

Oracle High Availability

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Agenda

- Oracle Real Application Clusters
- Oracle Data Guard
- Q & A

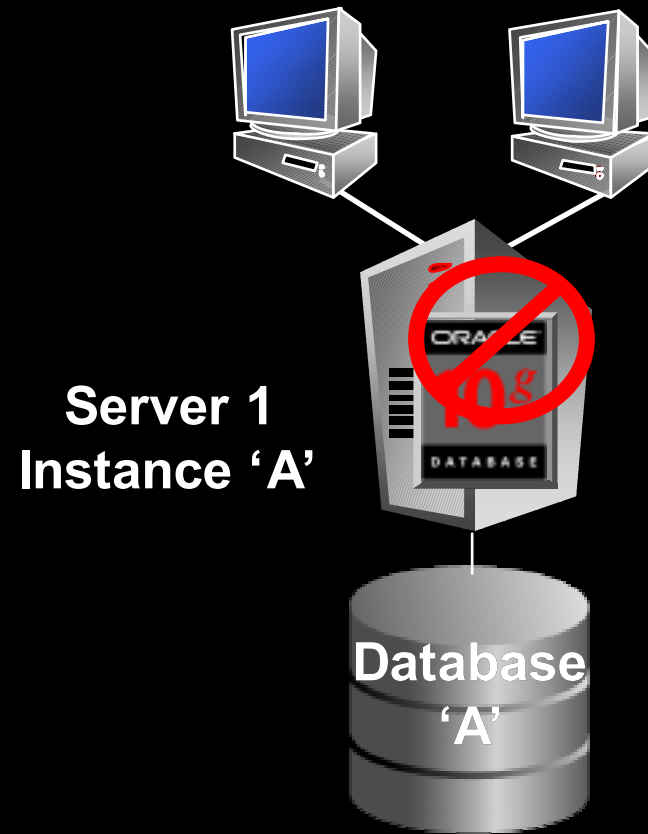


Oracle Database Real Application Clusters



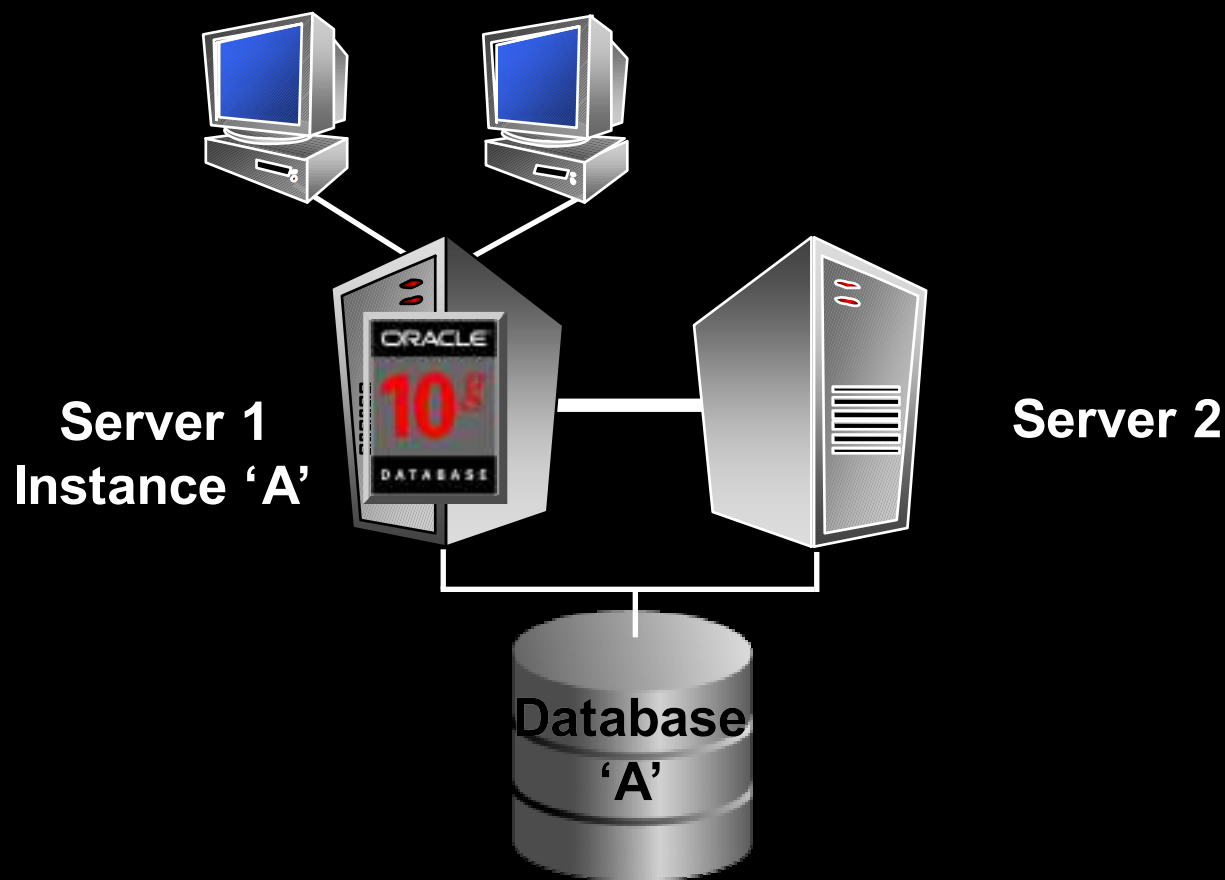
Server Availability Challenge

主機可用性



Server is a **SINGLE** point of failure
單台主機資料庫因當機無法運作

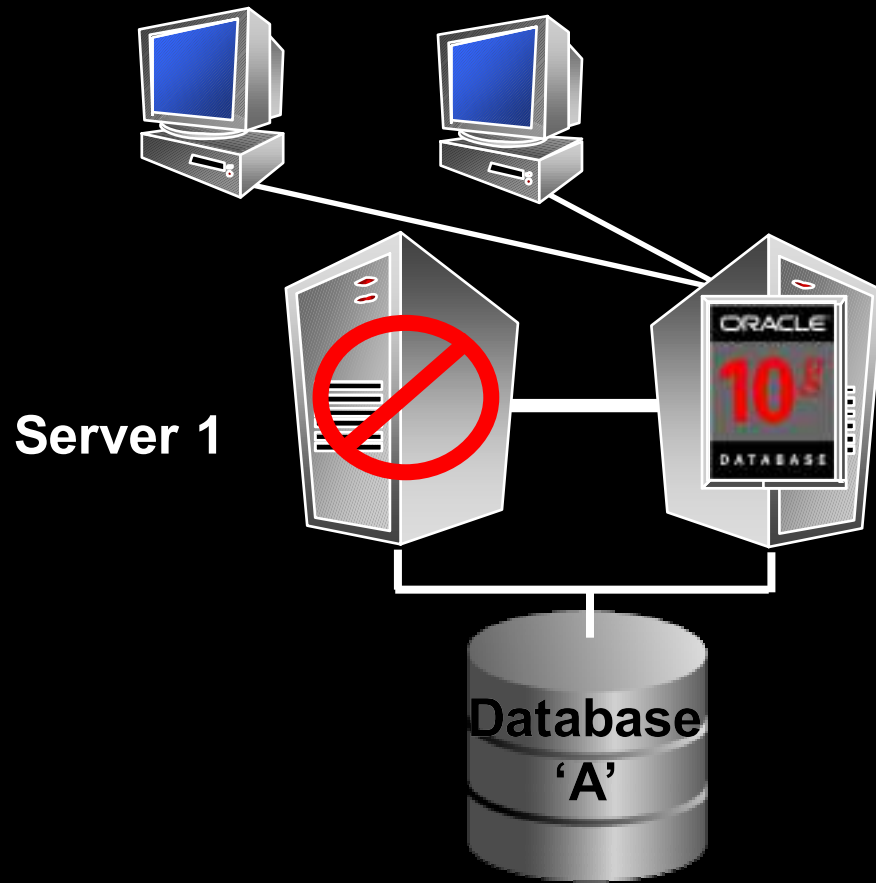
一般Cluster叢集架構



- 多主機
- 共享儲存設備
- 需購置叢集軟體 (Clusterware)
 - HP MC/Service Guard
 - IBM HACMP
 - Sun Cluster
 - Linux Cluster
 - MSCS

removes server as **SINGLE** point of failure
解決單台主機資料庫當機即無法運作

一般 Cluster Cold Failover

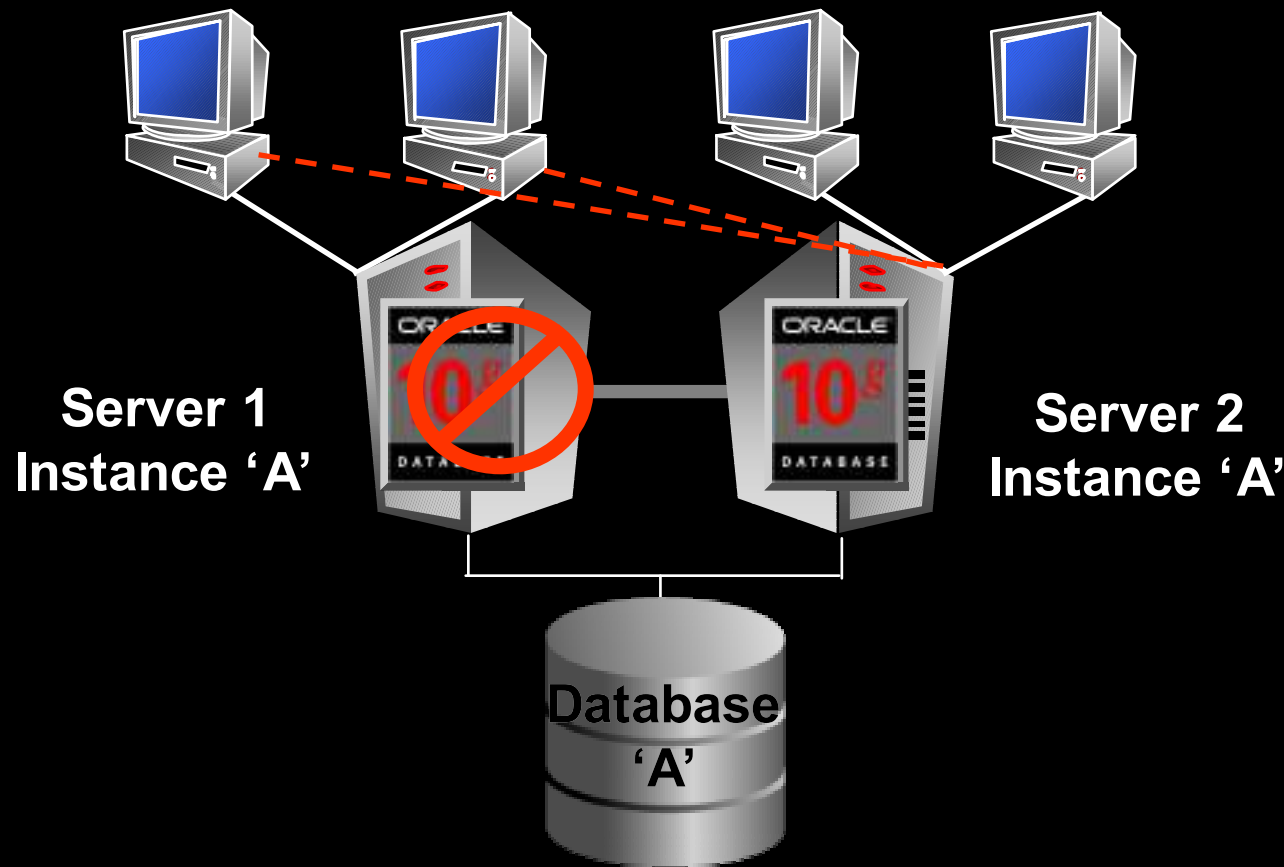


• Active/Passive 模式

- 備援主機平常閒置(無法提供服務給前端使用者)
- 資料庫系統回復時間較長
- 沒有延展性, 不能再加node, 只能擴充主機本身配備

Restart single database instance on Server 2
需在第二台主機重新啟動資料庫

Oracle Real Application Clusters



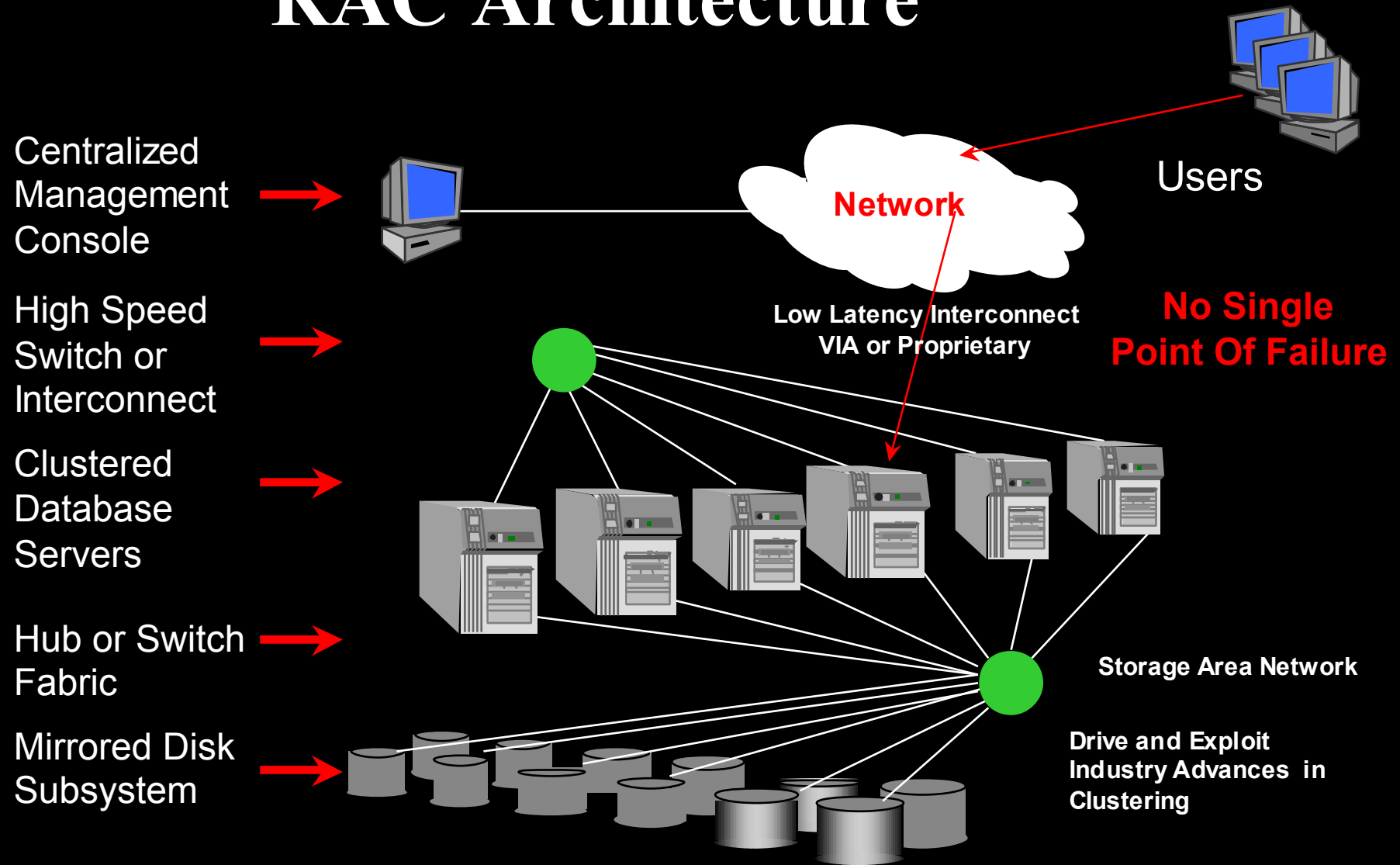
- Active/Active
- High speed inter-connect
- Oracle Clusterware
- Transparent Application Failover

one SERVER fail - your database remains available
主機當機，但是另一台主機使資料庫持續運作

RAC vs 'Cold' Failover?

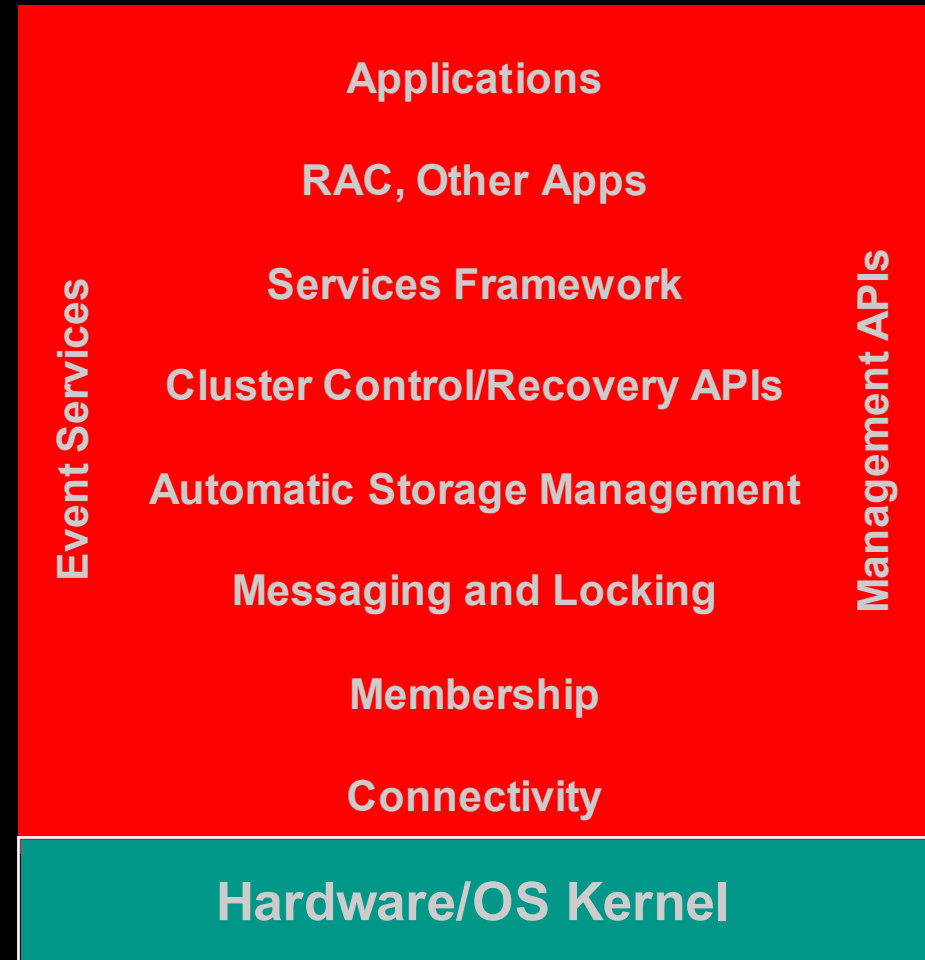
Failover Operation	RAC	'Cold'
Reconfigure Group Membership	15 sec	0 sec
Reconfigure Distributed Locks	5 sec	0 sec
Failover Disk Volumes	0 sec	Up to 20 min
Restart Oracle	0 sec	Up to 5 min
Recover Oracle	20 sec	20 sec
Warm Buffer Cache	0 sec	10 + min
Total Failover Time	< 60 sec	> 35 min

RAC Architecture



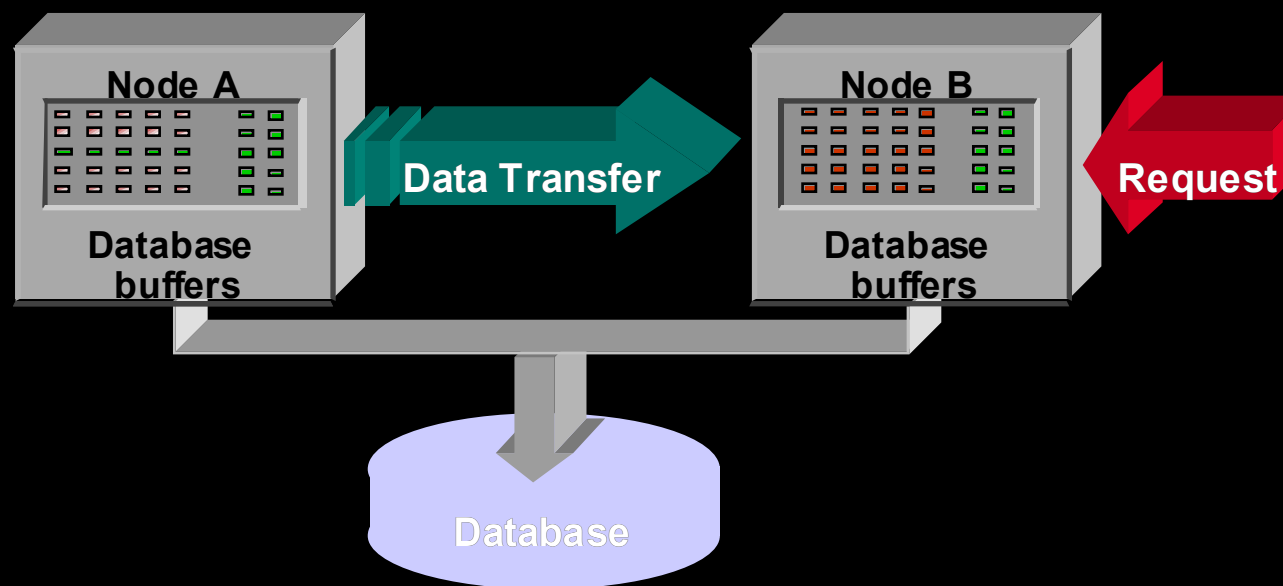
RAC 10g Integrated Clusterware

- **Complete Oracle cluster software solution**
- **Single-vendor support**
- **Low Cost**
 - No need to purchase additional software
 - Easy to install, manage
- **High quality and functionality across all platforms**
 - 100 nodes on all platforms
- **Advanced functionality**
 - Fast App Notification (FaN)
- **Support for third-party clusterware**

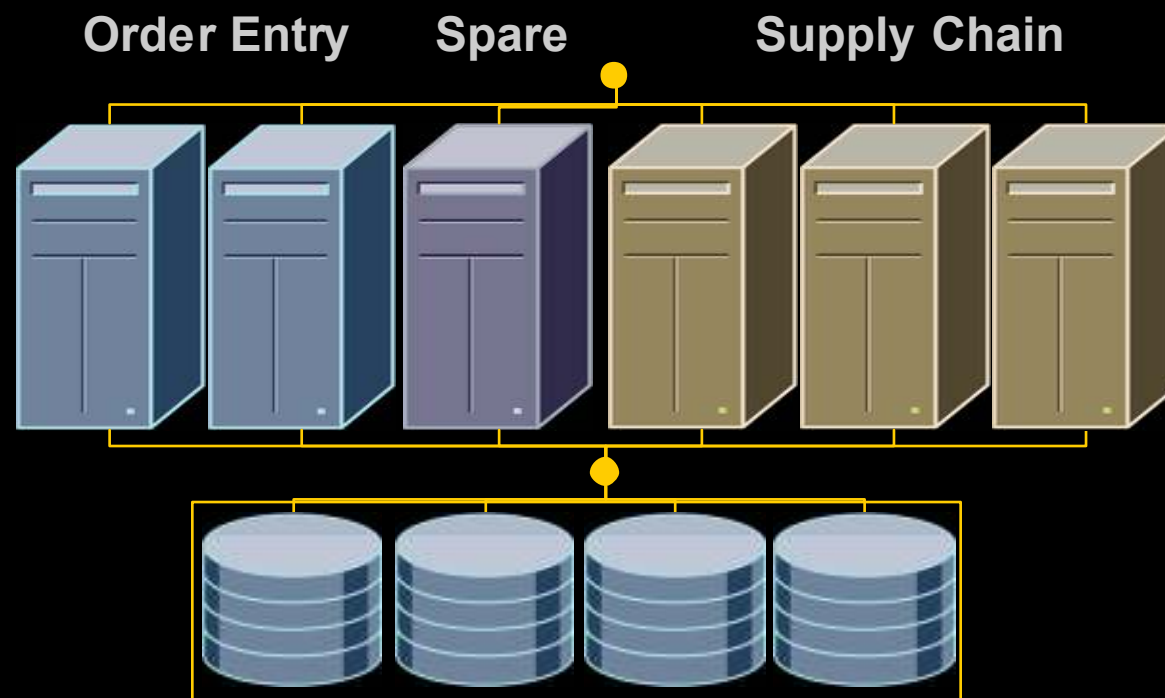


Cache Fusion

- Oracle Cache Fusion increases performance and scalability
 - Data is shipped directly over high speed interconnect
 - Minimize disk I/O
 - Enhanced IPC
 - Allow flexible transparent application deployment

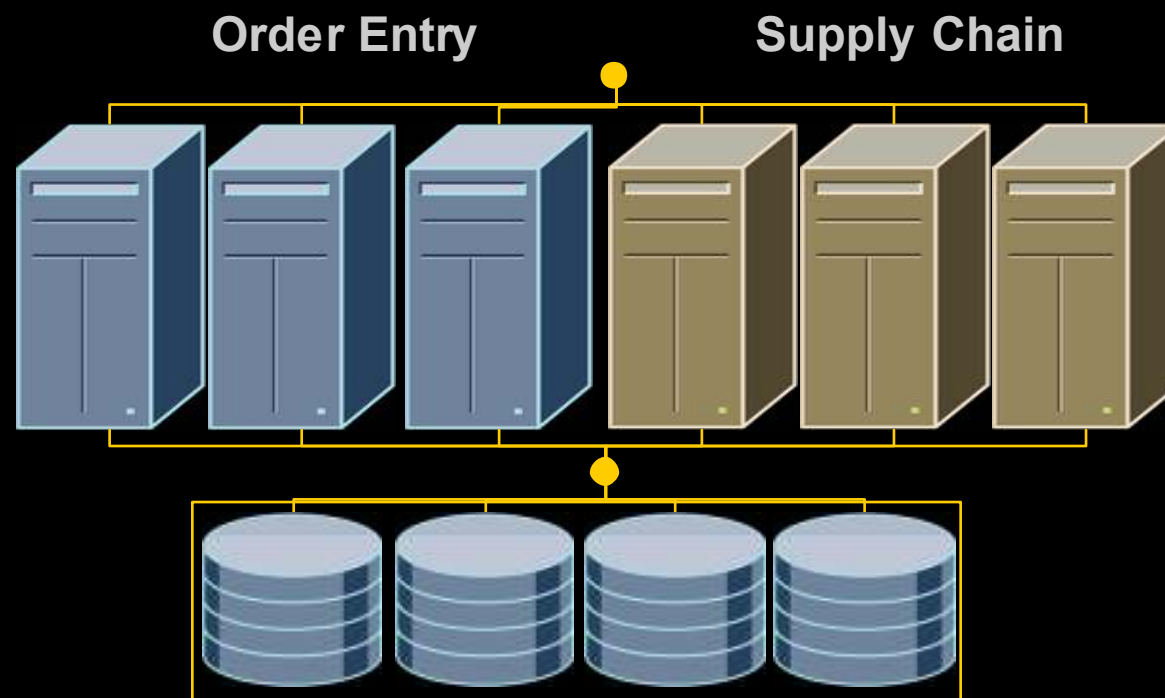


自動化工作平衡負載管理



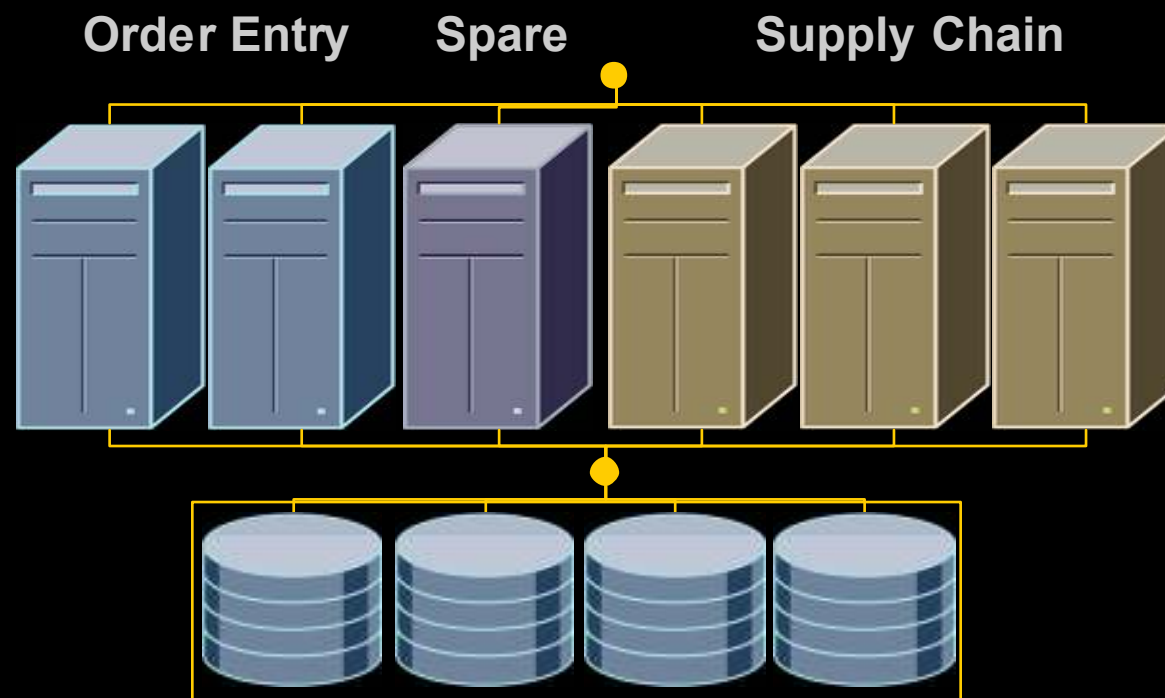
Normal Server Allocation

自動化工工作平衡負載管理



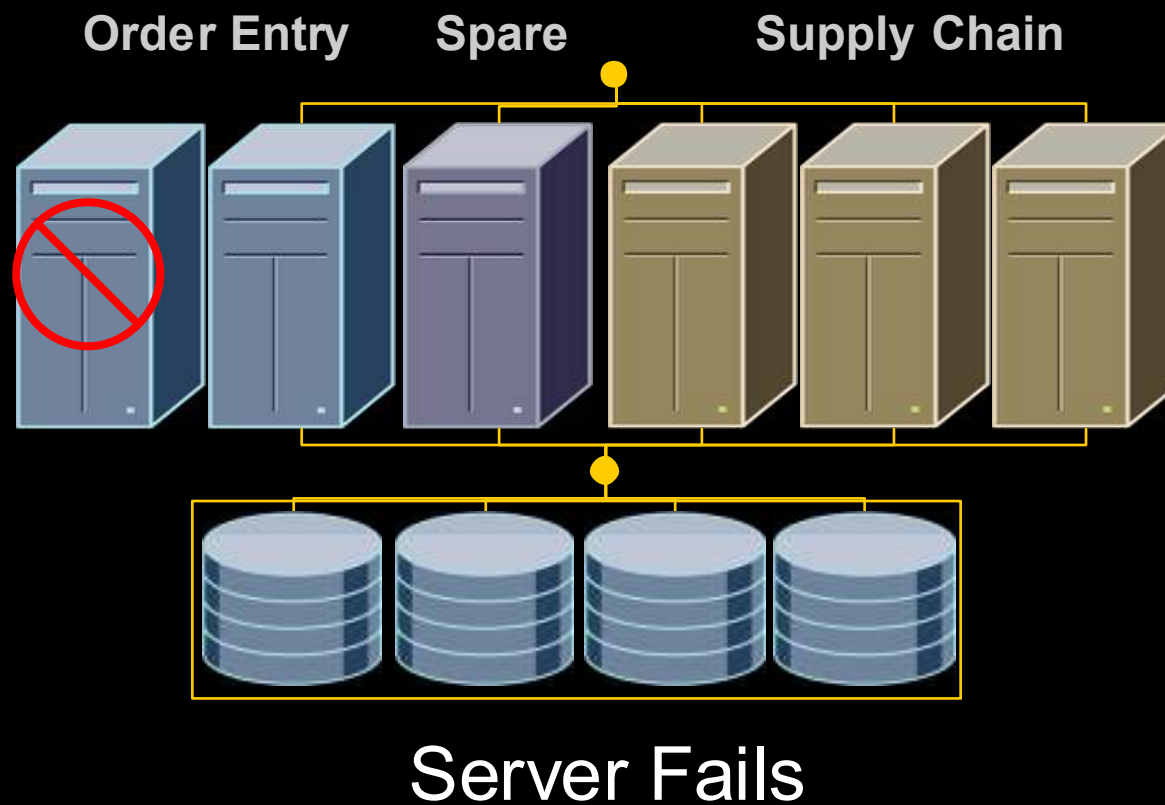
End of Quarter

自動化工作平衡負載管理

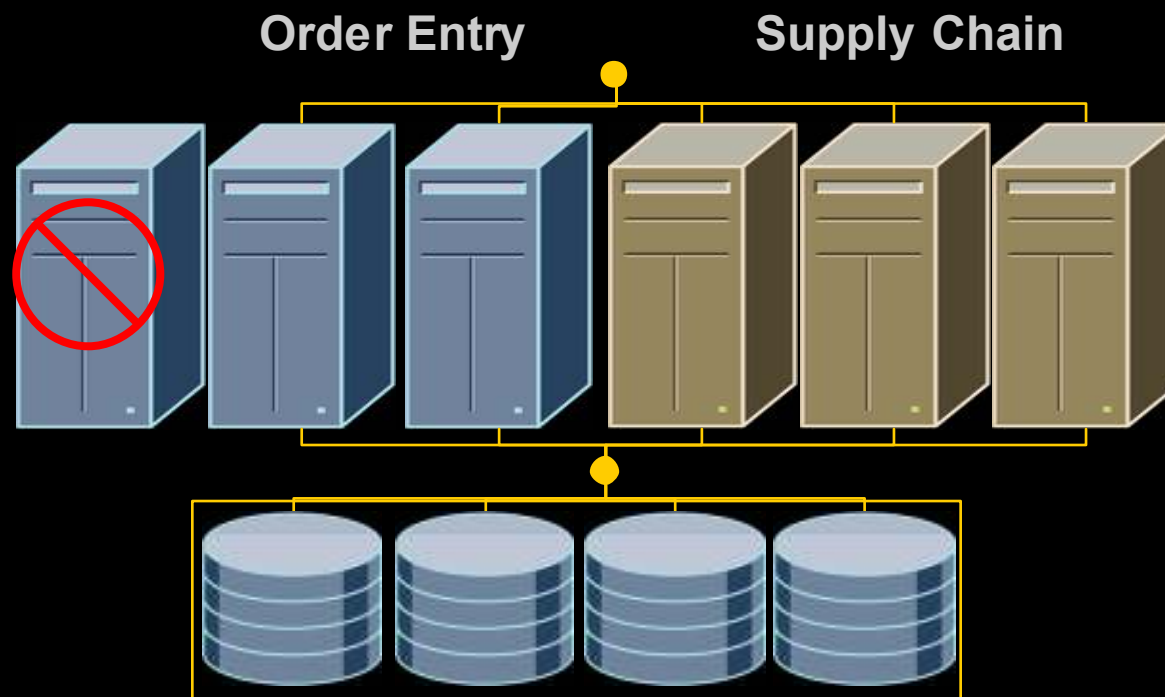


Normal Server Allocation

自動化工作平衡負載管理

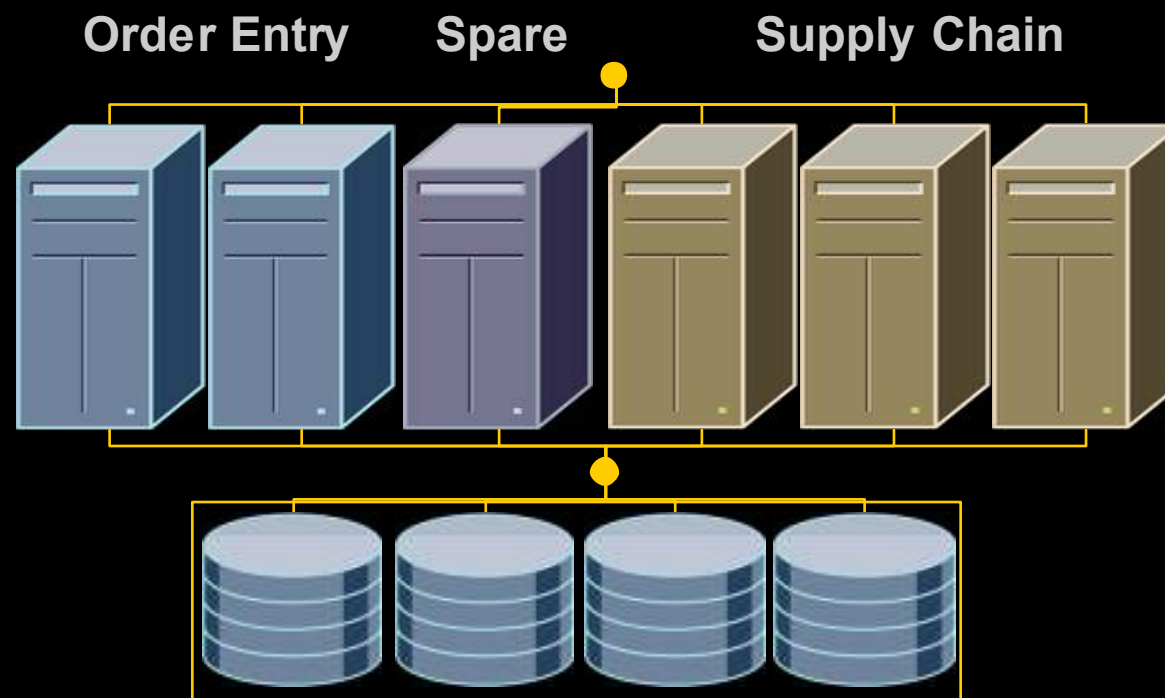


自動化工作平衡負載管理



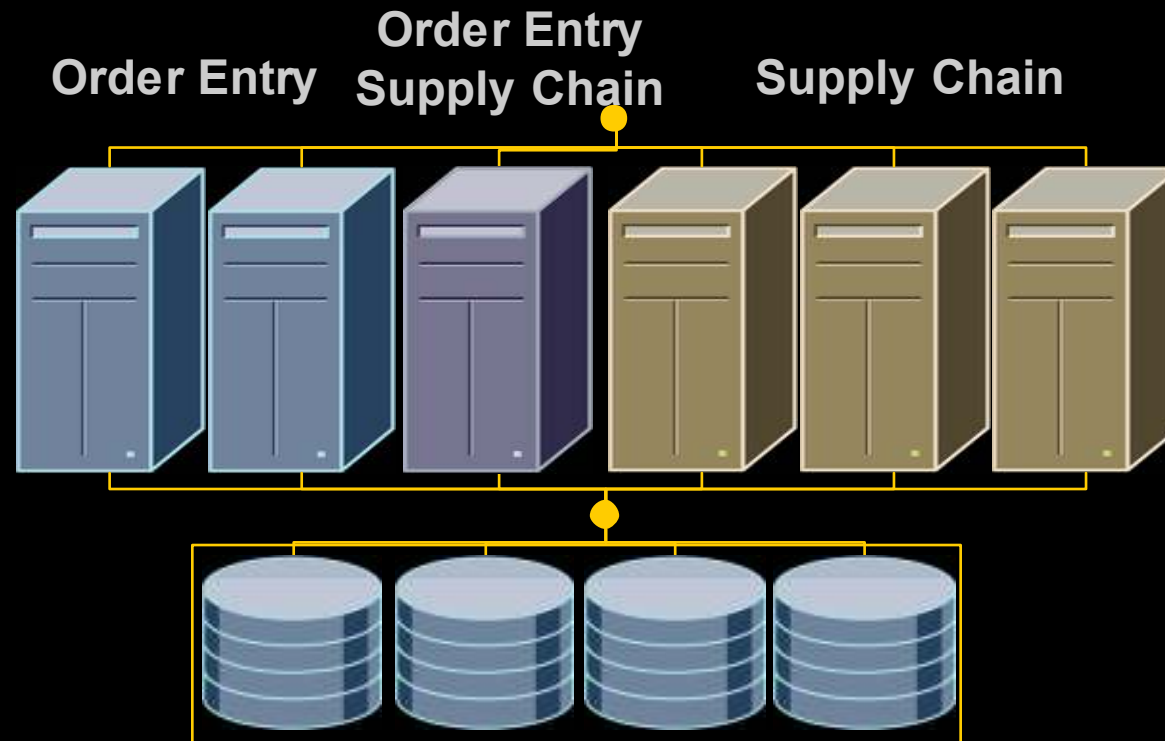
Reallocate Spare server to Order Entry

自動化工作平衡負載管理



Failed Server Restored

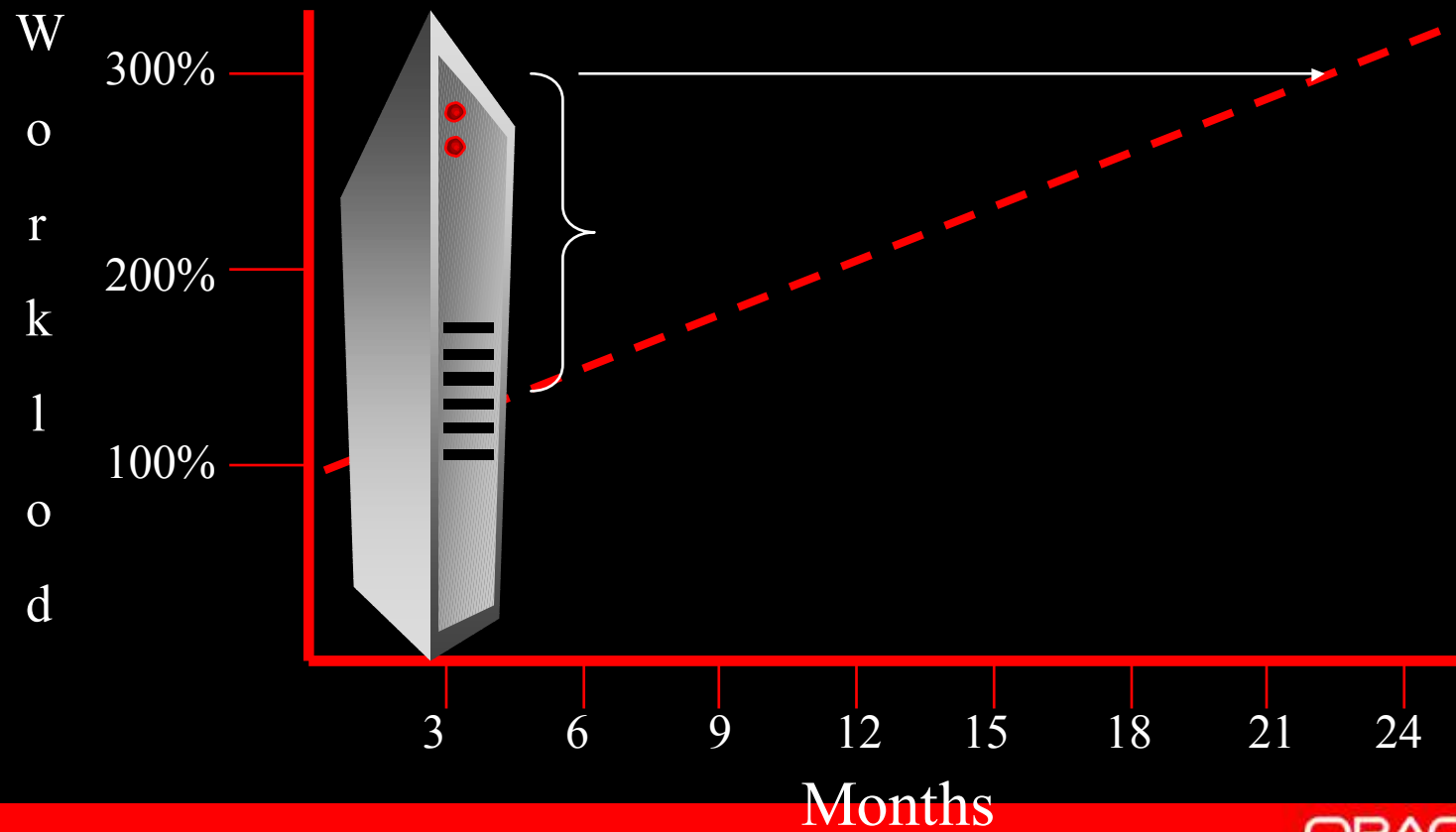
自動化工作平衡負載管理



Application Resource Requirements Grow

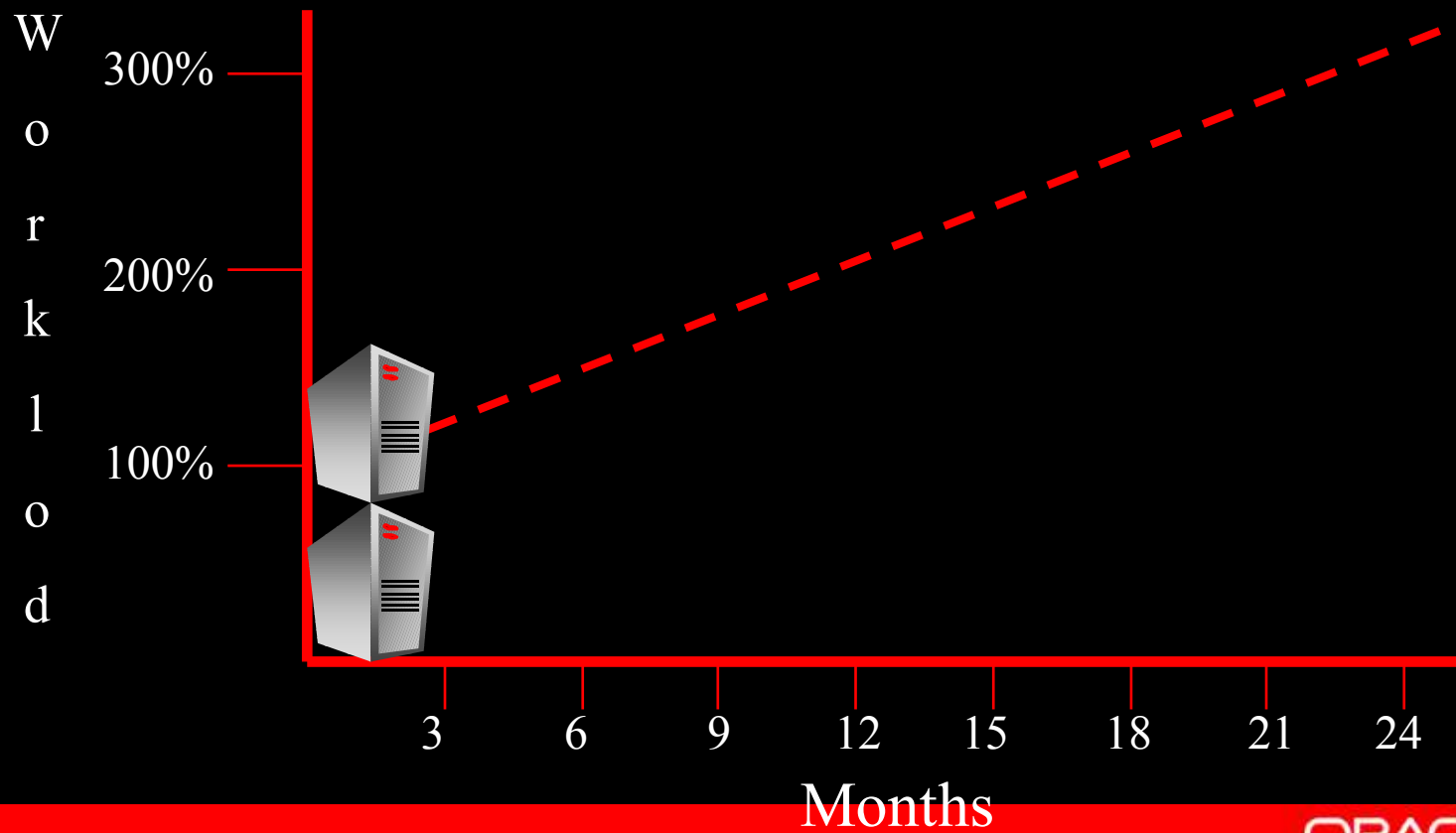
Capacity Planning ...

- Planning to handle workload



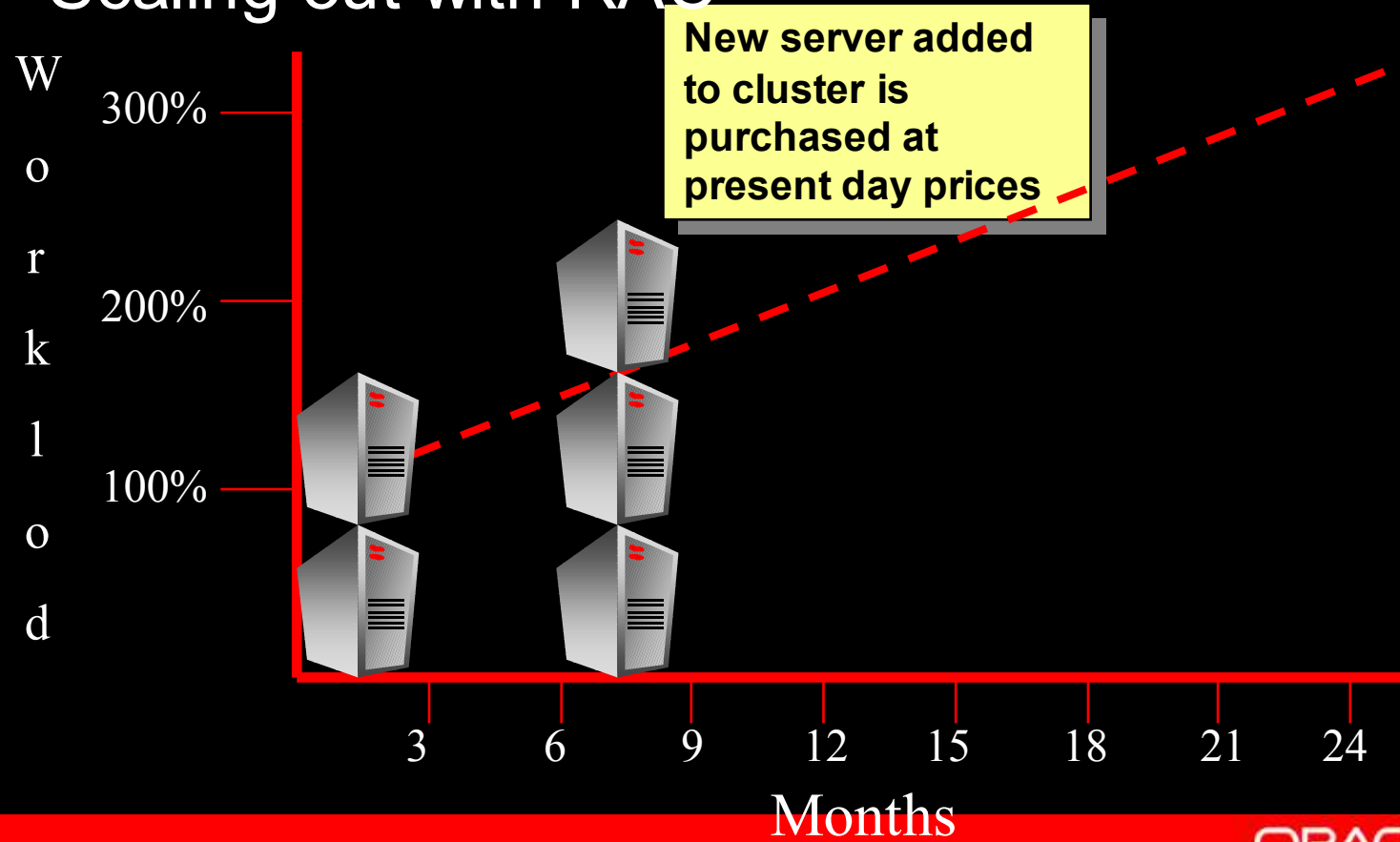
... vs Capacity on Demand

- Initial workload with RAC



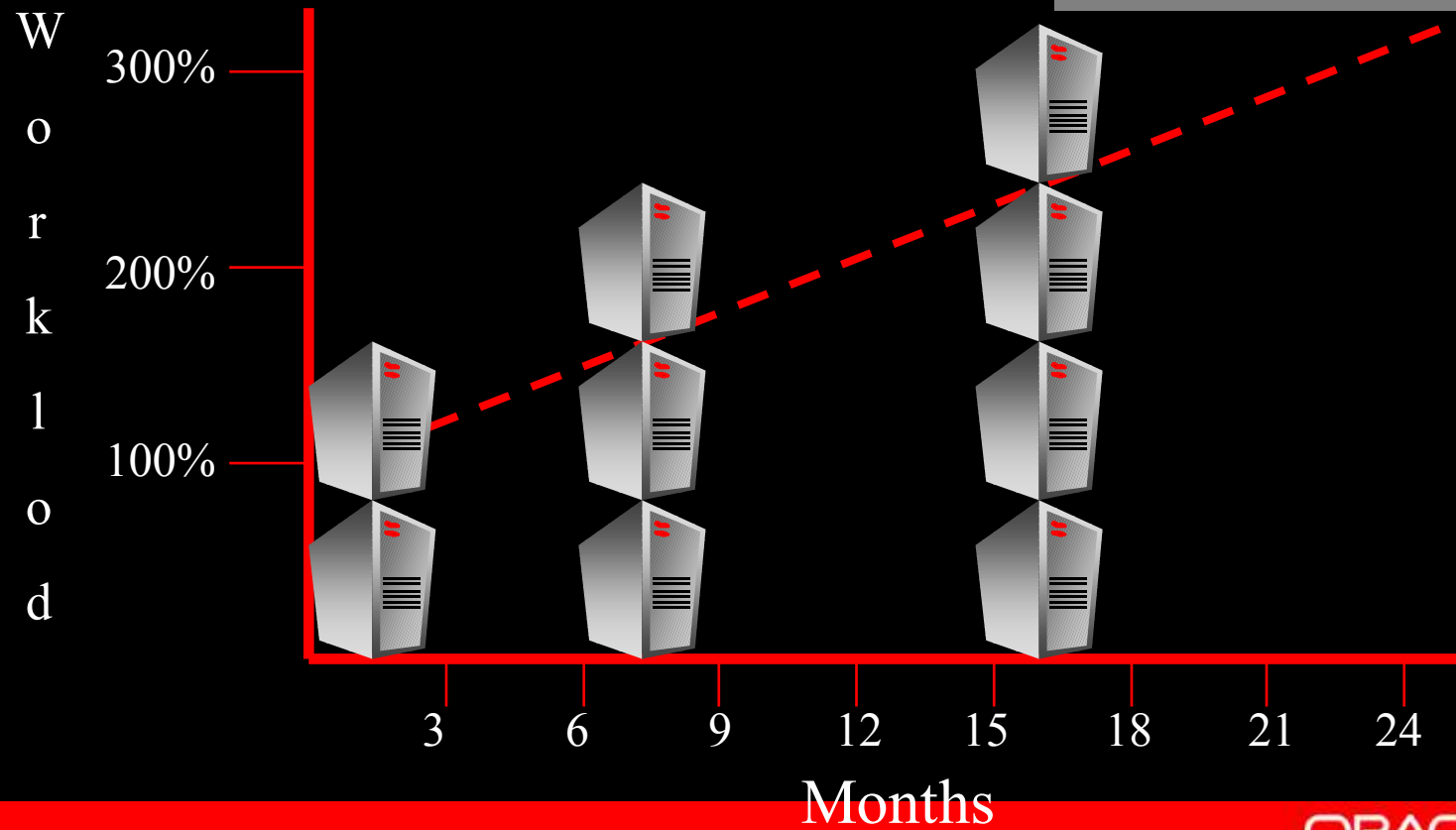
... etc ...

- Scaling out with RAC

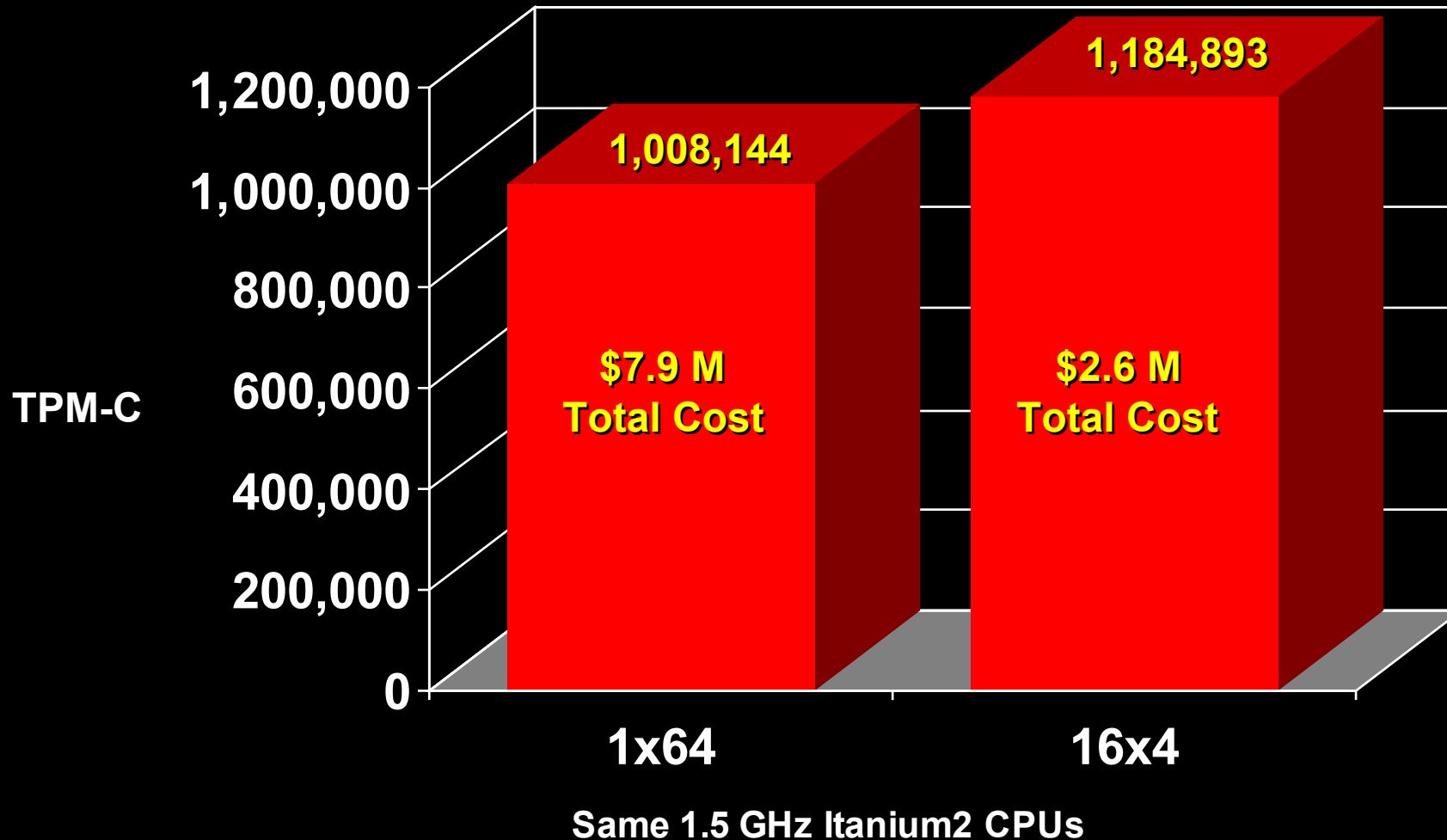


... etc ...

- Scaling out with RAC

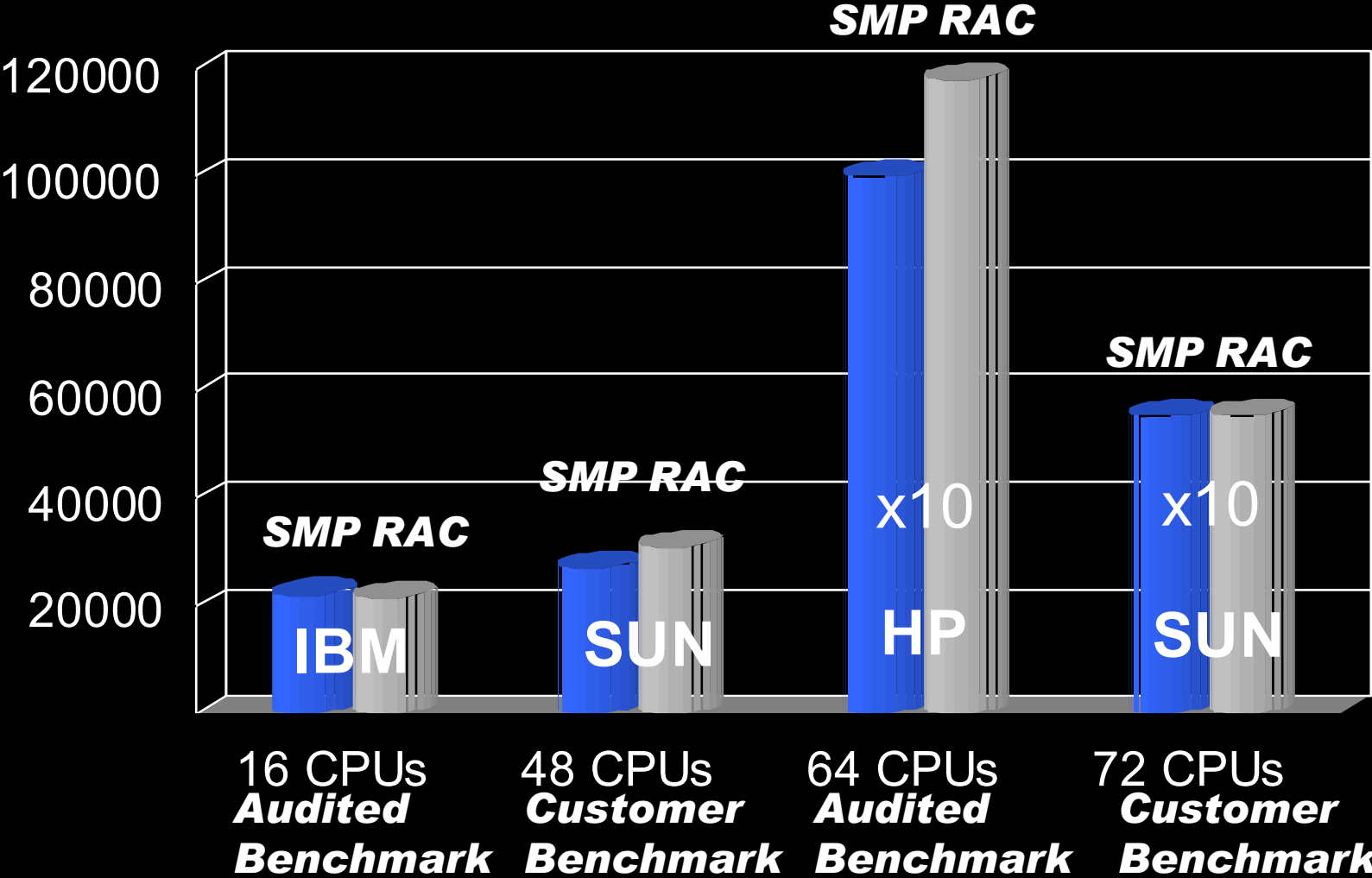


Low Cost Servers - HP TPC-C Benchmark



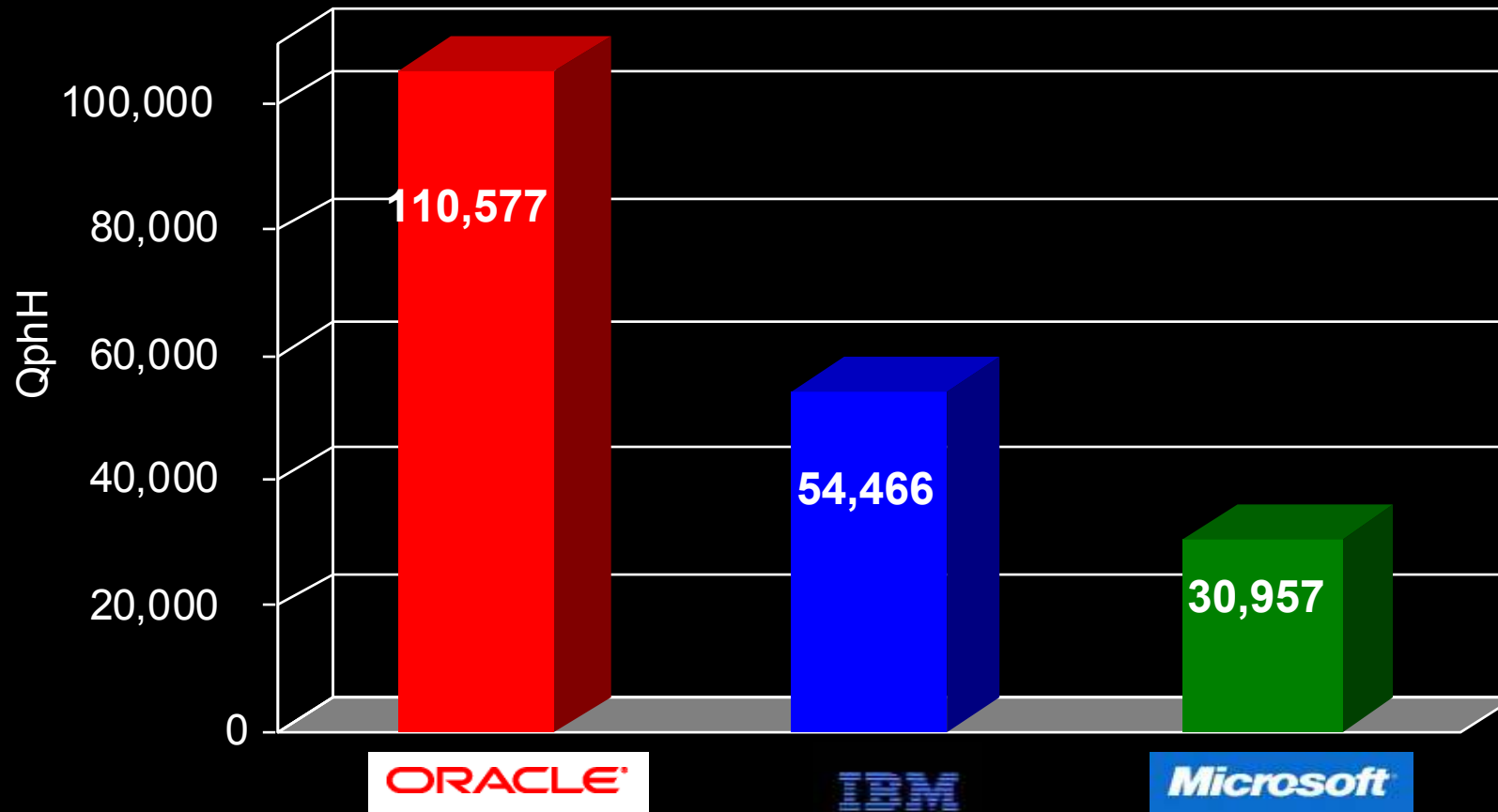
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Scale Out at a Fraction of the Cost



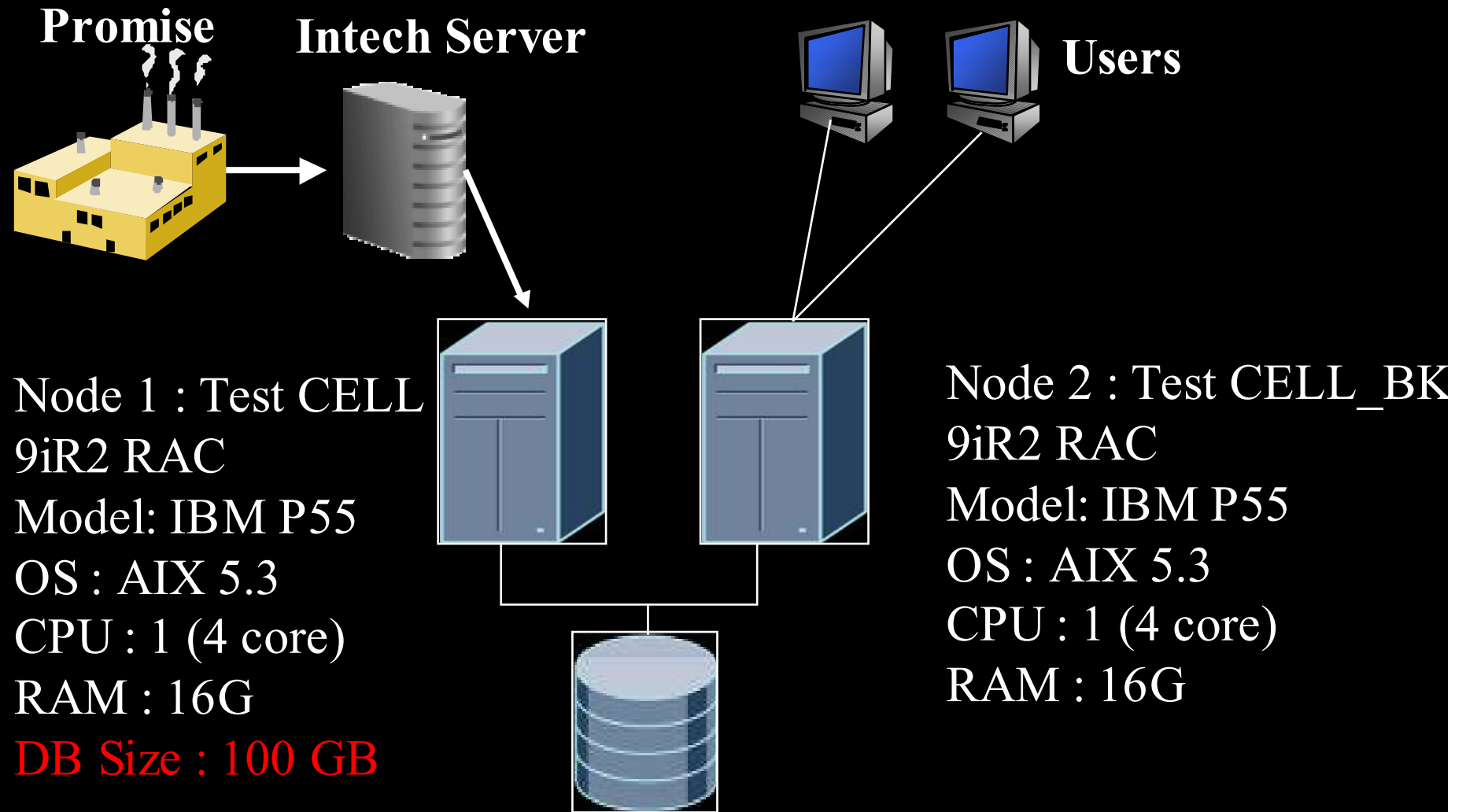
TPC-H Three Terabyte Best Performance Results by Database

as of June 8, 2006

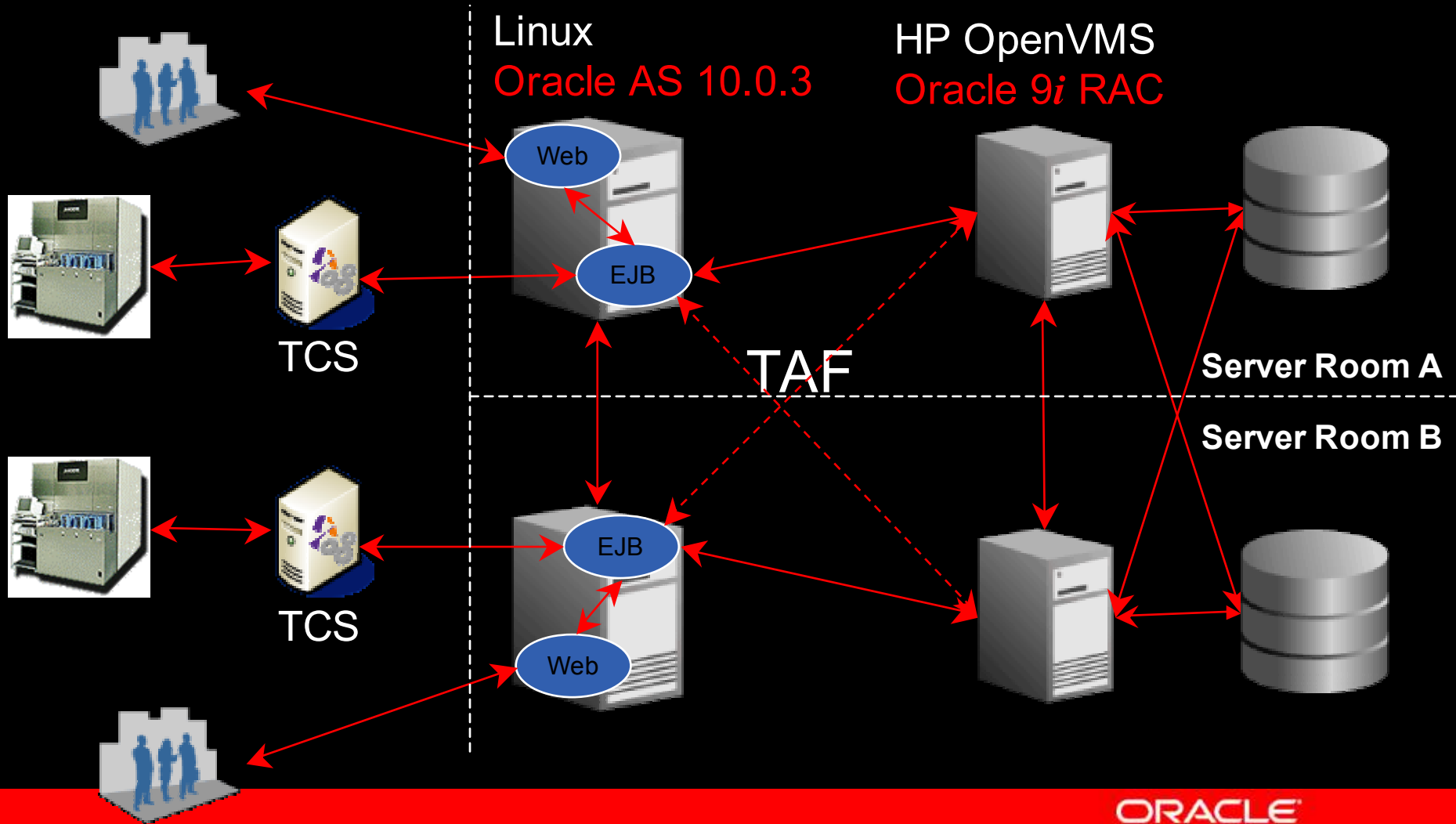


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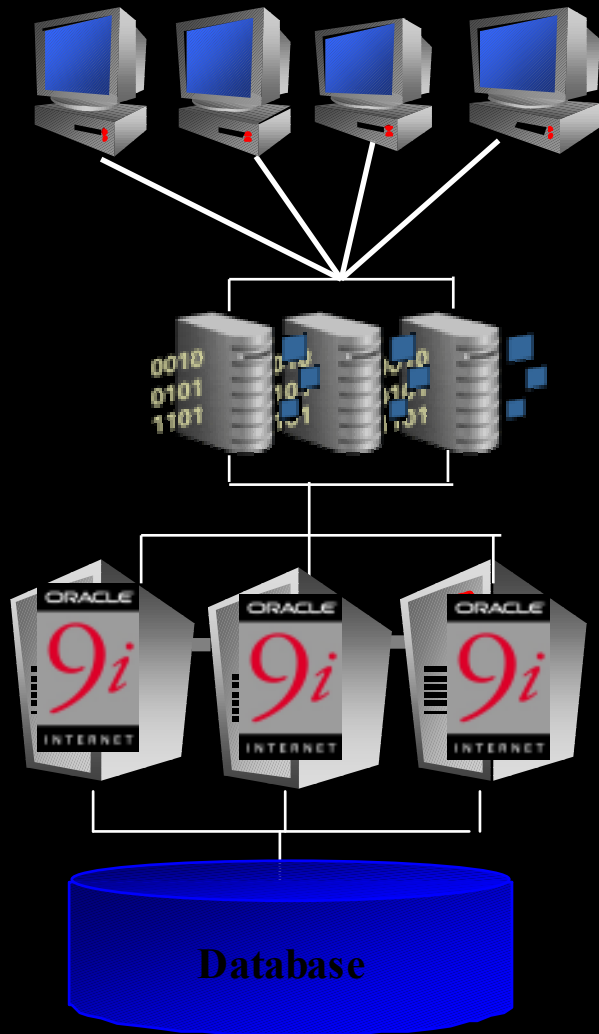
Oracle RAC for ASE's MES



Oracle RAC for AUO's LCD MES



Oracle RAC for ProMOS Fab3 MES



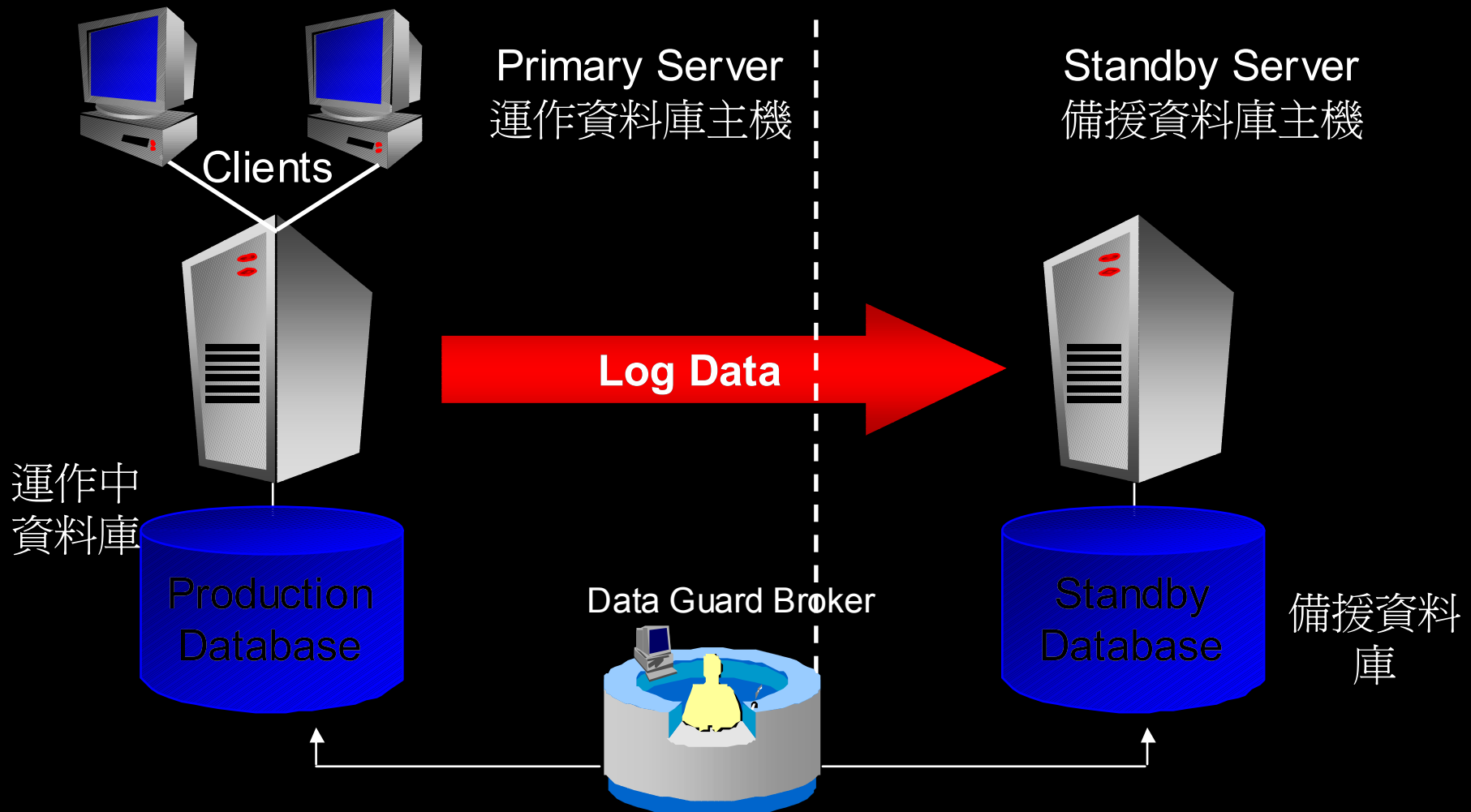
- **MES System : Brooks**
- **Cost of downtime : Over NT\$ 6M/hr**
- **System**
 - H/W : HP Alpha GS1280
 - 3 nodes : 16cpu, 32GB;
16cpu, 32GB; 8cpu, 14GB
 - O.S. : Tru64 Unix
 - Clusterware : TruCluster
- **Database**
 - DB Size : 2 TB
 - DB Version : 9iR2 (9.2.0.7)
- **Application Loading**
 - Transaction/hr : 200k
- **Benefit**
 - support 80k 12” wafer monthly yield

Oracle Database Data Guard

Oracle 資料庫異地備 援方案



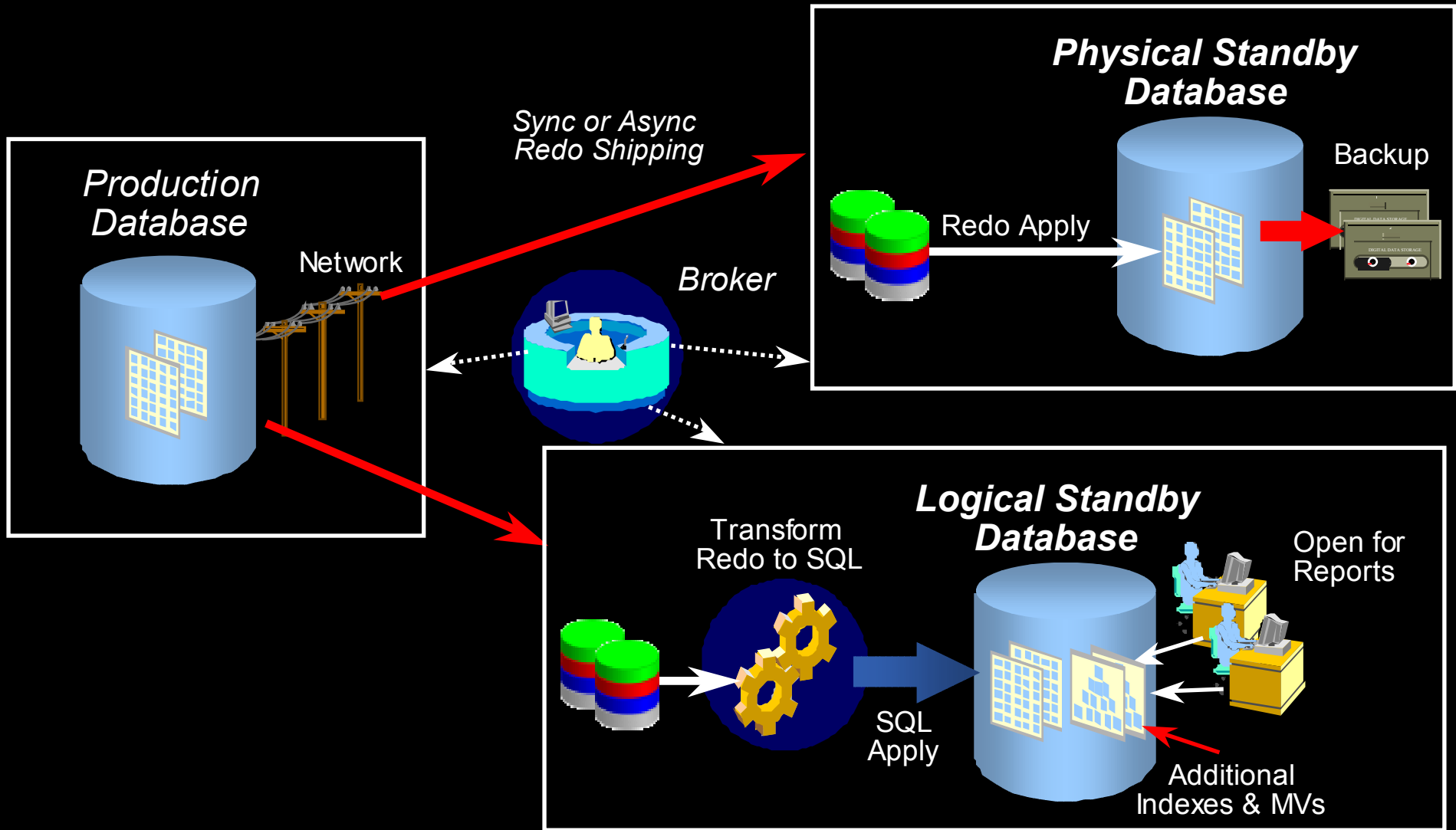
Oracle 10g Data Guard



Oracle's primary solution for data protection
Oracle 提供資料庫備援方案

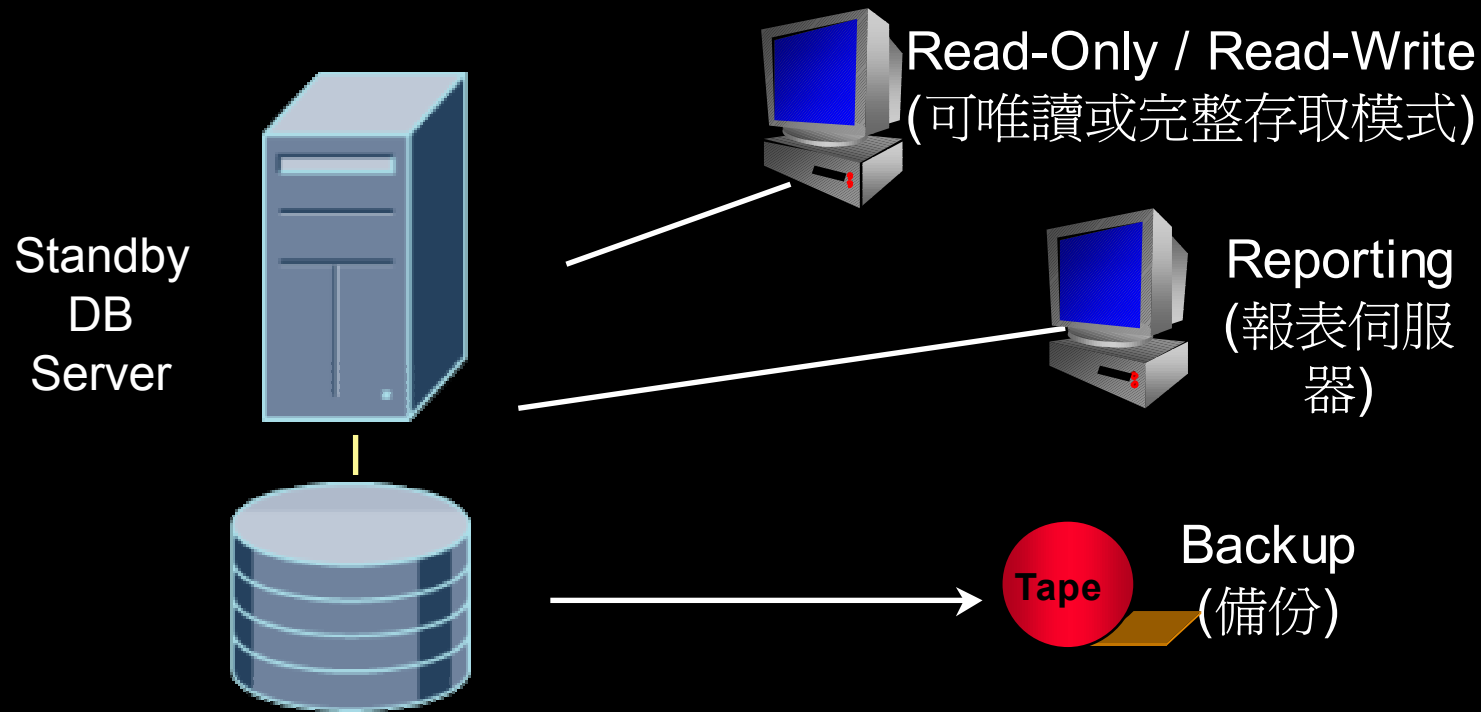
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Oracle 10g Data Guard 架構 (資料守護神)



Oracle 10g Data Guard

Standby Databases 用途

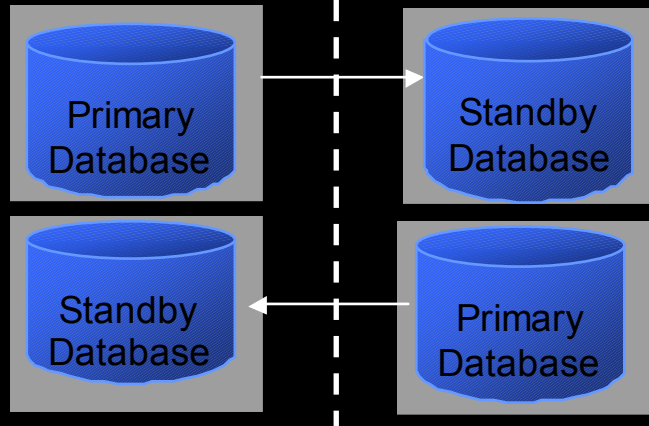


Standby 資料庫並非只有備援用途, 也可以做為報表伺服器, 備份伺服器等減少 Production 資料庫的負載

Oracle 10g Data Guard 使用範例

地區 A

地區 B



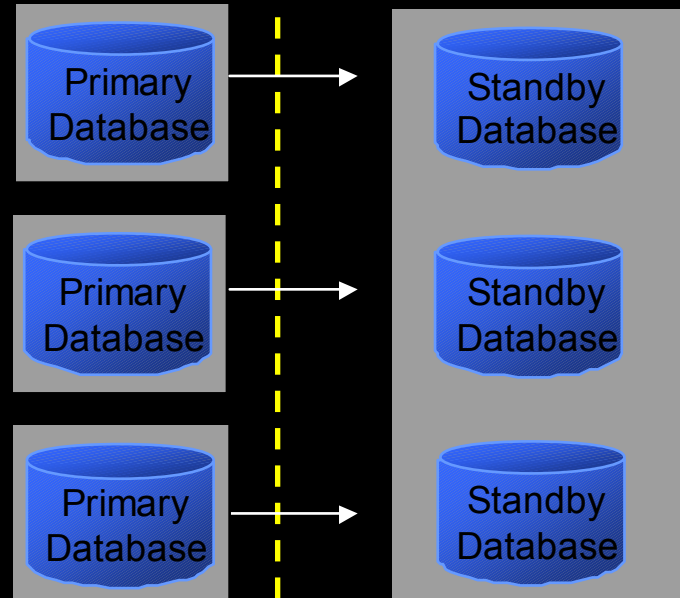
地區 A, B 的各個資料庫彼此互為備援

範例一

範例二

備援主機同時執行數個備援資料庫的任務(此備援主機需有足夠的硬體架構)

Primary Site A



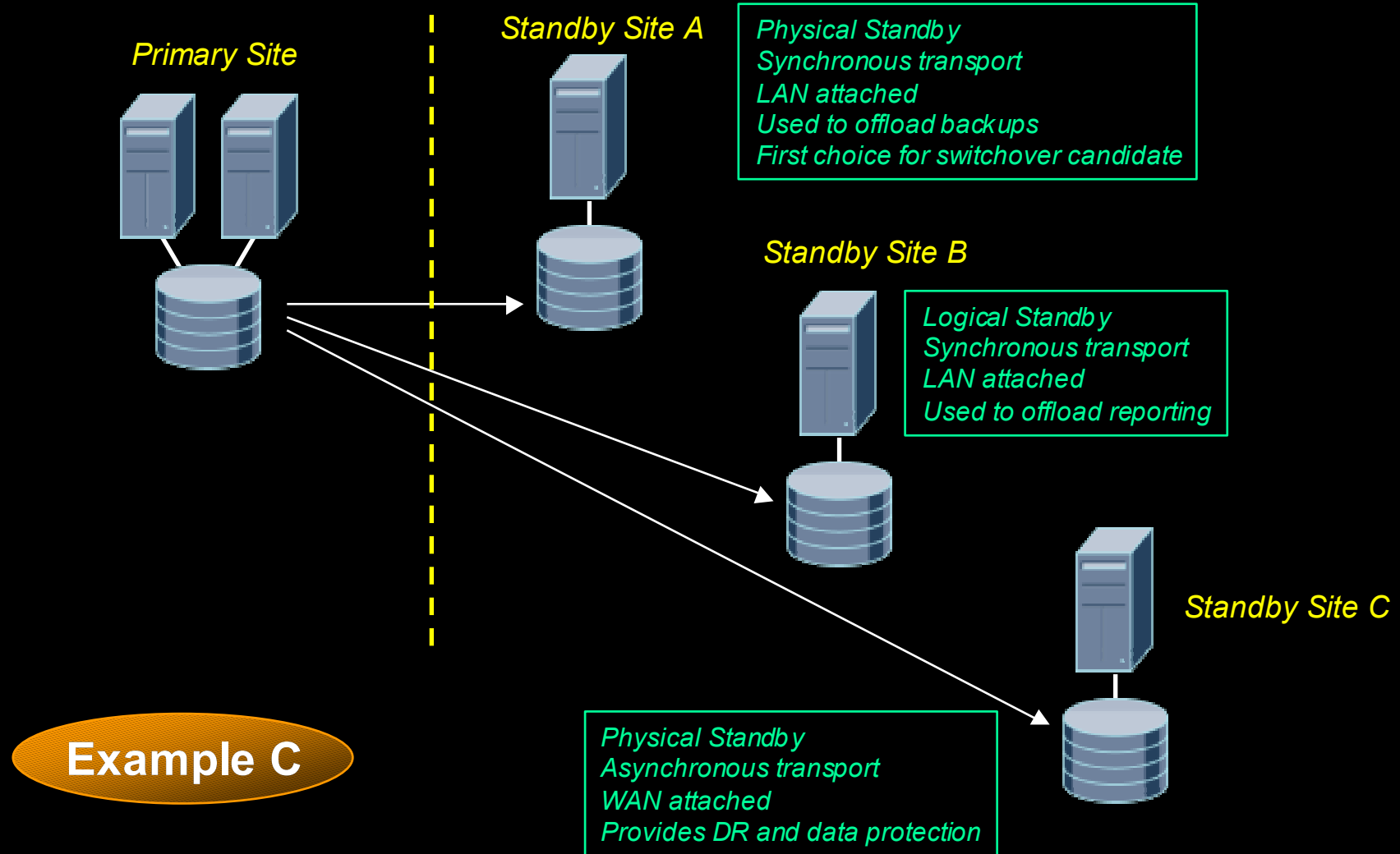
Primary Site B

Primary Site C

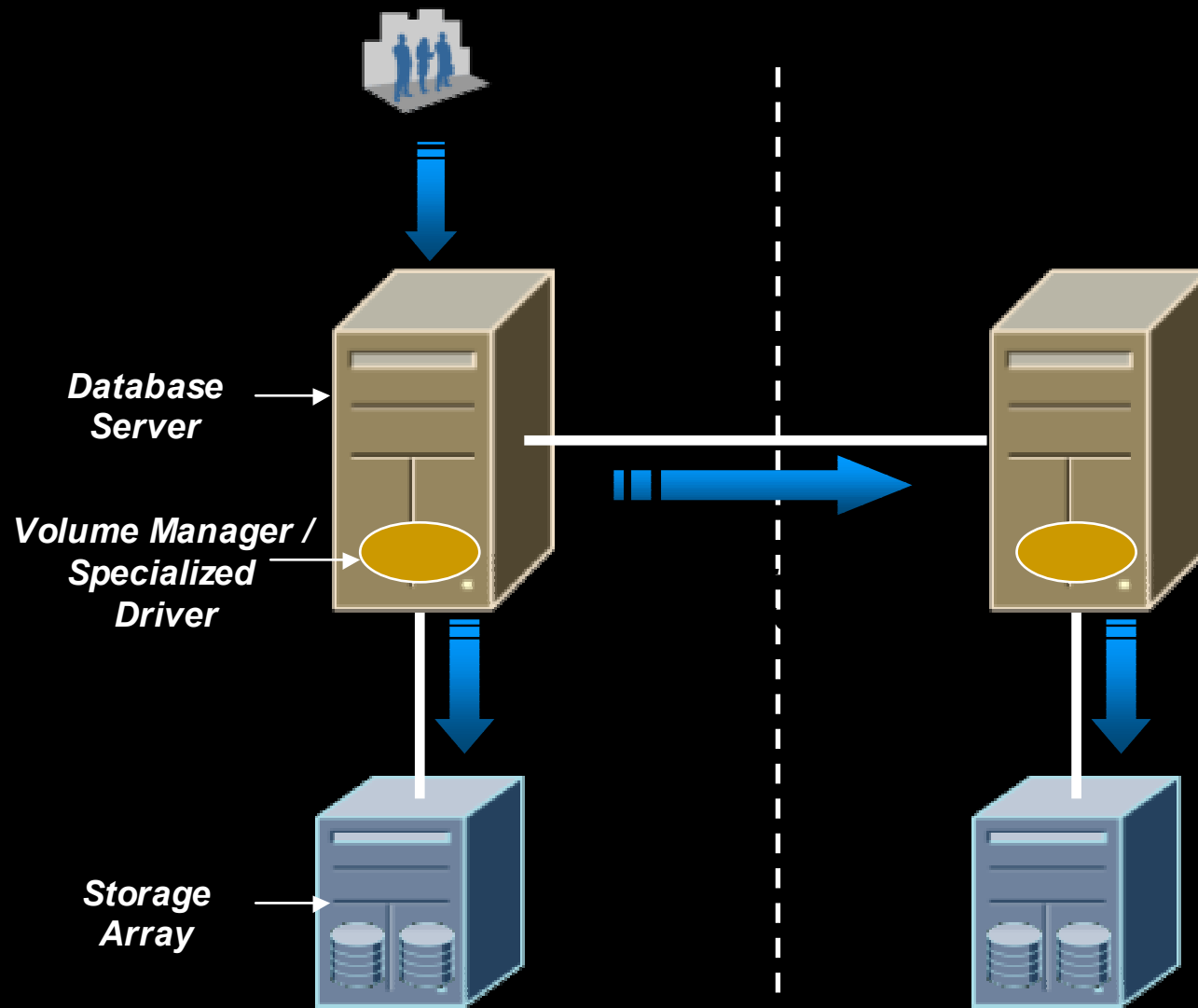
備援區

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Data Guard Usage Examples

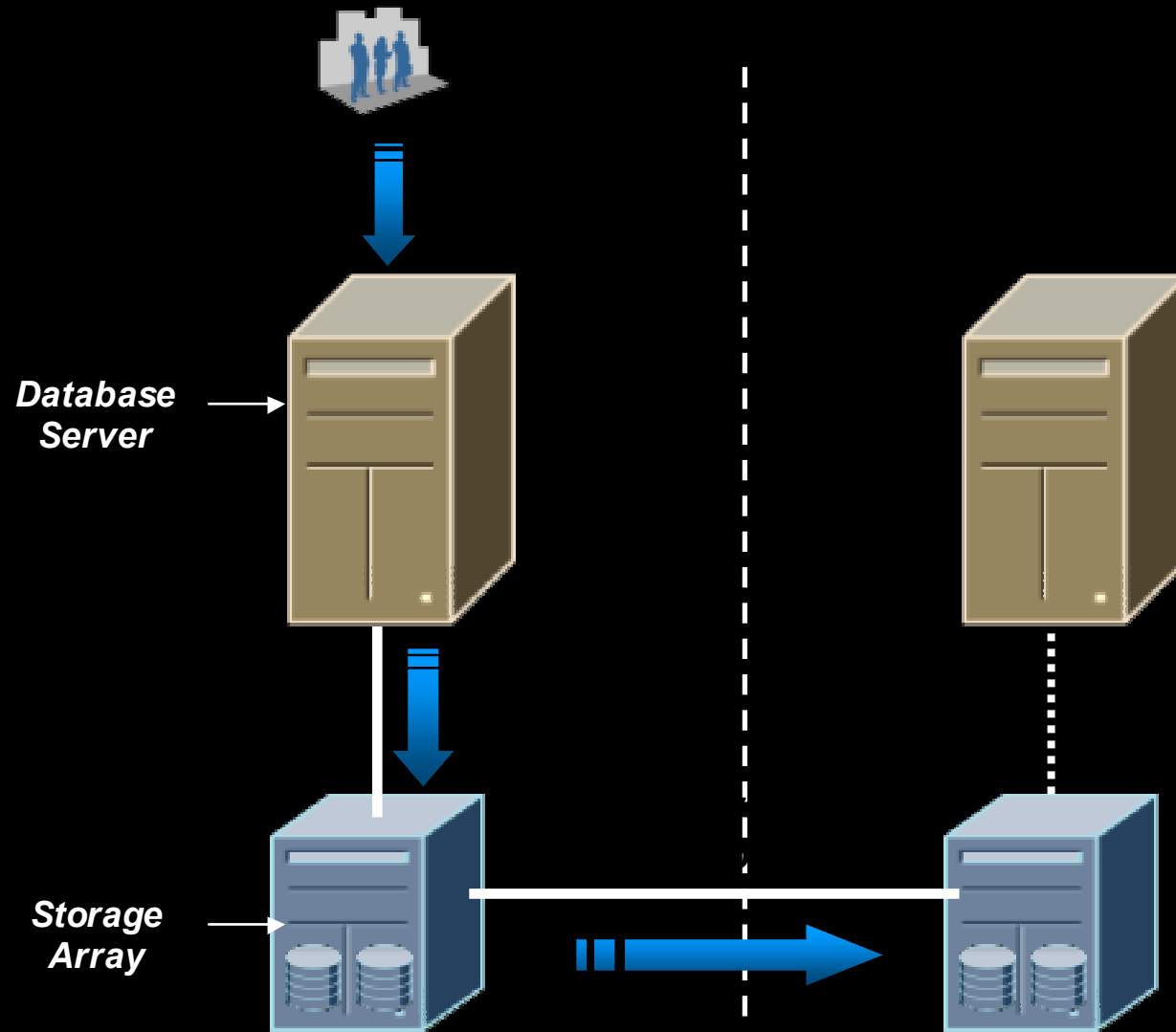


Host-based Mirroring



- 備援主機閒置
- 佔據較大網路頻寬
- Block level 對抄, bad block 也抄
- 資料庫 failover 所需時間較長
- 若網路中斷時, 可能傷到控制檔, 資料庫重起時需 recover
- 軟體授權不便宜

Storage-based Mirroring

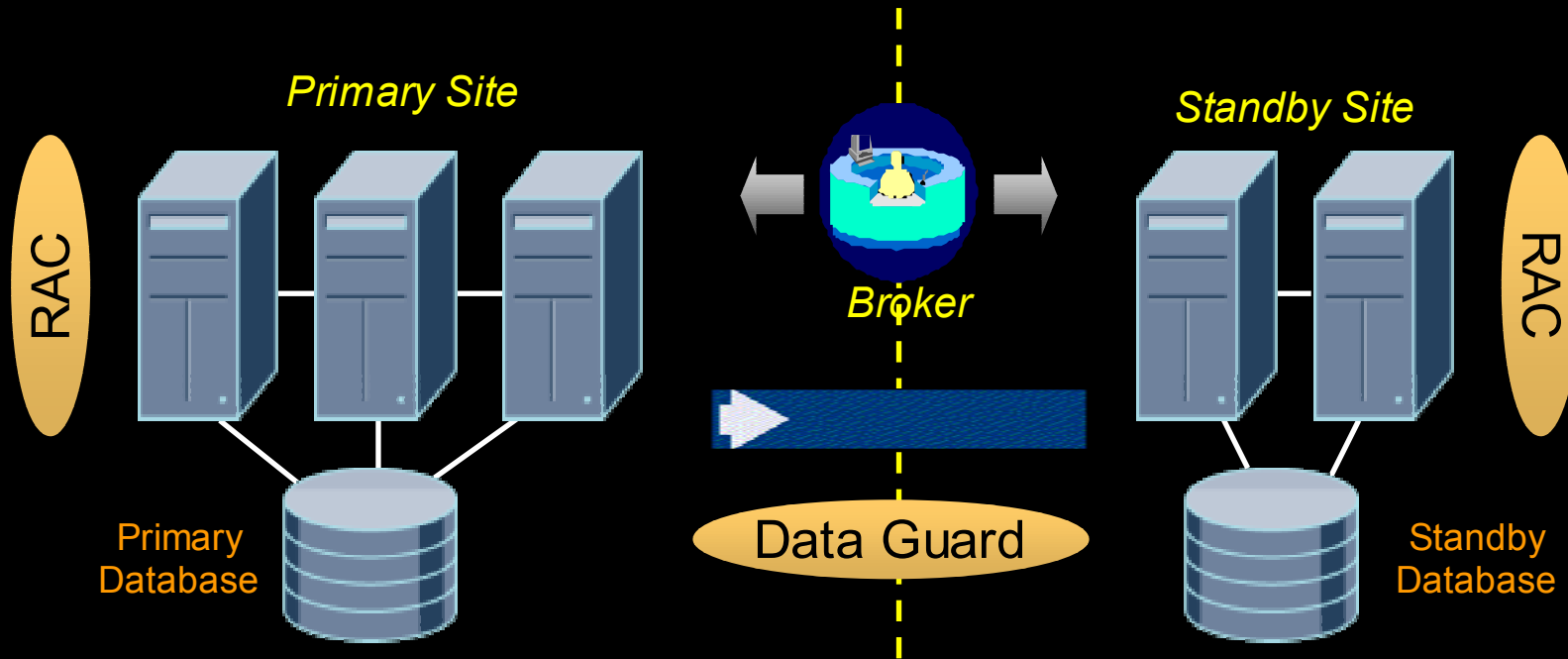


- 備援主機閒置
- 佔據較大網路頻寬
- Block level 對抄, bad block 也抄
- 資料庫 failover 所需時間較長
- 價格昂貴

Oracle 異地備援解決方案 - Data Guard 效益

- 建置成本最低
 - 異地端只需要主機硬體及資料庫軟體授權費用，不需額外費用
- 可同時為本地或異地資料庫備援解決方案
- 網路中斷回復後，自動 re-sync
- 具備雙向的異地備援機制
 - 主資料庫與備援資料庫角色可以互換 (switch over)
- 異地備援資料庫可做為
 - 資料庫備份伺服器
 - 資料庫報表伺服器
- 相對其他異地備援解決方案使用最少的網路頻寬

Data Guard + RAC Configuration



- Data Guard + RAC: end-to-end Data Protection and HA
- Basis of Maximum Availability Architecture
- Managed as a single configuration

A large, stylized graphic of the letters 'Q' and 'A' in a dark grey, serif font. A red ampersand (&) is superimposed over the 'Q' and 'A'. The 'Q' is positioned above the 'A', and the ampersand is positioned between them.

Q U E S T I O N S
A N S W E R S

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