



JP ELEKTROPRIVREDA BiH

d.d. - Sarajevo



MIGRACIJA NA ORACLE FMW 12C ARHITEKTURU U UVJETIMA POTREBA ZA VISOKOM RASPOLOŽIVOSTI

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Sadržaj

- Razlozi za migraciju
- Organizacija EPBiH
- Prethodno stanje Oracle WebLogic Application Server arhitekture
- Planiranje kapaciteta
- Hardverska arhitektura
- Funkcionalna arhitektura
- Weblogic licence
- Izabrano rješenje
- Backup i Recovery procedura
- Testiranje i puštanje u produkciju

PROIZVODNJA, SNABDIJEVANJE I DISTRIBUCIJA

Distributivni centri u EPBIH

- PTZ Sarajevo
- ED Zenica
- ED Tuzla
- ED Mostar
- ED Bihać



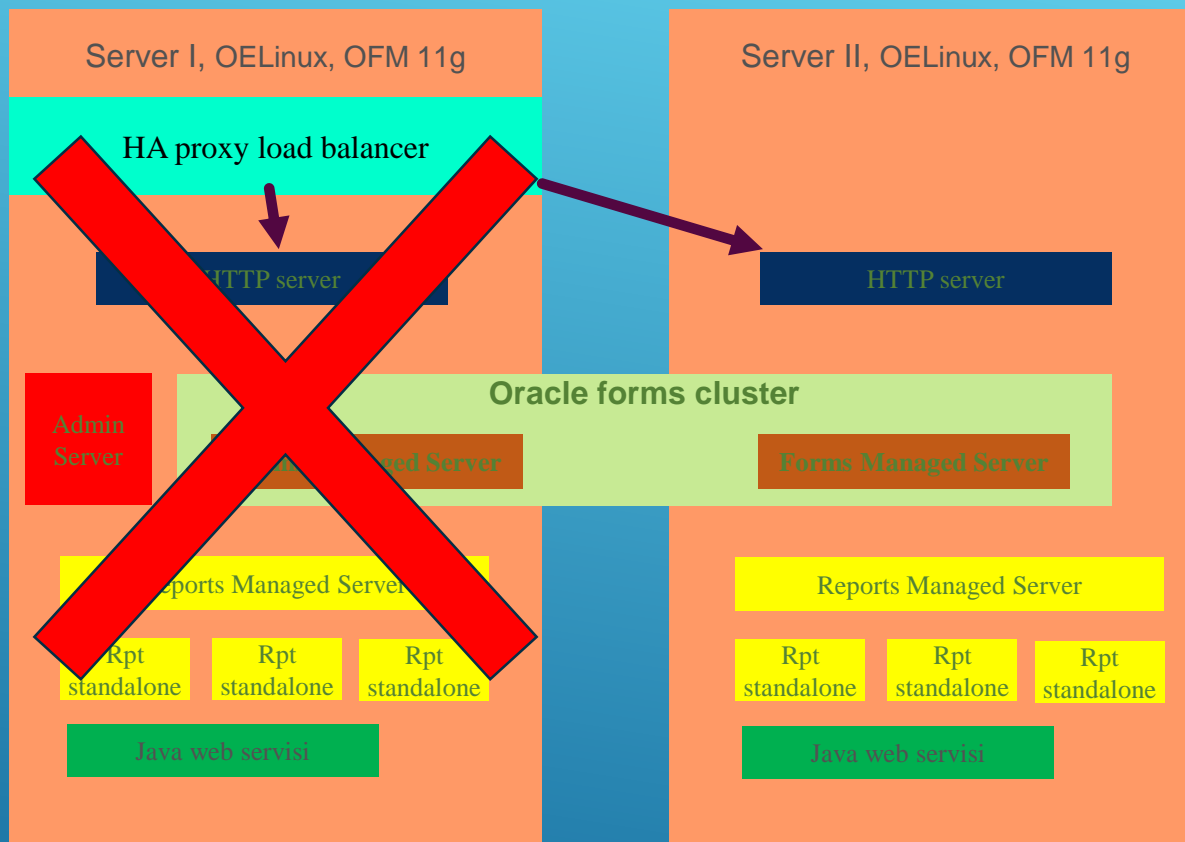
Razlozi za migraciju na novu weblogic arhitekturu

- Problemi sa otežanim radom aplikacija, koji se ogledaju u povremenim usporenjima i kratkim prekidima u toku korištenja.
- Kompaniju napušta osoba zadužena za održavanje Oracle FMW arhitekture
- Loše, gotovo nikako dokumentovan postojeći sistem sa dosta neprilagođenih funkcionalnosti sa stare client - server arhitekture.
- Oracle Forms and Reports 11g, extensible support ends at Dec 2018.
- Ne postojanje DR lokacije.
- Hardver na kojem je radila stara weblogic platforma je zastario.
- Ne postojanje obučenih i certificiranih zaposlenika za Oracle Middleware



Prethodno stanje Oracle WebLogic Application Server arhitekture

- Izgubljen Admin server, što je dovelo do usložnjavanja administracije WLS managed servera.
- Smanjen, neoptimiziran i nedovoljan broj Managed servera.
- Nedovoljna količina memorije koja je dostupna za Managed servere.
- Neadekvatna konfiguracija JVM controlera za podršku rada Oracle Forms 11g.
- Neprilagođen heap size prema raspoloživoj memoriji servera.
- Posljedica prethodno navedenog je prisutnost swap-a na fizičkim serverima.
- Batch kampanje obrada su se izvršavale otežano.
- JRE 1.6 nasuport JRE 1.8



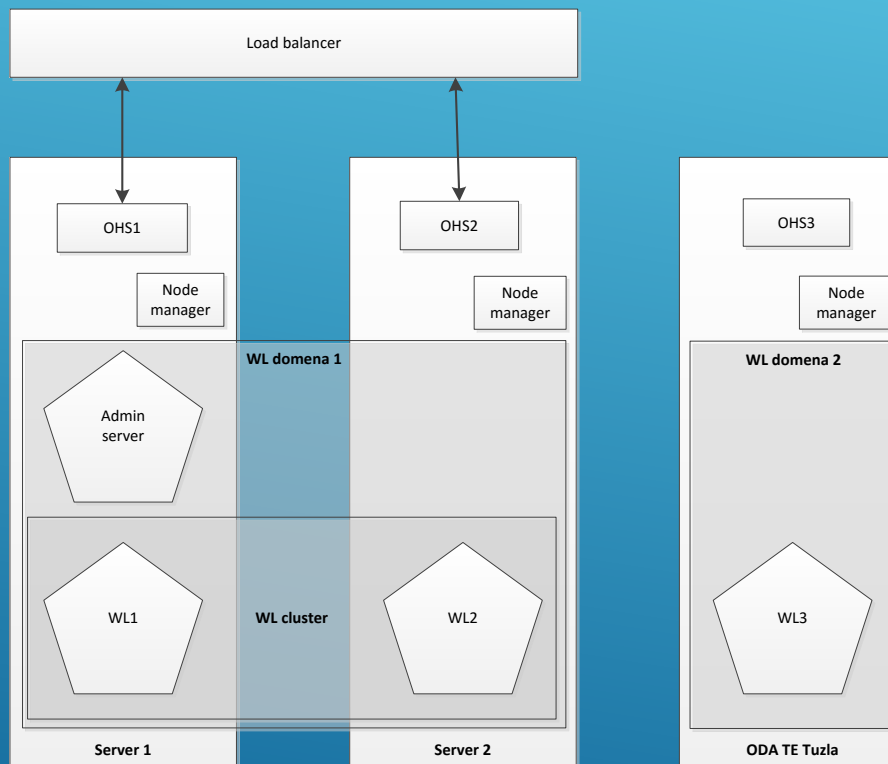
Stara OFM arhitektura

Planiranje kapaciteta za Enterprise High availability Oracle FMW

- Broj trenutnih korisnika aplikacija sa ukupnim i prosječnim brojem korisnika prilikom analize postojećeg sistema.

	Naziv aplikacije	Broj korisnika	Prosječan broj aktivnih korisnika	Dostupnost servisa	Dostupnost tokom radne sedmice	Zahtjevana dostupnost na mjesečnom nivou
0403	Informacioni sistem za priključenja kupaca na distributivnu mrežu (DISP)	422	382	Ponedjeljak-Petak	7 - 17h	95%
0702	Sistem obračuna i naplate EE (SOEE)	844	450	Ponedjeljak-Petak	0 - 24h	99%
0404	Sistem obračuna neovlaštene i neregistrovane potrošnje (SONN)	354	10	Ponedjeljak-Petak	0 - 24h	99%
0406	Dispečiranje/Održavanje elektroenergetskih objekata (BTPL)	551	274	Ponedjeljak-Petak	7 - 17h	95%
-	Sistem obračuna distributivne mreže (SODM)	180	-	-	-	-
-	Imovinsko-pravni odnosi	10	-	-	-	-

- Izbor buduće arhitekture
- Oracle FMW domena, jedna ili više, da li odvojiti Admin server na posebnu mašinu, koliko Managed servera koristiti, koristiti Cluster okruženje za pojedine vrste Managed servera?



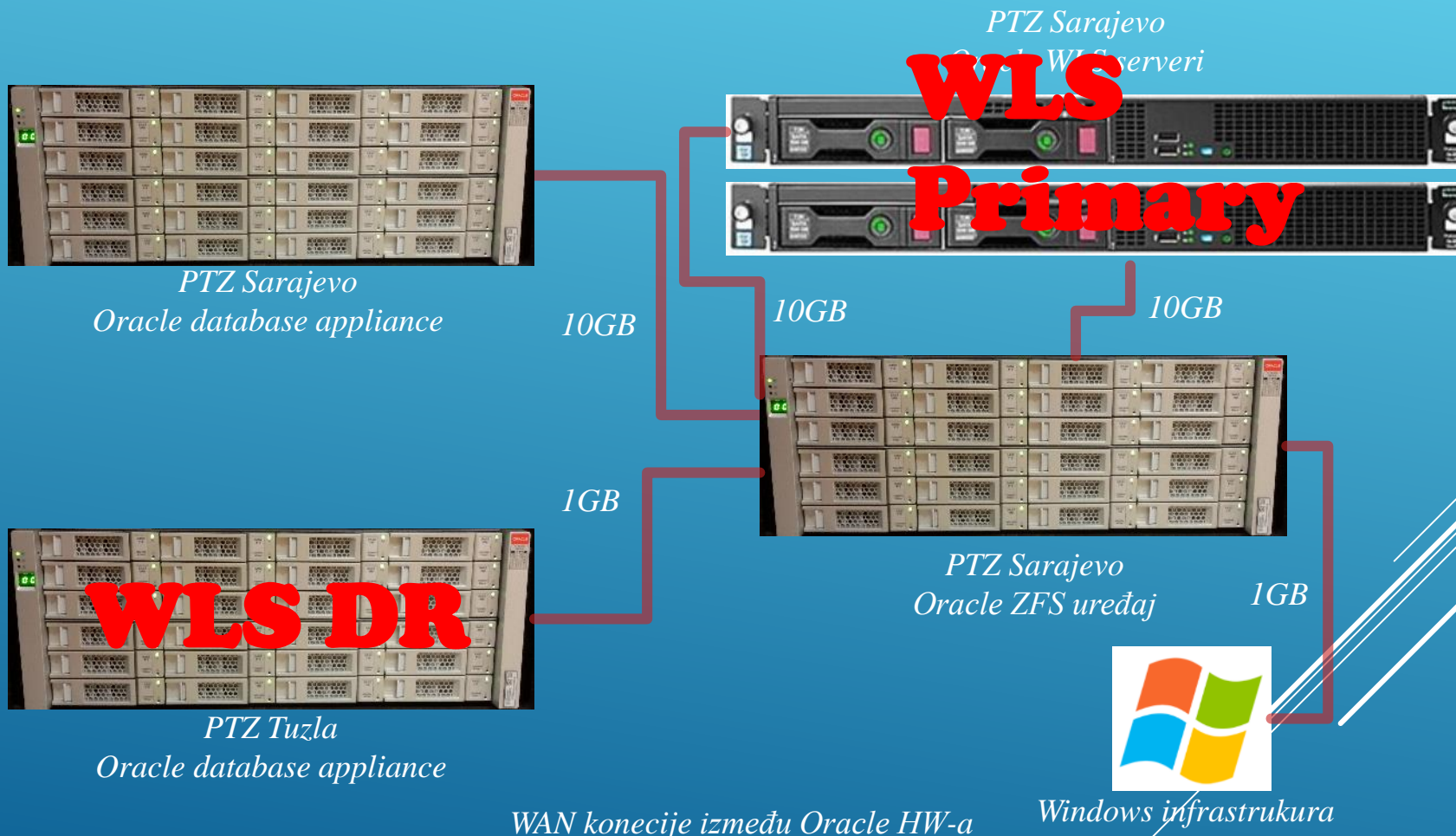
WebLogic topologija

ORACLE arhitektura bazirana na ODA uređajima

- PTZ Sarajevo i TE Tuzla
- Da li kreirati VM mašine na ODA uređajima
- Šta ako dođe do problema na ODA-i



Mrežna konekcija između uređaja



WAN konekcije između Oracle HW-a

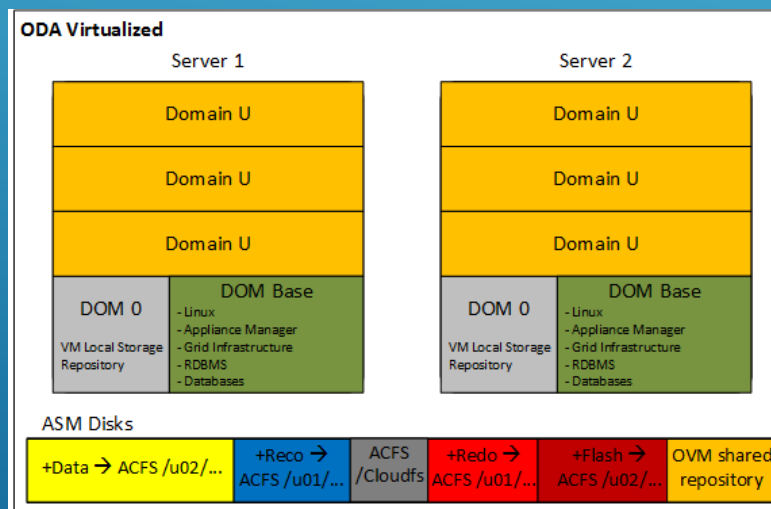
Windows infrastruktura

- Konfiguracija fizičkih primarnih WLS servera. Ostaje pitanje koju verziju Oracle Forms/reports-a koristiti:

Opis	Kom.
Serveri	4
HP DL120 Gen9 8SFF Configure-to-order Server HPE DL120 Gen9 Intel Xeon E5-1650v4 (3.6GHZ 6-core 15MB 140W) Pro, Oracle enterprise linux	2
Virtualne mašina (Load balancer)	1
Virtualna mašina (DR site)	1

Specifikacija servera

- Izbor da primarni site koristi fizički HW, dok će disaster site koristiti virtuelnu mašinu na ODA uređaju.



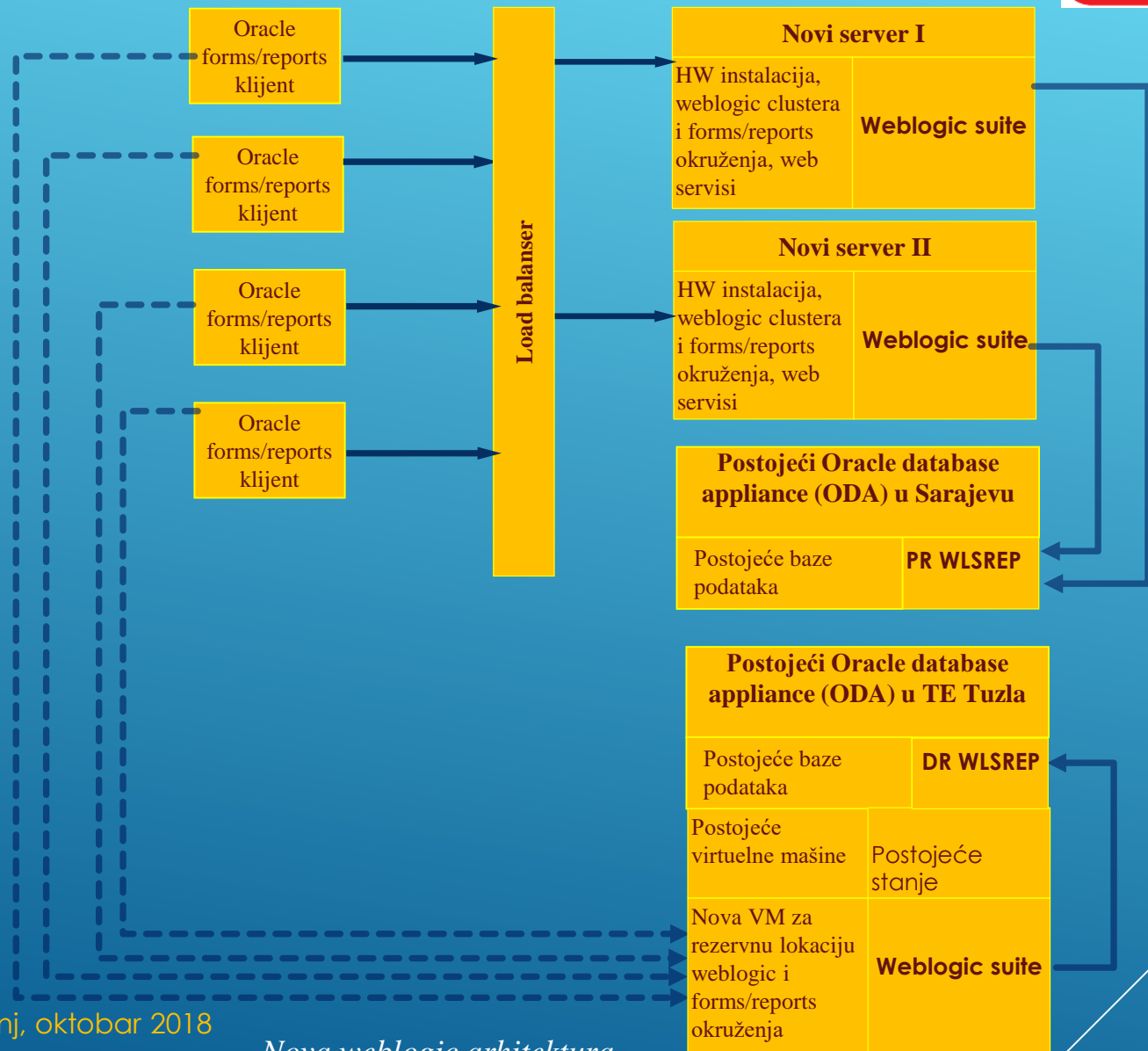
ODA virtuelizirani uređaj za potrebe DR lokacije

- VM na DR site-u:

```
[root@ep-01-000 ~]# oakcli configure vm ep-01-000 -vcpu 4 -maxvcpu 4 -cpupool wls_dr
Configured VM : ep-01-000. Changes will take effect on next restart of VM.

[root@ep-01-000 ~]# oakcli configure vm ep-01-000 -memory 48G -maxmemory 48G
Configured VM : ep-01-000. Changes will take effect on next restart of VM.
```

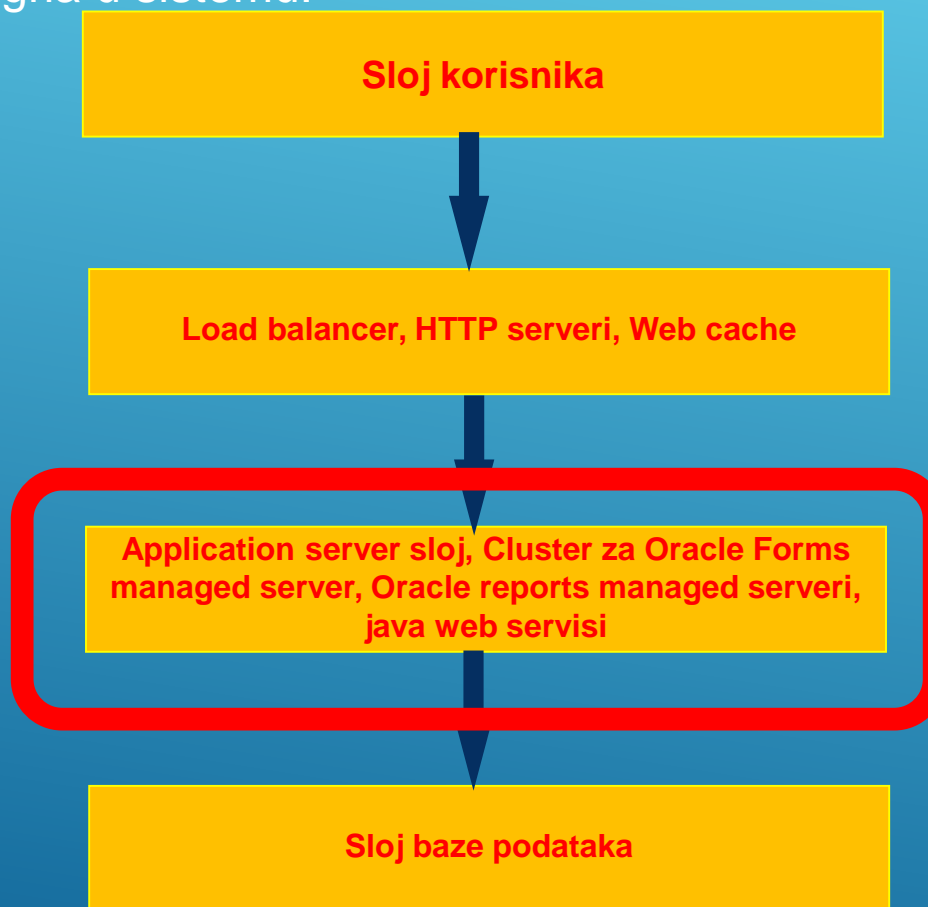
- Dualna instalacija Oracle WLS platforme 11g i 12c u cilju provođenja migracije te zadovoljenje potreba tokom migracije
- Različite verzije JDK-a, OFM-a, Forms-a i Reporta, te brojevi portova koji će se koristiti za različite Managed Service
- Punjenje /tmp direktorija, kreiranje formweb*.out. datoteka, FORMS_LIMIT_EXTERNAL_MESSAGES=1



Rovinj, oktobar 2018

Nova weblogic arhitektura

- Funkcionalna arhitektura podrazumijeva pravilnu konfiguraciju kako bi se izbjegla uska grla u sistemu:



Funkcionalna arhitektura

○ Weblogic suite opcije

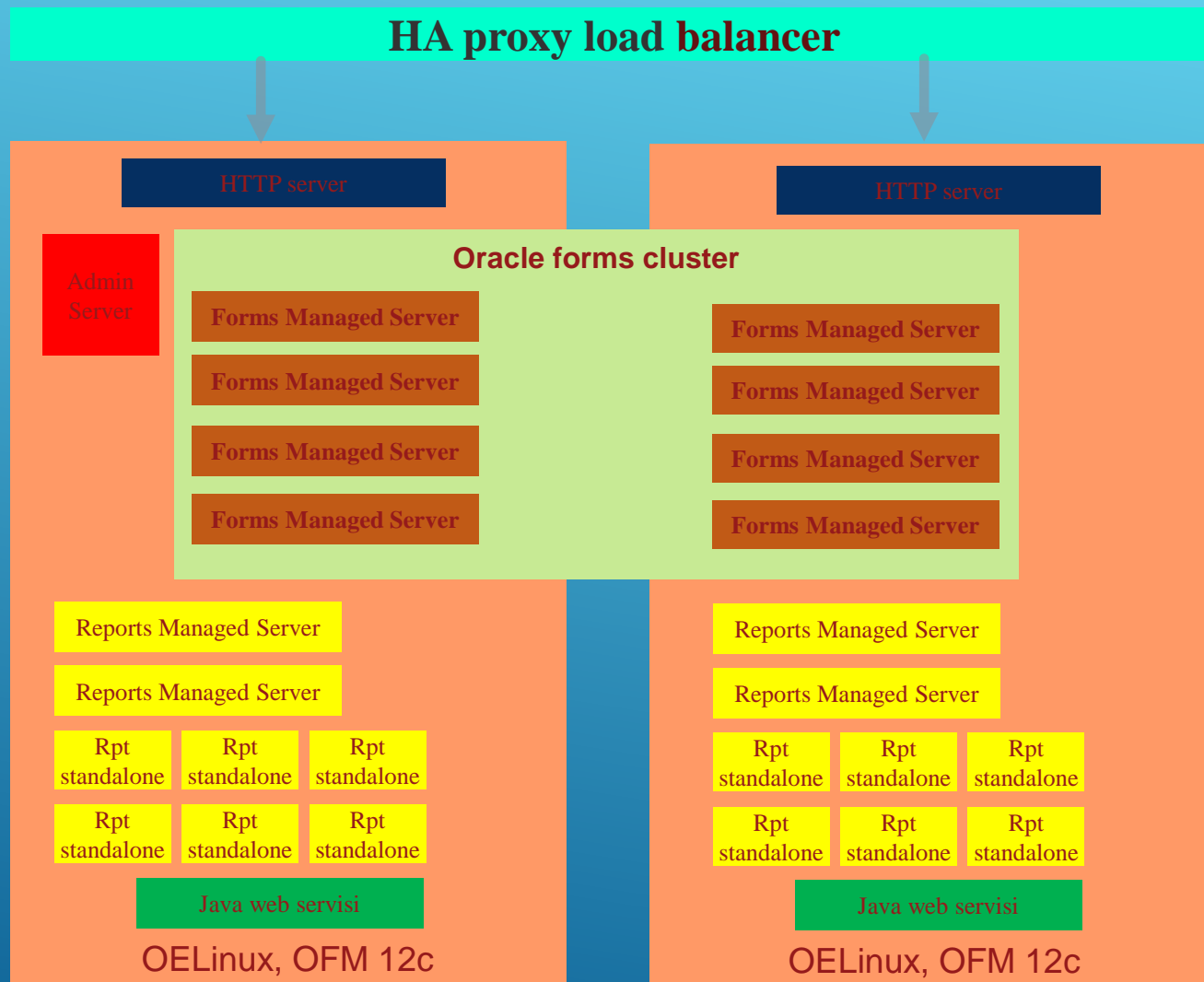
Table 2-1 (Cont.) Oracle WebLogic Server (WLS) Editions

WLS Edition	High Level Functionality	Features Included
WebLogic Suite	<p>Includes all of the Enterprise Edition functionality, plus:</p> <ul style="list-style-type: none"> • Oracle Coherence Enterprise Edition • Oracle Forms, Reports, and Portal • Oracle Enterprise Manager Pack for Oracle Coherence • Oracle Java SE Suite (restricted for WebLogic Server, Oracle Containers for J2EE and Coherence. Java SE is included for client applications that access these server components) 	<p>All Enterprise Edition features, plus:</p> <ul style="list-style-type: none"> • Application data management provided by Oracle Coherence Enterprise Edition. Includes: fault-tolerant data caching, data management, write-behind, transactions, analytics and events. For license details, see Oracle Coherence Products • High performance, low latency JDK with deterministic garbage collection for Java EE applications running on Oracle WebLogic Server with JRockit Real Time. JRockit Real Time is included in Java SE Suite. For details on Java SE Editions, see http://www.oracle.com/technetwork/java/javase/terms/products/index.html. • Management tooling for monitoring, administering, and provisioning Oracle Coherence with Oracle Enterprise Manager Management Pack for Oracle Coherence. For complete license details, see the Oracle Enterprise Manager Licensing Information document available at http://www.oracle.com/technetwork/oem/grid-control/documentation/index.html. <p>Also includes Oracle Internet Application Server Enterprise Edition, which contains:</p> <ul style="list-style-type: none"> • Oracle Internet Directory • Oracle Single Sign-On • Oracle Reports Services • Oracle Forms Services • Oracle WebLogic Server • Oracle Containers for J2EE • Oracle Portal • Oracle Web Cache • Oracle Directory Integration Platform <p>For license details about Oracle Internet Application Server Enterprise Edition, see Oracle Internet Application Server</p>

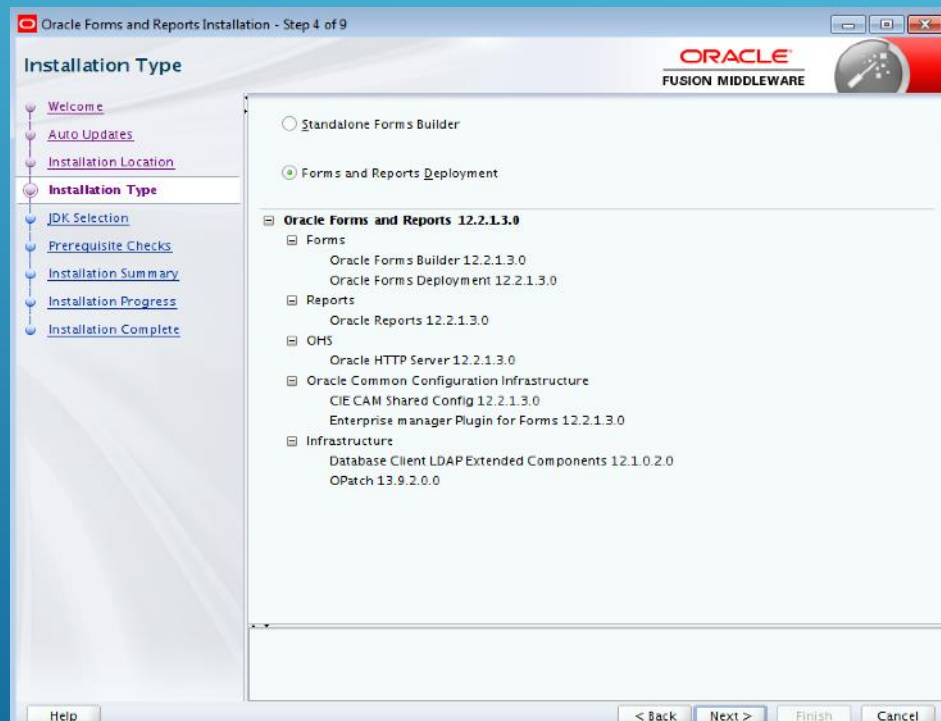
Oracle Weblogic 12c opcije koje zahtjevaju dodatne licence a vezane su za regulisanje i upravljanje kapacitetom arhitekture:

- Oracle WebLogic Server Multitenant
 - Oracle Traffic Director
 - Oracle WebLogic Server Multitenant Domain Partitions and integrated constructs including Virtual Targets, Resource Groups, Resource Consumption Managers
 - Oracle WebLogic Coherence Grid Edition Option

- Oracle WebLogic Server Continuous Availability
 - Oracle Traffic Director
 - Oracle WebLogic Server Zero Downtime Patching
 - Oracle WebLogic Server Cross Domain XA Transaction Recovery
 - Oracle WebLogic Server Domain Partition Live Migration
 - Oracle WebLogic Coherence Grid Edition Option
 - Oracle Enterprise Manager Site Guard



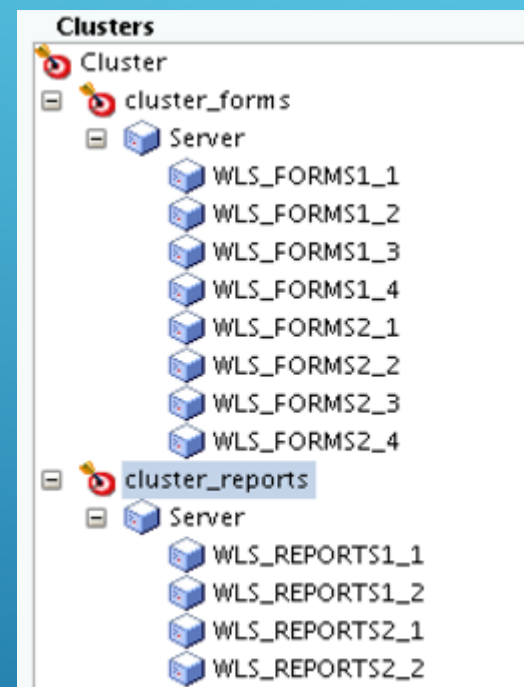
- Yum install oracle-database-server-12cR2-preinstall
- Oracle enterprise linux release 6.7
- Instalacija JKD, npr release 1.8.0_151
- Weblogic server 12.2.1.3
- Instalacije infrastrukture
- Instalacija Formi i reporta



- Kreiranje Repository i Weblogic domene nakon instalacije Repository šeme

Component	Schema Owner
<input type="checkbox"/> Oracle AS Repository Components	
<input checked="" type="checkbox"/> AS Common Schemas	
<input checked="" type="checkbox"/> Common Infrastructure Services *	WLSPROD_STB
<input checked="" type="checkbox"/> Oracle Platform Security Services	WLSPROD_OPSS
<input type="checkbox"/> User Messaging Service	UMS
<input checked="" type="checkbox"/> Audit Services	WLSPROD_IAU
<input checked="" type="checkbox"/> Audit Services Append	WLSPROD_IAU_APPEND
<input checked="" type="checkbox"/> Audit Services Viewer	WLSPROD_IAU_VIEWER
<input checked="" type="checkbox"/> Metadata Services	WLSPROD_MDS
<input checked="" type="checkbox"/> Weblogic Services *	WLSPROD_WLS

- Konfiguracija na drugom čvoru je urađena pakovanjem domene,
- `./pack.sh -managed=true -domain=/u01/app/oracle/Middleware12c/user_projects/domains/domain_pr -template=domain_pr-template.jar -template_name=domain_pr`



○ Tri ključna parametra za rad HAProxy load balancera

- the session rate kad se koristi keep-alived enabled
- the session concurrency
- the data forwarding rate

○ haproxy.cfg konfiguracija

- server serverI:port weight 1 cookie 1 check
- server serverII:port weight 1 cookie 2 check

HAProxy

Statistics Report for pid 2431

> General process information

pid = 2431 (process #1, nbproc = 1)
 uptime = 38d 1h27m19s
 system limits: memmax = unlimited; ulimit-n = 8034
 maxsock = 8034; maxconn = 4000; maxpipes = 0
 current conns = 25; current pipes = 0/0; conn rate = 28/sec
 Running tasks: 1/31; idle = 97 %

Legend for process states:

- active UP
- active UP, going down
- active DOWN, going up
- active or backup DOWN
- active or backup DOWN for maintenance (MAINT)
- active or backup SOFT STOPPED for maintenance
- backup UP
- backup UP, going down
- backup DOWN, going up
- not checked

Note: "NOLB"/"DRAIN" = UP with load-balancing disabled.

Display option:

- Scope :
- [Hide 'DOWN' servers](#)
- [Refresh now](#)
- [CSV export](#)

External resources:

- [Primary site](#)
- [Updates \(v1.5\)](#)
- [Online manual](#)

	Queue			Session rate			Sessions				Bytes		Denied		Errors			Warnings			Server											
	Cur	Max	Limit	Cur	Max	Limit	Cur	Max	Limit	Total	LbTot	Last	In	Out	Req	Resp	Req	Conn	Resp	Retr	Redis	Status	LastChk	Wght	Act	Bck	Chk	Dwn	Dwntme	Thrd		
Frontend	0	2	-	1	1	3 000	27						133 920	4 203 180	0	0	0	0	0	0	0	OPEN										
Backend	0	0		0	2		0	1	300	5	0	0s	133 920	4 203 180	0	0	5	0	0	0	0	38d1h UP		0	0	0			0			

	Queue			Session rate			Sessions				Bytes		Denied		Errors			Warnings			Server											
	Cur	Max	Limit	Cur	Max	Limit	Cur	Max	Limit	Total	LbTot	Last	In	Out	Req	Resp	Req	Conn	Resp	Retr	Redis	Status	LastChk	Wght	Act	Bck	Chk	Dwn	Dwntme	Thrd		
Frontend	28	65	-	24	70	3 000	22 329	747					53 643	616 242	160 620	703 593	0	0	1 614	0	0	OPEN										
ep-01	0	0	-	49	409		3	47		32 978	893	18 255	1s	29 115	993 668	85 680	492 242	0	0	0	0	38d1h UP	L4OK in 0ms	1	Y	-	0	0	0s	-		
ep-02	0	0	-	46	421		2	27		27 978	714	18 254	1s	24 527	622 574	74 939	933 420	0	0	0	0	38d1h UP	L4OK in 0ms	1	Y	-	0	0	0s	-		
Backend	0	0		96	473		5	52	300	60 957	609	36 509	1s	53 643	616 242	160 620	703 593	0	0	0	0	38d1h UP		2	2	0		0	0s			

- OPMN alat je ukinut u 12c, tako da se koristi WLST alat da se kreiraju i manage-iraju WLS komponente.
- Oracle enterprise manager ne sadrži opciju upravljanja Report serverima (System MBean Browser).
- Konfiguracija HTTP servera da prosleđuje zahtjeve prema Forms cluster-u.
- Konfiguracija forms environment varijabli za različite aplikacije, te web konfiguracija (više manuelnog rada).
- Forms performance tuning: RUN_REPORT_OBJECT() (RRO) from Forms with JVM controler, 250-400 forms sesija po managed serveru, veličina java heap size za managed servere
- Oracle enterprise linux parametar fs.file-max
- Konfiguracija report servera. Nakon instalacije neophodno je kreirati ReportsToolsInstance.
- Kreiranje in-proces i/ili standalone report servera.
- Konfiguracija report servera

- Migracija formi i reporta na verziju 12c
- Forms 12c Runtime prikazuje pogrešno vrijeme u satima i minutama (Doc ID 2139346.1), riješeno sa dodatnom konfiguracijom FORMS_DATETIME_LOCAL_TZ=GMT
- Problem ne prikazivanja greške na WLS 12c u odnosu na 11g i to:
Forms 11g : ORA-40735 : WHEN-BUTTON-PRESSED trigger podiže izuzetak
Forms 12c : ORA-00000 normal, successful completion i aplikacija 'zaledi'

Primjer1:

```
exception  
  when others then  
    db_rollback;  
    Set_Application_Property (cursor_style, 'DEFAULT');  
    raise;  
end;
```

Riješenje:

```
exception  
  when others then  
    db_rollback;  
    javi_poruku( SQLERRM);  
    Set_Application_Property (cursor_style, 'DEFAULT');  
    raise Form_Trigger_Failure;  
end;
```


- Problemi u toku eksploatacije platforme:
- Sporost odziva Oracle FMW konzole i enterprise managera za naš slučaj koda postoji više managed servera, uključiti cache discovery prema noti 1423893.1
- Korištenje funkcionalnosti Forms Services Web Runtime Pooling (or Forms Runtime prestart):

```
prestartRuntimes  
prestartInit  
prestartTimeout  
prestartMin  
prestartIncrement
```

Support tražio izmjenu poziva RP2RRO.RP2RRO_RUN_PRODUCT u RUN_REPORT_OBJECT

- Izvještaji koji traju dugo bivaju prekinuti:
- http.conf konfiguracija

```
#  
# Timeout: The number of seconds before receives and sends time out.  
#  
Timeout 86400  
#  
# KeepAlive: Whether or not to allow persistent connections (more than  
# one request per connection). Set to "Off" to deactivate.  
KeepAlive Off
```

- Backup i recovery procedura:
- Backup Middleware-a se radi na način da se uradi pakovanje čitavog Middleware HOME-a i lokacije na kojoj se nalaze izvršne forme i reporti.
- Procedura je identična za oba node-a.
- Restore procedura je definisana na način da se uradi raspakivanje file-ova koji su defisani backup skriptom. Pošto konfiguracije WLS-a prate hostname notaciju potrebno je slijedeće:
 - 1) Mašinu na kojoj se radi restore potrebno je preimenovati na isto ime i nosi Admin server.
 - 2) Podesiti DNS resolving za repository bazu.
 - 3) Instalirati javu na lokaciju /usr/local/jdk12c
 - 4) Raspakovati file backup_WLS_`\${dateti}`.tgz sa potrebnim originalnim pravima.
 - 5) Raspakovati izvršne verzije zapakovanih aplikacija.

- Active-pasive replikacija za SOA arhitekturu na :

SOA Primary



*PTZ Sarajevo
Oracle database appliance*



SOA DR



*PTZ Tuzla
Oracle database appliance*

- VM serveri koriste različita imena
- ODA_BASE se koristi za primarnu i standby bazu
- `/usr/bin/rsync --delete --exclude '*log*' -avzhe ssh oracle@192.168.**.*/u01/app/oracle/product/soa /u01/app/oracle/product`
- Switch over procedura podrazumijeva sljedeći redoslijed koraka:
 - Prelazak baze na standby lokaciju

```
DGMGRL> switchover to soadbsby;
Performing switchover NOW, please wait...
New primary database "soadbsby" is opening...
Operation requires startup of instance "soadb" on database "soadb"
Starting instance "soadb"...
```

- Zamjena DNS parametara odnosno u /etc/hosts file-u postaviti ime kao na primarnom site-u
- Pokrecemo SOA procese na DR sajtu. Prije nego sto pokrenemo procese na dr sajtu očititi temp direktorij /u01/app/oracle/product/soa/user_projects/domains/epsoa_domain/servers/AdminServer/tmp . Napomena ---- ovaj korak jer je ključan za podizanje Enterprise managera
- Pokrecemo procese iz /home/oracle/bin

Izvori

- Izvedbeni projekat: Instalacija novog okruženja za Oracle Weblogic application server za sve aplikacije (Tim unutar EPBiH)
- Oracle Fusion Middleware Online Documentation Library 12c
- Oracle online documentation: Database Appliance Administration and Reference Guide, Managing Oracle Database Appliance Virtualized Platform

Q&A