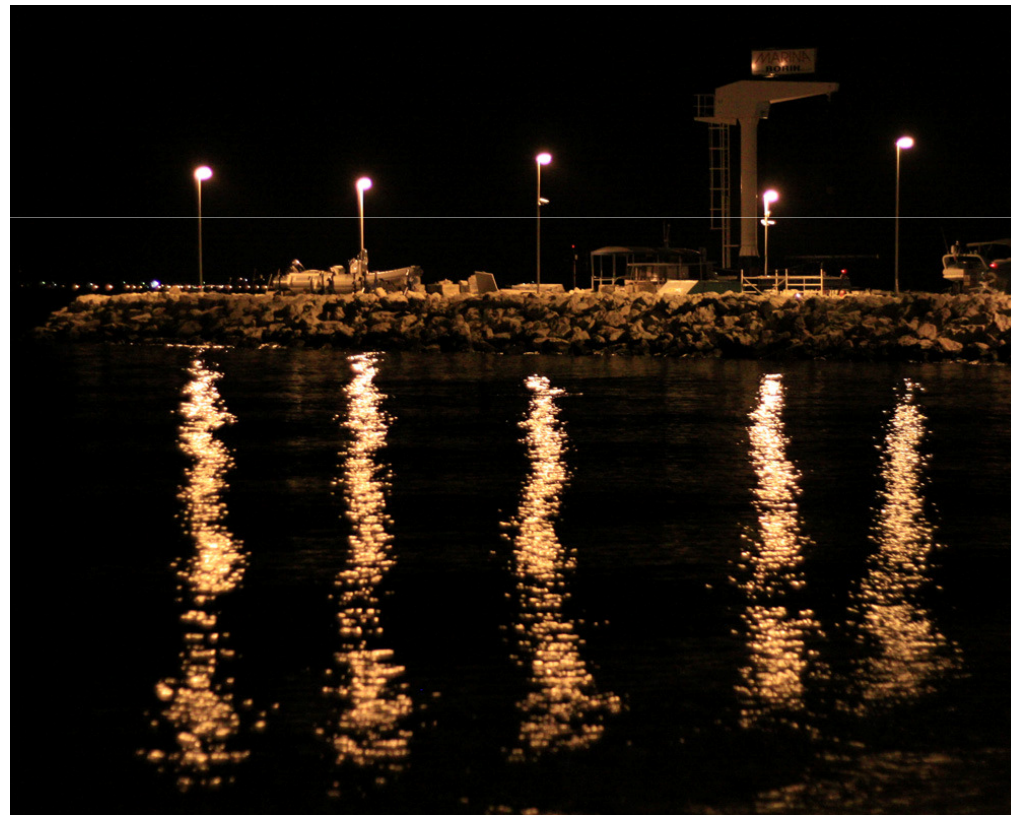


HEP d.d.

Sektor za informatiku i telekomunikacije

HROUG 17

Neslomljivi klaster



Dražen
Patarić





Promjena platforme - faktori za valorizaciju

- Cijena nabavke (i održavanja) HW
- Cijena nabavke (i održavanja) Sistemskog SW
- Kvaliteta takvog rješenja
 - visoka dostupnost koju osigurava takvo rješenje
 - robusnost takvog rješenja
 - potreba za održavanjem sistemskog HW i SW
- Ljudski faktor (znanje, angažman)
- Usvojenost
- Pozicija (konzultantske kuće)
- Čuvanje postojeće investicije



Zašto

- Diskontinuitet i cijena postojećeg rješenja
 - otežava i poskupljuje održavanje
- Novi servisi i poslovna rješenja (BI)
 - nove verzije baze (nepodržane)
 - nekompatibilnost s novim rješenjima
 - najviše dvije verzije razlike
- Nove mogućnosti:
 - Auditing
 - Sigurnost
 - Oracle Single Sign-On
 - suradnja s AD-om (OID)
 - TAF



Realnost

Stara oprema – već kupljena

- Trošak održavanja

vs

Nova oprema

- Cijena HW
- Cijena sistemskog SW
- Trošak održavanja



Linux + Intel (CISC)

Building
Block

- **Najpovoljniji HW**
 - odnos performanse / cijena
- Zanemariva cijena OS-a
- **Oracle CRS + Oracle ASM**
 - mogućnost reduciranja održavanja
 - ne treba klasterska rješenja velikih SW kuća
- Pouzdano i robusno
- Provjereno i testirano
- Analitičke kuće ga preferiraju

Building
Block

Building
Block



Tehničko rješenje





HW / SW

- **HW**
 - HP ProLiant 380 - jeftina cigla za ugradnju
 - 12 (2 x 6) jezgri (**OS vidi 24**)
 - RAM 48 GB (96 GB)
 - 2 napajanja
 - 4 mrežna adaptera
 - **2 FC adaptera**
 - **RAM (do 144 GB)**
- **SW**
 - Oracle Enterprise Linux 5.7 ili noviji (6.x)
 - bez klasterskog softvera
- **Klaster (Oracle GRID infrastruktura)**
 - Oracle CRS 11gR2 (11.2.0.3)
 - Oracle ASM 11gR2 (11.2.0.3)



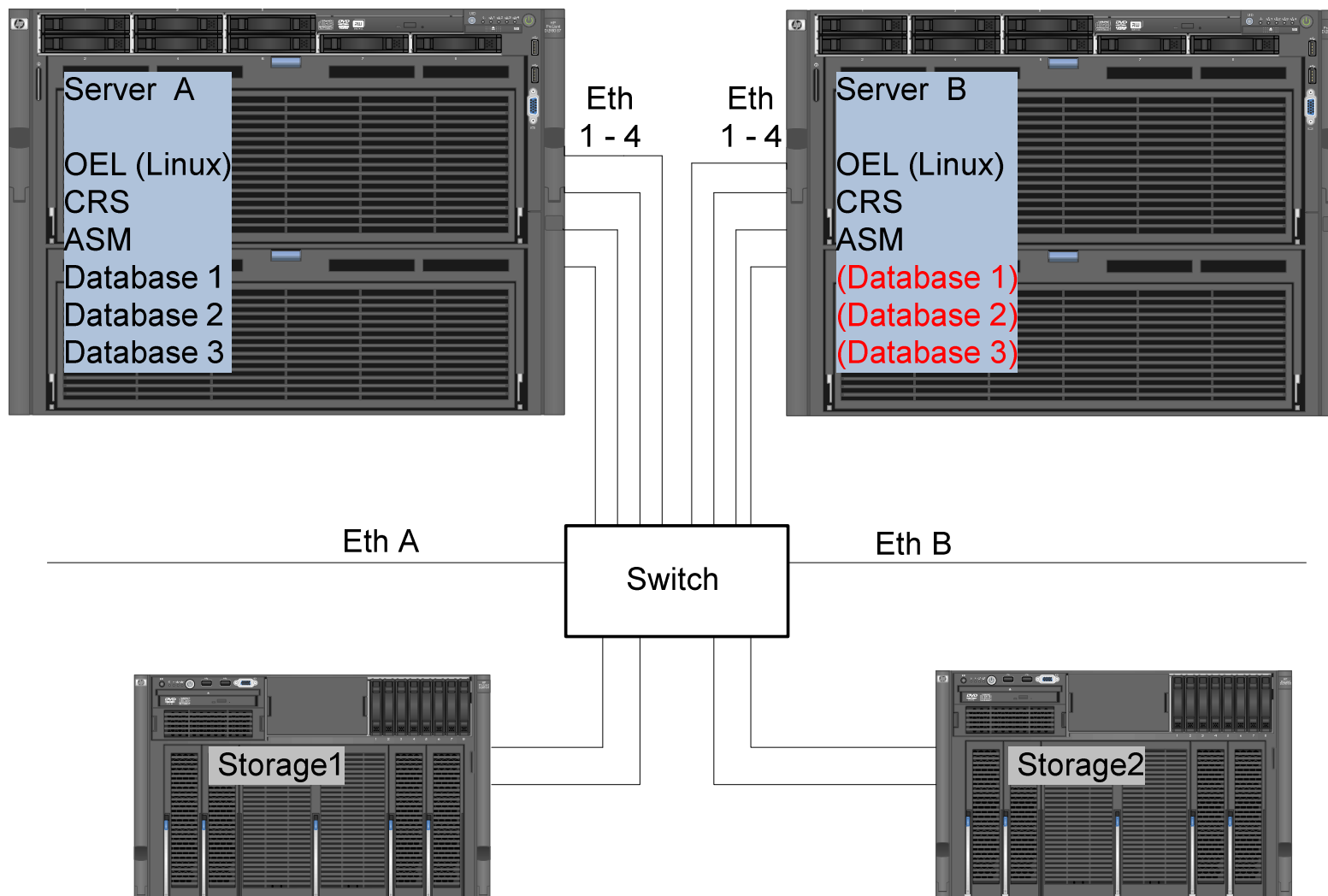
BAZA

Oracle RDBMS ver. 10gR2

ili

Oracle RDBMS ver. 11gR2

nadogradnja i fleksibilnost





Prednosti

- ASMLIB i “row” uređaji
 - nisu više potrebni
 - direktan rad sa “/dev/mapper/asm_xxx”
- ON - LINE re-konfiguracija
 - dodavanje diskova sa SAN-a
(re-scan SCSI bus-a, re-start multipath SW)
 - dodavanje i re-konfiguracija lokalnih diskova
 (“hpacucli” kontrolni program za interni RAID)
- Napredne opcije ASM-a (rebalncing)
 - dodavanje diskova u disk grupu
 - izuzimanje diskova iz disk grupe



Preduvjeti za Oracle SW

- OS – paketi potrebni za rad Oracle SW
- Postavke kernela (semafori, dijeljena memorija, ...)
- Vatrozid – isključiti
- Konfigurirati IP “bonding”
- Konfigurirati “multipathing“
- Kreirati korisnike i grupe vlasnika SW
- Podesiti sigurnosne postavke za korisnika vlasnika (oracle)
- Podesiti “user equivalence” za korisnika vlasnika (oracle)
- Prirediti direktorij za instalaciju
- Instalirati “cvuqdisk paket“
- Konfigurirati “ntp” servis

- OS – paketi za vlastitu komociju (monitoring, ...)



Važno – za bazu 10g

Nakon uspostavljanja klastera 11gR2 treba “pinati” postojeće čvorove kako bi prošla naredba “srvctl” verzije 10gR2

```
crsctl pin css -n <node1> <node2> ...
```



Backup – unificiran za sve baze

- Zajedničke skripte
 - ime baze u argumentu
- Zajednički direktoriji
 - za rman backup
 - za expdp
 - za exp
- Klon baze (test iz produkcije)

**Rolling
Window**



Dodavanje novog poslužitelja u klaster

- Za verziju 11g (GRID infrastrukturu)
 - oracle naredba “addnode.sh” s jednog od postojećih poslužitelja u klasteru
 - par minuta (uz zadovoljenje preuvjeta)
- Za 10g bazu
 - instalacija osnovne verzije + PS na dodanom poslužitelju
 - 30-tak minuta



Vlastite naredbe (shell skripte)

- Za kreiranje grupe resursa
(baza, instanca, listener, IP adresa)
crea_res
- Za kreiranje resursa za bazu
(.profile, backup dir, init.ora, admin dir)
crea_dir



Primjer naredbe crea_res

```
[oracle@szg01lcp1 ng]$ ./crea_res prod prod lsnprod prodfo db_prod
```

Cluster: szg01lc

node1: szg01lcp1
node2: szg01lcp2
node3: szg01lcp3

service data:

database_name: prod
instance_name: prod
listener: lsnprod
VIP name: prodfo
IP address: db_prod

CRS (clusterware) resources:

VIP resource: ora.prodfo.vip
LSN resource: ora.lsnprod.lsnr
DB resource: ora.prod.db
Inst resource: ora.prod.prod.inst

Important:

IP name db_prod must be DNS resolvable.
Listener lsnprod must be defined in
GRID_HOME/network/admin on all nodes in cluster.



Primjer naredbe crea_dir

```
[oracle@szg01lcp1 ng]$ ./crea_dir prod
```

```
Cluster: szg01lc
```

```
node1: szg01lcp1
```

```
node2: szg01lcp2
```

```
node3: szg01lcp3
```

```
creating adump bdump cdump dpdump udump dirs on node szg01lcp1 ...done
creating /backup/exp/prod on node szg01lcp1 ...
creating /backup/rman/prod on node szg01lcp1 ...
creating /backup/db/prod on node szg01lcp1 ...
creating .profile_prod on node szg01lcp1 ...done
creating initprod.ora on node szg01lcp1 ...done
creating adump bdump cdump dpdump udump dirs on node szg01lcp2 ...done
creating /backup/exp/prod on node szg01lcp2 ...
creating /backup/rman/prod on node szg01lcp2 ...
creating /backup/db/prod on node szg01lcp2 ...
creating .profile_prod on node szg01lcp2 ...done
creating initprod.ora on node szg01lcp2 ...done
creating adump bdump cdump dpdump udump dirs on node szg01lcp3 ...done
creating /backup/exp/prod on node szg01lcp3 ...
creating /backup/rman/prod on node szg01lcp3 ...
creating /backup/db/prod on node szg01lcp3 ...
creating .profile_prod on node szg01lcp3 ...done
creating initprod.ora on node szg01lcp3 ...done
```



re – kreiranje CRS-a

1. Brisanje starog CRS-a
2. Brisanje sadržaja ASM diskova
3. Kreiranje novog CRS-a
4. Kreiranje listener-a
5. Kreiranje ASM-a
6. Kreiranje baze
 - povrat iz backup-a (rman)
 - kreiranje crs resursa za bazu (registracija baze)

60
minuta



Primjer CRS okoline

```
oracle@szg01lcp1 ~]$ crsstat | grep lcp1
ora.CRS.dg                ora.diskgroup.type      ONLINE      ONLINE on szg01lcp1
ora.DATA.dg               ora.diskgroup.type      ONLINE      ONLINE on szg01lcp1
ora.FRA.dg                ora.diskgroup.type      ONLINE      ONLINE on szg01lcp1
ora.LISTENER.lsnr        ora.listener.type       ONLINE      ONLINE on szg01lcp1
ora.SBMP.dg               ora.diskgroup.type      ONLINE      ONLINE on szg01lcp1
ora.asm                   ora.asm.type            ONLINE      ONLINE on szg01lcp1
ora.fag1.db               application              ONLINE      ONLINE on szg01lcp1
ora.fag1.fag1.inst       application              ONLINE      ONLINE on szg01lcp1
ora.hepaud.db             application              ONLINE      ONLINE on szg01lcp1
ora.hepaud.hepaud.inst   application              ONLINE      ONLINE on szg01lcp1
ora.hepaud.lsnr          ora.scan_listener.type  ONLINE      ONLINE on szg01lcp1
ora.hepaudfo.vip         ora.cluster_vip.type    ONLINE      ONLINE on szg01lcp1
ora.hepfagfo.vip         ora.cluster_vip.type    ONLINE      ONLINE on szg01lcp1
ora.hepweb.lsnr          ora.scan_listener.type  ONLINE      ONLINE on szg01lcp1
ora.hepwebfo.vip         ora.cluster_vip.type    ONLINE      ONLINE on szg01lcp1
ora.lsnfag.lsnr          ora.scan_listener.type  ONLINE      ONLINE on szg01lcp1
ora.lspipol.lsnr         ora.scan_listener.type  ONLINE      ONLINE on szg01lcp1
ora.net1.network         ora.network.type        ONLINE      ONLINE on szg01lcp1
ora.ons                   ora.ons.type            ONLINE      ONLINE on szg01lcp1
ora.p10g.db               application              ONLINE      ONLINE on szg01lcp1
ora.p10g.p10g.inst       application              ONLINE      ONLINE on szg01lcp1
ora.pipol.db              application              ONLINE      ONLINE on szg01lcp1
ora.pipol.pipol.inst     application              ONLINE      ONLINE on szg01lcp1
ora.pipolfo.vip          ora.cluster_vip.type    ONLINE      ONLINE on szg01lcp1
ora.sbmp.db               application              ONLINE      ONLINE on szg01lcp1
ora.sbmp.lsnr            ora.scan_listener.type  ONLINE      ONLINE on szg01lcp1
ora.sbmp.sbmp.inst       application              ONLINE      ONLINE on szg01lcp1
ora.sbmpfo.vip           ora.cluster_vip.type    ONLINE      ONLINE on szg01lcp1
ora.szg01lcp1.ASM1.asm   application              ONLINE      ONLINE on szg01lcp1
ora.szg01lcp1.LISTENER_SZG01LCP1.lsnr application              ONLINE      ONLINE on szg01lcp1
ora.szg01lcp1.ons        application              ONLINE      ONLINE on szg01lcp1
ora.szg01lcp1.vip        ora.cluster_vip_net1.type ONLINE      ONLINE on szg01lcp1
```



Premještanje resursa

```
[oracle@szg01lcp1 ~]$ crsctl relocate resource ora.topraz.db -c szg01lcp1
```

```
CRS-2527: Unable to start 'ora.topraz.db' because it has a 'hard' dependency on 'ora.topraz.topraz.inst'
```

```
CRS-2525: All instances of the resource 'ora.topraz.topraz.inst' are already running; relocate is not allowed because the force option was not specified
```

```
CRS-0222: Resource 'ora.topraz.db' has dependency error.
```

```
[oracle@szg01lcp1 ~]$ crsctl relocate resource ora.topraz.db -c szg01lcp1 -f
```

```
Attempting to stop `ora.topraz.db` on member `szg01lcp2`
```

```
Stop of `ora.topraz.db` on member `szg01lcp2` succeeded.
```

```
Attempting to stop `ora.topraz.topraz.inst` on member `szg01lcp2`
```

```
Stop of `ora.topraz.topraz.inst` on member `szg01lcp2` succeeded.
```

```
Attempting to stop `ora.topraz.lsnr` on member `szg01lcp2`
```

```
Stop of `ora.topraz.lsnr` on member `szg01lcp2` succeeded.
```

```
Attempting to stop `ora.toprazfo.vip` on member `szg01lcp2`
```

```
Stop of `ora.toprazfo.vip` on member `szg01lcp2` succeeded.
```

```
Attempting to start `ora.toprazfo.vip` on member `szg01lcp1`
```

```
Start of `ora.toprazfo.vip` on member `szg01lcp1` succeeded.
```

```
Attempting to start `ora.topraz.lsnr` on member `szg01lcp1`
```

```
Start of `ora.topraz.lsnr` on member `szg01lcp1` succeeded.
```

```
Attempting to start `ora.topraz.topraz.inst` on member `szg01lcp1`
```

```
Start of `ora.topraz.topraz.inst` on member `szg01lcp1` succeeded.
```

```
Attempting to start `ora.topraz.db` on member `szg01lcp1`
```

```
Start of `ora.topraz.db` on member `szg01lcp1` succeeded.
```