

Mulighetene med Oracle9i Real Application Cluster

- Forskjellen mellom de forskjellige plattformene
- Fallgruver man bør være klar over

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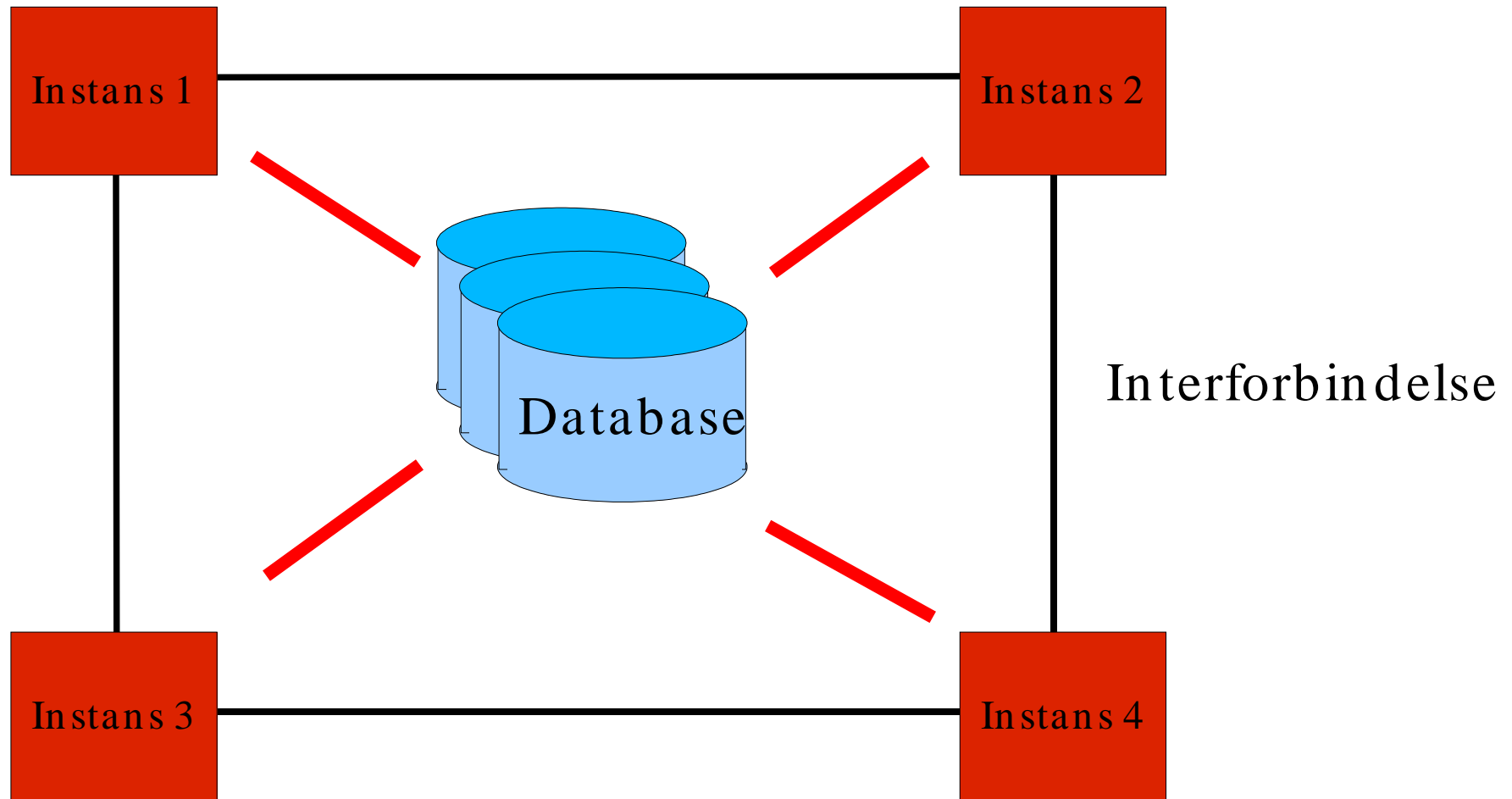
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Ingemar Jansson Data AS

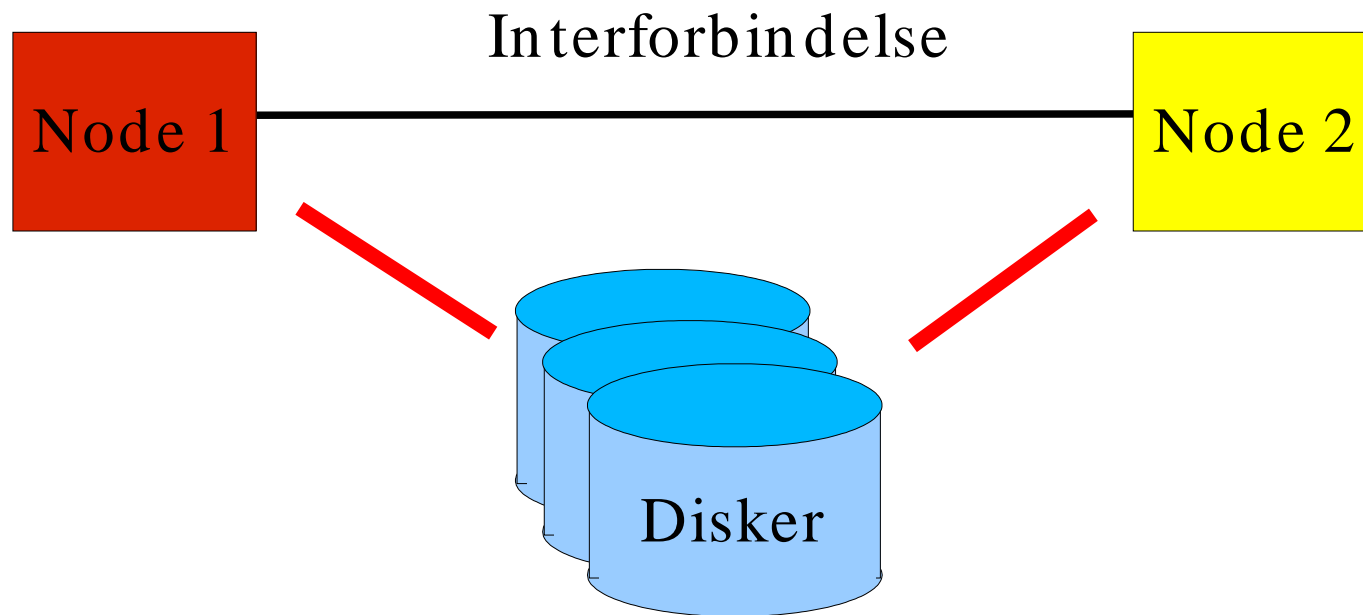
Mine tjenester

- Rådgivning og tilrettelegging med fokus på *Oracle9i*:
 - Avansert replikering
 - Distribuerte databaser
 - Datavaruhus
 - Skalering / Parallellisering / Ytelse
 - Databaser i klynge: Real Application Cluster

Hva er en klynge?



Hva er en HA*-løsning?



*HA - High Availability

Node

- CPUer
 - Antall
 - Frekvens, MHz og GHz...
- CPU arkitektur
 - RISC/CISC
 - 32/64 bit
- Internminne
- Valg av operativsystem

Interforbindelse*

- Interforbindelse brukes til å:
 - Sende meldinger mellom nodene
 - Sende datablokker mellom nodene
- Kan bestå av:
 - GigaBit Ethernet
 - Skreddersydde løsninger
 - Virtual Interface Architecture (VIA)
 - HP's Hyper Messaging Protocol (HMP)
 - RMS fra Sun

Disk Subsystem

- Delt disksystem
 - Rå devices på unix
 - Logisk drivere på Windows
 - Cluster filesystem
 - Veritas
 - IBM's General Parallel File System (GPFS)
 - CFS for HP Tru64
 - Oracle Cluster Filesystem (OCFS)

Hva støttes hvor?

• Platform

AIX

HP/UX (Service Guard)

HP/UX Pa-Risc (Veritas DBE/ AC)

Linux

Open VMS

Solaris (Fujitsu)

Solaris (Sun Cluster)

Solaris (Veritas DBE/ AC)

HP Tru64

Windows NT/2000/2003

LFS= Lokal filsystem

CFS= Cluster filsystem

• Oracle

LFS eller CFS

LFS

LFS eller CFS

LFS

CFS

LFS

LFS

LFS eller CFS

LFS eller CFS

LFS eller OCFS

• Database

CFS og/ eller Rå

Rå devices

CFS og/ eller Rå

OCFS og/ eller

Rå

CFS

Rå devices

Rå devices

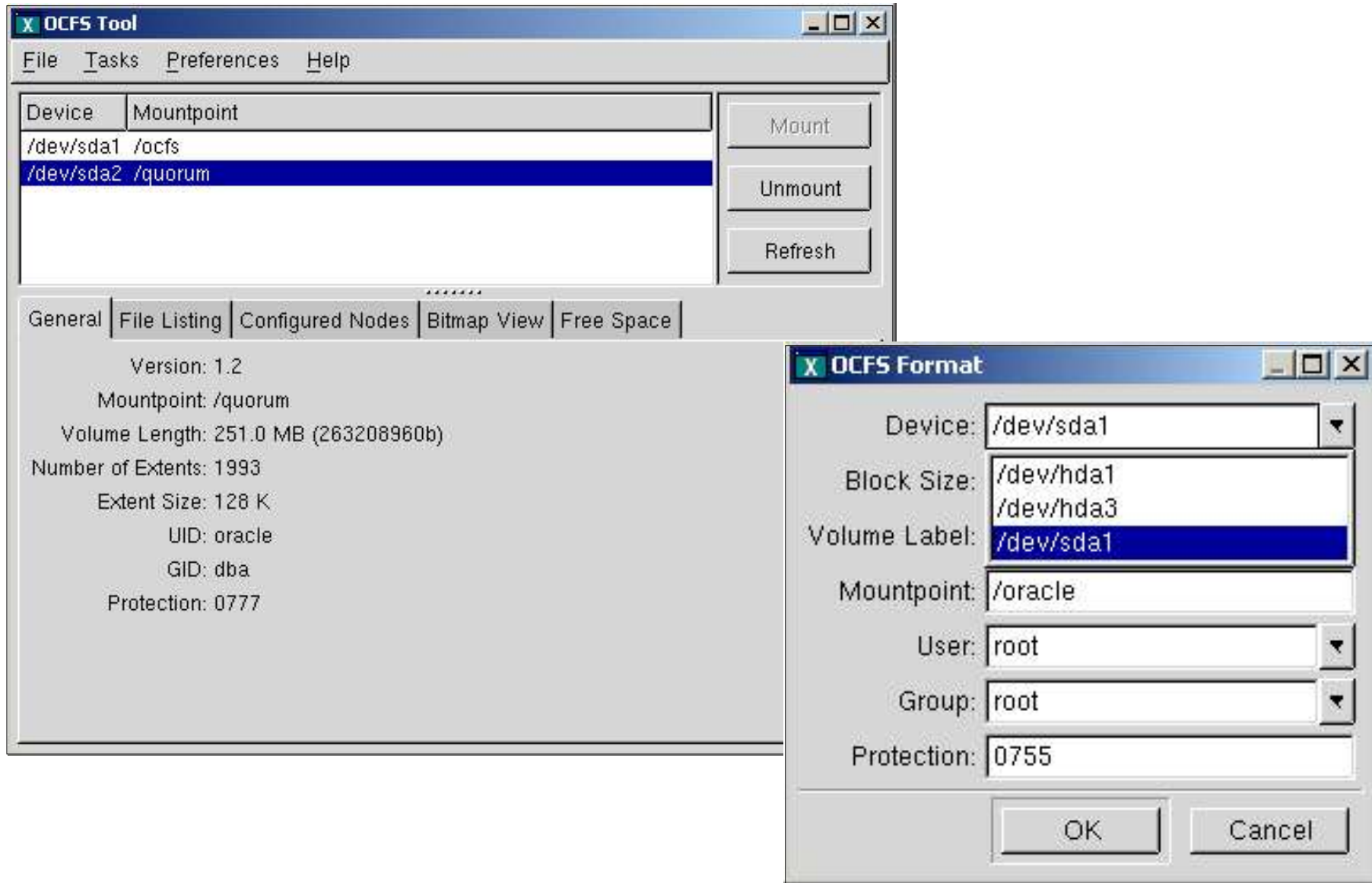
CFS og/ eller Rå

CFS og/ eller Rå

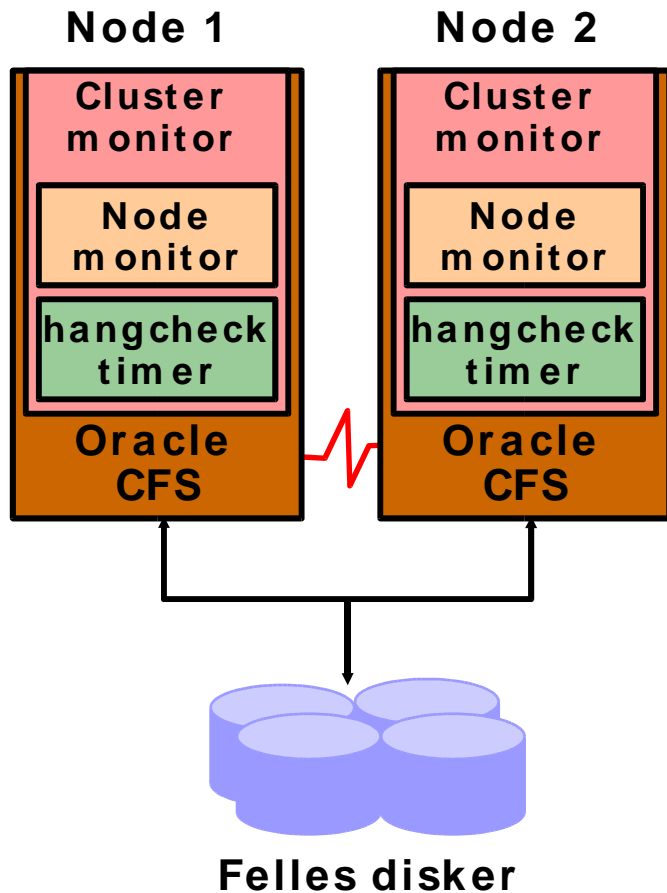
OCFS og/ eller

Rå

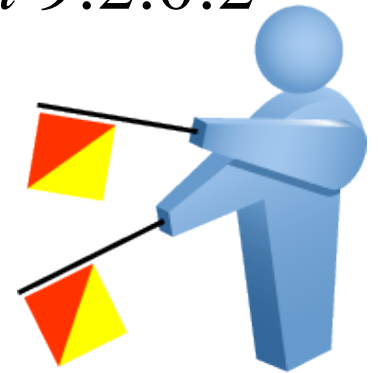
OCFS Diskadministration



Oracle9i RAC på Linux



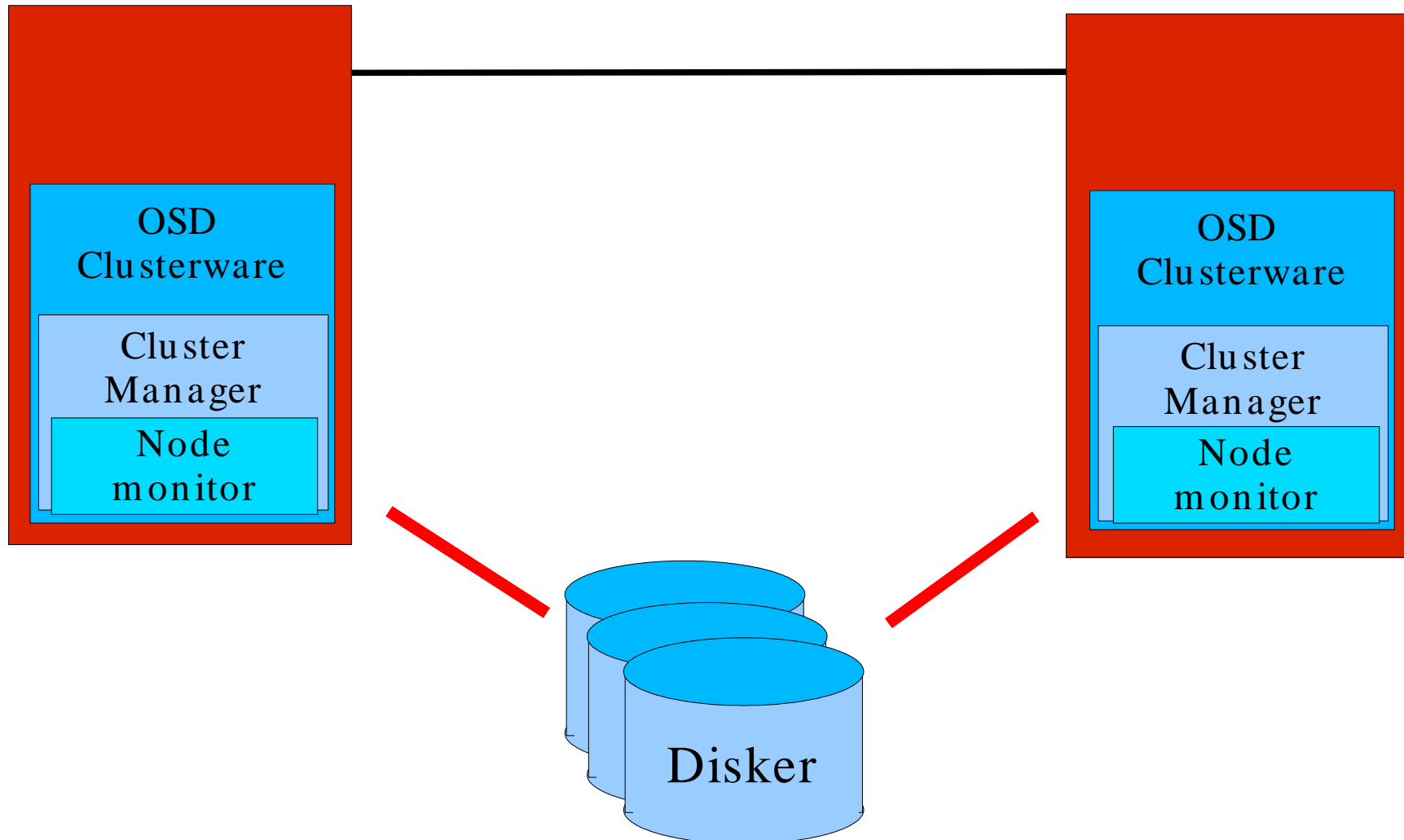
- Hangcheck timer
 - Lastes inn som en kjerne modul
 - Erstatter *watchdog daemon* i *Oracle9i 9.2.0.2*
- Node Monitor
 - Integret i cluster monitor process i *Oracle9i 9.2.0.2*



Klynge programvare

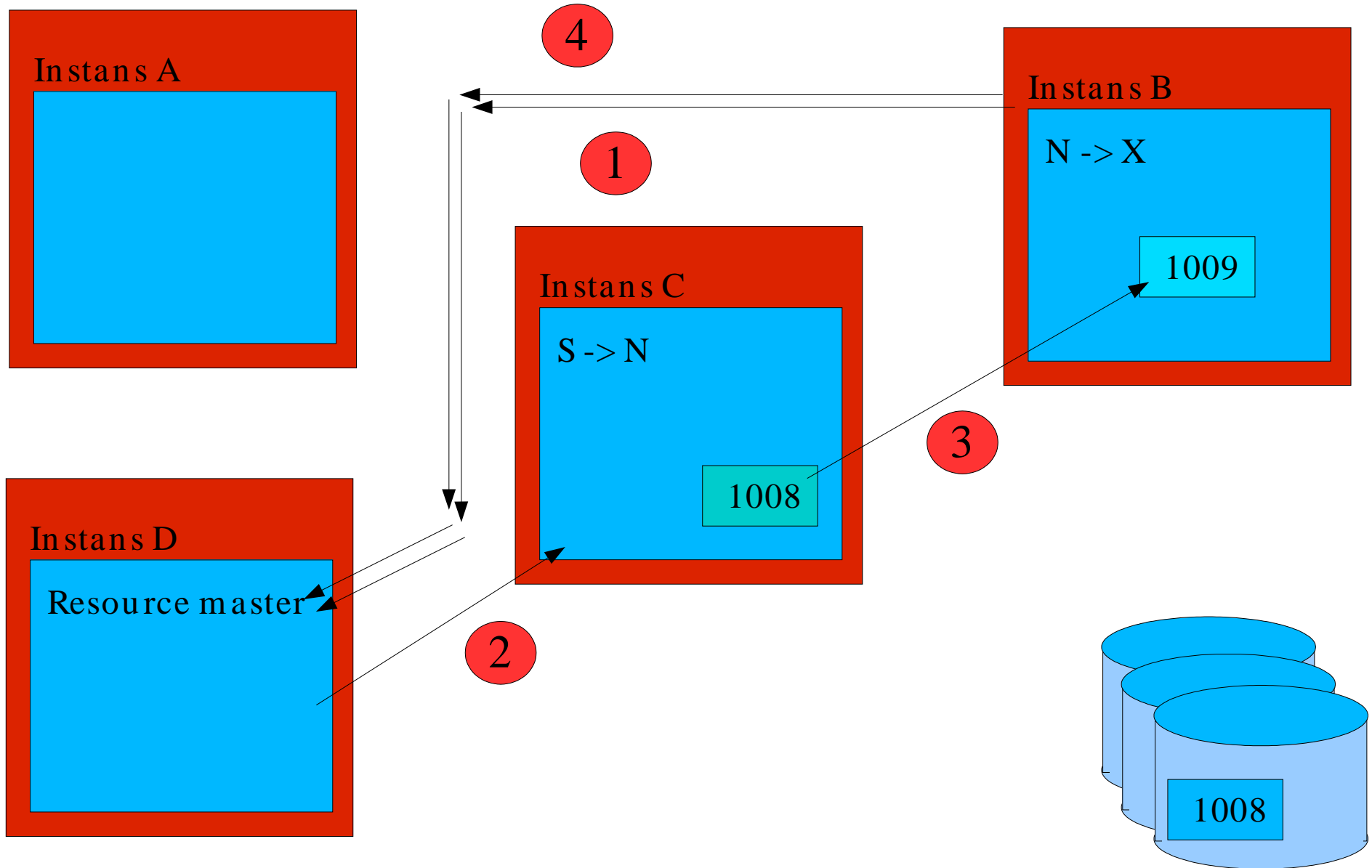
Node 1

Node 2

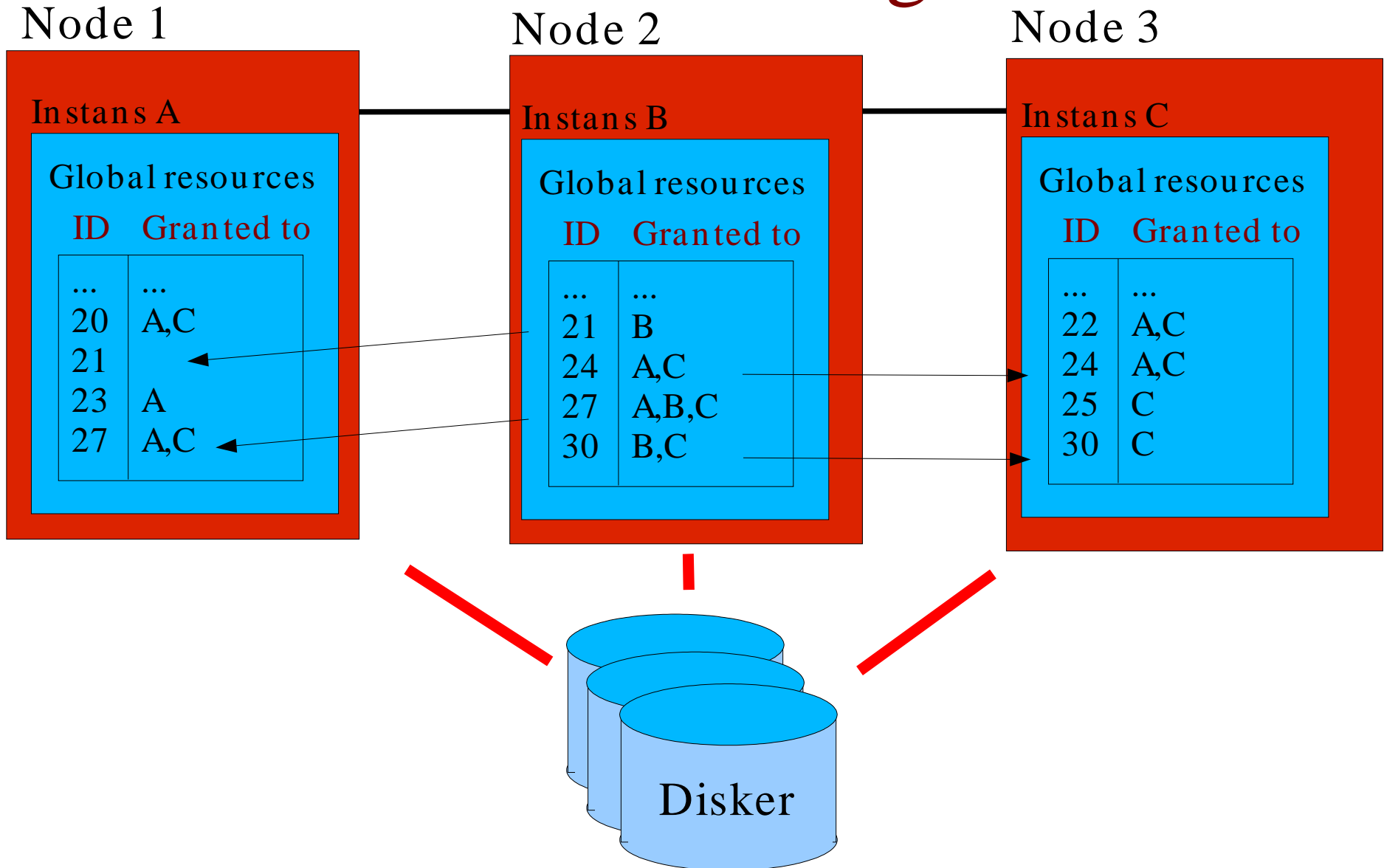


OSD - Operativsystem avhengig programvare

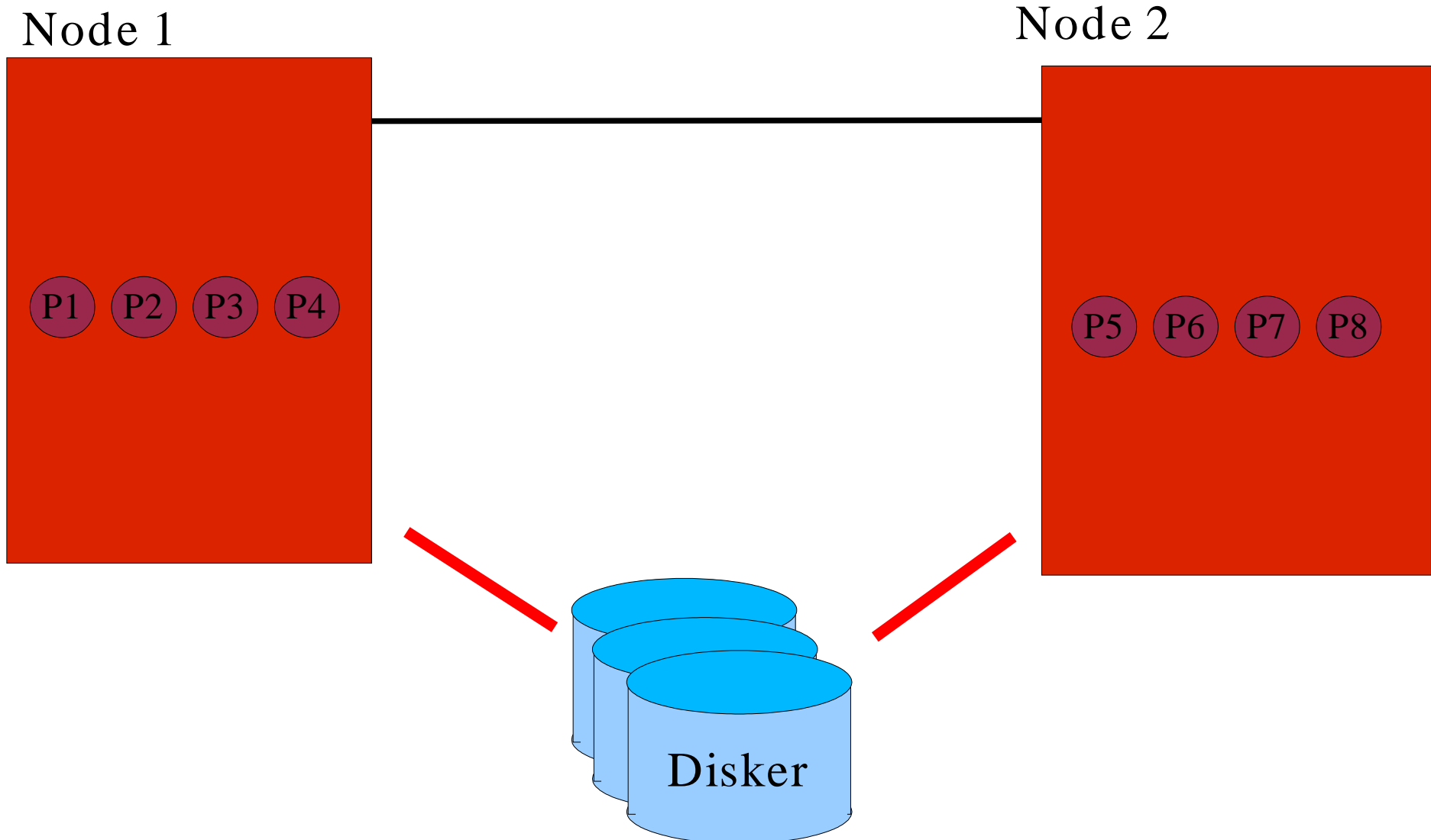
Cache Fusion: les til skriv



Global Cache Resource remastering



Parallellisering = Skalerbarhet?



Transparent Application Failover

- Transparent Application Failover:

Aruntime failover for high availability environments, such as Real Application Clusters. TAF refers to the failover and reestablishment of application-to-service connections. It enables client applications to automatically reconnect to the database if the connection fails, and optionally resume a SELECT statement that was in progress. This reconnect happens automatically from within the Oracle Call Interface (OCI) library.

- Transparent - Adj. gjennom siktig
- Translucent - Adj. gjennomskinnelig
- Failover
 - Arbeide videre, uten avbrudd...
 - Automatisk oppkobling

Failover parametere

- Settes i *tnsnames.ora*:

```
db.us.acme.com=
  (description=
    (load_balance=on) /* only connect time load balancing and */
                        /* connection load balancing */
    (failover=on)      /* only connect time failover */
  (address=
    (protocol=tcp)
    (host=db1-server)
    (port=1521))
  (address=
    (protocol=tcp)
    (host=db2-server)
    (port=1521))
  (connect_data=
    (service_name=db.us.acme.com)
    (failover_mode=
      (type=select)
      (method=basic)))
```

Java program eksempel

- Eksempel *OCIFailOver.java* i *\$ORACLE_HOME/jdbc/demo/samples/jdbcoci*

```
// TAF callback function
public int callbackFn (Connection conn, Object ctxt, int type, int
event) {
...
switch (event) {
case FO_BEGIN:
    System.out.println(ctxt + ": " + ftype + " failing over...");
    break;
case FO_END:
    System.out.println(ctxt + ": failover ended");
    break;
```

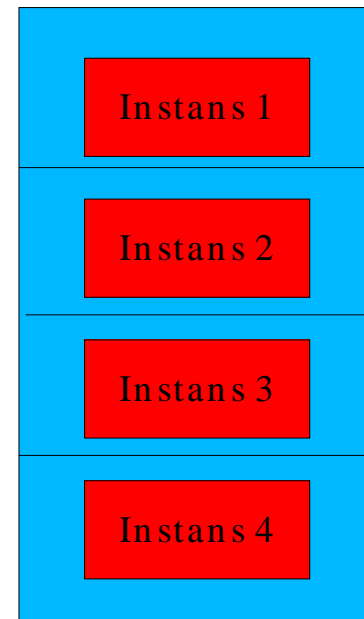
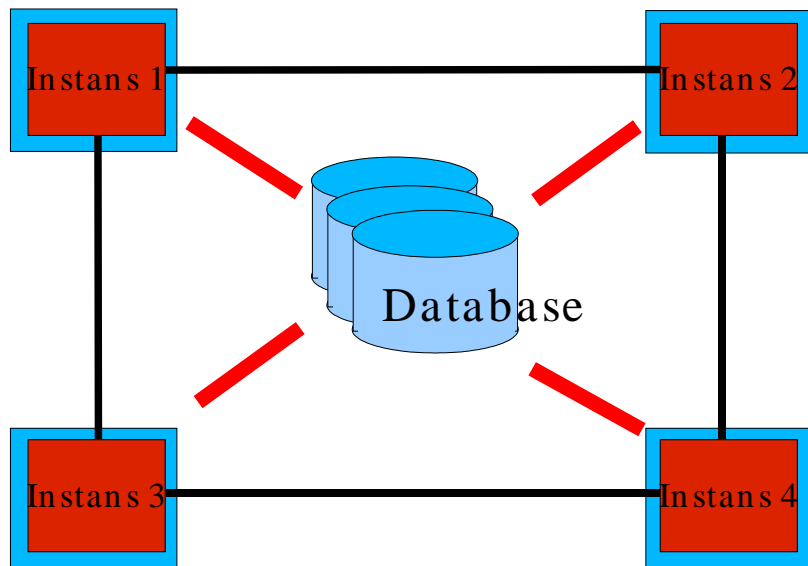
```
William Gietz
null: SELECT failing over...
null: failover error gotten. Sleeping...
null: failover ended
Steven King
```

RAC utfordringer

- Sekvensnummerering
 - Sekvensnummer for hver node
 - Caching vs. Ordnet
- Aktive indeksblokker -> Primærnøkkel
 - Omvendt nøkkel (Reverse key)
 - Endringer utføres på en instans

Oppgraderinger...

- *Oracle9i versjon 1 til Oracle9i versjon 2*
- Operativsystem, patcher, servicepack
- Oppgradering av mikrokode i SAN
- Utvikling, test, produksjon



VPAR/ LPAR