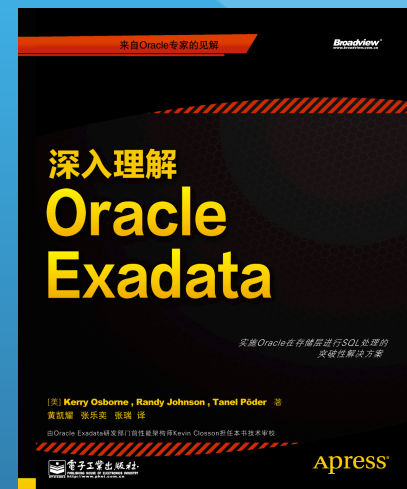# Oracle Introduces Exadata X3

The Fourth Generation of Exadata Engineered Systems

Kerry Osborne - Enkitec

whoami -

Never Worked for Oracle
Worked with Oracle Since 1982 (V2)
Working with Exadata since early 2010
Work for Enkitec (www.enkitec.com)
(Enkitec owns a Half Rack – V2/X2)
(Enkitec owns a Big Data Appliance)
Exadata Book (recently translated to Chinese)
Hadoop Aficionado

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Who is Enkitec?

- Oracle-centric Consulting Partner focused on Oracle's core Database Technology Solutions

- Exadata Specialized Partner status (*one of a handful globally*)

- 100 Exadata Implementations to date

- Database Pillar Partner for South Central US

- Dedicated, In-house Exadata and ODA Lab and Big Data Appliance (*POV, Patch Validation, Training*)

How is X3-2 Different?

- Hardware Refresh is Central to Change

    - More and Faster CPUs (cores)
    - More and Faster Flash
    - More and Faster Memory

- New Exadata Eighth Rack

    - Capacity on Demand / Reduced Cost

- Software Update

    - Write Back Cache

* Note: Architecture is Unchanged

Exadata Fourth Generation – X3

Exadata X3-2 Database Servers

More Memory, More Cores, Faster CPU, More 10Gbe

Database Server	X4170 (X2-2)	Sun Server X3-2	Improvement
CPU	6-core X5675	**8-core** E5-2690	1.3x – 1.5x
Memory	96GB (144GB)	**128GB** (256GB*)	1.3x – 1.7x
Network	4 x 1 Gbe Copper 2 x 10 Gbe Optical	4 x 1 or 10 Gbe Copper 2 x 10 Gbe Optical	3 more 10 Gbe
PCIe Bus	2.0	3.0 (uses 2.0 cards)	None / Future

* No lowering of clock speed like with X2

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Exadata Fourth Generation – X3

Exadata X3 Storage Servers

More Memory, More Flash Cache

Database Server	X4170 (X2-2)	Sun Server X3-2	Improvement
CPU	6-core L5640	6-core E5-2630L	Minimal
Memory	24GB	**64**	2.6x
Flash Cache	384GB (4 x 96GB)	**1600 GB** (4 x 400GB)	4x
PCIe Bus	2.0	3.0 (uses 2.0 cards)	None / Future

- Read / Write Performance Improved by 40%+
- Disk / Infiniband Controllers are same as X2-2
- Writes are Permanent

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Exadata Ugrades to X3

X3 Hardware can be Combined with X2 / V2 Systems

- Single Exadata can have V2/X2/X3 Components and act as a single system

- Database / RAC / ASM can Span V2/X2/X3 hardware

- Storage Expansion Racks use X3 Cells (more Flash)

- X3 Hardware Requires Storage Software Release 11.2.3.2.0

Exadata X3 Pricing – Q / H / F / X3-8

X3-2 Components and Pricing

Component	Quarter / Half / Full
Hardware	No Change – More RAM / More Cores
Storage	No Change – Same Number of Disks / Cores
Database	33% More – Increased to 8 Core CPU's

X3-8 Components and Pricing

Component	Quarter / Half / Full
Hardware	No Change – More RAM
Storage	No Change – Same Number of Disks / Cores
Database	No Change – Same Number of Cores (80)

Exadata X3 Pricing – Eighth Rack

X3-2 Eighth Rack Components and Pricing

- Same Hardware as X3-2 Quarter Rack
- Half Capacity is Enabled:

  - 8 Cores / Database Server (full disk / RAM)
  - 6 Cores / 6 Drives per Storage Cell
  - 2 Flash Cards / Cell

- Hardware List Price - $200K
- Software / Storage License Cut in Half (vs X3-2 Qtr)
- Enable Remaining Capacity via Script

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X3 Smart Flash Cache Writeback

Writeback Uses Flash Cache for Reads and Writes

- 20x more Write IOPS than Disk on X3

- 10x more Write IOPS than Disk on X2/V2

- Cached Blocks Retained in Flash

- Write Cache is Persistent Across Reboots

  - Speeds Crash Recovey
  - Improves Redo Apply for DataGuard

- Flash Card Failure is handled by ASM / Exadata

  - Can use Mirrored Data from Other Cells

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Things to Remember

- Cost of Entry to Exadata is Significantly Reduced with X3-2 Eighth Rack

- X3-2 Database Servers have 16 Cores vs 12 in X2-2 and they are faster

- X3-2 Storage Servers have 1.6TB of Flash Cache vs 384 GB in X2

- No Change in Hardware Cost for X3-2 / X3-8

- Still the BEST Platform for Oracle Database

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Contact

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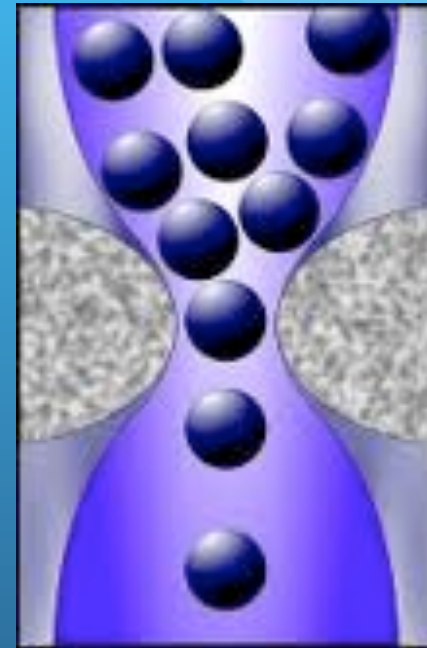www.enkitec.com

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The Big Ah Ha!

The Bottleneck on Many (Most) Large
Databases is between the Disk and the DB
Server(s)!

How to Speed Up?

    Make the Pipe Bigger/Faster
    Reduce the Volume

* The fast way to do anything is not to do it ~ Cary Millsap