Når blir et sikkert system for sikkert?

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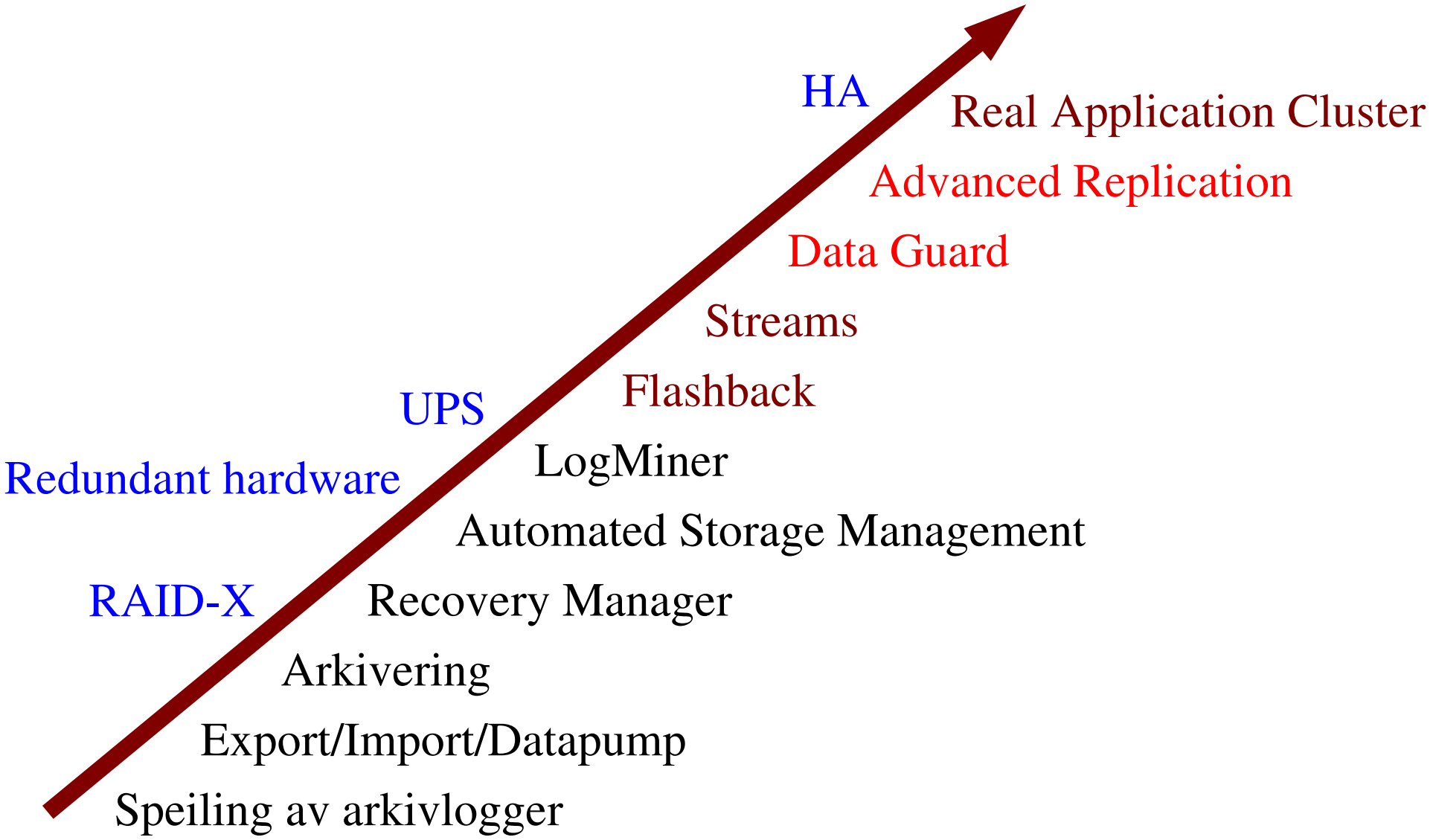
ORACLE

Certified Professional

Sikkert?

- Hvor høy oppe tid ønskes?
  - 99,9999%
  - 7x24
- Installasjon
- Oppgradering
- *Oracle9i* eller *Oracle10g*?
  - 9.2.0.6/7
  - 10.1.0.4/5
- *Oracle10g R1* eller *Oracle10g R2*
- Datamodell

Hvor sikkert?



Det svakeste ledd...

Krav

En **listener** eller flere

Virtuell IP

Spfile eller **pfile**

«Wizards» og konfigurasjonsassistenter

Tid

?

Dokumentasjon

Support

Oracle9i eller **Oracle10g**

OFA og **OMF**

RAID-1 eller «Multiplexed» redologger

OCFS/CFS/NFS/ASM eller **Raw**

OCR

Voting/Quorum disk

Kompetanse

Support

- Metalink
  - Søkemoter
  - Svarte hull
- Forventer nyeste Oracle versjon
- Lokal eller global støtte
- Prøv ut support
- Kulturforskjeller
- Fjernhjelp – Brannmur og VPN
- RDA
- Ansvarsfordeling og roller

Arkivering

- Bør arkivere mot to ulike områder:
  - lokalt
  - NFS-område eller «share» på Windows
  - *Data Guard*
- Unngå å fylle opp arkivområdet!
  - *Recovery Manager*

Recovery Manager

- Fysisk sikkerhetskopi med mange gode egenskaper

```
RUN {
  SQL 'ALTER SYSTEM ARCHIVE LOG CURRENT';
  SQL 'ALTER DATABASE BACKUP CONTROLFILE TO TRACE';
  BACKUP DATABASE FORMAT '\\NKBCK01\BACKUP\@\@_%U.BCK';
  CROSSCHECK ARCHIVELOG ALL;
  BACKUP ARCHIVELOG LIKE '%001.ARC'
    DELETE INPUT FORMAT '\\NKBCK01\BACKUP\@\@_%U.ARC';
  }
```

- Forbedret, men fremdeles store forbedringsmuligheter

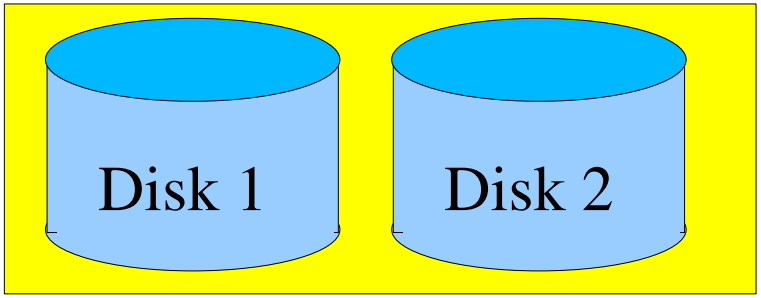
```
RMAN> CONFIGURE CONTROLFILE AUTOBACKUP ON;
```

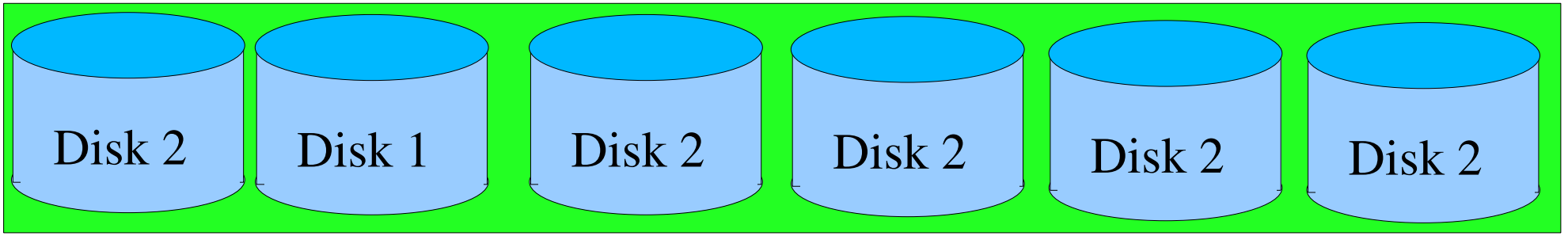
- Feilmeldinger som er vanskelige å tolke
- Mulighet å klone en database

```
RMAN> ALTER DATABASE MOUNT CLONE DATABASE;
RMAN> RECOVER DATABASE UNTIL CANCEL USING BACKUP CONTROLFILE;
RMAN> ALTER DATABASE OPEN RESETLOGS;
```

Automated Storage Management

- Tre varianter:
  - Ekstern
  - Normal (speiling)
  - Ekstra (treveis speiling)
- Avhengig av Oracle support hvis problemer.
- Mange avanserte muligheter.



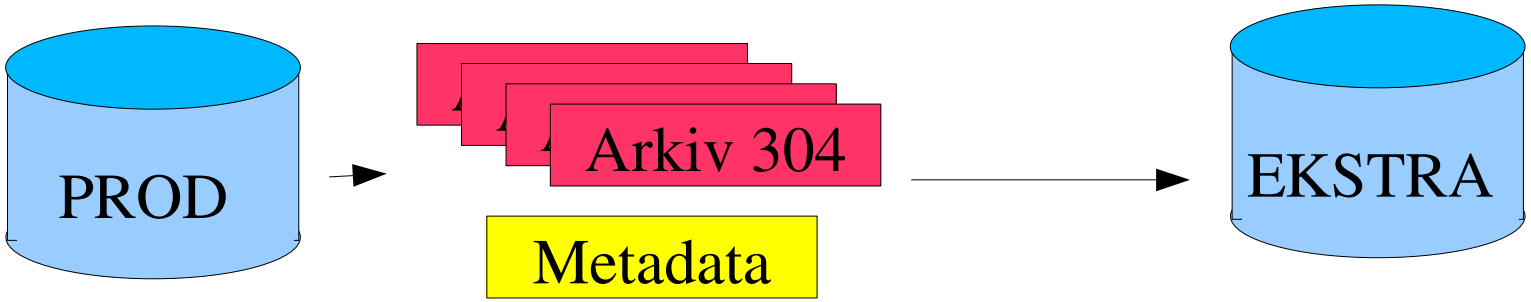


Automated Storage Management

- Flytter logikken fra hardware til software.
- En ny «instans» å forholde seg til.
- Primitive verktøy for å håndtere diskene på lav nivå.
- Forbedret i *Oracle10g R2*

```
SQL> CREATE DISKGROUP ORA_DG1
     DISK '\\.\ORCLDISKDATA4',
          '\\.\ORCLDISKDATA5';
Diskgruppen er opprettet.

SQL> SELECT * FROM v$asm_diskgroup;
GROUP_NUMBER NAME     STATE       TYPE      TOTAL_MB    FREE_MB
------------ -------- ----------- ------ ---------- ----------
           1 ORA_DG1  MOUNTED     NORMAL      69060      23960
           2 ORA_DG2  MOUNTED     NORMAL     279788      29636
```

LogMiner



- *LogMiner* pakke **DBMS_LOGMNR** eller *EM Wizard*
- Slå på ekstra logging:

```
SQL> ALTER DATABASE ADD SUPPLEMENTAL LOG DATA;
```

- Resultatet:

SQL_REDO

```
delete from "OE"."ORDERS"
 where "ORDER_ID" = '2413'
   and "ORDER_MODE" = 'direct'
   and "CUSTOMER_ID" = '101'
   and "ORDER_STATUS" = '5'
   and ROWID = 'AAAHTCAABAAAZAPAAN';
```

SQL_UNDO

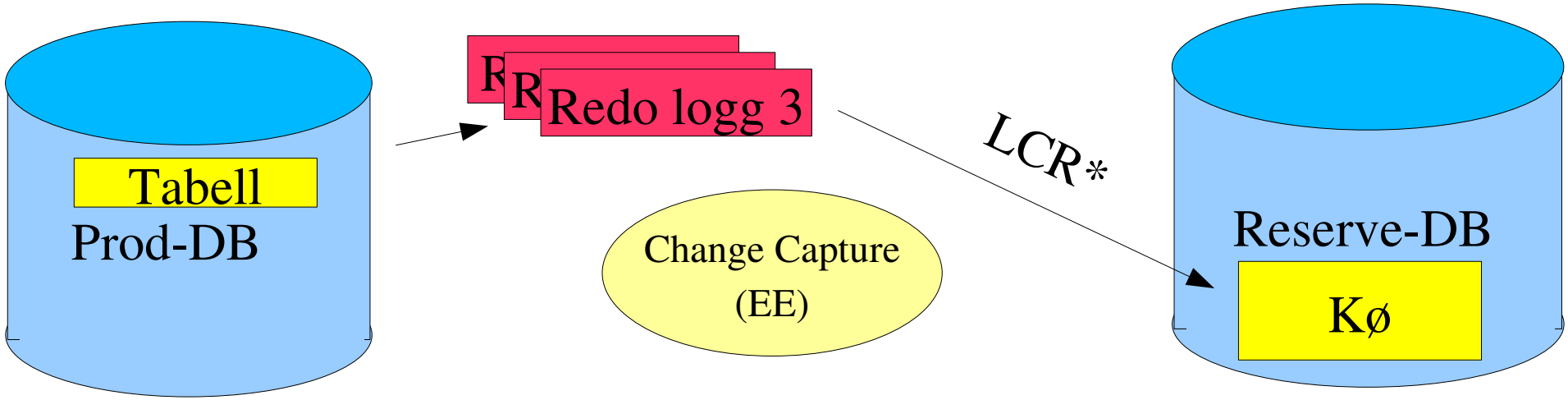
```
insert into "OE"."ORDERS"
   ("ORDER_ID","ORDER_MODE",
    "CUSTOMER_ID","ORDER_STATUS")
values ('2413','direct','101','5');
```

Flashback

- Before image/After image
- Flashback query, table og database.

```
SQL> FLASHBACK TABLE employee TO TIMESTAMP
     TO_TIMESTAMP('2003-04-04 09:30:00', `YYYY-MM-DD HH24:MI:SS');

SQL> SELECT object_name as recycle_name, original_name, object_type
     FROM recyclebin;
RECYCLE_NAME                      ORIGINAL_NAME          OBJECT_TYPE
--------------------------------  ----------------------  -------------
BIN$gk3lsj/3akk5hg3j2lkl5j3d==$0  EMPLOYEE_DEMO          TABLE
BIN$JKS983293M1dsab4gsz/I249==$0  I_EMP_DEMO             INDEX
BIN$NR72JJN38KM1dsaM4gI348as==$0  LOB_EMP_DEMO           LOB
BIN$JKJ399SLKnaslkJSLK330SIK==$0  LOB_I_EMP_DEMO         LOB INDEX

SQL> FLASHBACK DATABASE TO TIME
     TO_TIMESTAMP('2003-04-04 14:00:00', 'YYYY-MM-DD HH:MI:SS');

RMAN> FLASHBACK DATABASE TO TIME (SYSDATE-1/24);
```

Streams



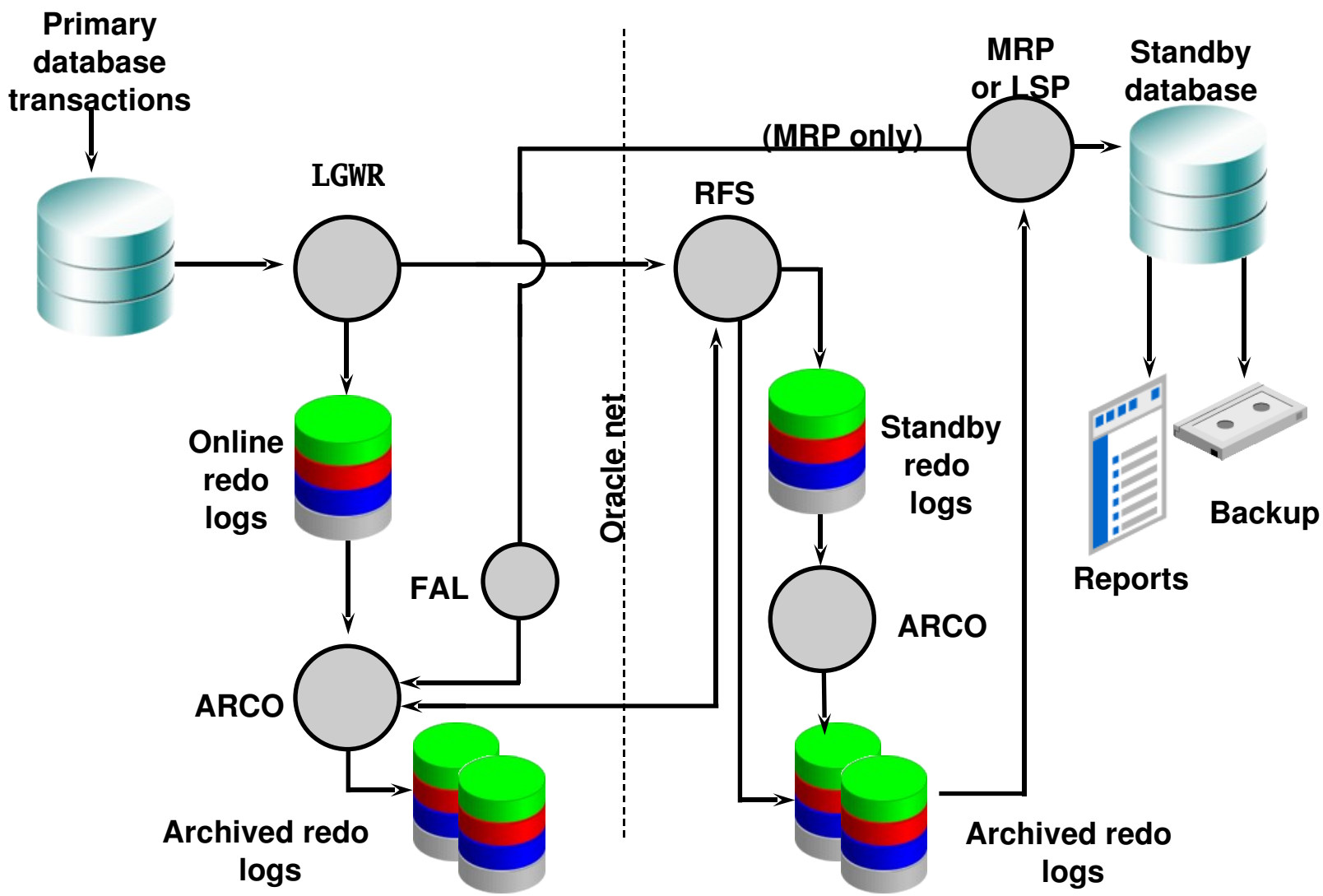
- Streams arbeider på logiske data
- Regler
- Konflikthåndtering
- Administrasjon ved hjelp av PL/SQL pakker eller EM

*LCR - logical change record

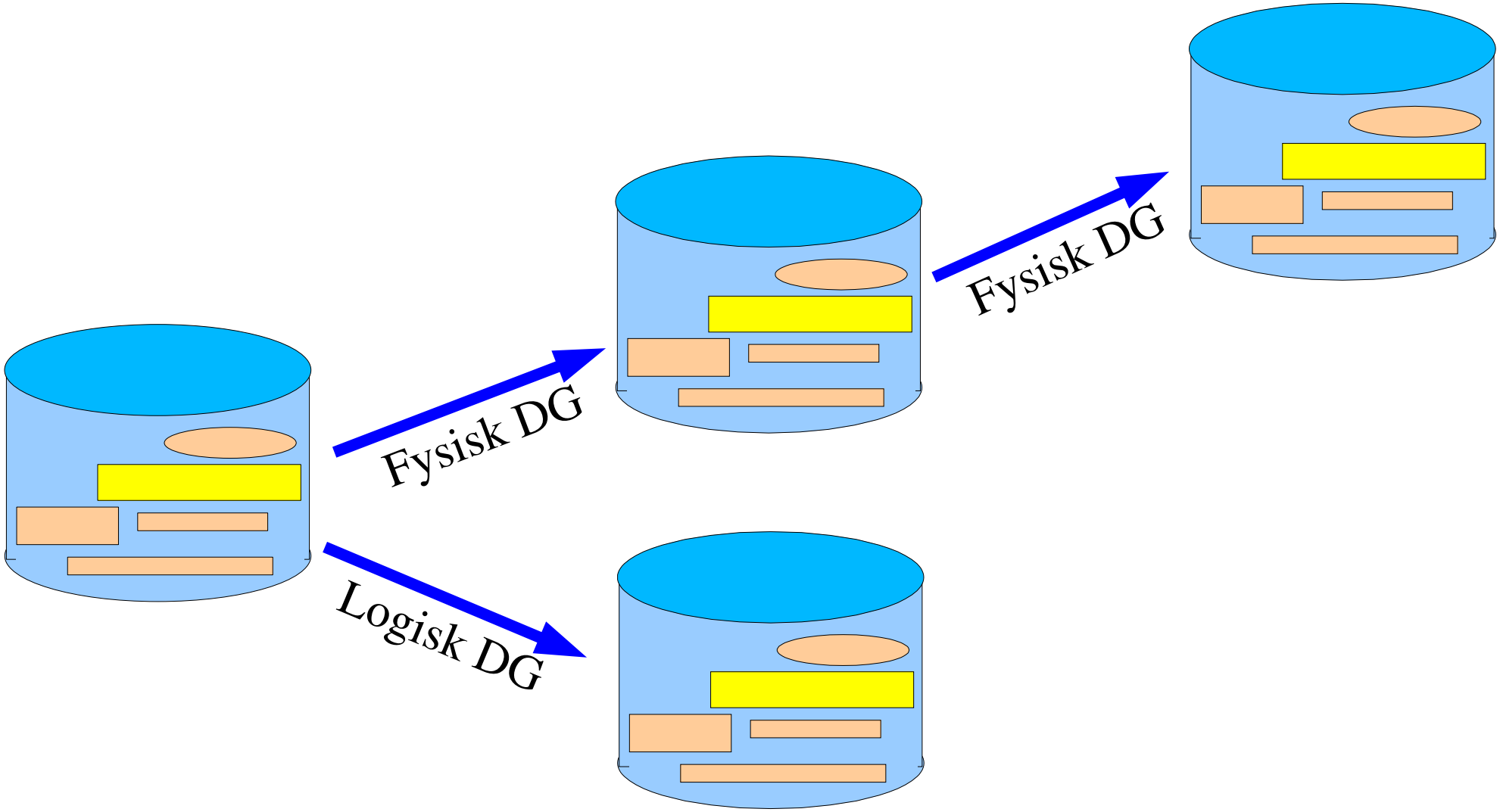
Data Guard

- Enterprise Edition
- Data Guard Broker
- Type av Data Guard
  - **Physical Standby**
  - **Logical standby -> 10.1.0.4: r**ullerende oppgradering...
- Beskyttelsesgrad:
  - **Maximum protection**
  - **Maximum availability**
  - **Maximum performance** (standard)
- Avstand mellom serverene og båndbredde
- Kan forsinke overføringen mellom databasene

Data Guard arkitektur



Data Guard nivåer



Fra primær- til reserve-basen

- I standby modus:

```
SQL> ALTER DATABASE MOUNT STANDBY DATABASE;
Database altered.

SQL> ALTER DATABASE RECOVER MANAGED STANDBY DATABASE DISCONNECT;
Database altered.
```

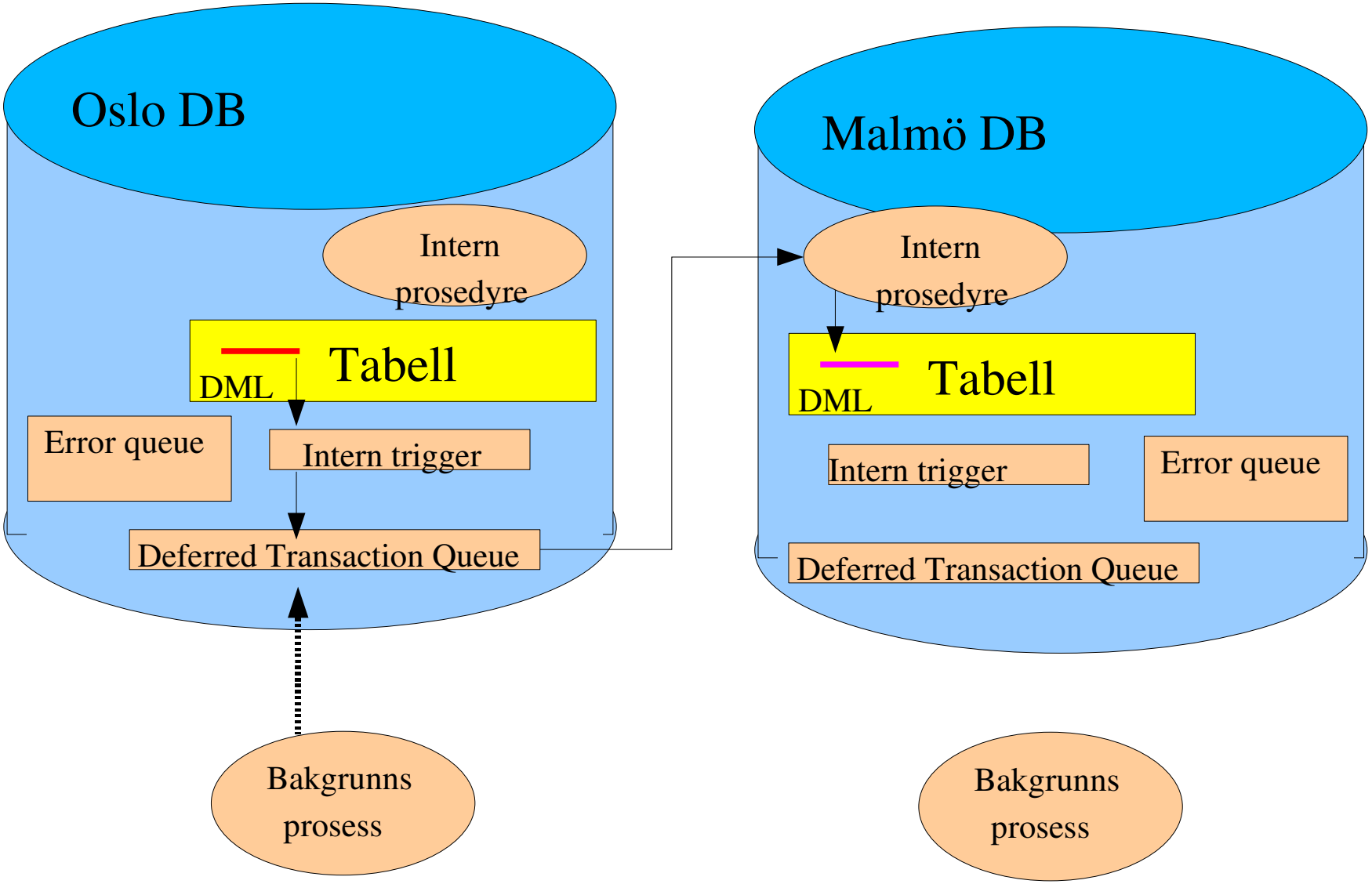
- Sette reserve basen i produksjon:

```
SQL> ALTER DATABASE RECOVER MANAGED STANDBY DATABASE
          FINISH SKIP STANDBY LOGFILE;

SQL> ALTER DATABASE COMMIT TO SWITCHOVER TO PRIMARY;

SQL> SHUTDOWN IMMEDIATE;

SQL> STARTUP;
```

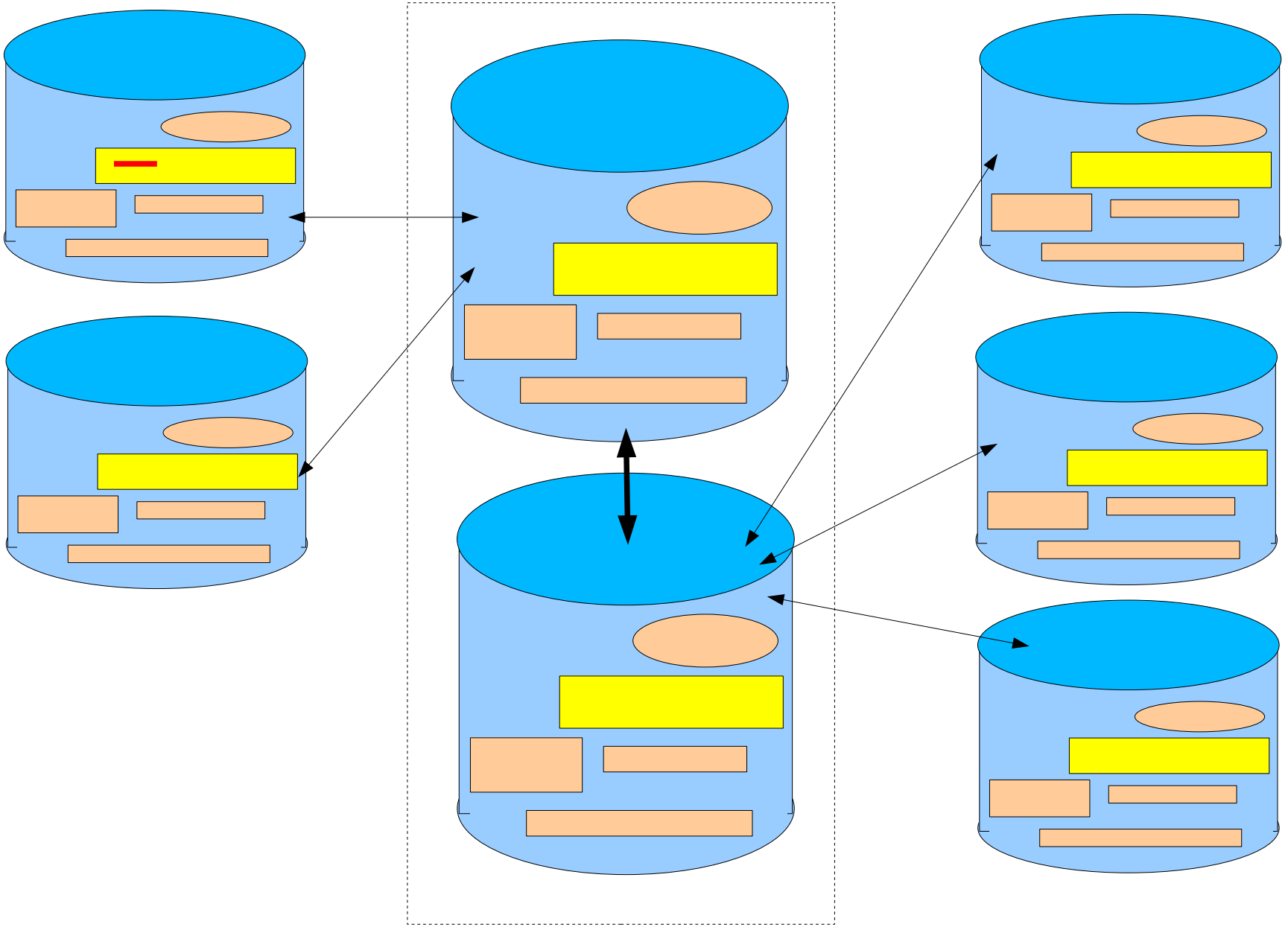
Data Guard Broker

```
DGMGRL> SWITCHOVER TO "DR_Sales";
Performing switchover NOW. Please wait...
Operation requires shutdown of instance "sales1" on database
"North_Sales".
Shutting down instance "sales1"...
ORA-01109: database not open

Database dismounted.
ORACLE instance shut down.
Operation requires shutdown of instance "dr_sales1" on database
"DR_Sales".
Shutting down instance "dr_sales1"...
database not mounted
ORACLE instance shut down.
Operation requires startup of instance "sales1" on database "North_Sales".
Starting instance "sales1"...
ORACLE instance started.
Database mounted.
Operation requires startup of instance "dr_sales1" on database "DR_Sales".
Starting instance "dr_sales1"...
ORACLE instance started.
Database mounted.
Switchover succeeded. New primary is "DR_Sales"
```

Advanced Replication



Hybrid Konfigurasjon



Materialized views | Master til master | Materialized views

Advanced Replication

- Master til Master replikering (EE)
- Oppdaterbare tabeller (Materialized views)
- Read only tabeller (SE)
- Konfigureres ved hjelp av Wizards eller pakker
- Støttes meget godt i Enterprise Manager
- Asynkron eller synkron overføring
- Ytelse:
  - Insert : 1.000.000 rader / minutt
  - Delete/Update: 1000 rader /minutt
- Konflikthåndtering:
  - Primærnode
  - Verdibasert
  - Dynamisk, basert på oppgave

Replikeringsteknikker

- Definere replikering ved hjelp av pakker:

```
EXECUTE dbms_repcat.define_site_priority('HR_MG', 'SITE_PRIORITY_SP');
```

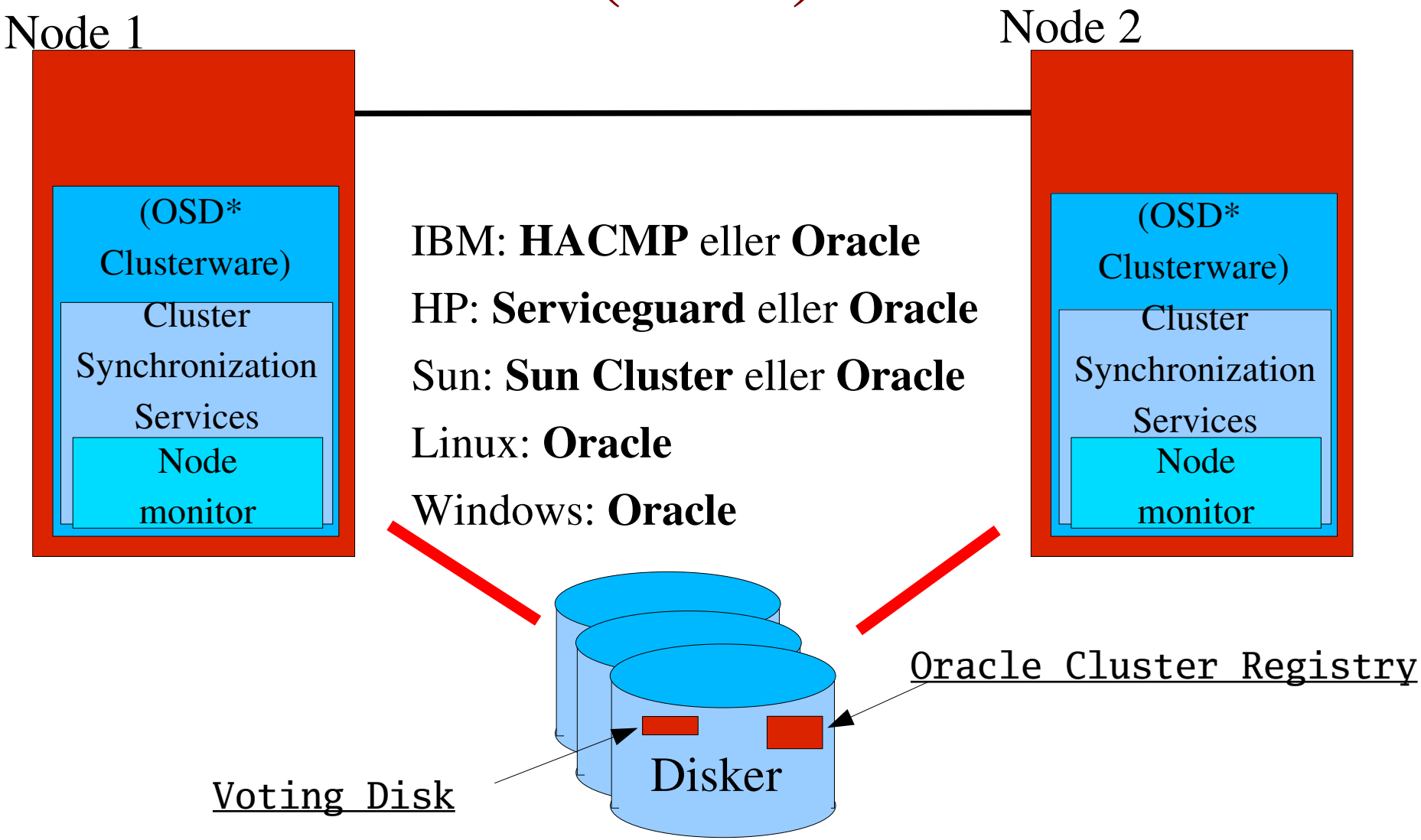
- Konflikthåndtering:

```
CREATE TRIGGER hr.emp_conflict
BEFORE
INSERT OR UPDATE
ON hr.employees
FOR EACH ROW
DECLARE
   site VARCHAR2(30) := DBMS_REPUTIL.GLOBAL_NAME;
BEGIN
   IF (DBMS_REPUTIL.FROM_REMOTE = FALSE AND
    DBMS_SNAPSHOT.I_AM_A_REFRESH = FALSE) THEN
    :new.SITE_UPDATE := site;
   END IF;
END;
```

Real Application Cluster

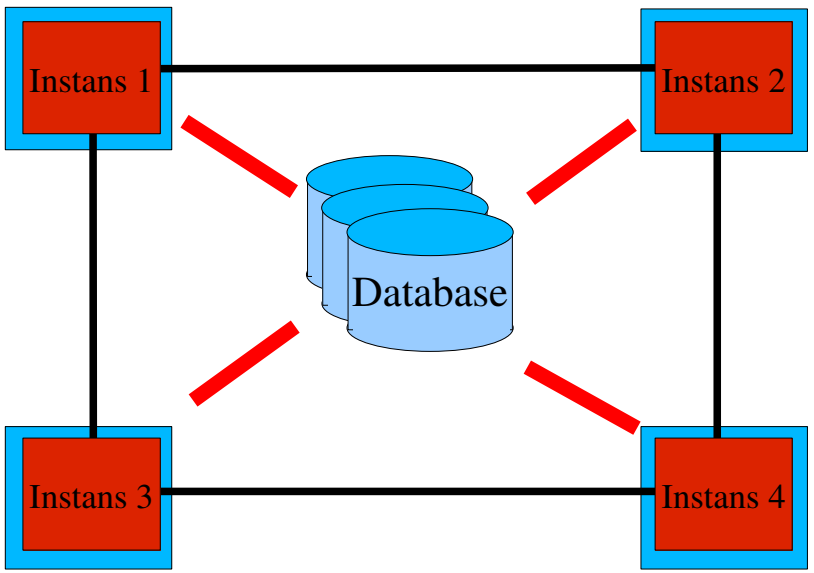
- *Enterprise Edition* eller *Standard Edition*
- RAC *Standard Edition* må bruke ASM (normal)
- Utvikling, Test, Preproduksjon og Produksjon
- Felleslagring: Raw device, OCFS, ASM eller NAS
- Forbindelse mellom maskinene: **Cluster Interconnect**
- Voting/quorum disk (redundans)
- Synkronisering av data mellom nodene
- *Oracle10g* - G for Grid -> parallellisering/skalering?

10g: Oracle Cluster Ready Services (CRS)

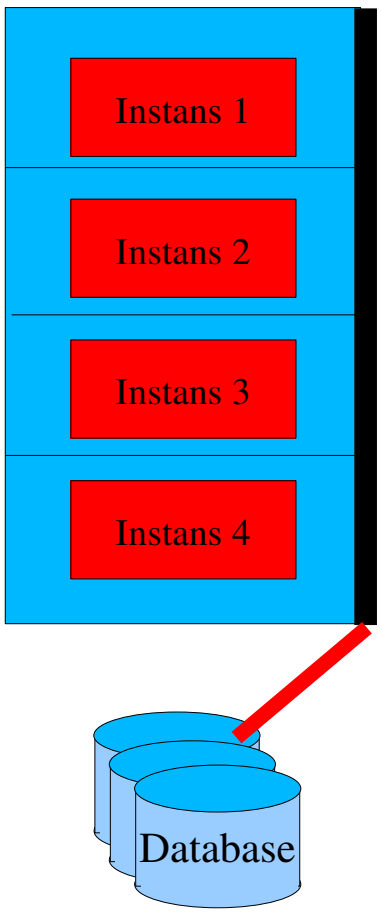


*(OSD - Operativsystem avhengig programvare)

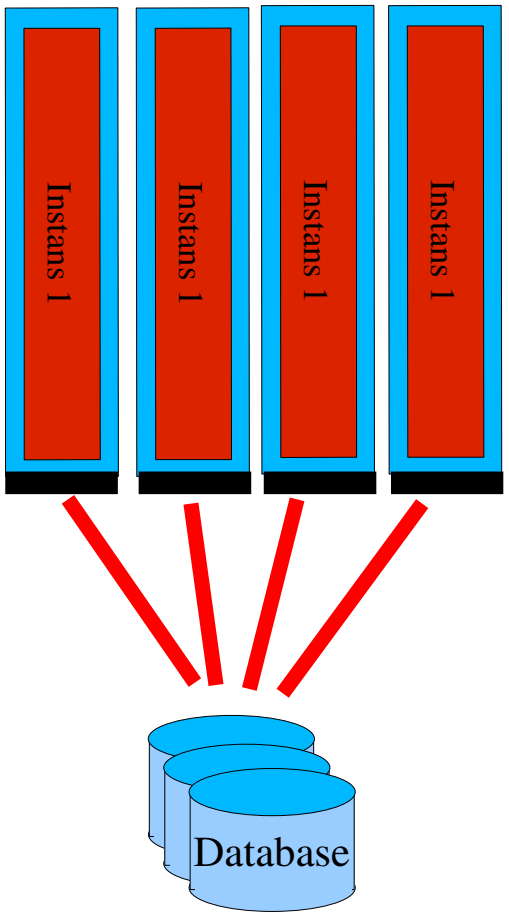
RAC: Hvor mye fleksibilitet?



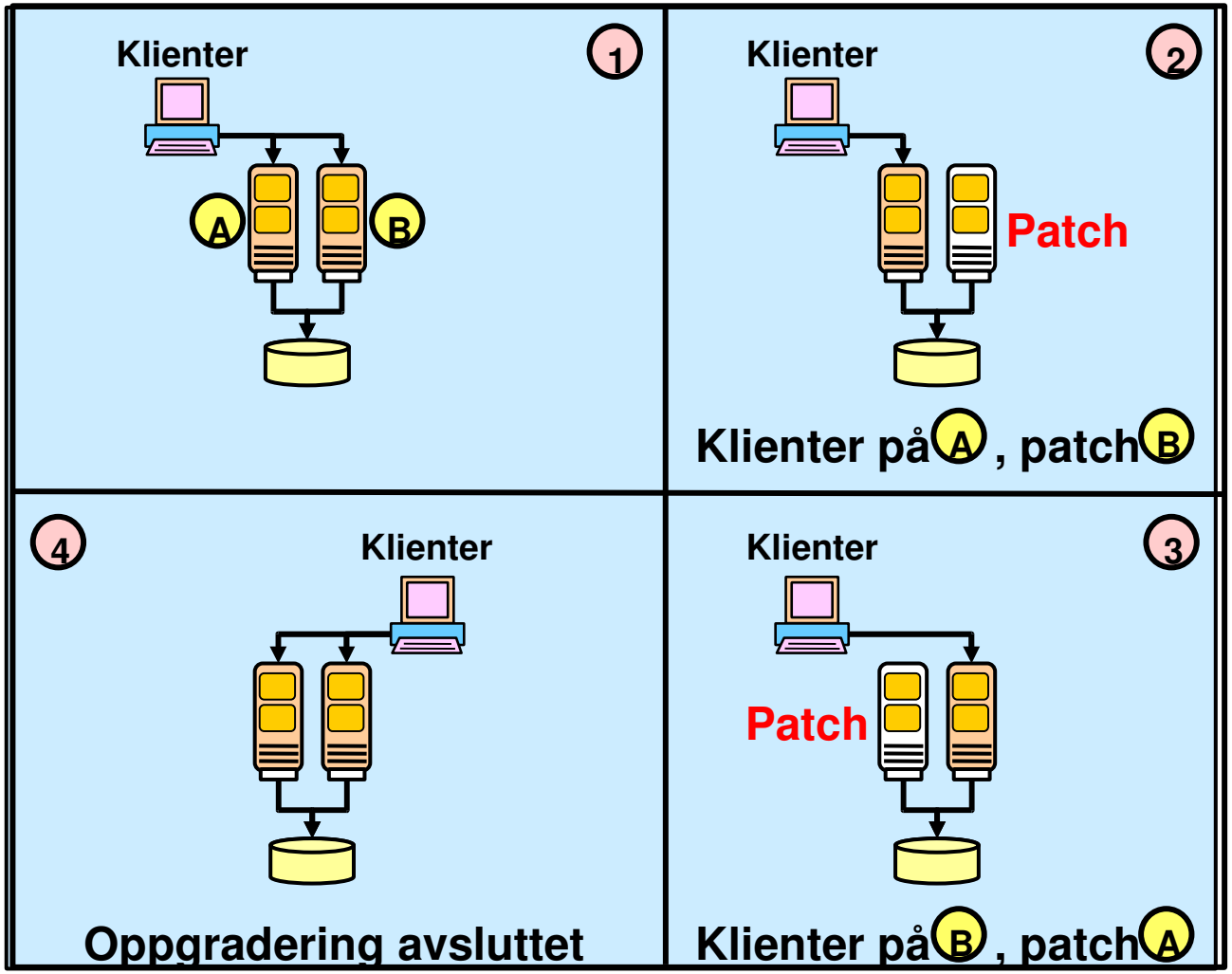
VPAR/LPAR



Blades



RAC oppgradering

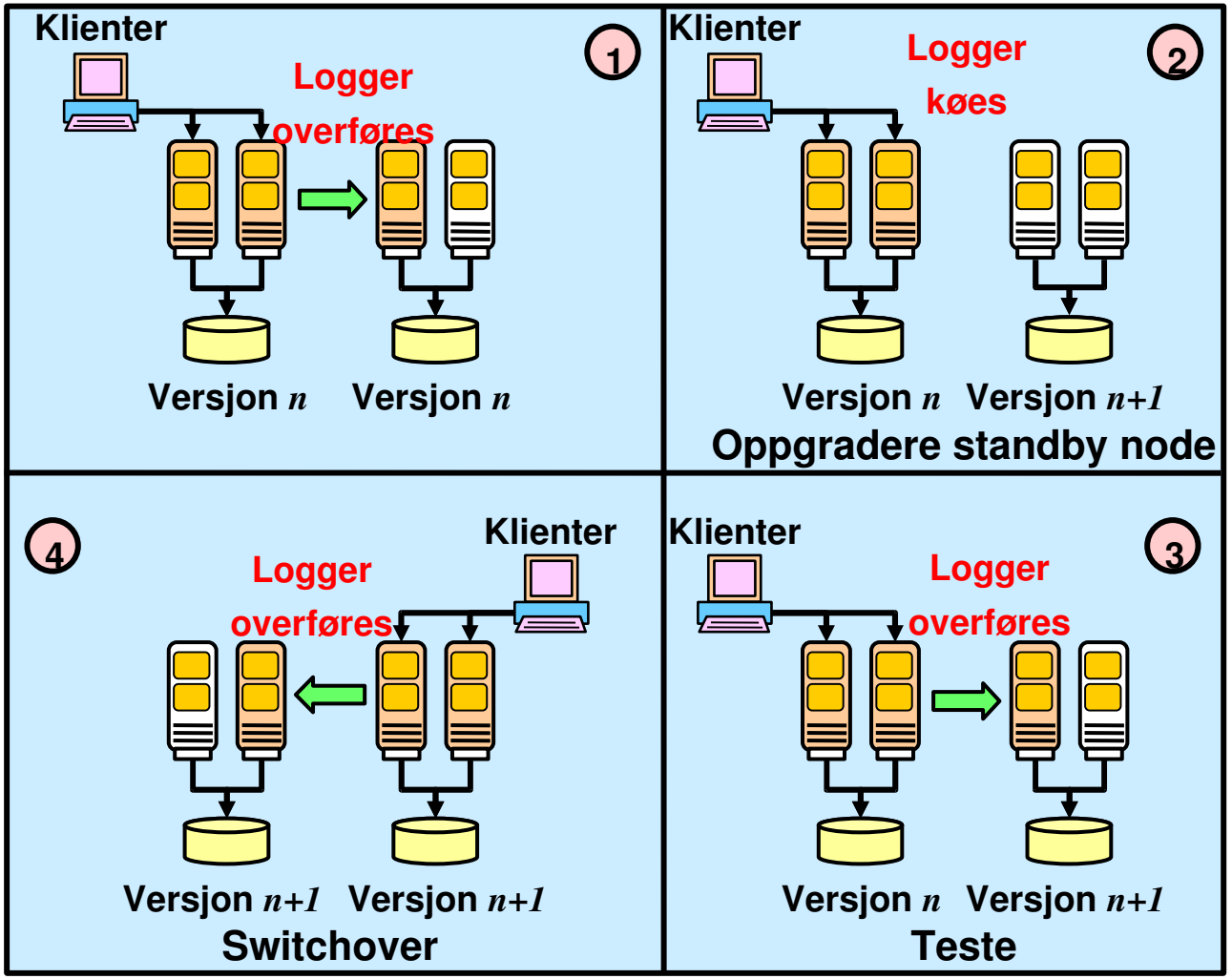


Oracle patch oppgradering

Operativ system oppgradering

Maskin oppgradering

RAC og Data Guard SQL apply

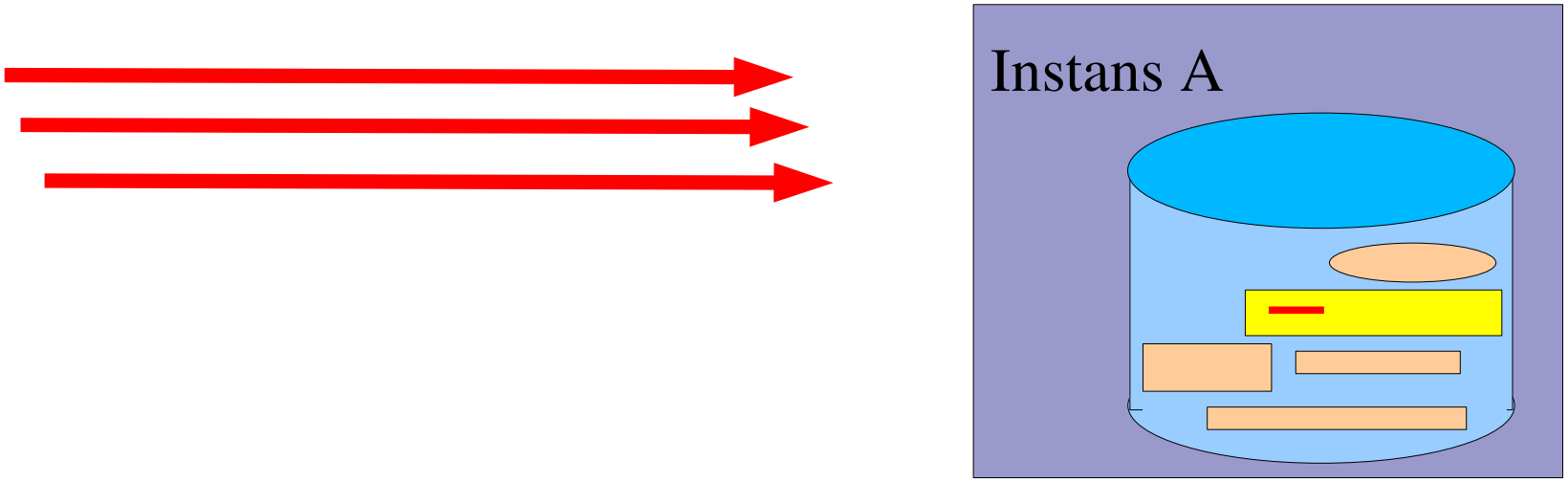


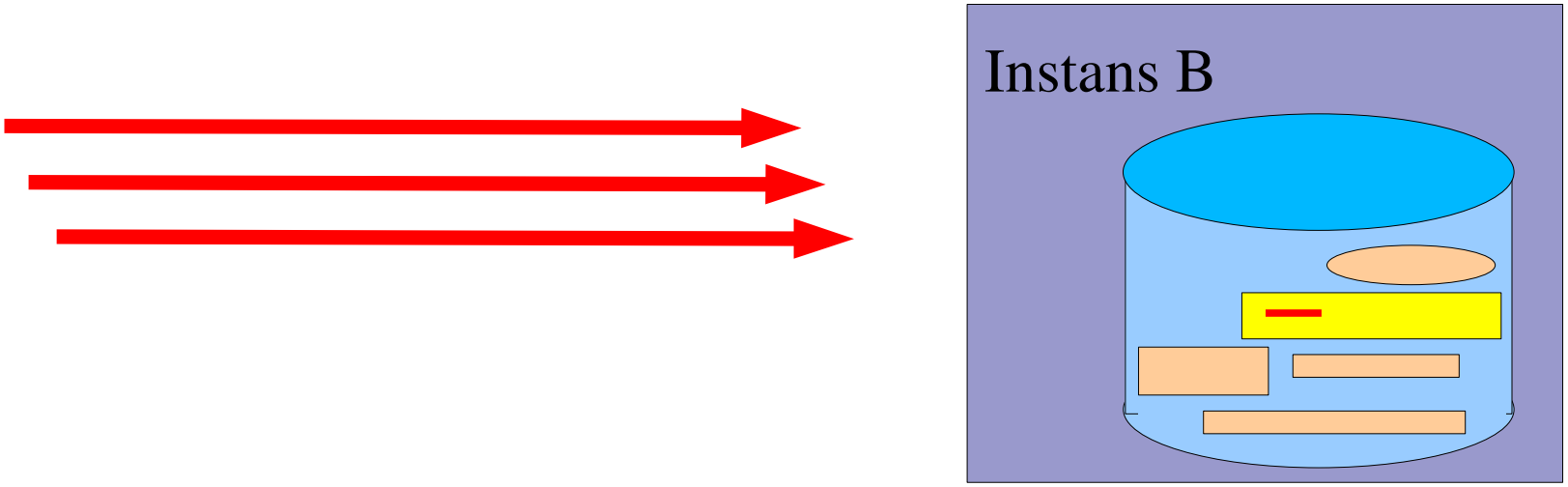
Patch set oppgraderinger

Hoved versjons oppgraderinger

Cluster program og Maskin oppgraderinger

Alternativ til RAC?





Anbefalinger

- Starte med et mindre viktig prosjekt – kjør pilot
- Forsikre deg at dine samarbeidspartnere er på banen...
- Gjør hjemmelekse
- Det enkle er ofte det beste...
- Dokumenter og planlegg for eventualiteter
- Sjekk referansene!
- Arbeid i gruppe
- *Data Guard* første prioritet, *RAC* andre prioritet.
- **Unngå 1.0 versjoner: *Oracle7.0, 8.0, 9.0* og *10.1***
- Til sist: **sett ambisjonene på riktig nivå**