



ORACLE APEX REPOZITORIJ

Pomoć pri razvoju i praćenju rada APEX
aplikacija

21.10.2008

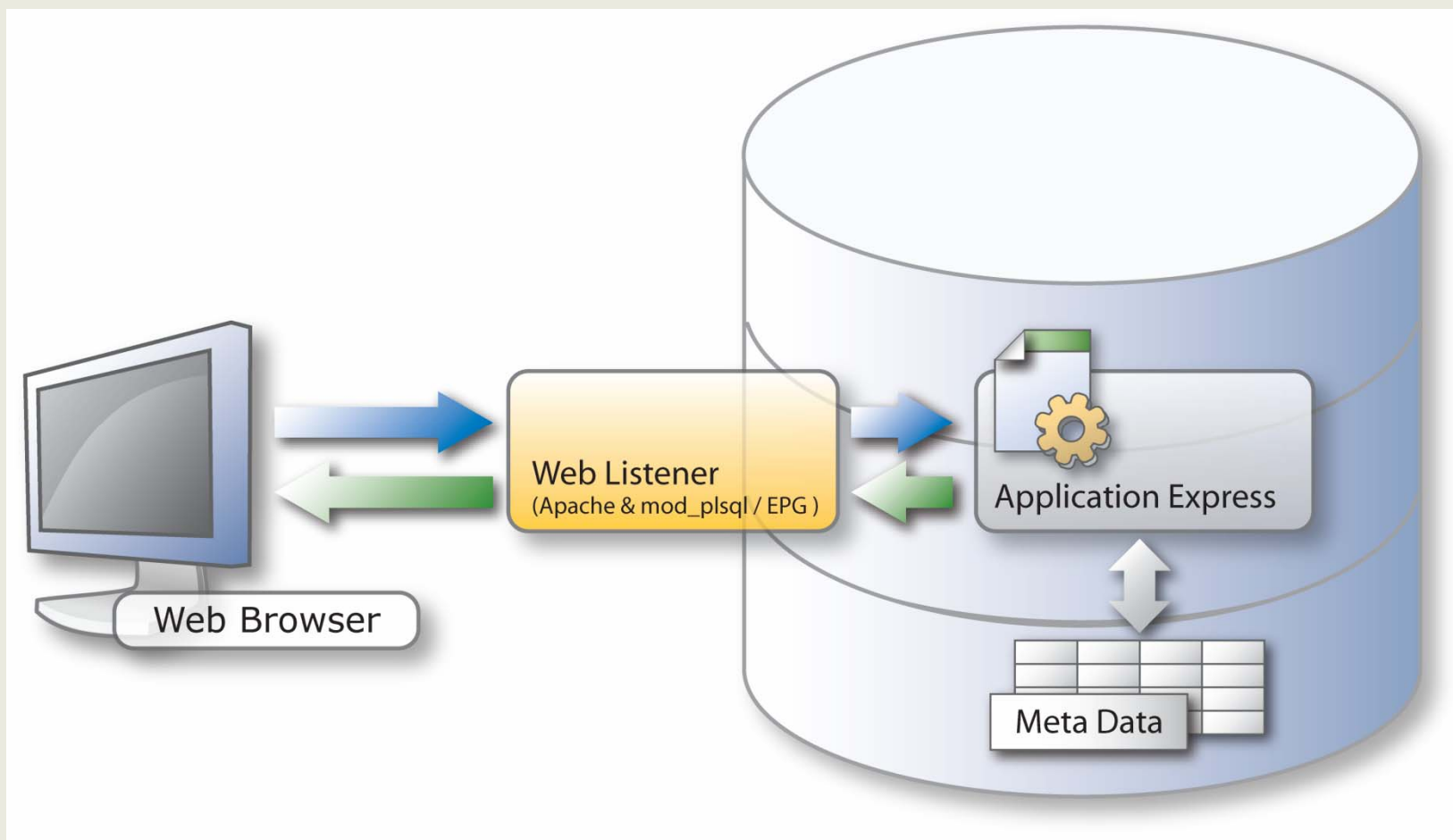
UVOD

- ◆ Općenito o APEX-u
 - Arhitektura
 - Osnovne funkcionalnosti
 - Razvoj aplikacija
 - Forms vs. APEX
 - Microsoft Access vs. APEX
 - Praktičan primjer
- ◆ Oracle APEX Repozitorij
 - APEX Views
 - Primjena APEX Views alata
 - Provjera kvalitete
 - Automatsko dokumentiranje
 - Nadgledanje APEX Aplikacije

APEX...

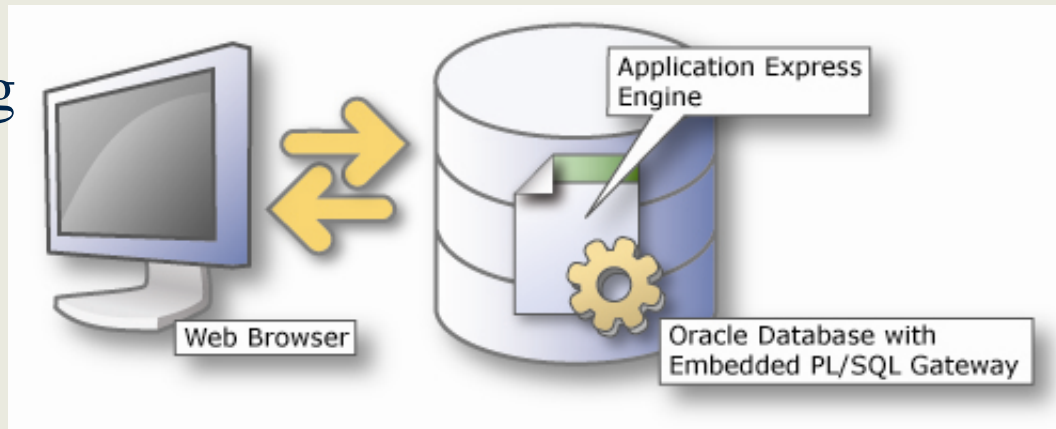
- ◆ Web Browser \approx Univerzalni klijent
 - Jednostavnost uporabe
 - Konzistentno okruženje
 - No Client Software
- ◆ Mogućnosti
 - Dynamic HTML generation
 - Multi-medija
 - Relativno pozicioniranje
 - AJAX, Flash, Javascript, CSS, ...
- ◆ Standard User Interface
 - Hyper-text links
 - Page UI model (ne IDE)

Arhitektura – 'šira' slika

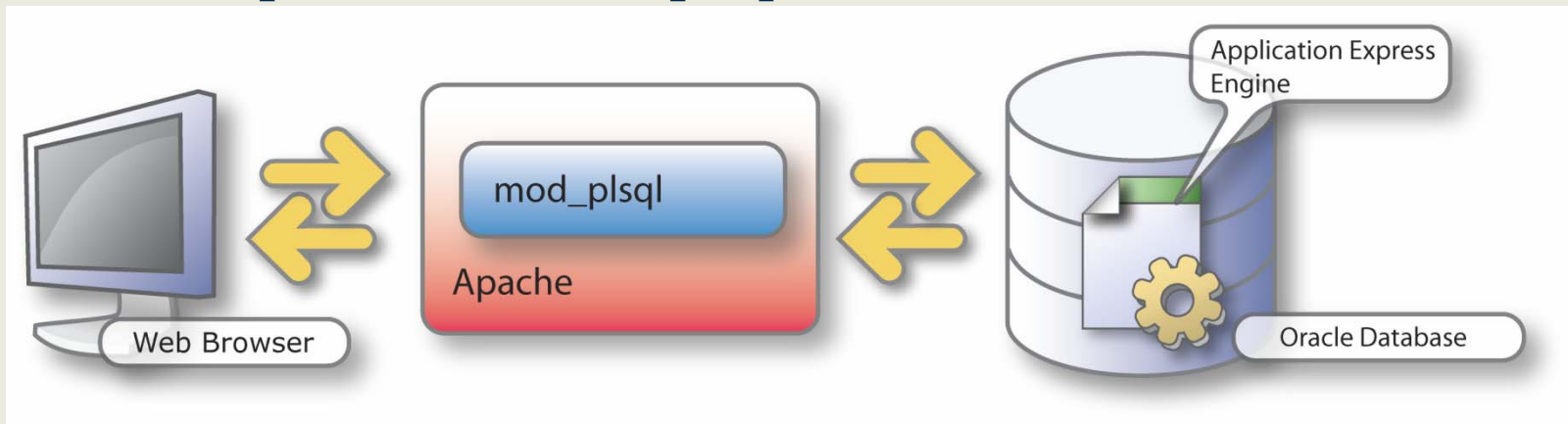


Arhitektura

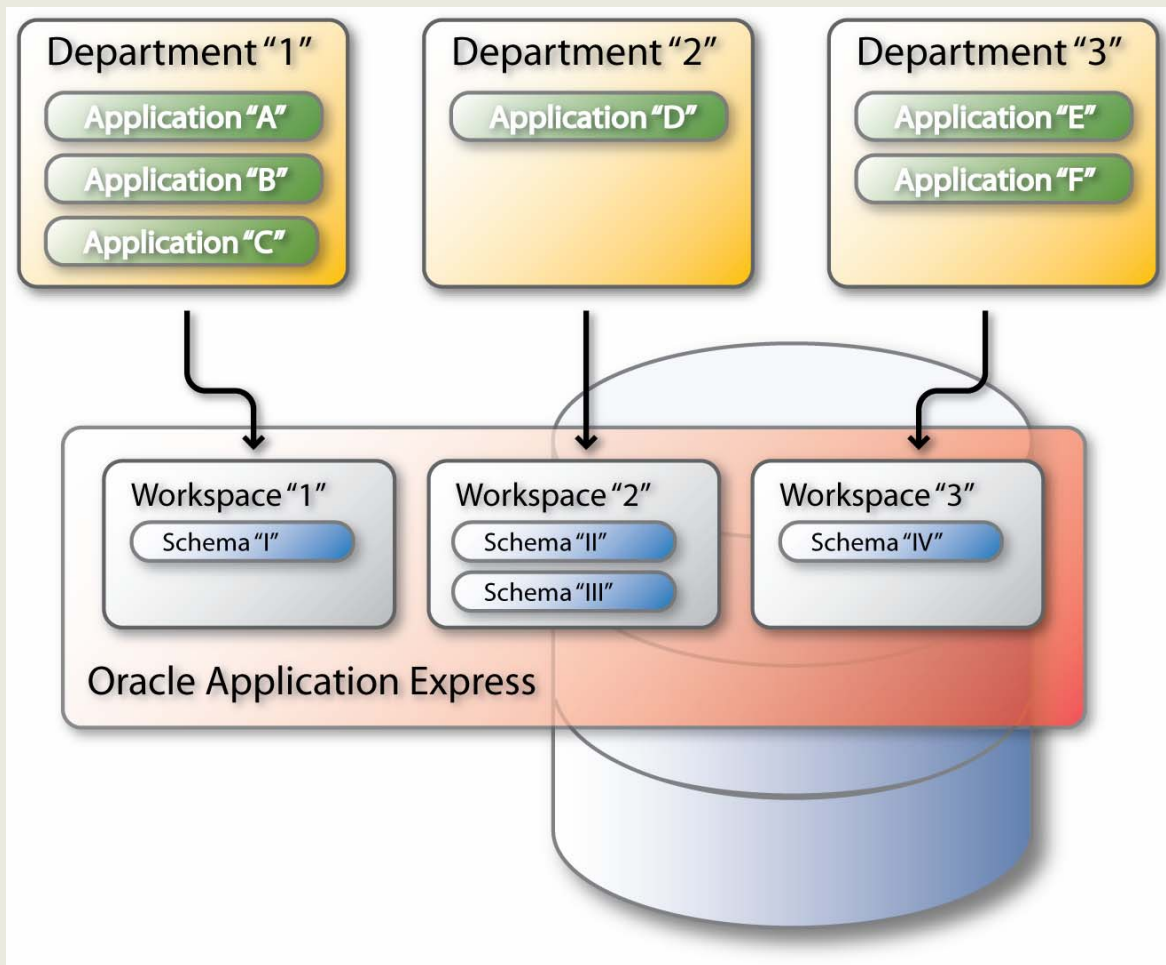
- With XE and 11g



- With Apache and mod_plsql



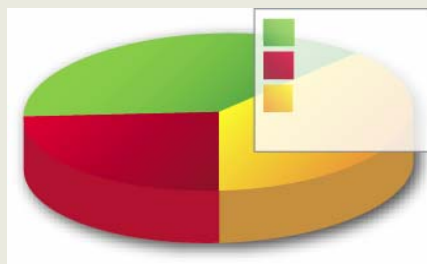
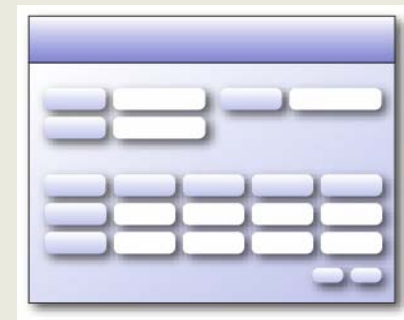
Višekorističko razvojno okruženje



Osnovne funkcionalnosti

7

- ◆ Izvještaji
- ◆ Formulari
- ◆ Grafovi
- ◆ Predefinirane teme
- ◆ Kontrola toka i navigacija
- ◆ Sučelje i proširivost
- ◆ Web servisi
- ◆ Brzina i sigurnost
- ◆ Migration Workshop



Razvoj aplikacije

- ◆ Izvještaji
- ◆ Forme za unos podataka
- ◆ Grafovi
- ◆ Kalendari
- ◆ Sigurnost
- ◆ Navigacija
- ◆ Izgled sučelja

Sample Application
DEMO Print Logout Home Customers Products Orders Charts Product Info **Store Employees**

Home > Store Employees Data

Store Employees Data

Employee Id	First Name	Email	Hire Date	Job Id	Salary	Manager Id	Department Id
3	Allen	allen.flash@rahoomail.com	13-FEB-07	23	200	1	31
4	James	james.black@gmail.com	12-FEB-07	22	400	2	31
2	Hui	hui.scrooge@gmail.com	13-FEB-07	21	100	1	30
5	King	king.kong@rediffmail.com	11-FEB-07	24	600	1	34
1	Loui	loui.scrooge@gmail.com	12-FEB-07	20	1000		30

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Employee Hiredate Information

Weekly Daily < Previous
Today Next >

February 2007

Sun	Mon	Tue	Wed	Thu	Fri	Sat
				01	02	03
04	05	06	07	08	09	10
11	12 Kong	13 Flash Scrooge	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28			

Department wise Salary


Salary	Department Id
1000	30
200	31
400	31
600	34
100	30

Izvještaji

9

Department Id	Department Name	Number Of Employees	Manager Name	Location
110	Accounting	<u>2</u>	S. Higgins	United States of America
10	Administration	<u>1</u>	J. Whalen	United States of America
40	Human Resources	<u>1</u>	S. Mavris	United Kingdom
80	Sales	<u>34</u>	J. Russell	United Kingdom
90	Executive	<u>3</u>	S. King	United States of America
70	Public Relations	<u>1</u>	H. Baer	Germany
20	Marketing	<u>2</u>	M. Hartstein	Canada
100	Finance	<u>6</u>	N. Greenberg	United States of America
30	Purchasing	<u>6</u>	D. Raphaely	United States of America
60	IT	<u>5</u>	A. Hunold	United States of America

CSV | PDF

row(s) 1 - 10 of 11 

- ◆ Layout kontrola i paginacija
- ◆ Column sortiranje
- ◆ Export sadržaja: CSV ili XML
- ◆ Print Attributes
- ◆ PDF
- ◆ Drill down prema drugim: reportima, chartovima, formama
- ◆ Externo procesiranje preko URL
- ◆ Djelomični Page Refresh

Forme za unos podataka

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Create/Edit Employee

Cancel Create

First Name Peter

Last Name Chen

Email peter.chen@anycorp.com

Phone Number 555-1240-5353

Hire Date

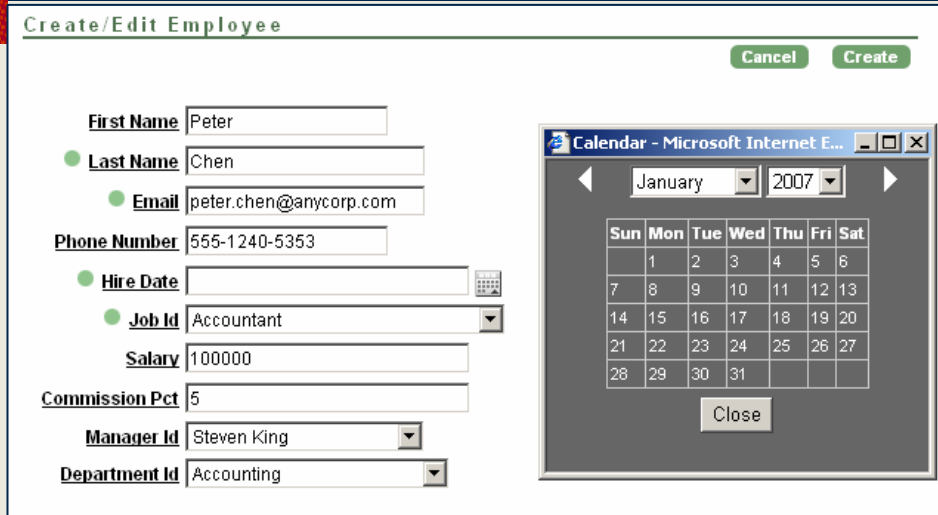
Job Id Accountant

Salary 100000

Commission Pct 5

Manager Id Steven King

Department Id Accounting



Sun	Mon	Tue	Wed	Thu	Fri	Sat
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

Close

- ◆ Tipovi Formi
 - ◆ Tabular
 - ◆ Master Detail
 - ◆ Forms nad Web Service
 - ◆ Form nad Tablicom s Reportom

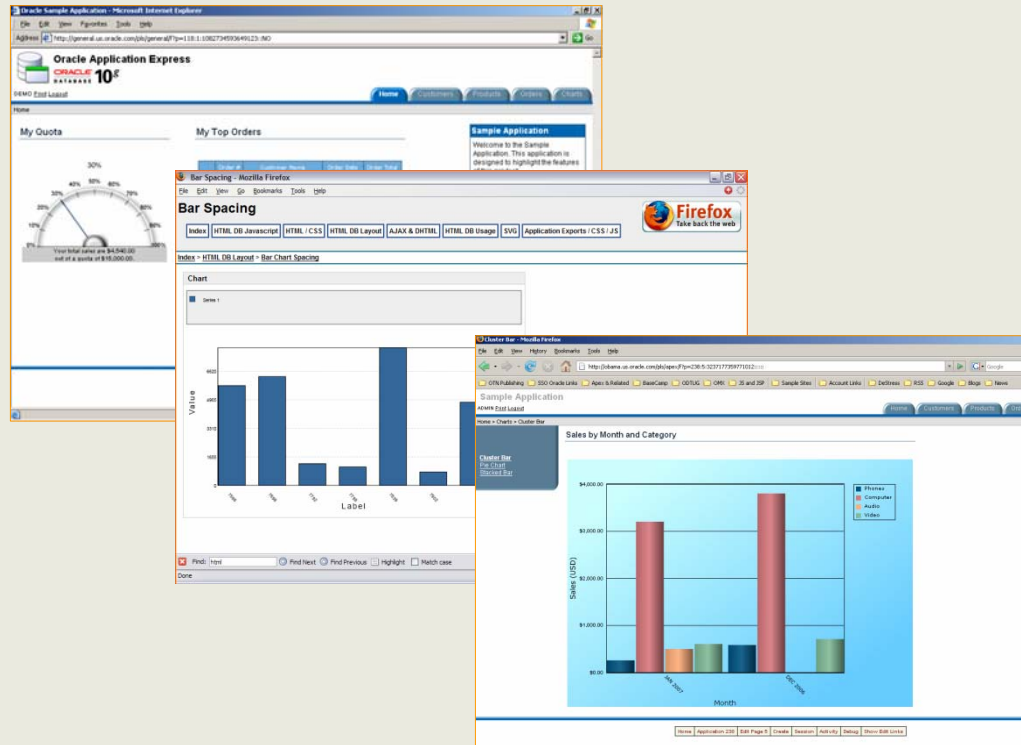
- ◆ Mnoštvo mogućnosti
 - ◆ Built in widgets
 - ◆ Pop-Up kalendar
 - ◆ LOV
 - ◆ Validacija na poljima
 - ◆ Lost update detekcija

Grafovi

◆ SVG

◆ HTML

◆ Flash

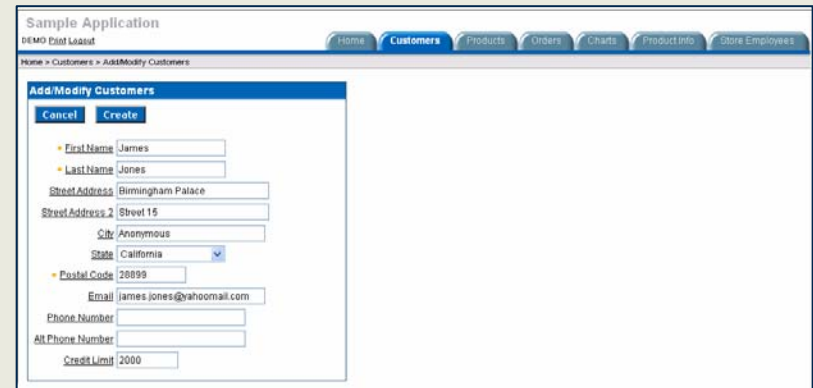
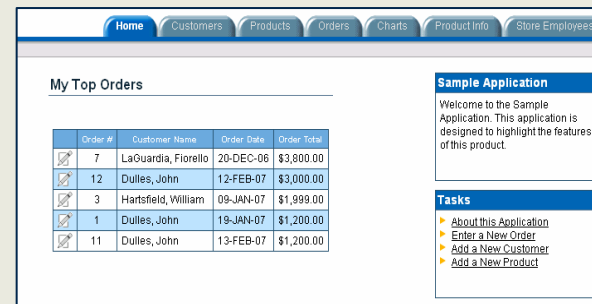


Sigurnost

- ◆ Ugrađeni autentikacijski moduli
 - LDAP
 - Single Sign-On
 - Open Door Credentials
 - Oracle Application Express Account Credentials
 - Database Account Credentials
 - No Authentication (using DAD)
- ◆ Centralizirano definirane autorizacijska pravila
- ◆ Zaštita sesije
- ◆ Integriranje s DB sigurnosnim mogućnostima
 - FGAC
 - Transparent Data Encryption

Navigacija

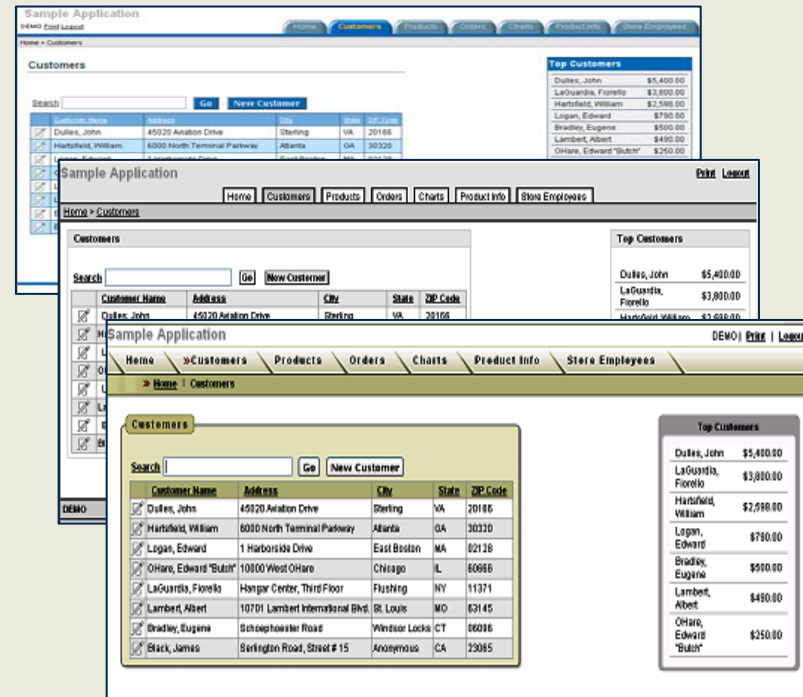
- ◆ Tabs
- ◆ Lists
- ◆ Breadcrumbs
- ◆ Navigation Bar Entries
- ◆ Trees
- ◆ Navigation Using Branches

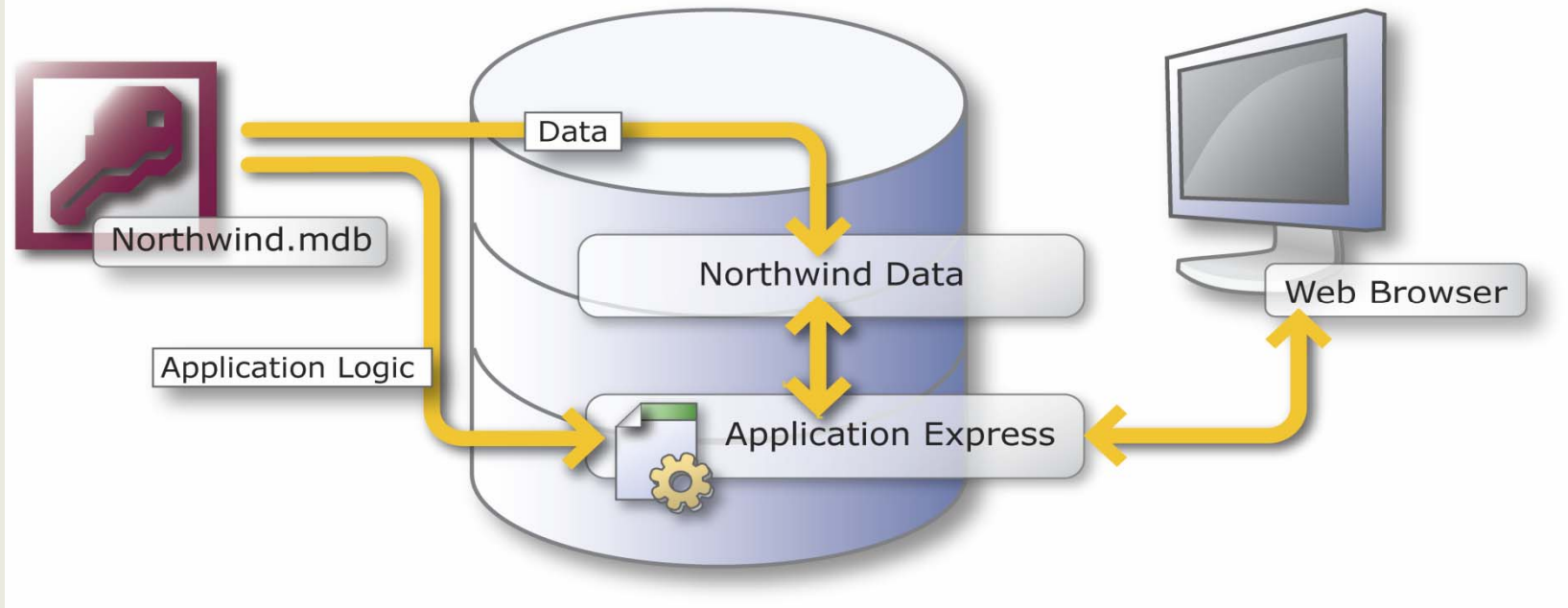
Order #	Customer Name	Order Date	Order Total
7	LaGuardia, Fiorello	20-DEC-06	\$3,800.00
12	Dulles, John	12-FEB-07	\$3,000.00
3	Hartsfield, William	09-JAN-07	\$1,999.00
1	Dulles, John	19-JAN-07	\$1,200.00
11	Dulles, John	13-FEB-07	\$1,200.00

Izgled sučelja

- ◆ Upravljan predloščima
- ◆ Konzistentan kroz aplikaciju
- ◆ Prilagodbe s HTML-om i CSS-om



Microsoft Access vs. APEX

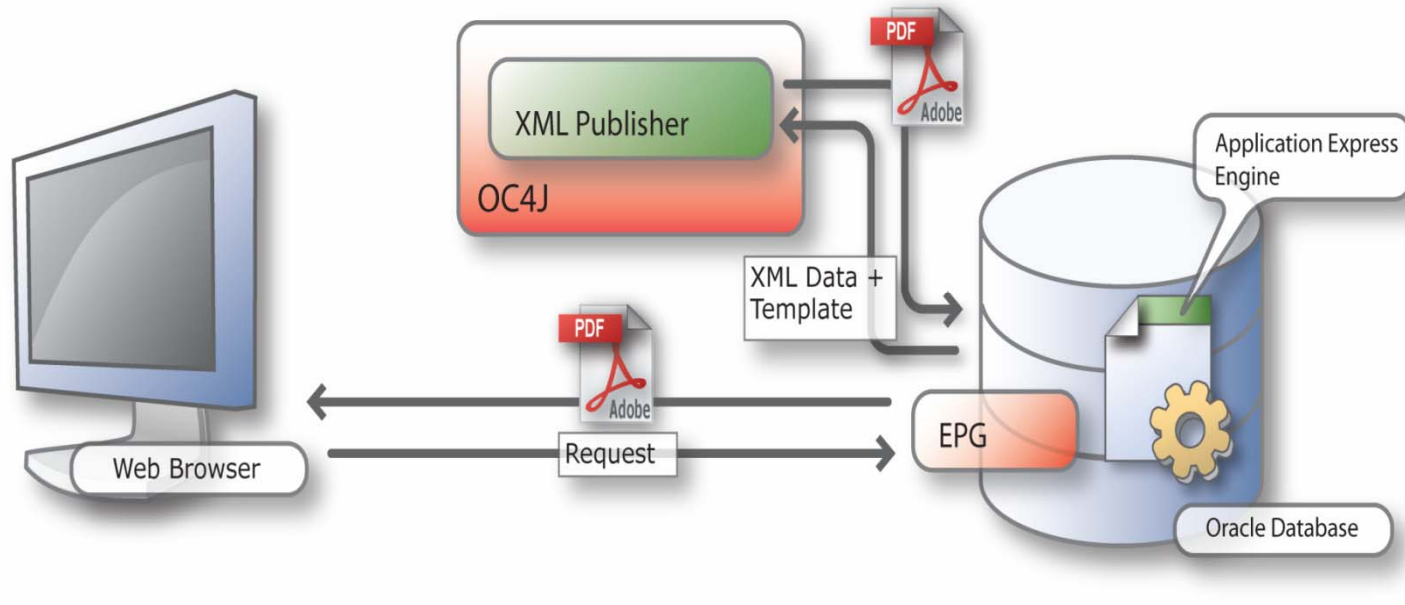


- ◆ Microsoft Access
 - ◆ Nesiguran
 - ◆ Client / Server
 - ◆ Slabe performanse
 - ◆ Jet Engine

- ◆ Application Express
 - ◆ Siguran
 - ◆ Web
 - ◆ Izvrsne performanse
 - ◆ Oracle Database

PDF

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- ◆ Declarativni PDF Reporting Servisi
- ◆ Profesionalni izgled Reportsa
- ◆ Mnoštvo formata dokumenata

Forms vs. Application Express

Feature	Forms	Application Express
4GL Declarative	Yes	Yes
4GL Languages	SQL and PL/SQL	SQL and PL/SQL
User Interface	Java	HTML
Page Layout	Windows / Canvases	Pages / Regions
Client-Side Field Control	Form triggers	Javascript and AJAX
Web Service Support	Yes	Yes
Charting	BI Beans	Flash Charts
Locking	Pessimistic Optimistic Custom	Optimistic Custom
Database Connections	Synchronous	Asynchronous
Concurrent User Support	User Session	Request's processing
Architecture	3 Tier	2 Tier

Praktičan primjer – ePonuda

File Edit View Favorites Tools Help

Address <http://zg-js-ias.in2.hr/apex/f?p=105:19:2097196981029751::NO::>

ePonuda sustav za javnu nabavu Republike Hrvatske

Ponude Nadmetanja Registracija Šifarnici Odjava

Nadmetanja Grupe nadmetanja Dokazi sposobnosti Prigovori Kriteriji nadmetanja

Nadmetanja

Rows 15 Go

Broj	Narucitelj	Datum	Datum ponude	Opis	Status	Broj ponuda
EMV-07/0025	ZAGREBAČKI HOLDING D.O.O	28.03.2007	25.04.2008	Tenisit	Poništeno	6
EVV-07/0008	ZOVKO	02.03.2007	02.03.2007	-	Poništeno	0
EMV-07/0027	ANTUNOVIĆ	08.05.2007	10.05.2007	-	Poništeno	0
EVV-07/0020	CROBENZ	08.05.2007	05.05.2007	-	Poništeno	0
EVV-07/0021	ENERGOPETRIOL	08.05.2007	06.06.2007	-	Poništeno	0
EVV-07/0022	ZOVKO	08.05.2007	07.07.2007	-	Otvorene ponude	2
EMV-07/0028	ENERGOPETRIOL	11.06.2007	01.06.2007	Ploče za plivačka okretišta	Otvorene ponude	3
EMV-07/0026	PETROL	11.06.2007	01.04.2006	Usluga marketinga	Otvorene ponude	2
EVV-07/0021	ZOVKO	02.07.2007	05.07.2007	IN2 probni primjerak	Otvorene ponude	4
EVV-07/0152	ANTUNOVIĆ	29.08.2007	02.08.2007	-	Otvorene ponude	1
EMV-08/0004	ZAGREBAČKI HOLDING D.O.O	29.01.2008	19.04.2008	-	Odabran dobavljač	3
EMV-07/0165	ZOVKO	29.01.2008	29.01.2008	-	Otvorene ponude	0
EVV-07/0025	ANTUNOVIĆ	10.03.2008	10.03.2008	-	U pripremi	0
EMV-08/0003	PETROL	10.03.2008	10.03.2008	-	Otvorene ponude	2
EMV-08/0002	CROBENZ	11.03.2008	11.03.2008	-	Otvorene ponude	2

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Nadmetanja u tjeku

Broj	Datum	Datum Ponude	Opis	Napomena	Status	Broj Ponuda
EW 32224	01.04.2008	30.04.2008	Moj testni	-	U pripremi	0

1 - 1

Oracle APEX Repozitorij

- ◆ Oracle APEX sprema sve meta-podatke za pojedinu aplikaciju u repozitorij u bazi
 - Naziv sheme FLOWS_xxx (APEX 3.0 > FLOWS_030000)
 - Tablice imaju prefiks WWV_FLOW_* (nisu javno dostupne)
 - Od verzije 2.2 APEXa postoji pristupni sloj (različiti pregledi)
- ◆ Verzija APEXa 3.0 uvodi alat APEX Dictionary (od verzije 3.1 naziva se APEX Views)
- ◆ Pristup alatu preko izbornika Utilities

APEX Views



APEX Views

Home > Utilities > **Application Express Views**

Search View **Icons** Display 15

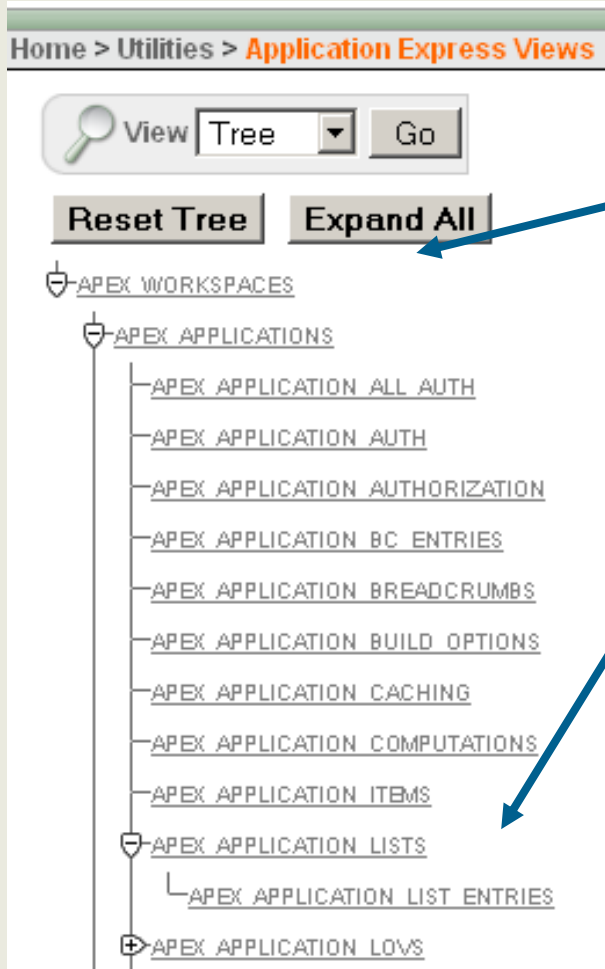
APEX Workspaces APEX Applications APEX Application All Auth APEX Application Auth

APEX Application Bc Entries APEX Application Breadcrumbs APEX Application Build Options APEX Application Caching

Izaberi Tree view

APEX Views

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Home > Utilities > **Application Express Views**

View

- [-] APEX WORKSPACES
 - [-] APEX APPLICATIONS
 - APEX_APPLICATION_ALL_AUTH
 - APEX_APPLICATION_AUTH
 - APEX_APPLICATION_AUTHORIZATION
 - APEX_APPLICATION_BC_ENTRIES
 - APEX_APPLICATION_BREADCRUMBS
 - APEX_APPLICATION_BUILD_OPTIONS
 - APEX_APPLICATION_CACHING
 - APEX_APPLICATION_COMPUTATIONS
 - APEX_APPLICATION_ITEMS
 - [-] APEX APPLICATION LISTS
 - APEX_APPLICATION_LIST_ENTRIES
 - [-] APEX APPLICATION LOVS

Stablasta hijerarhija
(tree view)

APEX Views

Home > Utilities > Application Express Views > **Application Express View Details**

View Name **APEX_WORKSPACES** Display

Description

View: **APEX_WORKSPACES**
 Description: **Available Application Express (Apex) workspaces**

Column Name	Comments
WORKSPACE	A work area mapped to one or more database schemas
SCHEMAS	Number of database schemas currently mapped to this workspace
LAST_PURGED_SESSION	Creation date of the most recently purged session. Used to track last login for workspace
SESSIONS	Number of non-purged Apex sessions
APPLICATIONS	Number of applications created in this workspace
APPLICATION_PAGES	Number of application pages created in this workspace
APEX_USERS	Number of Apex users created in this workspace
APEX_DEVELOPERS	Number of Apex users with developer privilege
APEX_WORKSPACE_ADMINISTRATORS	Number of Apex users with workspace administrator privilege
FILES	Number of Apex files associated with the workspace
SQL_SCRIPTS	Number of Apex SQL Scripts associated with the workspace
TRANSLATION_MESSAGES	Number of translatable and translated messages within the workspace

Description blok

APEX Views

Query Columns

Columns:

SESSIONS	WORKSPACE
APPLICATIONS	SCHEMAS
APPLICATION_PAGE	LAST_PURGED_SES
APEX_USERS	
APEX_DEVELOPERS	
APEX_WORKSPACE_	
FILES	
SQL_SCRIPTS	
TRANSLATION_MES	
FILE_STORAGE	
LAST_LOGGED_PAG	
PAGE_VIEWS	
WORKSPACE_ID	

The image shows a 'Query Columns' dialog box with two columns. The left column contains a list of database objects: SESSIONS, APPLICATIONS, APPLICATION_PAGE, APEX_USERS, APEX_DEVELOPERS, APEX_WORKSPACE_, FILES, SQL_SCRIPTS, TRANSLATION_MES, FILE_STORAGE, LAST_LOGGED_PAG, PAGE_VIEWS, and WORKSPACE_ID. The right column contains: WORKSPACE, SCHEMAS, and LAST_PURGED_SES. Between the columns are navigation icons: a double arrow pointing right, a single arrow pointing right, a double arrow pointing left, and a double arrow pointing left. To the right of the right column are four vertical arrow icons: up, up, down, and down.

APEX Views

Query Conditions

Column	Condition	Value
WORKSPACE	LIKE	'PAT%'
- Select Column -	=	
- Select Column -	!=	
- Select Column -	LIKE	
- Select Column -	NOT LIKE	
- Select Column -	>	
- Select Column -	<	
- Select Column -	BETWEEN	
- Select Column -	IS	

SQL Query

```
select WORKSPACE, SCHEMAS, LAST_PURGED_SESSION
from APEX_WORKSPACES
where WORKSPACE LIKE 'PAT%'
```

Data

WORKSPACE ▲	SCHEMAS	LAST PURGED SESSION
PATRICKS_DEMO_WORKSPACE	1	26-MAY-07

1 - 1

[Download](#)



Query Conditions blok

APEX Views alat

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- ◆ Rezultati upita u jednostavnom obliku, razumljiviji od generičkog oblika podatka
 - Skriva generički/stari model podataka
 - Lookupi za strane ključeve
 - Prevodi unutarnje brojače u razumljivi jezik
 - Sadrži statistike – npr. Brojači child elementa
- ◆ Detaljan opis svakog pogleda i kolone
- ◆ Provjeravaju se prava pristupa
 - Spojen kao shema korisnik: Sve aplikacije kojima je shema pridodjeljena.
 - Spojen kao SYS, SYSTEM, FLOWS_XXX: Sve aplikacije
 - Ostali korisnici: ništa

APEX Views alat

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- ◆ Pogledi podjeljeni u tri grupe:
 - Meta-podaci o aplikaciji
 - Application-Meta-Data
 - ◆ APEX_APPLICATION*
 - podaci o radu aplikacija (zapisnici)
 - Monitoring data about the application
 - ◆ APEX_WORKSPACE_ACCESS_LOG
 - ◆ APEX_WORKSPACE_ACTIVITY_LOG
 - ◆ APEX_WORKSPACE_LOG_SUMMARY*
 - ◆ APEX_WORKSPACE_CLICKS
 - ◆ APEX_WORKSPACE_SESSIONS
 - Meta-podaci o radnom području (workspace)
 - Workspace-Meta-Data
 - ◆ The reminding APEX_WORKSPACE* views. For example APEX_WORKSPACE_APEX_USERS, ...

Primjena APEX Views alata

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- ◆ provjere da li se razvojni tim pridržava dogovorenog standarda vezanih uz tipove komponenti koje se koriste na stranicama
- ◆ dinamička generacija navigacije kroz aplikaciju
- ◆ automatska dokumentacija aplikacije
- ◆ automatsko nadziranje rada aplikacije
- ◆ za generiranje generičkog koda

APEX Views

FLW5_030100

DR\$WWW_FLOW_OH_IDX\$I: Created: 24.4.2008 10:51:57 Last DDL: 24.4.2008 11:07:21

Columns Indexes Constraints Triggers Data Scripts Grants Synonyms Partitions Subpartitions Stats/Size Referential Used By Policies Auditing

Sort by Primary Key
Read Only

TOKEN_TEXT	TOKEN_TYPE	TOKEN_FIRST	TOKEN_LAST	TOKEN_COUNT	TOKEN_INFO
.3	0	508	511	4	(HUGE BLOB)
.41.2	0	912	912	1	(HUGE BLOB)
.5	0	34	34	1	(HUGE BLOB)
0	0	56	1000	133	(HUGE BLOB)
0,1,2,3,4,5,6,7,8	0	912	912	1	(HUGE BLOB)
0,9	0	35	35	1	(HUGE BLOB)
0.3	0	34	34	1	(HUGE BLOB)
0.5	0	34	34	1	(HUGE BLOB)
000000	0	34	257	4	(HUGE BLOB)
001	0	426	426	1	(HUGE BLOB)
002	0	426	426	1	(HUGE BLOB)
003	0	426	426	1	(HUGE BLOB)
004	0	426	426	1	(HUGE BLOB)
005	0	426	426	1	(HUGE BLOB)
006	0	426	426	1	(HUGE BLOB)
007	0	426	426	1	(HUGE BLOB)
008	0	426	426	1	(HUGE BLOB)
009	0	426	426	1	(HUGE BLOB)
01	0	107	963	98	(HUGE BLOB)
010	0	426	426	1	(HUGE BLOB)
011	0	426	426	1	(HUGE BLOB)
02	0	141	774	92	(HUGE BLOB)
03	0	466	774	91	(HUGE BLOB)
030100	0	539	962	29	(HUGE BLOB)

Row 1 of 500 fetched so far (more rows exist)

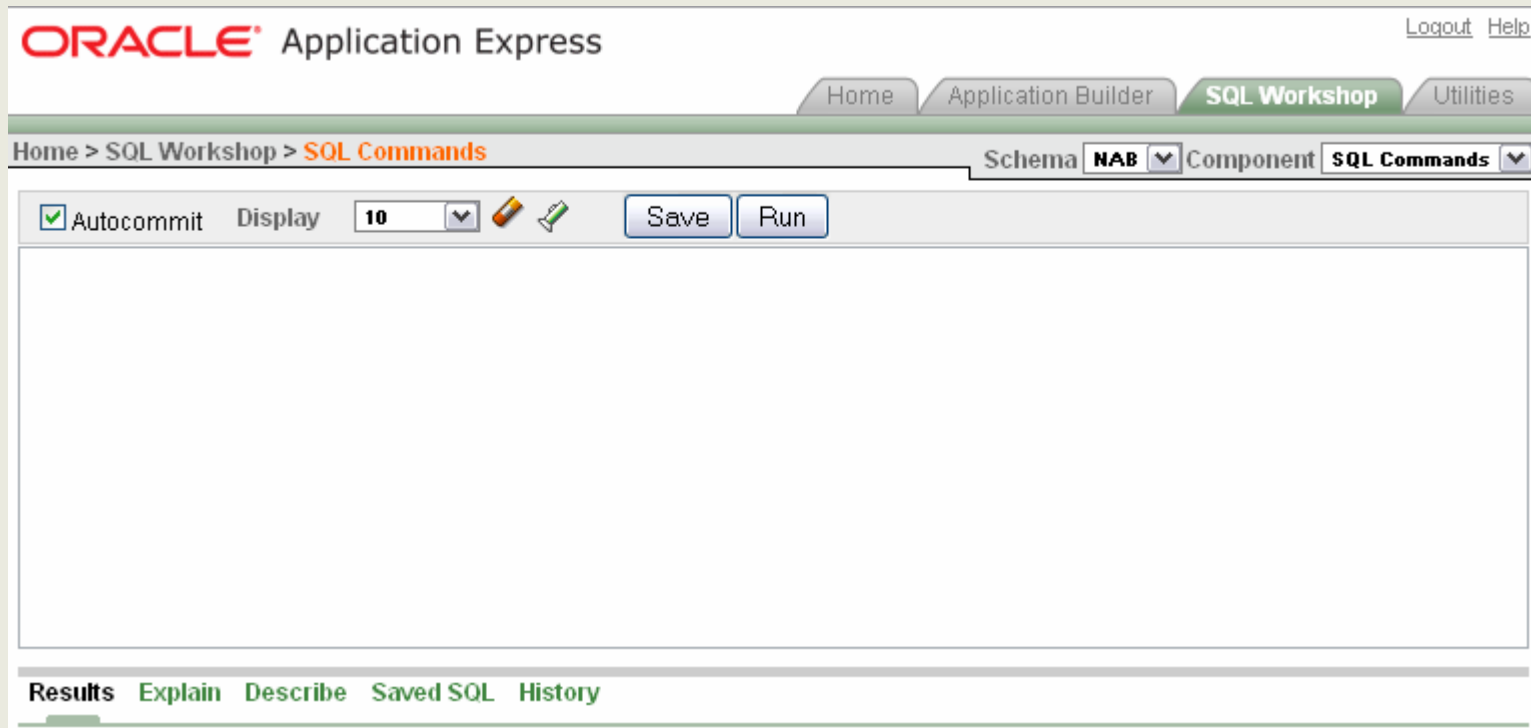
Cnt: 245 | SYS@JS10.IN2.HR

Editor Schema Browser

Provjera kvalitete

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◆ SQL Workshop



The screenshot displays the Oracle Application Express SQL Workshop interface. At the top, the Oracle logo and "Application Express" are visible, along with "Logout" and "Help" links. Below this is a navigation bar with tabs for "Home", "Application Builder", "SQL Workshop" (which is active), and "Utilities". The breadcrumb trail shows "Home > SQL Workshop > SQL Commands". The interface includes a "Schema" dropdown menu set to "NAB" and a "Component" dropdown menu set to "SQL Commands". A toolbar contains a checked "Autocommit" checkbox, a "Display" dropdown set to "10", and icons for editing and saving. "Save" and "Run" buttons are also present. The main workspace is a large empty text area. At the bottom, there are links for "Results", "Explain", "Describe", "Saved SQL", and "History".

Provjera kvalitete 1

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- ◆ Sve stavke koji imaju labele tipa „xxx Label with Help“

```
SELECT APPLICATION_NAME
      , PAGE_ID
      , ITEM_NAME
      , DISPLAY_AS
      , ITEM_LABEL_TEMPLATE
FROM APEX_APPLICATION_PAGE_ITEMS
WHERE ITEM_LABEL_TEMPLATE LIKE '%Label with Help'
      AND DISPLAY_AS          <> 'Hidden'
ORDER BY
      APPLICATION_NAME
      , PAGE_ID
      , ITEM_NAME
;
```

Provjera kvalitete 1

Results Explain Describe Saved SQL History

APPLICATION_NAME	PAGE_ID	ITEM_NAME	DISPLAY_AS	ITEM_LABEL_TEMPLATE
AnyCo Corp.	2	P2_REPORT_SEARCH	Text Field (always submits page when Enter pressed)	Optional Label with Help
AnyCo Corp.	2	P2_ROWS	Select List	Optional Label with Help
AnyCo Corp.	3	P3_DEPARTMENT_ID	Select List with Submit	Optional Label with Help
AnyCo Corp.	4	P4_COMMISSION_PCT	Text Field	Optional Label with Help
AnyCo Corp.	4	P4_DEPARTMENT_ID	Select List	Optional Label with Help
AnyCo Corp.	4	P4_EMAIL	Text Field	Required Label with Help
AnyCo Corp.	4	P4_EMPLOYEE_ID	Hidden and Protected	Optional Label with Help
AnyCo Corp.	4	P4_FIRST_NAME	Text Field	Optional Label with Help
AnyCo Corp.	4	P4_HIRE_DATE	Date Picker using Application Date Format	Required Label with Help
AnyCo Corp.	4	P4_JOB_ID	Select List	Required Label with Help

More than 10 rows available. Increase rows selector to view more rows.

10 rows returned in 0.00 seconds

[Download](#)

Language: en-us

Workspace: INTENDER2 User: NAB

Provjera kvalitete 2

- ◆ Popis svih labela koje nisu lijevo orjentirane

```
SELECT APPLICATION_NAME
       , PAGE_ID
       , ITEM_NAME
       , DISPLAY_AS
       , LABEL_ALIGNMENT
FROM   APEX_APPLICATION_PAGE_ITEMS
WHERE  LABEL_ALIGNMENT <> 'Left'
       AND DISPLAY_AS    <> 'Hidden'
ORDER BY
       APPLICATION_NAME
       , PAGE_ID
       , ITEM_NAME
;
```

Provjera kvalitete 2

Results Explain Describe Saved SQL History

APPLICATION_NAME	PAGE_ID	ITEM_NAME	DISPLAY_AS	LABEL_ALIGNMENT
AnyCo Corp.	2	P2_REPORT_SEARCH	Text Field (always submits page when Enter pressed)	Right
AnyCo Corp.	2	P2_ROWS	Select List	Right
AnyCo Corp.	3	P3_DEPARTMENT_ID	Select List with Submit	Right
AnyCo Corp.	4	P4_COMMISSION_PCT	Text Field	Right
AnyCo Corp.	4	P4_DEPARTMENT_ID	Select List	Right
AnyCo Corp.	4	P4_EMAIL	Text Field	Right
AnyCo Corp.	4	P4_EMPLOYEE_ID	Hidden and Protected	Right
AnyCo Corp.	4	P4_FIRST_NAME	Text Field	Right
AnyCo Corp.	4	P4_HIRE_DATE	Date Picker using Application Date Format	Right
AnyCo Corp.	4	P4_JOB_ID	Select List	Right

More than 10 rows available. Increase rows selector to view more rows.

10 rows returned in 0.02 seconds

[Download](#)

Language: en-us

Workspace: INTENDER2 User: NAB

Automatsko generiranje Site-Map izvještaja

- ◆ Potrebno je postaviti tagove \$SITEMAP\$ u komentare stranica koje želimo da se pojave u Site-Map izvještaju.

```
SELECT PAGE_ID
       , PAGE_TITLE
       , PAGE_GROUP
  FROM APEX_APPLICATION_PAGES
 WHERE APPLICATION_ID = :APP_ID
       AND INSTR(PAGE_COMMENT, '$SITEMAP$') > 0
 ORDER BY PAGE_TITLE
```

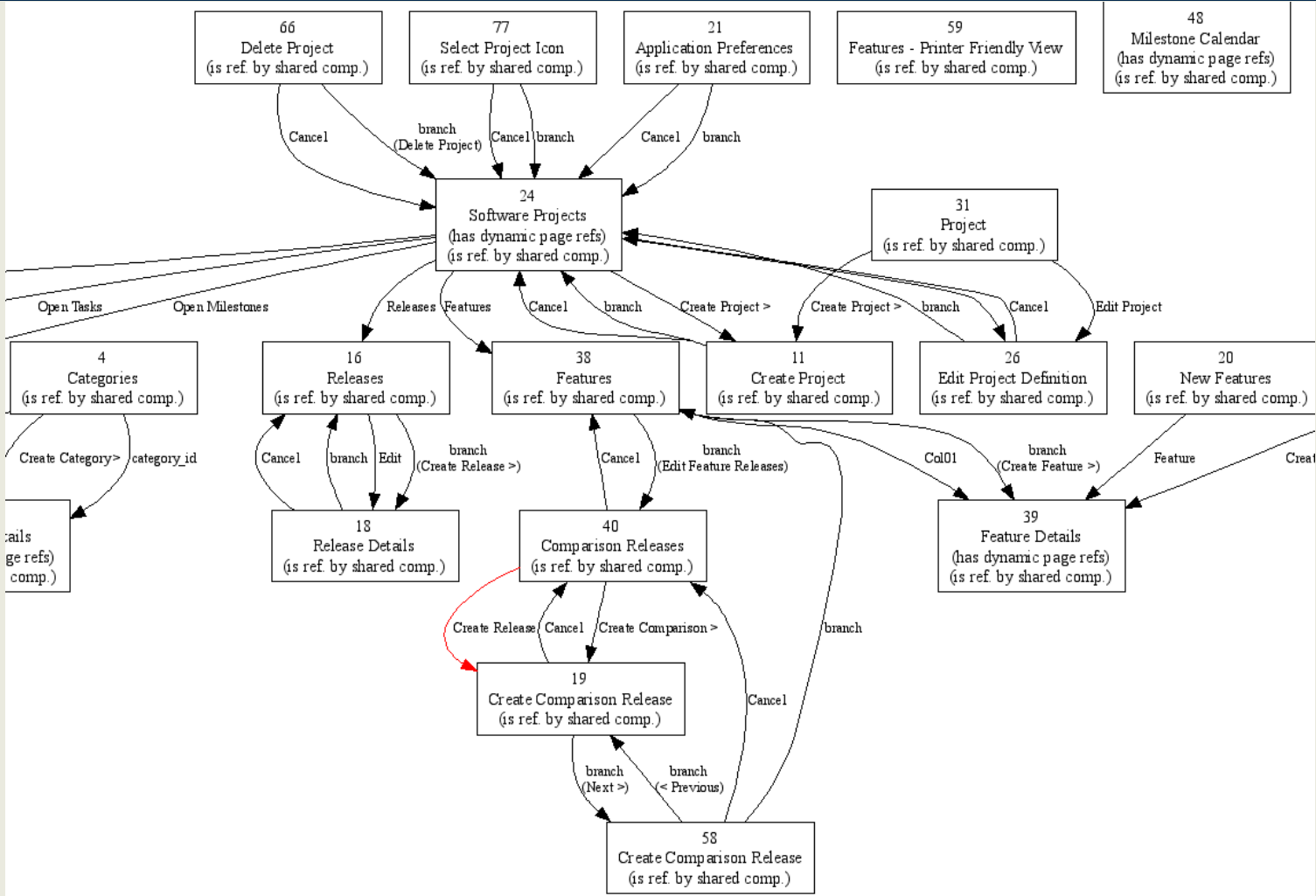
- ◆ SQL Report
- ◆ Za atribut „PAGE_TITLE“, promijeniti Link tekst na #PAGE_TITLE#, te za “Page” na #PAGE_ID#
- ◆ Atribut „PAGE_ID“ postaviti na „Hidden“.
- ◆ Skupine stranica (Page Group) se mogu iskoristiti za hijerarhijski prikaz u obliku stabla (tree view)...

Automatsko dokumentiranje

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- ◆ Zar ne bi bilo zgodno imate mogućnost izrade dijagrama toka stranica u aplikaciji (Page Flow)? S koje stranice se poziva koja stranica...
- ◆ Poput JDevelopera (Page Flow editor za JSF aplikacije), ali u ovom slučaju ručno održavan...
- ◆ Svi potrebni podaci za izradu ovakvih dijagrama dostupni su pomoću jednostavnih SQL upita, za razliku od većine drugih razvojnih okruženja gdje se takvi podaci spremaju u XML datoteke ili Java/... kod!
- ◆ Uz pomoć Graphviz alata (open source alat) generiranje grafičkih dijagrama je prilično jednostavno.

Automatsko dokumentiranje



Nadgledanje APEX Aplikacije

38

- ◆ Monitoring
- ◆ **Automatske obavijesti o nastalim greškama u aplikaciji**
- ◆ APEX omogućava korištenje viewa APEX_WORKSPACE_ACTIVITY_LOG te atributa ERROR_MESSAGE za tu svrhu.
- ◆ A DBMS_JOB se može koristiti za periodičko provjeravanje gornjih aktivnosti.
- ◆ Pogledajte blog:
<http://oraclequirks.blogspot.com/2007/05/simple-pager-for-apex-30.html>
- ◆ A pomoću linka <http://inside-apex.blogspot.com/2007/05/sending-sms-to-mobile-phone.html> možete saznati kako to sve poslati SMS-om.

Nadgledanje APEX Aplikacije

39

- ◆ **Mogućnost detektiranja hakerskih pokušaja upada u vašu aplikaciju**
- ◆ Sustav bilježi svaki pokušaj logiranja u tablice u bazi spremanjem slijedećih podataka:
 - Timestamp
 - Username
 - IP address
 - Result – Successful/Failed
- ◆ Kroz view `APEX_WORKSPACE_ACCESS_LOG` se na jednostavan način može doći do tih podataka

Nadgledanje APEX Aplikacije

40

- ◆ **Mogućnost detektiranja smanjenja vremena odziva aplikacije**
- ◆ Kroz view APEX_WORKSPACE_ACTIVITY_LOG mogu se vidjeti bilješke pristupa svakoj pojedinoj stranici, a kroz atribut ELAPSED_TIME možemo saznati vrijeme koje je potrebno APEX-u da izgenerira stranicu.
- ◆ Kombinacijom povijesnih podataka iz baze te brojem korisnika koji trenutno pristupaju sustavu možemo odrediti trend vremena odziva aplikacije.
- ◆ Atribut THINK_TIME za vrijeme koje je korisnik čekao dok mu se otvori slijedeća stranica.
- ◆ Upit koji vraća popis stranica koje se nikada ili jako rijetko koriste.

APEX Views – Zaključak

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- ◆ APEX repozitoriji pogledi dostupni od verzije 2.2
- ◆ Mnogo scenarija u kojima se može iskoristiti
- ◆ Najkorisniji tijekom razvoja aplikacije
- ◆ Najlakše upoznavanje kroz APEX Views alat

Pitanja

