Neue DB Engines für Hochleistungsanwendungen am Beispiel von Oracle

Datenbank Implementierungstechniken

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Gliederung

Oracle Exadata Database Machine

Exadata Database Machine X4-2

Oracle Exadata Database Machine

Einleitung

Was sagt Oracle?

The Oracle Exadata Database Machine is engineered to be the highest performing and most available platform for running the Oracle Database.

- Einfach Anzuwenden
- Vorkonfiguriert, getestet und optimiert
- Keine Flaschenhälse
- Deckt alle Anwendungsfälle ab

Oracle Exadata Database Machine

Einleitung

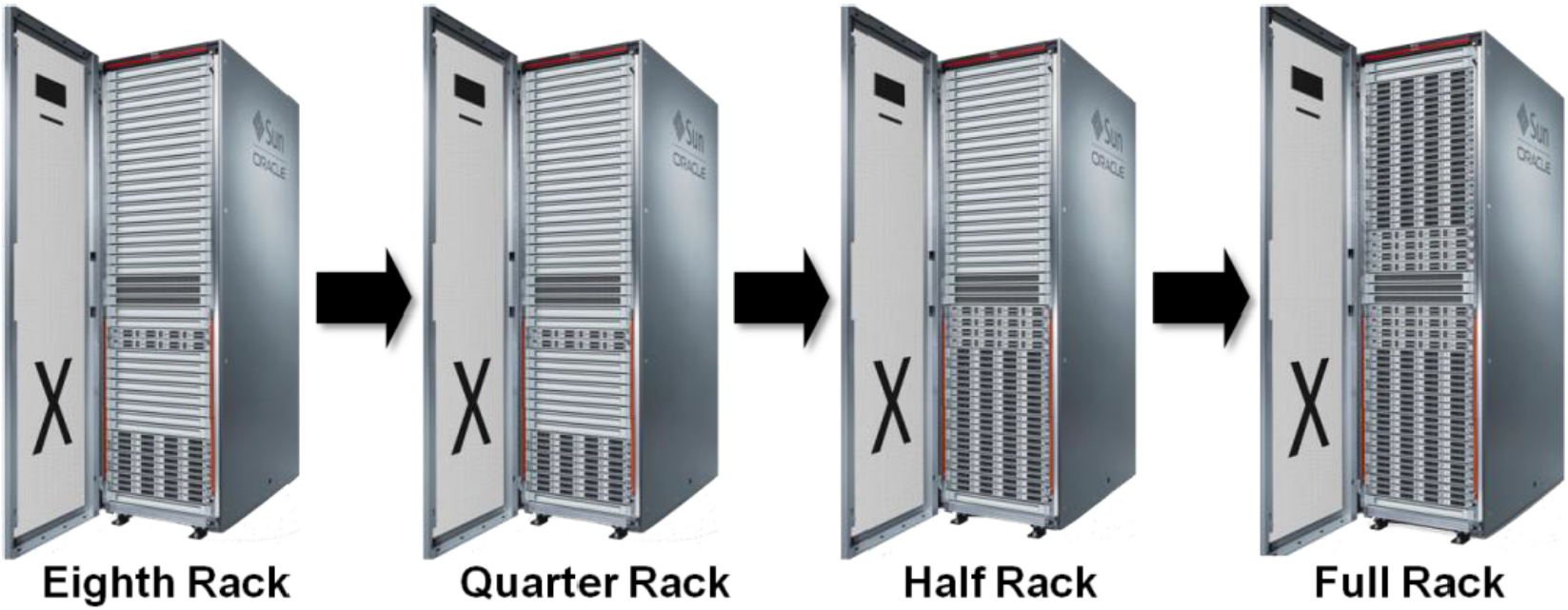
Komponenten

- Database Machine
- Storage Server
- Storage Server Software
- InfiniBand Networking

Gliederung

Oracle Exadata Database Machine

Zahlen



Database Machine X4-2 Upgrades

Oracle Exadata Database Machine

Zahlen

	Exadata Database Machine X4-2 Full Rack	Exadata Database Machine X4-2 Half Rack	Exadata Database Machine X4-2 Quarter Rack	Exadata Database Machine X4-2 Eighth Rack [1]
Database Servers	8	4	2	2
• **CPU cores for database processing**	192	96	48	24
• **Max Memory (GB)**	4,096	2,048	1,024	1,024
Exadata Storage Servers	14	7	3	3
• **CPU cores for SQL processing**	168	84	36	18
• **Exadata Smart Flash Cache (TB)**	44.8	22.4	9.6	4.8
• **Number of disks for database storage**	168	84	36	18
InfiniBand Switches	2	2	2	2

Oracle Exadata Database Machine

Zahlen

	Exadata Database Machine X3-8 and X4-2 Full Rack	Exadata Database Machine X4-2 Half Rack	Exadata Database Machine X4-2 Quarter Rack	Exadata Database Machine X4-2 Eighth Rack
Exadata Smart Flash Cache	44.8 TB	22.4 TB	9.6 TB	4.8 TB
Raw Disk Capacity				
• **High Capacity Disk**	672 TB	336 TB	144 TB	72 TB
• **High Performance Disk**	200 TB	100 TB	43.2 TB	21.6 TB
Useable Capacity	Up to	Up to	Up to	Up to
• **High Capacity Disk**	300 TB	150 TB	63 TB	30 TB
• **High Performance Disk**	90 TB	45 TB	19 TB	9 TB
(without data compression)				

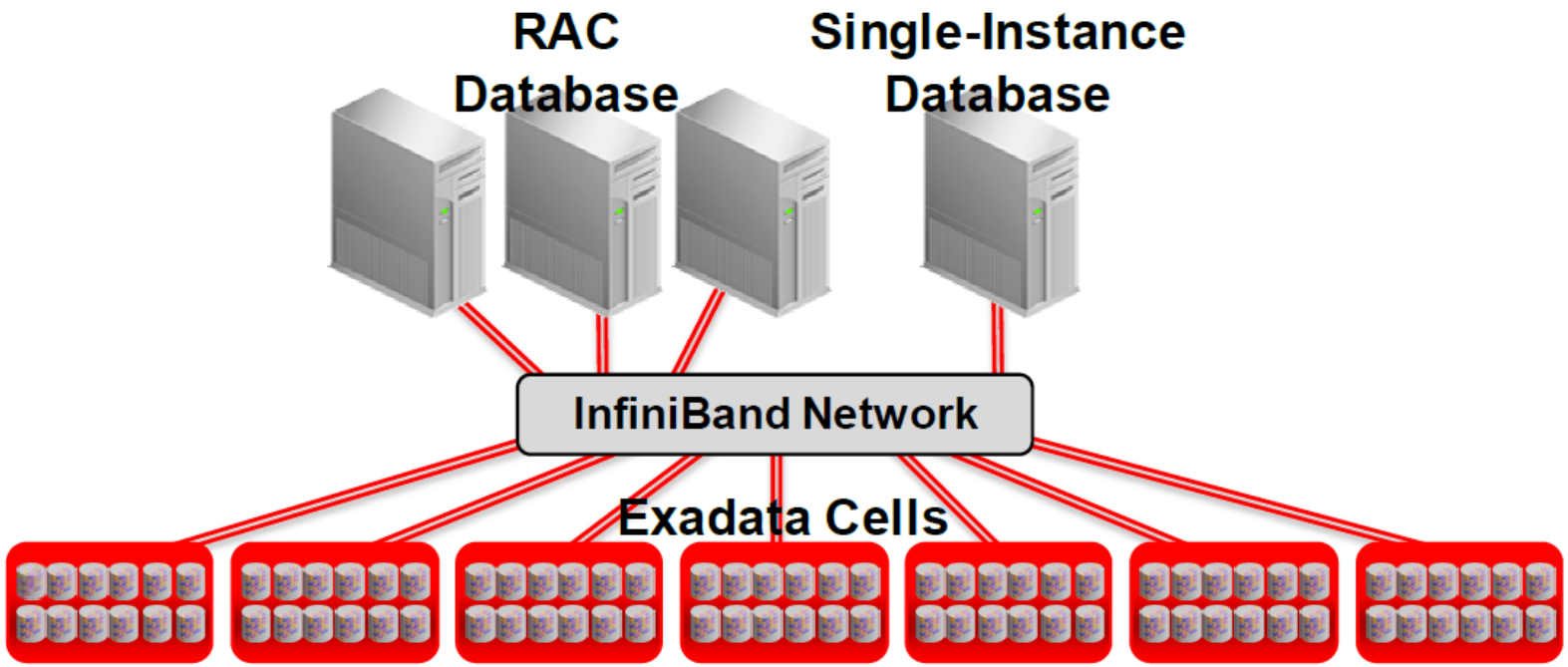
Database Machine Architecture

Terminologie

- RAC - Real Application Cluster
- Exadata Cell - Storage Server
- InfiniBand Network - Switches
- QDR Port - Quad Data Rate (schneller Netzwerk Port)
- ASM - Automatic Storage Management (Redundanz)
- ILOM - Integrated Lights Out Manager (Remote Überwachung)

Database Machine Architecture

Half Rack Beispiel



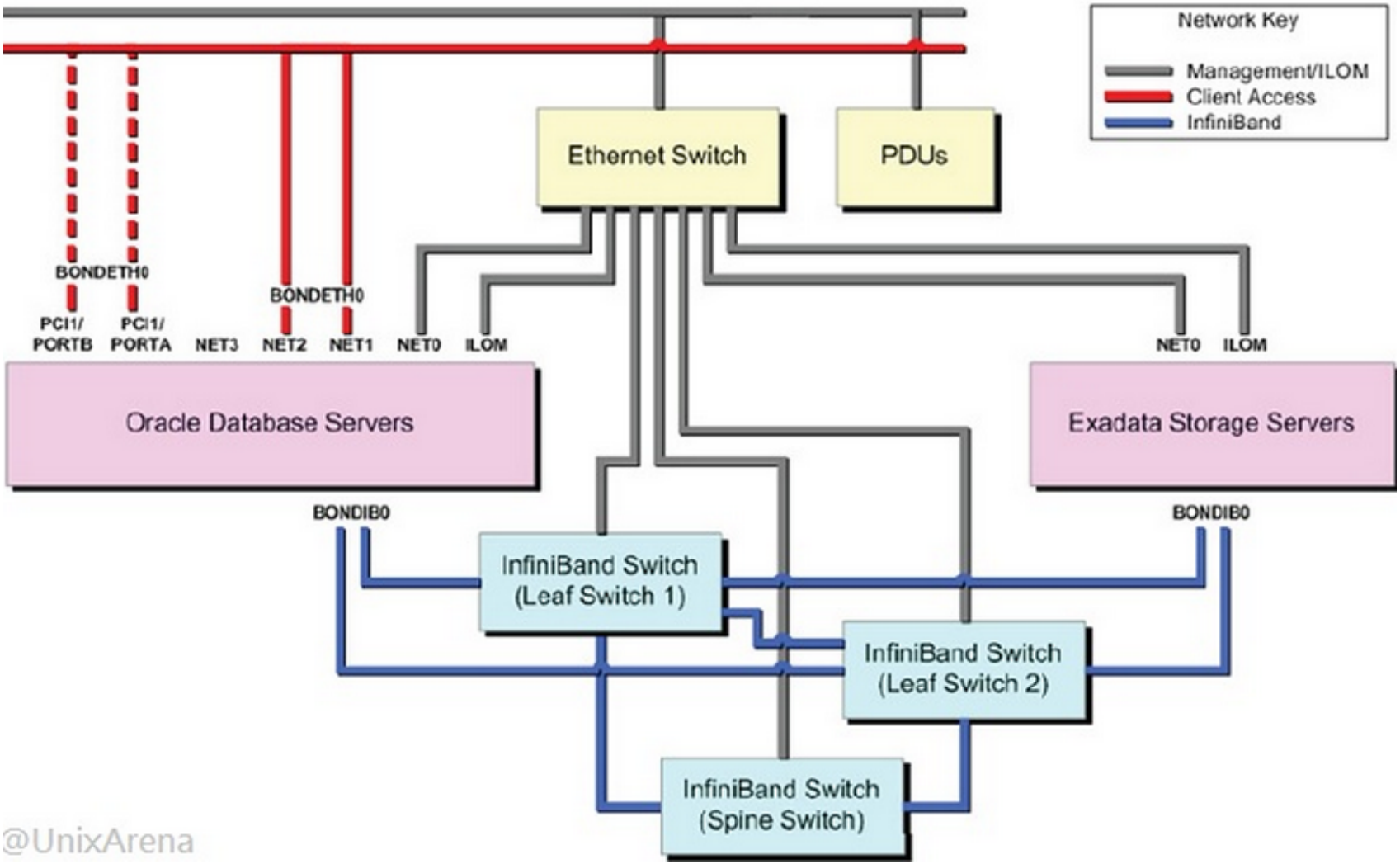
Database Machine Half Rack Deployment

Database Machine Architecture

Was macht die Database Machine so performant und sicher?

Database Machine Architecture

Network



Network Architecture

Management - ILOM

- Integrated Lights Out Management
- Eigener Prozessor
- Zugriff über Host OS
- Remote Keyboard, Mouse, Video Unterstützung
- Email/SMTP Alerts
- Hardware Überwachung

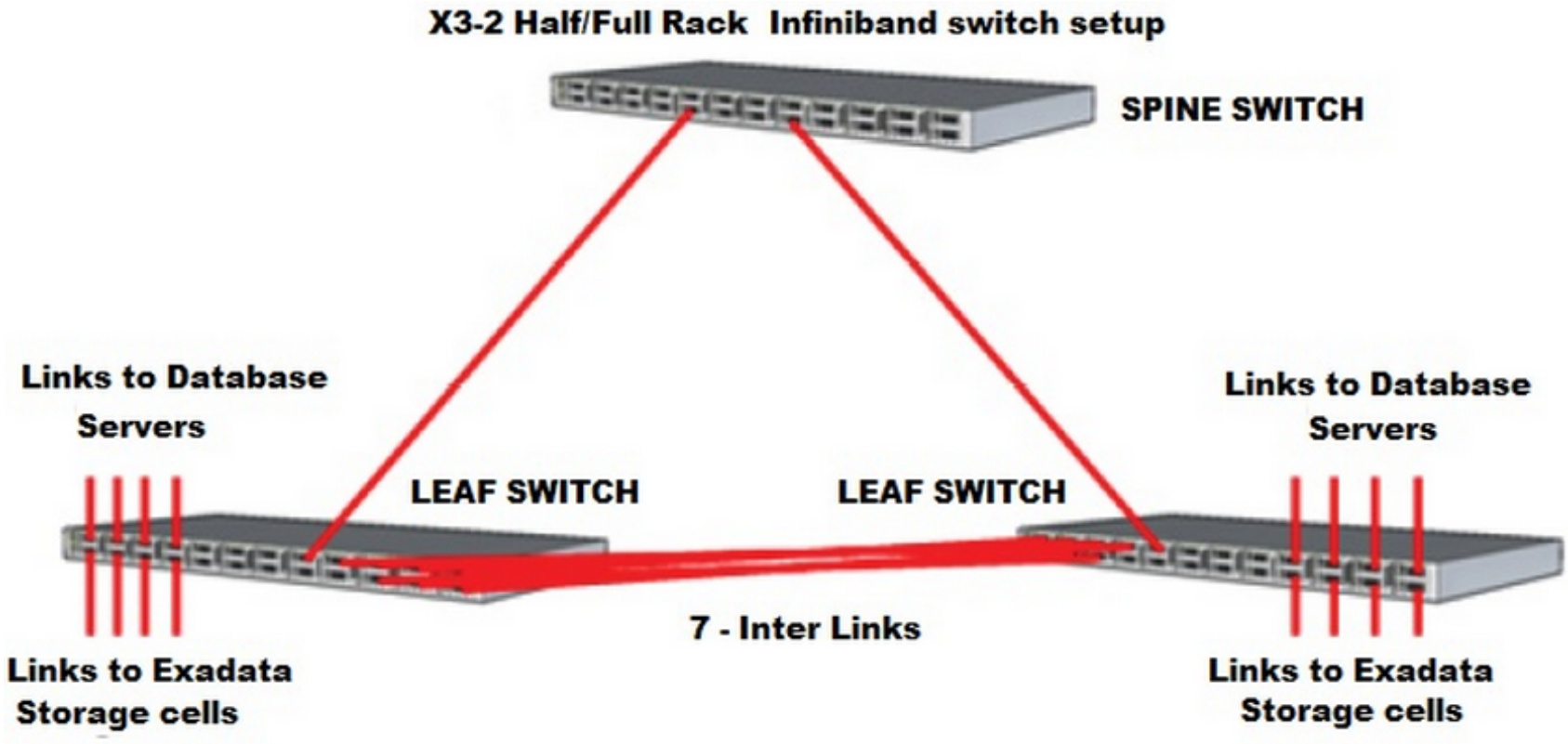
Network Architecture

Client Access

- Zugriff auf Database Server
- Ethernet
- Cisco Switche
- Multiport Connections

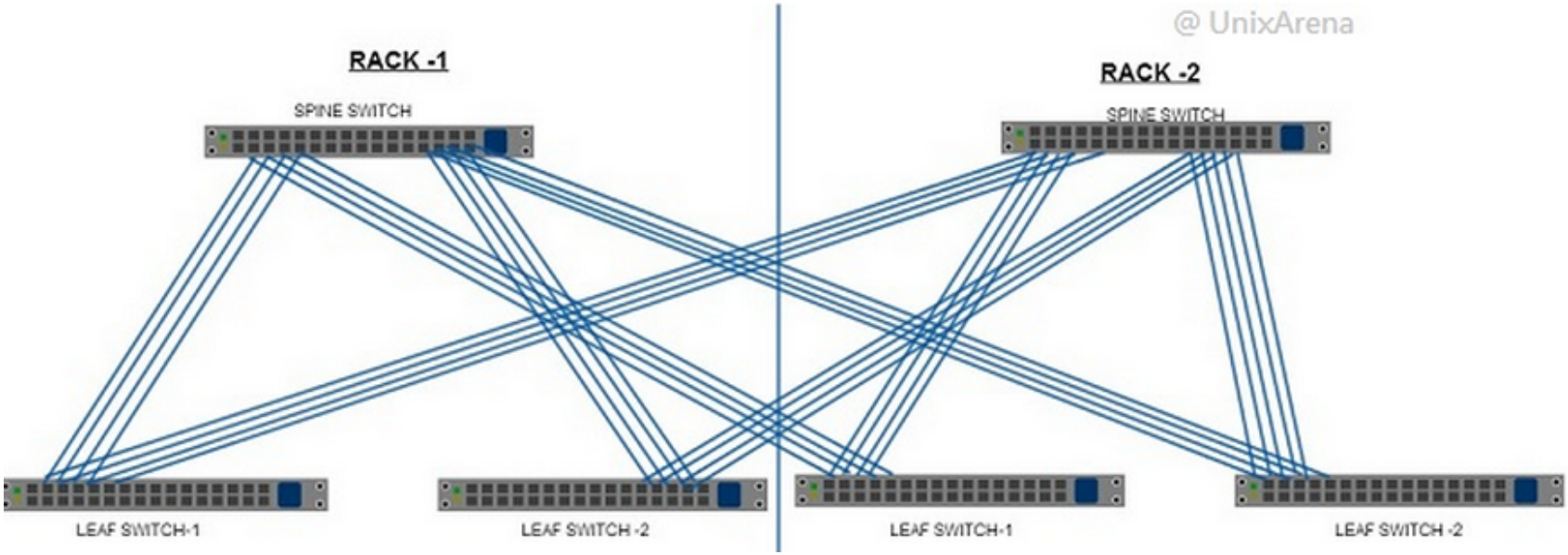
Network Architecture

InfiniBand Network



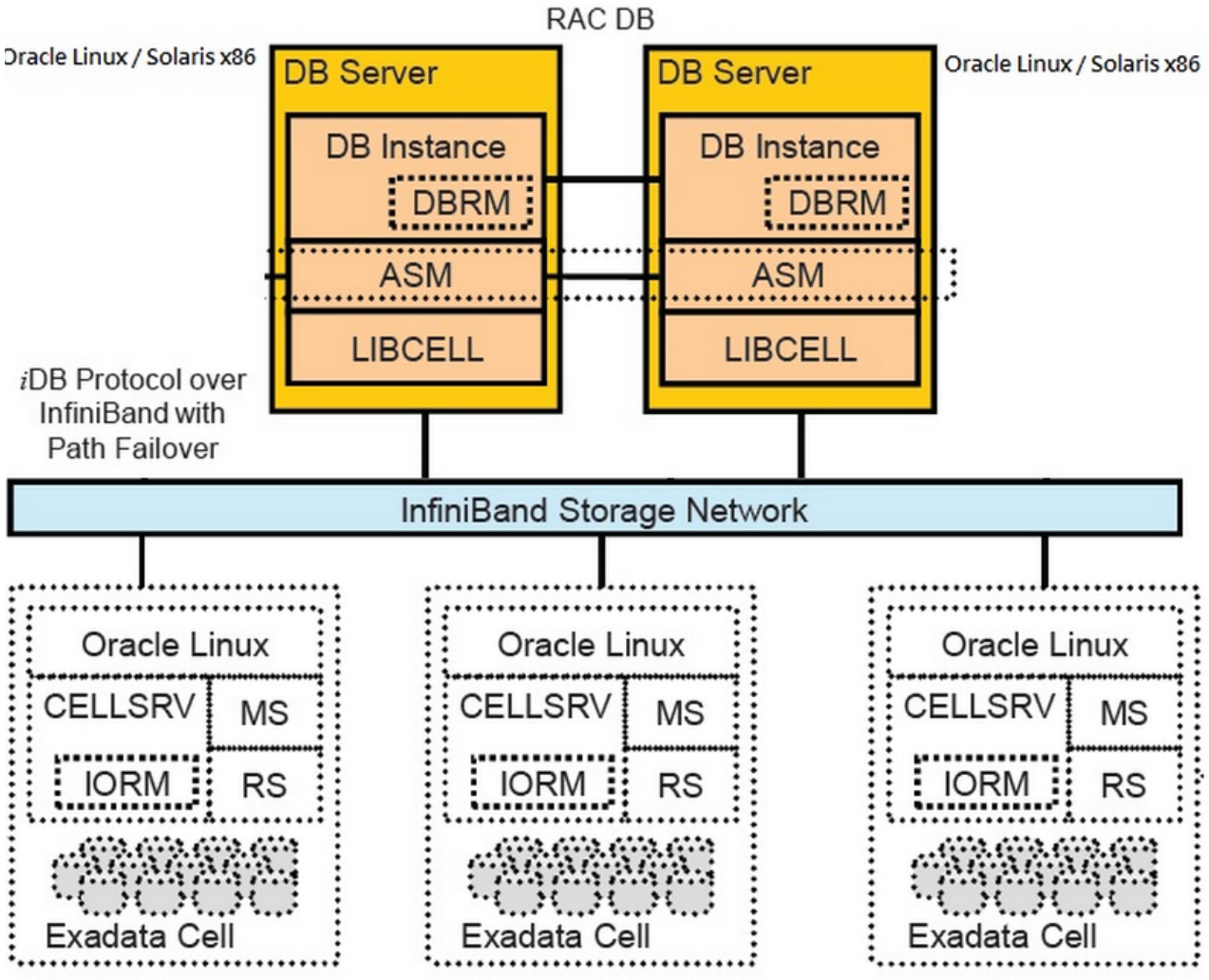
Network Architecture

InfiniBand Network



Software Architecture

Überblick



Gliederung

Besonderheiten

Smart Flash Cache

- In Storage Server integriert
- Caching häufiger Daten
- Keine Interaktion nötig
- Ermöglicht eigene Direktiven
- Kombination aus Flash Cache und Storage Server Software

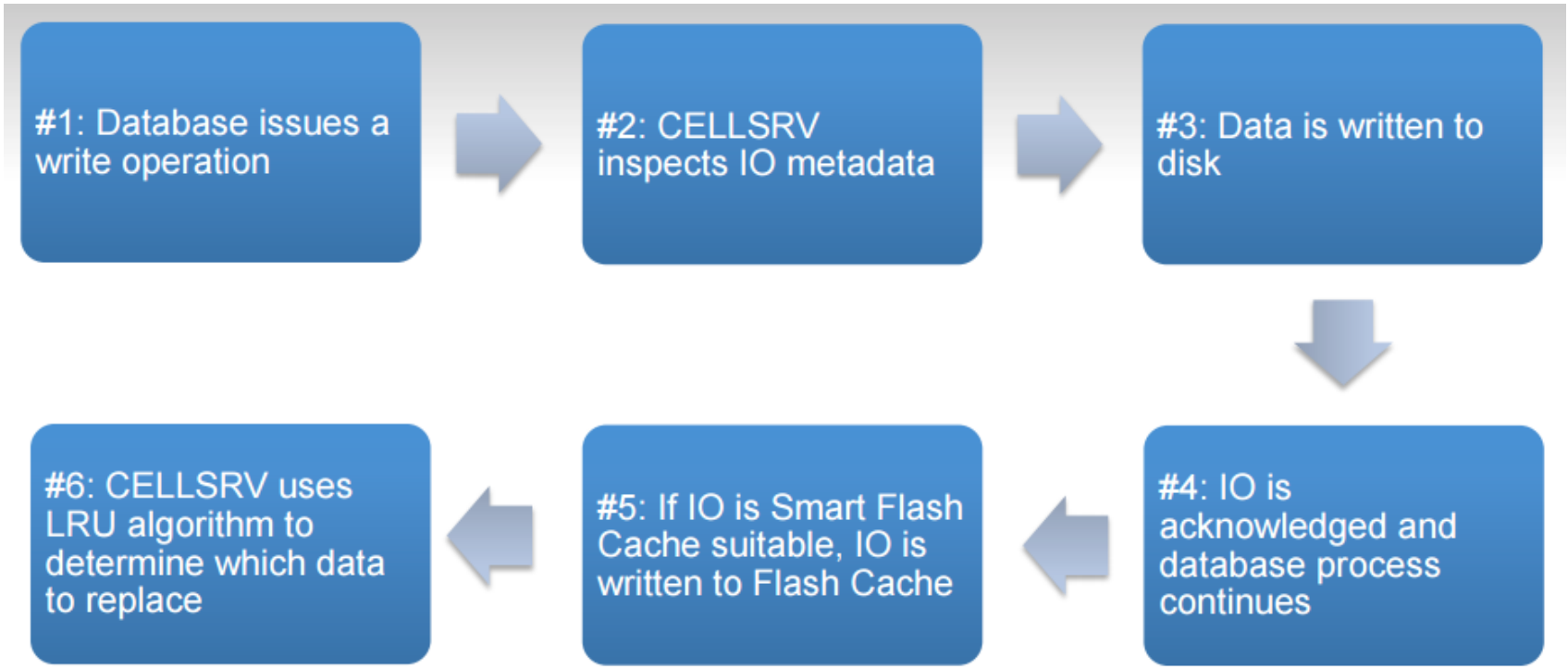
Smart Flash Cache

Funktionsweise

- I/O wird mit Meta Data getagged
- 1) Object Setting: DEFAULT, KEEP, NONE
- 2) Cache hint: CACHE, NOCACHE, EVICT
- Smart Flash Cache prüft:
  - Object Size + DEFAULT $\longrightarrow$ nicht cachen
  - Cache load spielt immer eine Rolle
- Spezielle Operationen werden generell nicht gecached (backups, export, import etc)

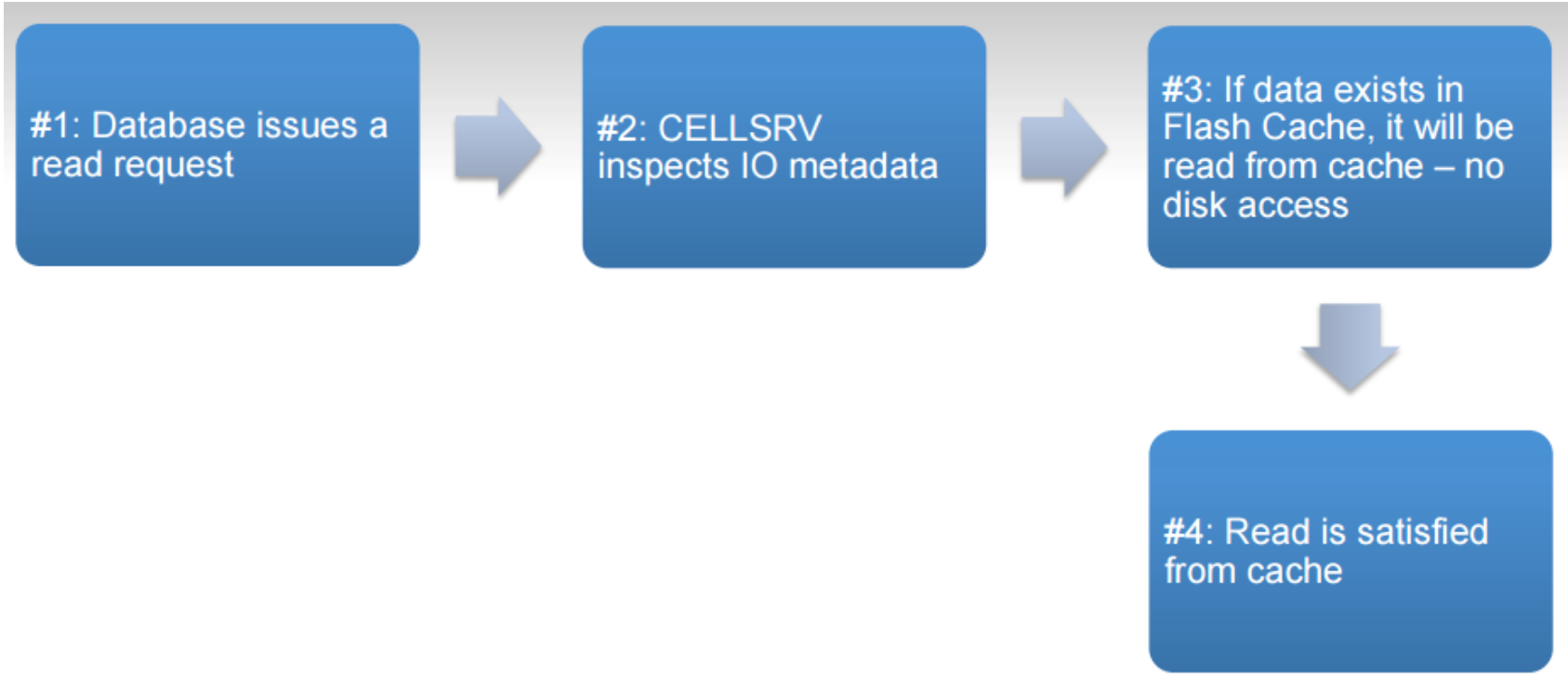
Smart Flash Cache

Write



Smart Flash Cache

Read



Gliederung

Quellen

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