] [-] [+]
	MW_IMP				[-] [-] [+]
	MW_SS				[-] [-] [+]
	NAR				[-] [-] [+]
	OGK				[-] [-] [+]
	OPP				[-] [-] [+]
	ORADEMO				[-] [-] [+]
	PLVQS				[-] [-] [+]
	SCOTT				[+] [-] [+]
1051	SCOTT	AA			[-]
1052	SCOTT	BONUS			[-]
1053	SCOTT	DEPT			[-]
1054	SCOTT	EMP			[-]
1055	SCOTT	SALGRADE			[-]

Register schema/table parameters [X]

Partitions: [v]

Audit SELECT events

Audit SELECT event values

Audit ALL columns

Audit PK columns

Audit UK columns

Audit FK columns

Register table



[#]ARBITER - Admin

Grant to user dialog box showing a list of tables and a 'Grant' button.

Grant to user

Grantee:

Owner	Table Name	Granted
SCOTT	AA	
SCOTT	BONUS	
SCOTT	DEPT	
SCOTT	EMP	
SCOTT	SALGRADE	

Grant

MW_SS		
NAR		
OGK		
OPP		
ORADEMO		
PLVQS		
SCOTT		
1051	SCOTT	
1052	SCOTT	
1053	SCOTT	DEPT
1054	SCOTT	EMP
1055	SCOTT	SALGRADE



[#]ARBITER - Auditor

Select Database

ID	Name	DB Link	Scheme
1362	AIROM	MORIA.ABAKUS.SI	MORIA_1362

[Search Audit](#) [Search Audit Data](#) [Search Access Log](#)

[Edit database parameters](#) [Register/Grant database tables](#) [Manage jobs](#) [Show gaps](#) [Show Auditing Options](#)

Action	Last Run Time	Duration	Rows
Audit	20-08-10 12:24	0s	145/29965
Data	19-08-10 14:20	79548s	82369/88051

Rows Inserted (last iteration)

Rows Inserted (last 24h)

[Create new DB definition](#)



[#]ARBITER - Auditor

Select Schema	Selected database: <u>MORIA.ABAKUS.SI</u>				
Select Table	Selected schema: <u>SCOTT</u>				
Search Parameters	Query Link Selected table: <u>DEPT_T6 , EMP_T6</u>				
Search by time	<input checked="" type="checkbox"/>	From	<input type="text" value="20.08.2010"/> <input type="text" value="00:00"/>	To	<input type="text" value="20.08.2010"/> <input type="text" value="23:59"/>
Search by user	<input type="checkbox"/>	Username	<input type="text"/>	Terminal	<input type="text"/>
Search by metadata	<input type="checkbox"/>	Session	<input type="text"/>	Transaction	<input type="text"/>
Search by action	<input type="checkbox"/>	Action	<input type="text" value="CREATE TABLE"/>		
<input type="button" value="Search"/>		Select Sort	<input type="text" value="Timestamp (Asc)"/>	Select State	<input type="text" value="Show Collapsed"/>

- Timestamp (Asc)
- Timestamp (Desc)
- Username (Asc)
- Username (Desc)
- Terminal (Asc)
- Terminal (Desc)



[#]ARBITER - Auditor

Select Schema	Selected database: MORIA.ABAKUS.SI		
Select Table	Selected schema: SCOTT		
Search Parameters	Selected table: DEPT_T6 , EMP_T6		
Search Result	Query Link		
	<input type="button" value="Download Report"/> <input type="button" value="Save Query"/> <input type="button" value="Copy Query"/> <input type="button" value="Refresh"/>		
INSERT	09.08.2010 15:03:05.000000 +02:00	T: 0800050064840100 S: 7707917	SCOTT @ ERNA
	INSERT INTO EMP_T6 VALUES (1101, 'DAMJAN', 'SALESMAN', 1000, '01.01.2003', 1500, NULL,20)		
INSERT	09.08.2010 15:03:05.000000 +02:00	T: 0800050064840100 S: 7707917	SCOTT @ ERNA
	INSERT INTO EMP_T6 VALUES (1102, 'DUŠAN', 'SALESMAN', 1100, '01.01.2001', 1500, NULL,20)		
INSERT	09.08.2010 15:03:05.000000 +02:00	T: 0800050064840100 S: 7707917	SCOTT @ ERNA
	INSERT INTO EMP_T6 VALUES (1103, 'HENRIK', 'SALESMAN', 1200, '01.01.2005', 1500, NULL,20)		
INSERT	09.08.2010 15:03:05.000000 +02:00	T: 0800050064840100 S: 7707917	SCOTT @ ERNA
	INSERT INTO EMP_T6 VALUES (1104, 'JURE', 'SALESMAN', 1300, '01.01.2000', 1500, NULL,20)		
INSERT	09.08.2010 15:03:05.000000 +02:00	T: 0800050064840100 S: 7707917	SCOTT @ ERNA
	INSERT INTO EMP_T6 VALUES (1105, 'TATJANA', 'SALESMAN', 1400, '01.01.2006', 1500, NULL,20)		
INSERT	09.08.2010 15:03:05.000000 +02:00	T: 0800050064840100 S: 7707917	SCOTT @ ERNA
	INSERT INTO EMP_T6 VALUES (1106, 'EMIL', 'SALESMAN', 1000, '01.01.2008', 1500, NULL,20)		
UPDATE	09.08.2010 15:03:27.000000 +02:00	T: 0800050064840100 S: 7707917	SCOTT @ ERNA
	UPDATE EMP_T6 SET SAL = SAL * 1.5 WHERE EMPNO LIKE '11%'		
UPDATE	09.08.2010 15:04:24.000000 +02:00	T: 090003009A850100 S: 7707917	SCOTT @ ERNA
	UPDATE EMP_T6 SET DEPTNO = 10 WHERE EMPNO IN (1104, 1105)		



[#]ARBITER - Auditor

Select Schema	Selected database: <u>MORIA.ABAKUS.SI</u>
Select Table	Selected schema: <u>SCOTT</u>
Search Parameters	Selected table: <u>DEPT_T6 , EMP_T6</u>
Search Result	Query Link
<input type="button" value="Download Report"/> <input type="button" value="Save Query"/> <input type="button" value="Copy Query"/> <input type="button" value="Refresh"/>	

INSERT	09.08.2010 15:03:05.000000 +02:00	T: 0800050064840100 S: 7707917	SCOTT @ ERNA
<pre>INSERT INTO EMP_T6 VALUES (1103, 'HENRIK', 'SALESMAN', 1200, '01.01.2005', 1500, NULL,20)</pre>			
<input type="button" value="Toggle long SQL"/> <input type="button" value="Show transaction data"/> <input type="button" value="Transaction Tables"/> <input type="button" value="Session Tables"/> <input type="button" value="Audit Details"/> <input type="button" value="Transaction Details"/>			
INSERT	09.08.2010 15:03:05.000000 +02:00	T: 0800050064840100 S: 7707917	SCOTT @ ERNA
<pre>INSERT INTO EMP_T6 VALUES (1104, 'JURE', 'SALESMAN', 1300, '01.01.2000', 1500, NULL,20)</pre>			

<pre>INSERT INTO EMP_T6 VALUES (1104, 'JURE', 'SALESMAN', 1300, '01.01.2000', 1500, NULL,20)</pre>			
INSERT	09.08.2010 15:03:05.000000 +02:00	T: 0800050064840100 S: 7707917	SCOTT @ ERNA
<pre>INSERT INTO EMP_T6 VALUES (1105, 'TATJANA', 'SALESMAN', 1400, '01.01.2006', 1500, NULL,20)</pre>			
INSERT	09.08.2010 15:03:05.000000 +02:00	T: 0800050064840100 S: 7707917	SCOTT @ ERNA
<pre>INSERT INTO EMP_T6 VALUES (1106, 'EMIL', 'SALESMAN', 1000, '01.01.2008', 1500, NULL,20)</pre>			
UPDATE	09.08.2010 15:03:27.000000 +02:00	T: 0800050064840100 S: 7707917	SCOTT @ ERNA
<pre>UPDATE EMP_T6 SET SAL = SAL * 1.5 WHERE EMPNO LIKE '11%'</pre>			
UPDATE	09.08.2010 15:04:24.000000 +02:00	T: 090003009A850100 S: 7707917	SCOTT @ ERNA
<pre>UPDATE EMP_T6 SET DEPTNO = 10 WHERE EMPNO IN (1104, 1105)</pre>			



[#]ARBITER - Auditor

UPDATE 22.07.2010 14:43:30 T:09002500357B0100 S:7593115 SCOTT @ ERNA
UPDATE EMP SET COMM = 1000 WHERE DEPTNO = 10

DELETE 22.07.2010 SCOTT @ ERNA
DELETE FROM

UPDATE 22.07.2010 SCOTT @ ERNA
UPDATE EMP

SELECT 22.07.2010 SCOTT @ ERNA
SELECT * FROM

INSERT 22.07.2010 SCOTT @ ERNA
INSERT INTO

Toggle long SQL Show

INSERT 22.07.2010 SCOTT @ ERNA
INSERT INTO

INSERT 22.07.2010 SCOTT @ ERNA
INSERT INTO

INSERT 22.07.2010 14:43:08 T:0A000100831C0100 S:7593115 SCOTT @ ERNA
INSERT INTO EMP VALUES (8011, 'SERGEJ', 'MANAGER', 0, '01.01.2000', 2000, NULL, 10)

Transaction data

Action	EMPNO	ENAME	JOB	MGR	HIREDATE	SAL	COMM	DEPTNO
INSERT	8011	SERGEJ	MANAGER	0	01.01.2000 00:00:00	2000		10
INSERT	8012	DAMJAN	SALESMAN	0	01.01.2000 00:00:00	2200		10
INSERT	8013	ERNA	ANALYST	0	01.01.2003 00:00:00	2100		10
INSERT	8014	HENRIK	SALESMAN	0	01.01.1999 00:00:00	2200		20
INSERT	8015	LUKA	SALESMAN	0	01.01.2006 00:00:00	2200		20



[#]ARBITER - Auditor

Transaction tables

Transaction: 0600260067810100

Owner	Object Name	SQL Text
SCOTT	DEPT_T6	INSERT INTO DEPT_T6 VALUES (91, 'PRODAJA', 'KRANJ')
SCOTT	DEPT_T6	INSERT INTO DEPT_T6 VALUES (92, 'NABAVA', 'KRANJ')
SCOTT	DEPT_T6	INSERT INTO DEPT_T6 VALUES (93, 'INORMATIKA', 'KRANJ')
SCOTT	EMP_T6	INSERT INTO EMP_T6 VALUES (7222, 'SERGEJ', 'MANAGER',0,'01.01.2000', 2000, NULL, 10)
SCOTT	EMP_T6	INSERT INTO EMP_T6 VALUES (7223, 'DAMJAN', 'SALESMAN',0,'01.01.2000', 2200, NULL, 10)
SCOTT	EMP_T6	INSERT INTO EMP_T6 VALUES (7273, 'ERNA', 'ANALYST',0,'01.01.2003', 2100, NULL, 10)
SCOTT	EMP_T6	INSERT INTO EMP_T6 VALUES (7274, 'HENRIK', 'SALESMAN',0,'01.01.1999', 2200, NULL, 20)
SCOTT	EMP_T6	INSERT INTO EMP_T6 VALUES (7275, 'LUKA', 'SALESMAN',0,'01.01.2006', 2200, NULL, 20)
SCOTT	EMP_T6	update emp_t6 set sal = sal * 0.3
SCOTT	SALGRADE_T6	INSERT INTO SALGRADE_T6 VALUES (74, 100, 1000)
SCOTT	SALGRADE_T6	INSERT INTO SALGRADE_T6 VALUES (75, 200, 2000)
SCOTT	SALGRADE_T6	INSERT INTO SALGRADE_T6 VALUES (76, 300, 3000)



[#]ARBITER - Auditor

Parameter	Value
Audit Action	INSERT
Username	SCOTT
Userhost	ABAKUS\ERNA
Terminal	ERNA
Extended Timestamp	25.08.2010 13:47:41.000000 +02:00
Session ID	7840438
Transaction ID	
Transaction ID	
SQL Text	
SQL Bind	
Audit Table	MORIA_1362.A\$2127
OS Username	erna
Owner	SCOTT
Object Name	DEPT
Action	2



[#]ARBITER - Auditor

UPDATE 22.07.2010 14:43:38 T:09002500357B0100 S:7593115 SCOTT@ERNA

UPDATE EMP SET SAL = SAL * :B1 WHERE DEPTNO = 20

UPDATE 22.07.2010 SCOTT@ERNA

UPDATE EMP SET SAL = SAL * 1.2 WHERE DEPTNO = 20

DELETE 22.07.2010 :B1 => 1.2 SCOTT@ERNA

DELETE FRO

UPDATE 22.07.2010 SCOTT@ERNA

UPDATE EMP SET SAL = SAL * 1.2 WHERE EMPNO LIKE '8_'



[#]ARBITER - Auditor

ABAKUS  ARBITER

[Databases](#) [Jobs](#) [Users](#) [Settings](#) [My Profile](#) [Logout](#)

Select Schema

Selected database: **MORIA.ABAKUS.SI**

Select Table

Selected schema: **SCOTT**

Select Parameters

Selected table: **EMPDEP**

Search by time

From

To


Search by column values

EMPNO

DEPTNO

[show / hide other columns](#)

Select Sort

ABAKUS  ARBITER



[#]ARBITER - Auditor

Select Schema

Selected database: MORIA.ABAKUS.SI

Select Table

Selected schema: SCOTT

Select Parameters

Selected table: EMPDEP

Audit Data

[Back to last audit search](#) [Query Link](#)

Enter search words to filter underlying contents.

Transaction 636621 (SQL Queries)

EMPDEP (SCOTT.EMPDEP)				DEPTNO		EMPNO		MGR		SAL		ENAME		JOB	
User	Operation	Table	Timestamp (start)	OLD	NEW	OLD	NEW	OLD	NEW	OLD	NEW	OLD	NEW	OLD	NEW
	UPDATE	SCOTT.EMPDEP	10.09.2010 15:16:49.000000	20	20	4404	<u>4401</u>	4000	1200						

Transaction 636620 (SQL Queries)

	UPDATE	SCOTT.EMPDEP	10.09.2010 13:47:34.000000	20	20	4404	<u>4401</u>			750	1125				
--	--------	--------------	-------------------------------	----	----	------	-------------	--	--	-----	------	--	--	--	--

Transaction 636619 (SQL Queries)

	UPDATE	SCOTT.EMPDEP	10.09.2010 13:40:13.000000	20	20	4404	<u>4401</u>			4500	750				
--	--------	--------------	-------------------------------	----	----	------	-------------	--	--	------	-----	--	--	--	--

Transaction 636618 (SQL Queries)

	INSERT	SCOTT.EMPDEP	10.09.2010 13:39:32.000000		20		<u>4401</u>		1000		1500		DAMJAN		SALESM.
--	--------	--------------	-------------------------------	--	----	--	-------------	--	------	--	------	--	--------	--	---------

Copy Query



[#]ARBITER - Auditor

Select Period

Selected database: **MORIA.ABAKUS.SI**

From

To

Select Sort

or

Select Schema

Selected period: **01.05.2010 00:00 - 23.08.2010 23:59**

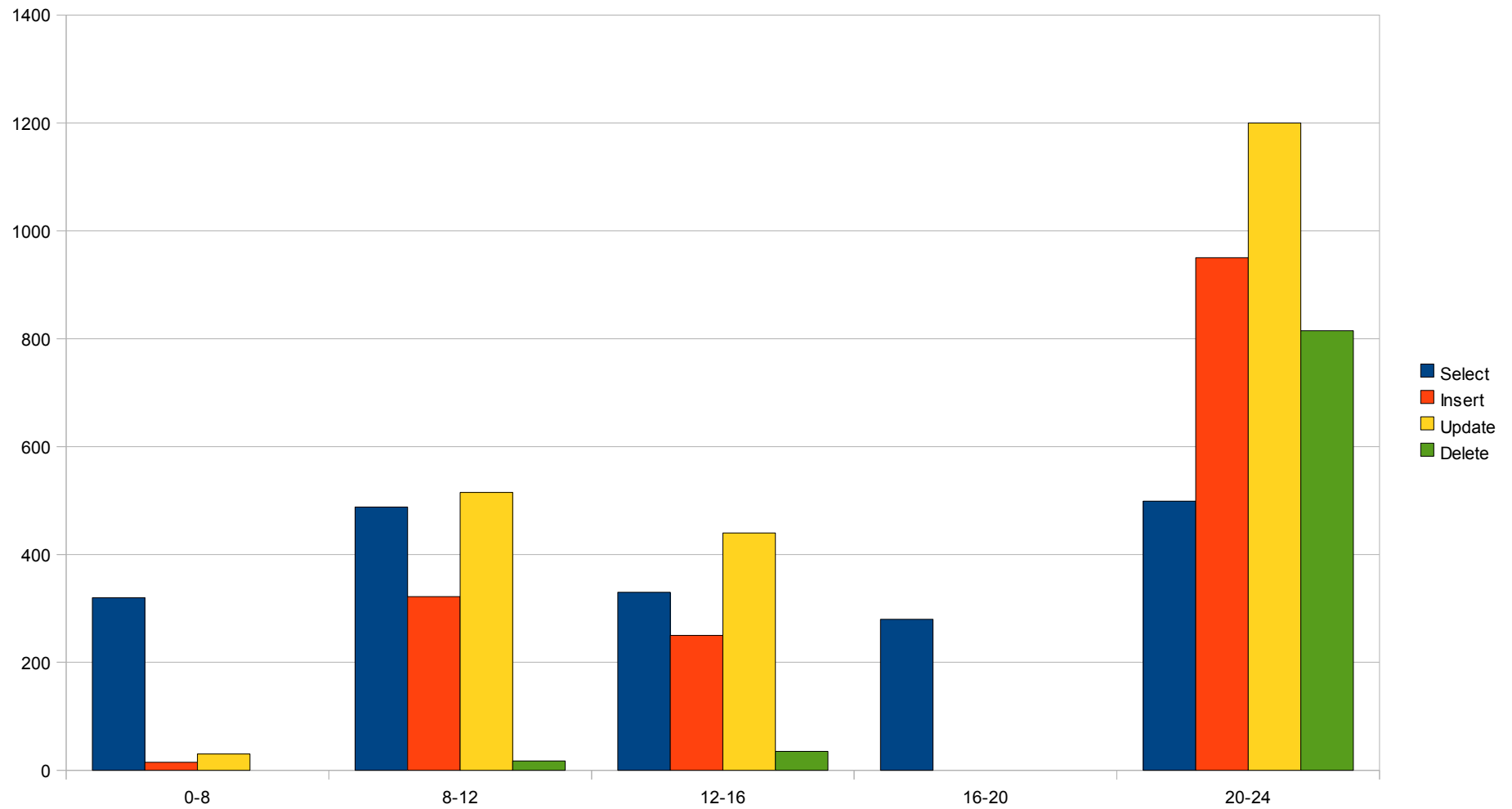
Access Log

Enter search words to filter underlying contents.

Username	OS Username	User Host	Terminal	Last Access
SCOTT	erna	ABAKUS\ERNA	ERNA	23.08.2010 15:27:17.974327 +02:00
REV_SCR_USER	User	paris.abakus.si		23.08.2010 13:39:47.263021 +02:00
SCOTT1	erna	ABAKUS\ERNA	ERNA	06.08.2010 14:10:45.147310 +02:00
SCOTT	oracle	raa	pts/1	30.07.2010 06:01:51.581358 +02:00

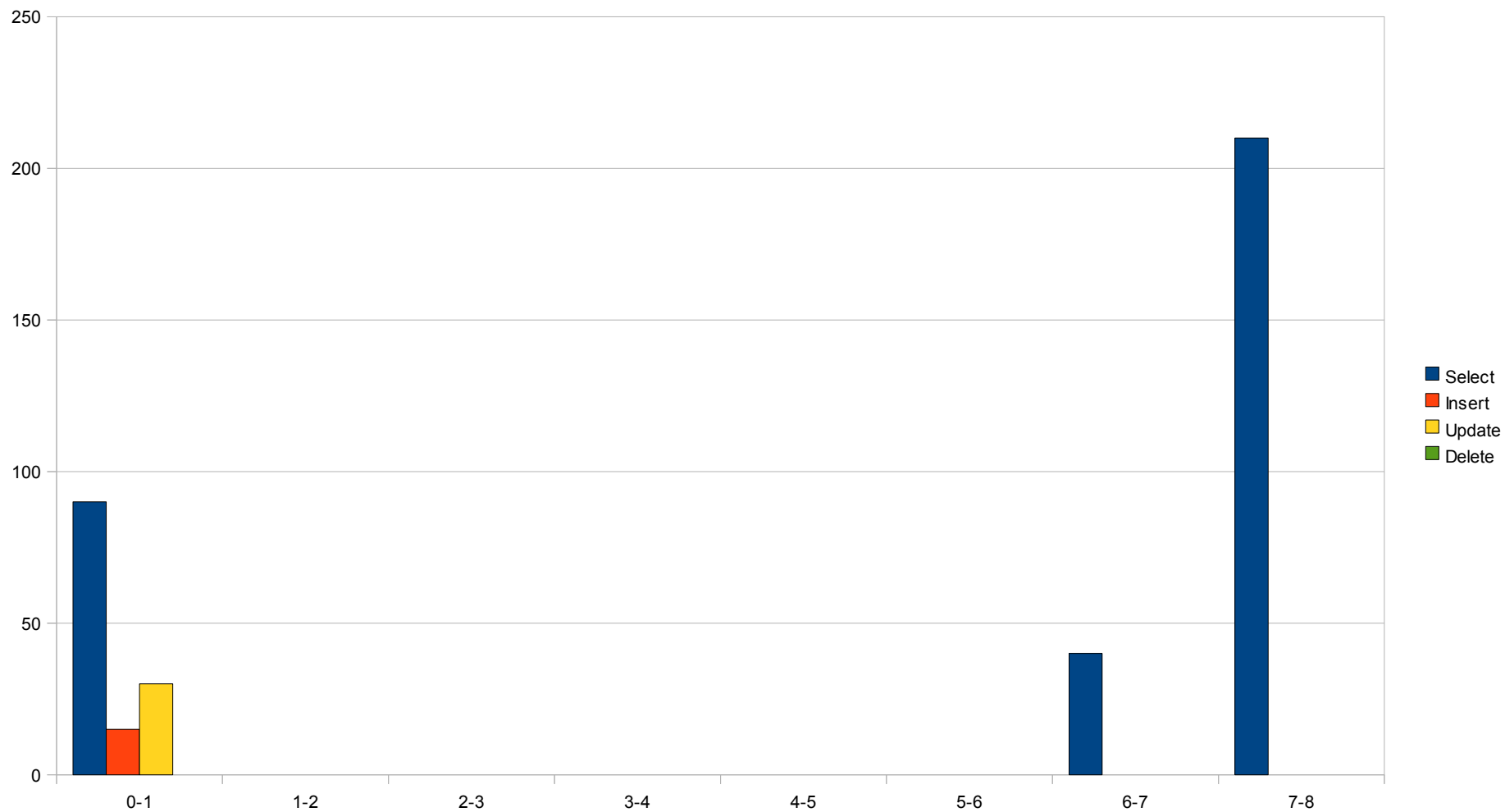


[#]ARBITER - Auditor



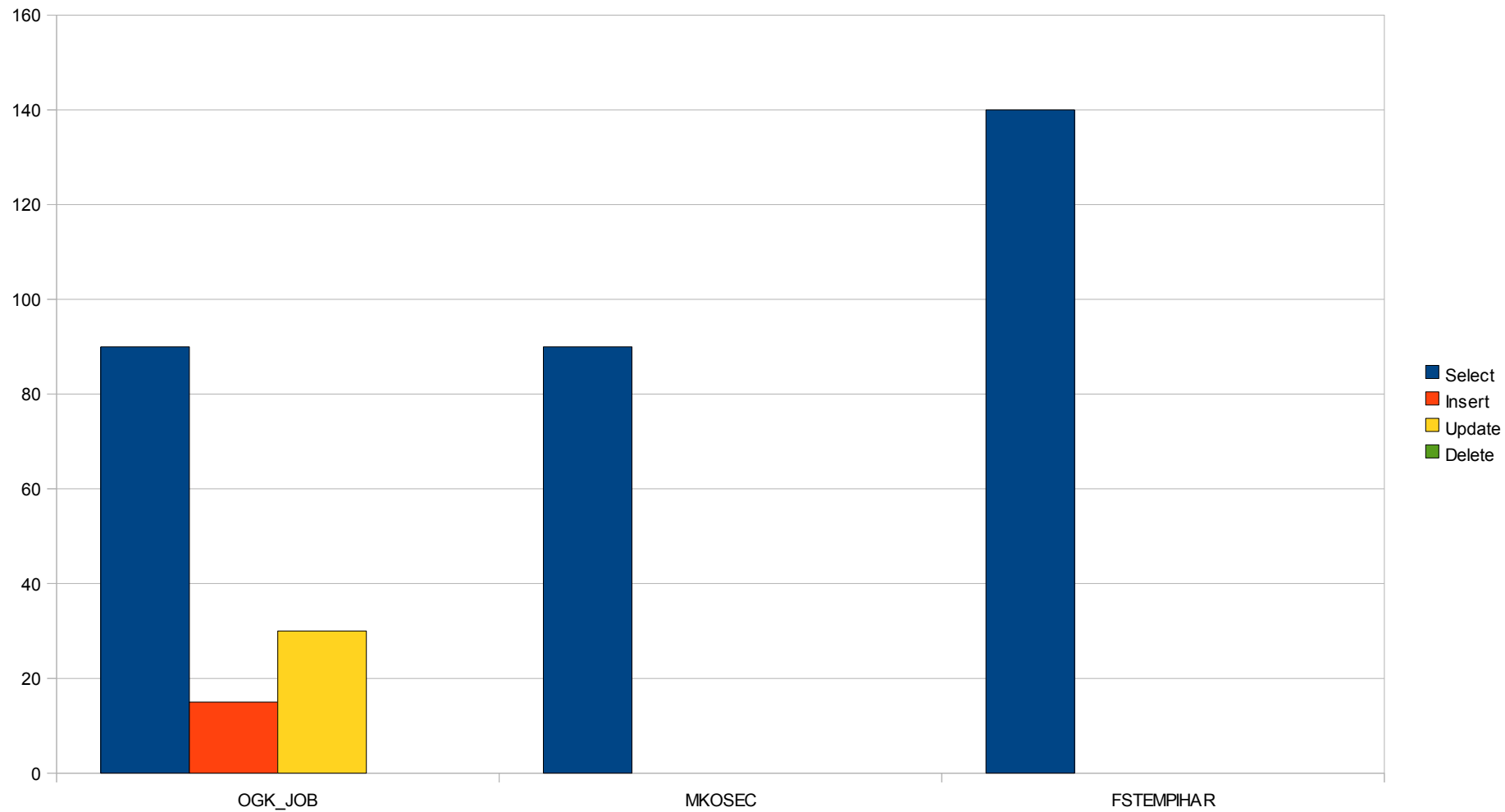


[#]ARBITER - Auditor





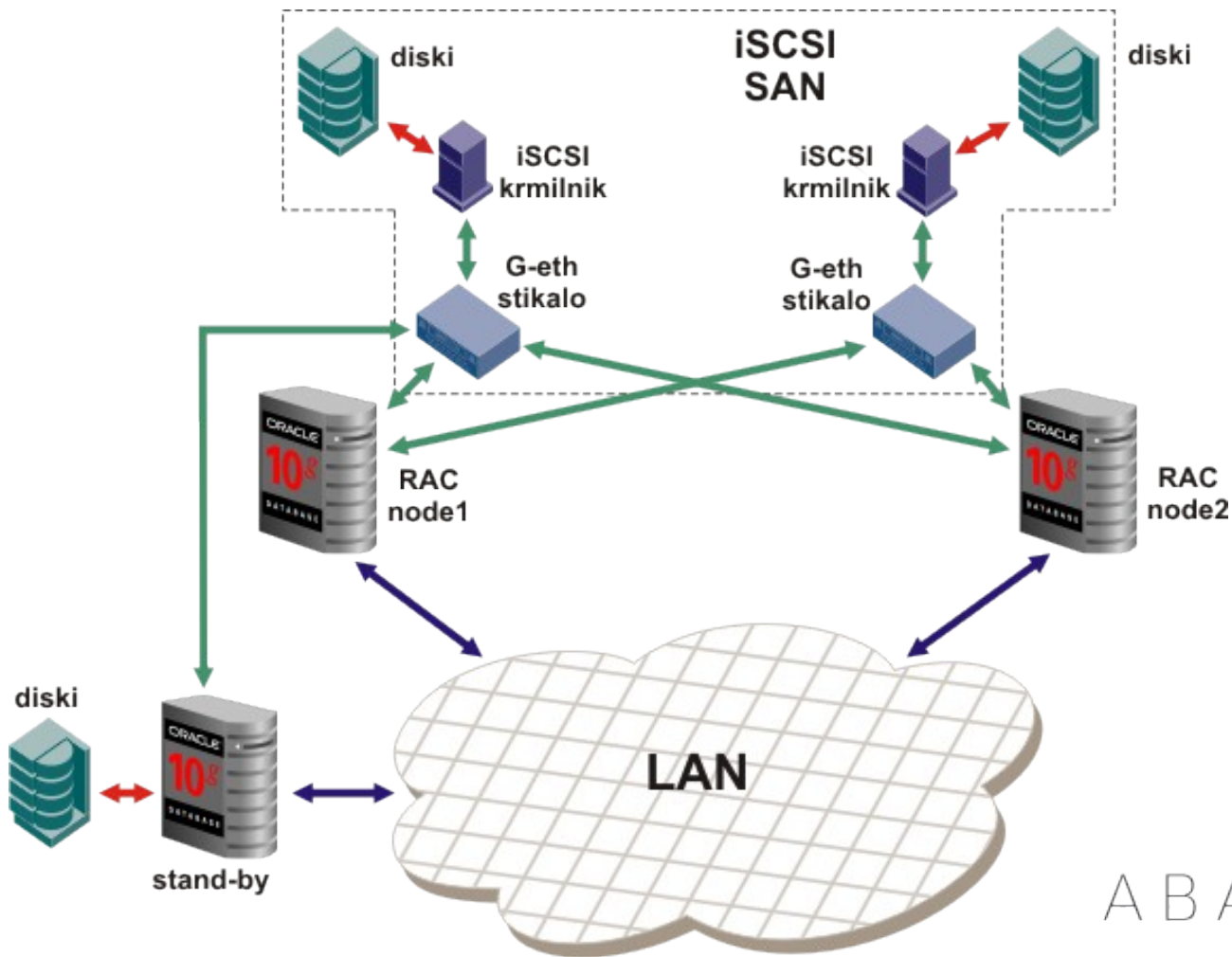
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Visoko raspoloživ sustav

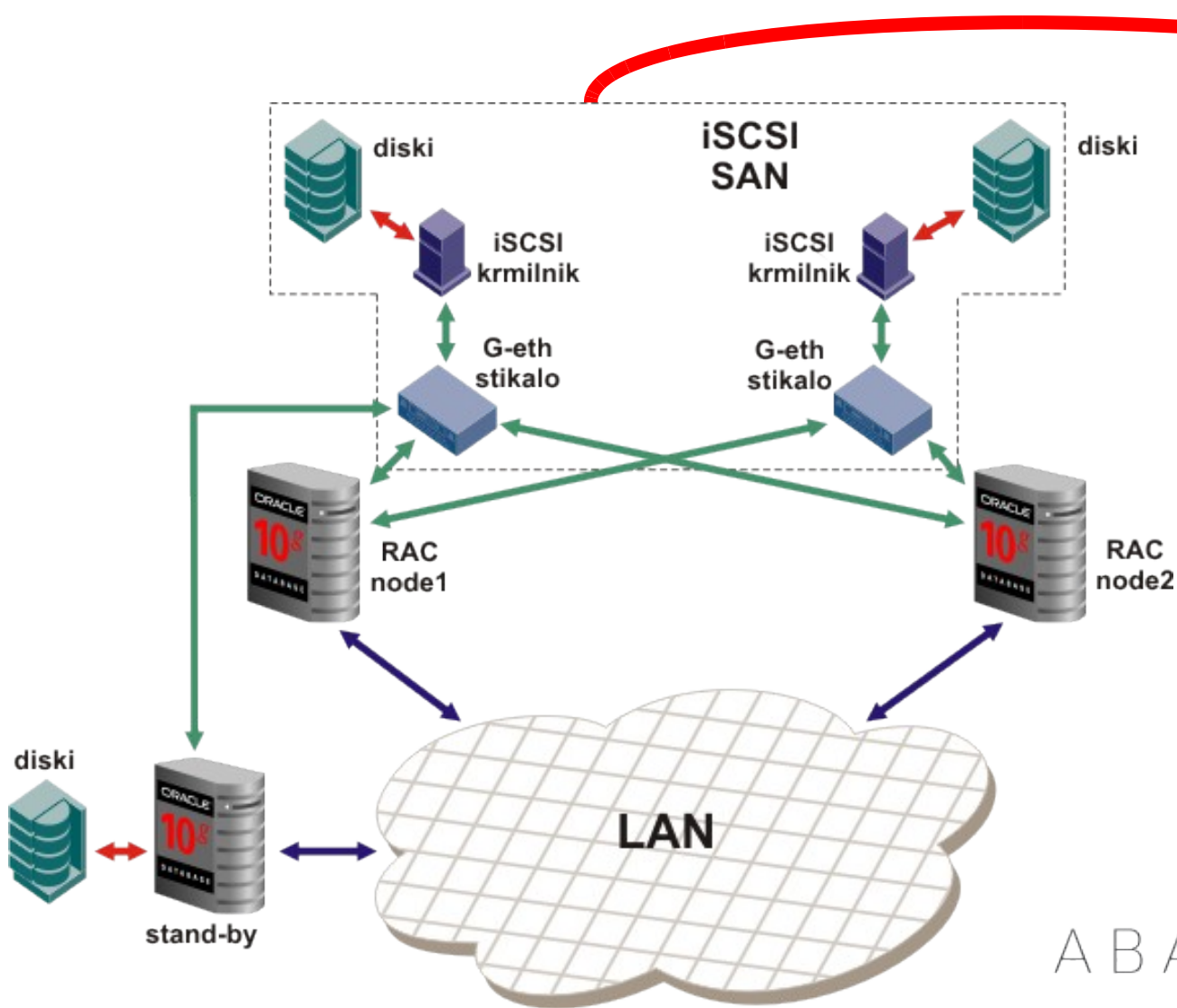
visoko raspoloživ i otporan na katastrofe





Visoko raspoloživ sustav

visoko raspoloživ i otporan na katastrofe



Arbiter:
povjerenje u
podatke



Prednosti

- nije potreban pristup aplikaciji,
- transparentan i jednostavan pregled,
- centralno upravljanje, pregled i analiza,
- automatizacija i konsolidacija,
- revizijski tragovi su odvojeni od podataka.



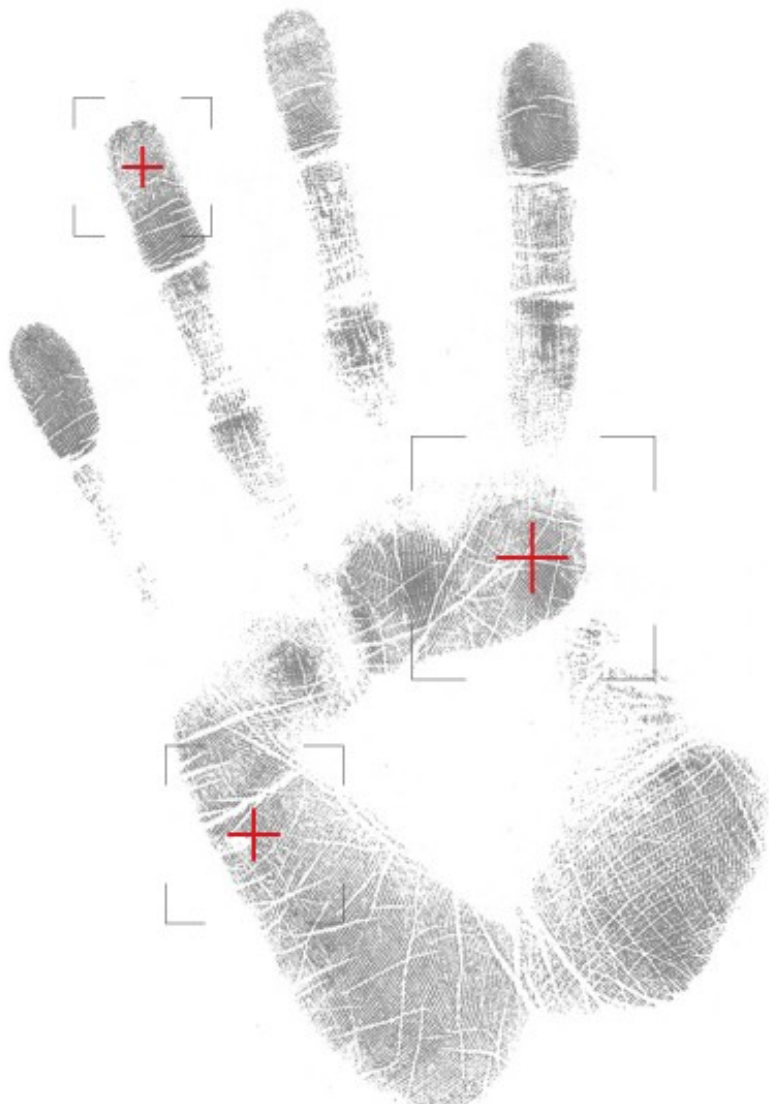
Sa revizijskim tragovima ne možemo
zaštiti podatke, ali **možemo prikazati**
kada i tko je gledao ili obrađivao
određene podatke!

Abakus **ARBITER**

Pitanja

Tatjana Dondur
Futura plus d.d.

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Abakus plus d.o.o.



ORACLE

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PROFESSIONAL



15. Konferencija hrvatske udruge Oracle korisnika
19.-23. listopada 2010. ROVINJ

Tragovi vrijedni povjerenja



Infrastruktura za Arbiter

- **Arbiter DB Server**
 - Oracle SE1 11.2
 - svi OS, na kojima se može instalirati baza
- **Arbiter GUI Server**
 - PHP 5.2.12
 - nginx, Apache
 - OS: linux, windows
- **DB in GUI Server mogu biti na istom serveru!**



Podrřžane source baze

- **trenutno pdrřžane source baze**
 - Oracle 9.2 i viře
 - MS SQL Server 2005
 - syslog (linux, unix)



Instalacija

- **virtualni serveri**
 - Oracle VM, KVM, VMware slike
- **HW (server + opcionalno diskovni podsustav) sa instaliranom bazom i GUI**
- **instalacija na serveru klienta**
 - baza Oracle 11.2, nginx (Apache) + php
- **uračunte Oracle licence: Oracle SE1, 5x**