CAN COMMODITY HW PERFORM BETTER THAN EXADATA

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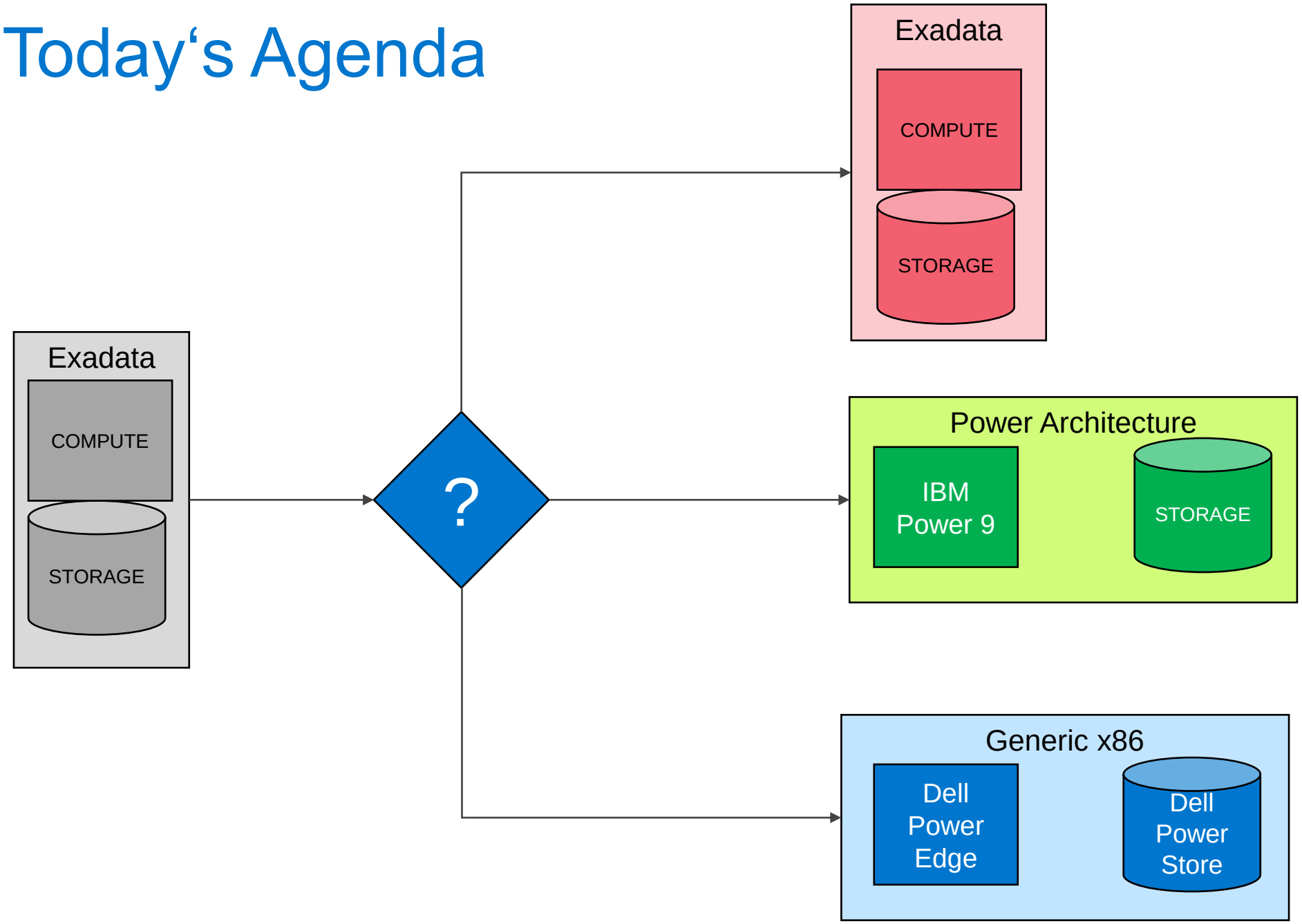
Today‘s Agenda



Exadata

Smart Flash Cache Intelligent Caching
Compression
Smart Scan Processing
Management

Hybrid Columnar

I/O Resource

2 Compute nodes and 3 cell servers

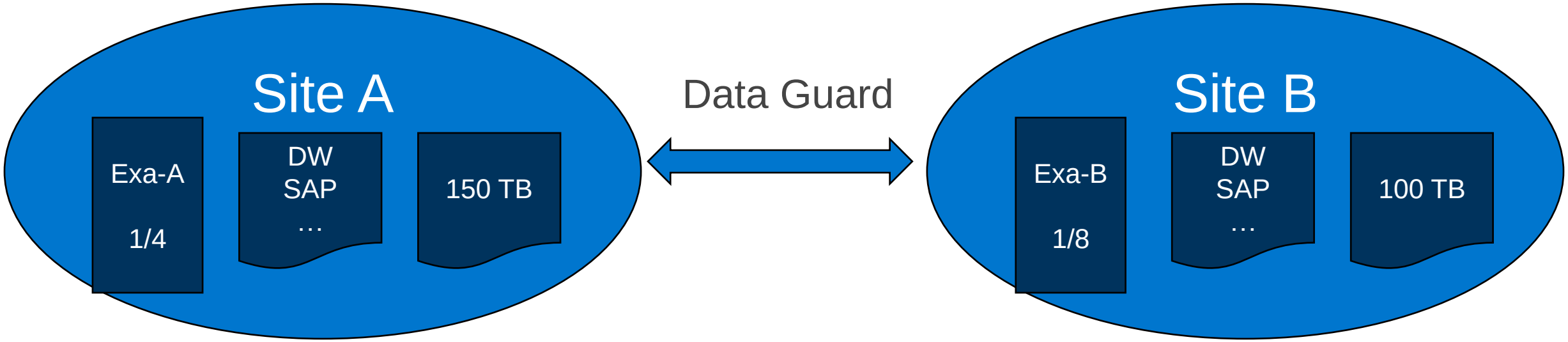
2 Compute nodes and 3 cell servers

4 Compute nodes and 7 cell servers

8 Compute nodes and 14 cell servers

½ cores disabled
½ disks unused

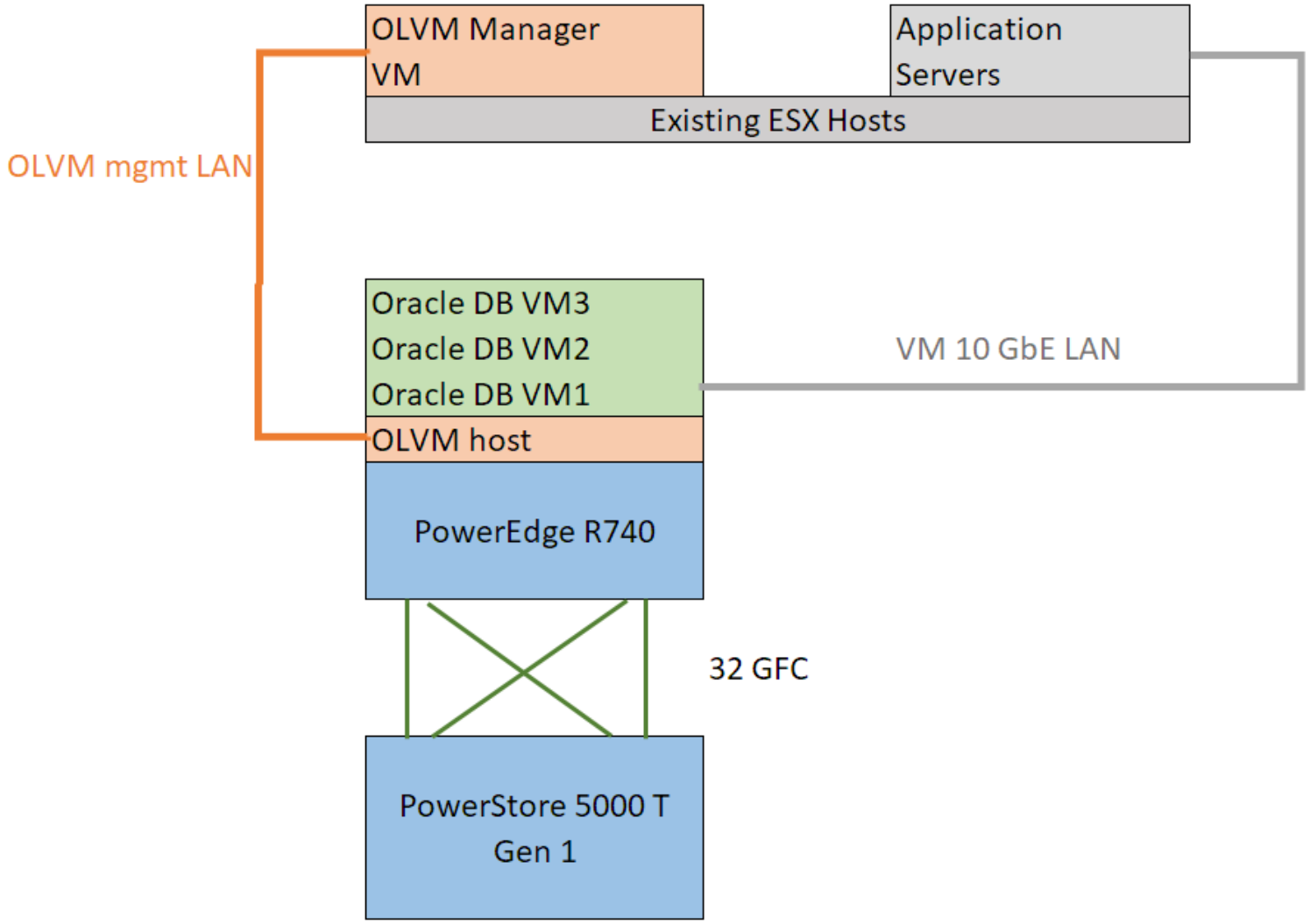
Initial Environment



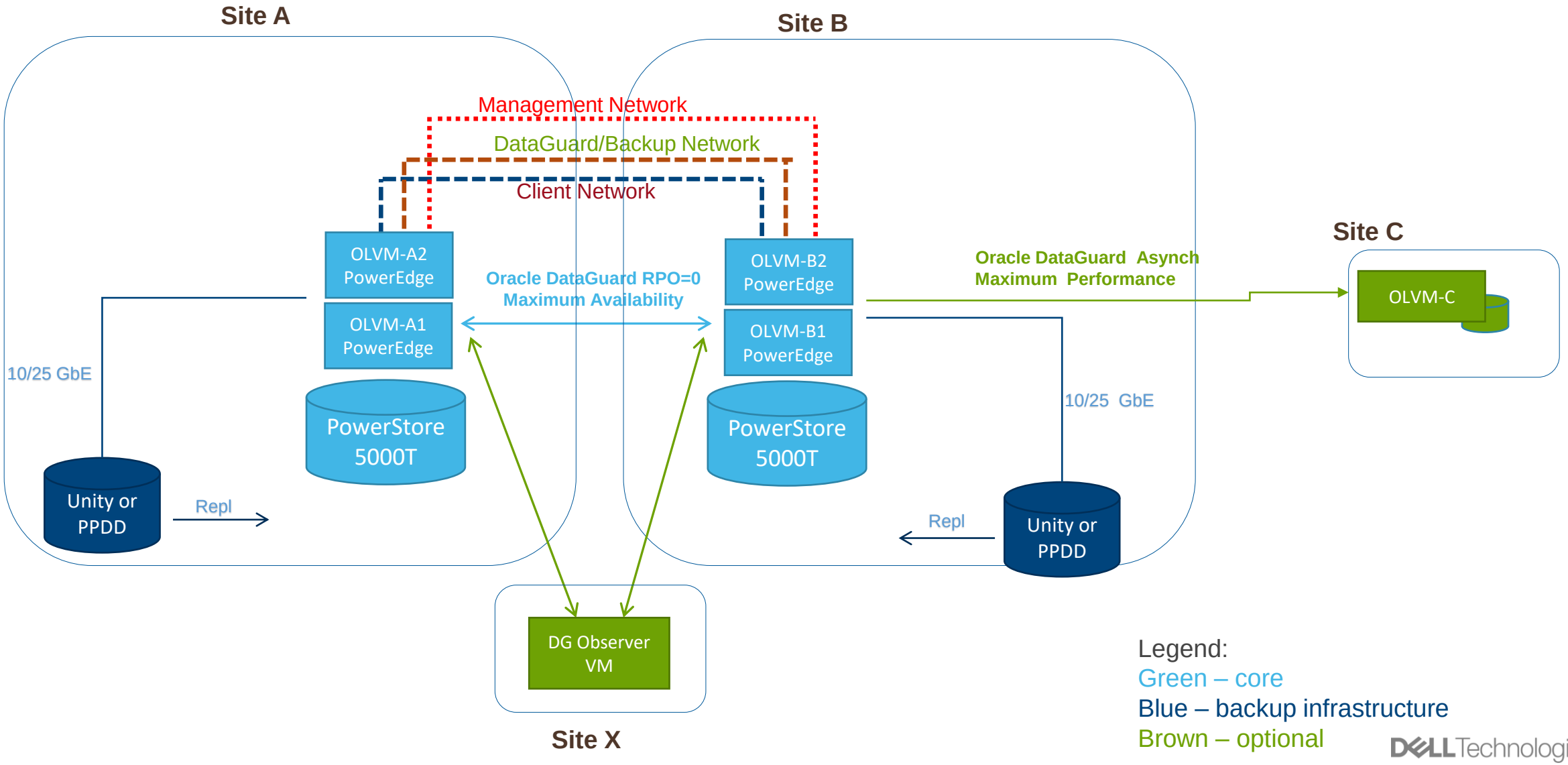
Total 50 DB instances

- KPI 1: 30% less Oracle licenses needed
- KPI 2: 15% performance improvement
- KPI 3: x86 solution: storage data reduction at least 3:1

What We Needed for the PoC?



Implementation



Legend:
Green – core
Blue – backup infrastructure
Brown – optional

Servers

1	329-BEIK	PowerEdge R740/R740XD Motherboard (ZR)
2	338-BVKL	Intel Xeon Gold 6242R 3.1G, 20C/40T, 10.4GT/s, 35.75M Cache, Turbo, HT (205W) DDR4-2933 (ZR)
1	379-BDCO	Additional Processor Selected (ZR)
1	379-BCSF	iDRAC,Factory Generated Password (ZR)
1	379-BCQV	iDRAC Group Manager, Enabled (ZR)
1	321-BCSM	Chassis with up to 8 x 2.5" SAS/SATA Hard Drives for 2CPU Configuration (ZR)
1	325-BCHU	PowerEdge 2U Standard Bezel (ZR)
1	330-BBHB	Riser Config 2, 3 x8, 1 x16 slots (ZR)
1	343-BBFG	PowerEdge R740 Shipping Material (ZR)
1	350-BBKG	Dell EMC Luggage Tag (ZR)
1	350-BBJV	No Quick Sync (ZR)
1	370-AAIP	Performance Optimized (ZR)
1	370-AFNV	3200MT/s LRDIMMs (ZR)
16	370-AGEW	128GB LRDIMM, 3200MT/s, Quad Rank (ZR)
1	385-BBKT	iDRAC9,Enterprise (ZR)
2	400-AZUT	480GB SSD SATA Mix Use 6Gbps 512 2.5in Hot-plug AG Drive, 3 DWPD, (ZR)
1	405-AAOE	PERC H730P RAID Controller, 2GB NV Cache, Adapter, Low Profile (ZR)
2	406-BBPZ	QLogic 2772 Dual Port 32Gb Fibre Channel HBA, PCIe Full Height (ZR)
4	407-BBVK	SFP+, SR, Optical Transceiver, Intel, 10Gb-1Gb (ZR)
2	407-BCBE	Dell EMC PowerEdge SFP+ SR Optic 10GbE 850nm (ZR)
1	540-BBHP	Intel X710 Dual Port 10GbE Direct Attach SFP+ Adapter, PCIe Full Height (ZR)
1	555-BCKP	Intel X710 Quad Port 10GbE SFP+, rNDC (ZR)

Dell EMC PowerEdge R750

Support for up to 28 Drives

- 24 NVMe Drives
- BOSS-S2 (2 x M.2) for boot
- HW NVMe RAID

Support for high-speed and memory capacity

- 32 DDR4 DIMMs
- 3200 MT/s
- Intel® Optane Persistent Memory 200 series

2 Socket Capable

- Up to two 3rd Generation Intel® Xeon® Scalable processors with up to 40 cores

Flexible I/O

- Up to 8 x PCIe Gen4 slots
- OCP 3.0 for network cards
- SNAP I/O Support

- Multi Vector Cooling 2.0
- Dell Direct Liquid Cooling (DLC) Support
- Industry-leading manageability and security

TARGET WORKLOADS

Database and Analytics

Ideal for XaaS, Hadoop, OLTP and Decision Support Systems workloads with flexible resources

Virtual Desktop Infrastructure

Balanced core count and GPU to support for maximum numbers of end users

Mixed Workload Standardization

For datacenters that require standardized hardware with several diverse workloads. Provides the highest capacity, performance and configuration flexibility in a single server

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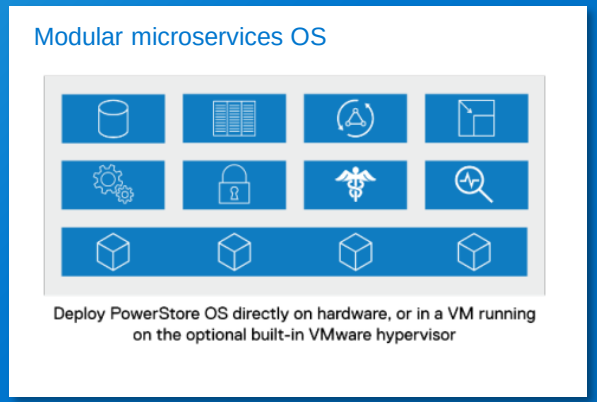
Storage

1	370-AEZR	1152GB Appliance DIMM 576GB Per Node (ZR)
8	400-BGGK	P1 25X2.5 NVME SED SSD 15.36TB (ZR)
1	406-BBQI	10GBE OPTICAL 4 PORT CARD PAIR (ZR)
8	407-BCGC	32G FC MULTIMODE OPTICAL SFP PAIR (ZR)
1	450-AIOM	Dual 1800W (200-240V) Power Supply, includes C13/C14 Power Cords (ZR)
2	565-BBJS	32GB FC 4 PORT IO MODULE PAIR (ZR)

PowerStore

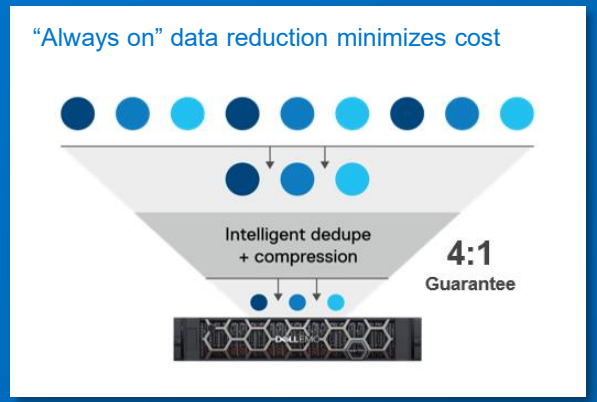
AllFlashArray – Full NVMe

Container-based design



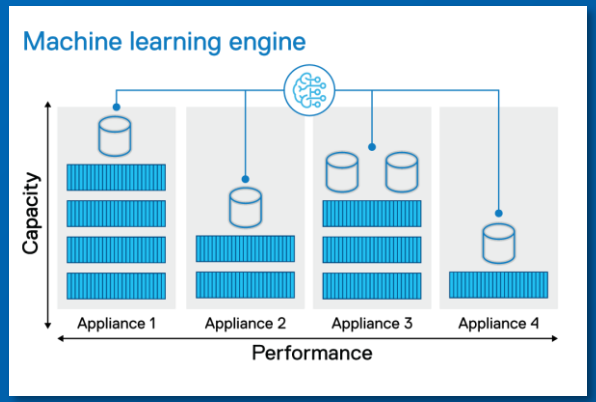
Enables rapid delivery of new PowerStore features

Self-optimizing architecture



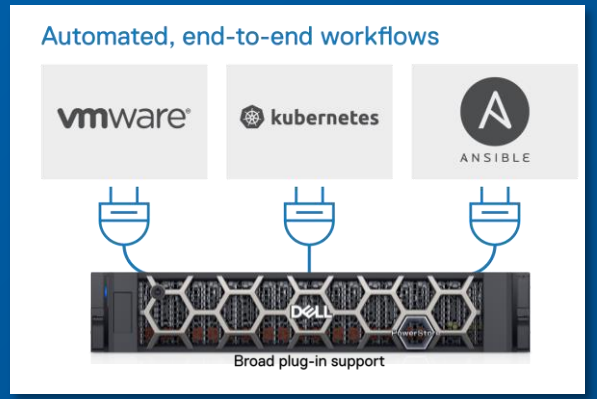
Auto-tunes efficiency, performance, resiliency

Intelligent scale-UP *and* -OUT



Respond quickly and easily to change

Programmable infrastructure



Provision PowerStore services from your platform of choice

PowerStore Family

PowerStore model	500	1200	3200	5200	9200
CPU (appliance)	24 cores 2.2GHz	40 Cores 2.4GHz	64 Cores 2.1GHz	96 Cores 2.2GHz	112 Cores 2.2GHz
Memory (appliance)	192GB	384GB	768GB	1152GB	2560GB
Max capacity (appliance)	4.71 PB Effective *(1.49 PB Raw)*	4.52 PB Effective *(1.43 PB Raw)*			
Max capacity (cluster)	18.83 PB Effective[2] *(5.96 PB Raw[2])*	18.06 PB Effective *(5.71 PB Raw)*			
Max drives (appliance / cluster)	97 / 388[2]	93 / 372			
AppsON	NA	X models only			
Drive types	NVMe SSD/SCM	NVMe SSD/SCM			
Embedded ports[1]	25/10/1 GbE	25/10/1 GbE or 10/1 GbE BaseT			
Expansion (per appliance)	Add up to 3 expansion enclosures per appliance				
Clustering	Up to four appliances (mix and match any model/config[3])				
IO Modules	32/16/8 Gb FC, 100/25/10 GbE, 10/1 GbE BaseT				
Front-end connectivity	FC: 32Gb NVMe/FC, 32/16/8Gb FC; Ethernet: 100/25/10 GbE NVMe/TCP, iSCSI, File				

Implementation

- Smaller DBs
  - Backup/Restore
  - Less than 1 hour downtime
- Critical DBs
  - Oracle Data Guard
  - Less than 5 min downtime (if HCC not used)
- Some performance optimizations after migration
  - Adding indexes

Licensing and Pinning

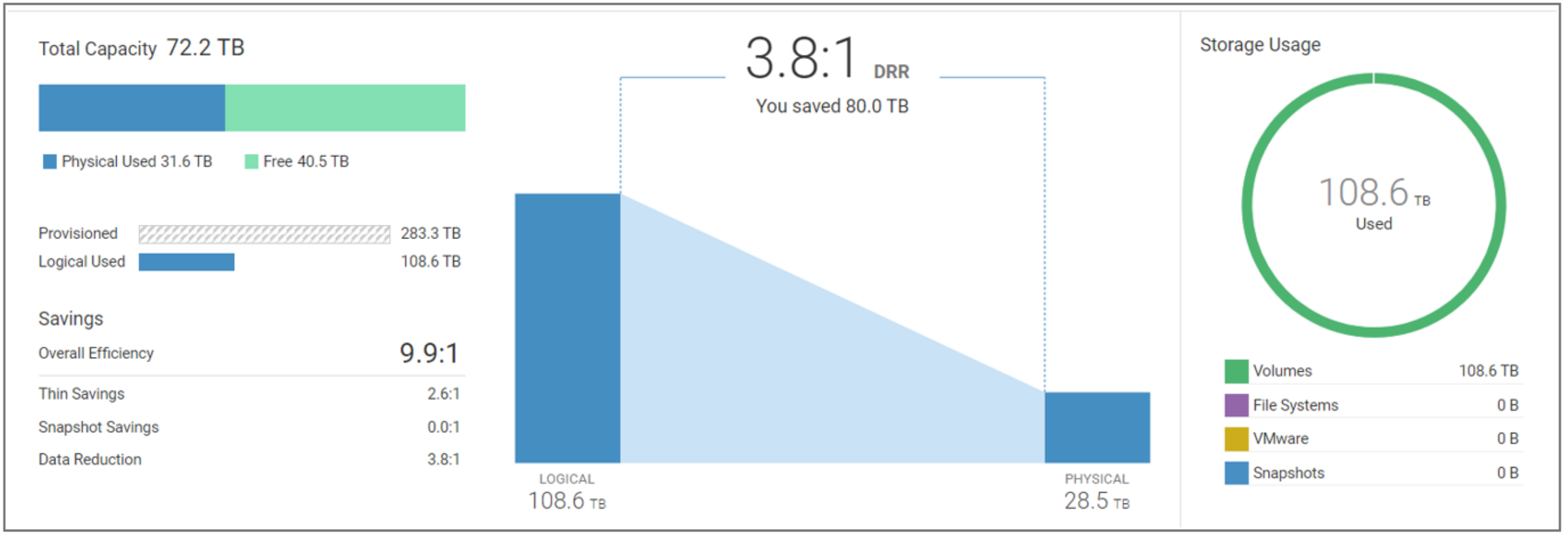
```
[root@olvm2-a ~]# lscpu -e
CPU NODE SOCKET CORE L1d:L1i:L2:L3 ONLINE MAXMHZ     MINMHZ
0   0    0      0    0:0:0:0       yes    4100.0000 1200.0000
1   1    1      1    1:1:1:1       yes    4100.0000 1200.0000
2   0    0      2    2:2:2:0       yes    4100.0000 1200.0000
3   1    1      3    3:3:3:1       yes    4100.0000 1200.0000
4   0    0      4    4:4:4:0       yes    4100.0000 1200.0000
5   1    1      5    5:5:5:1       yes    4100.0000 1200.0000
```

	socket 0			socket 1	
	numa node 0			numa node 1	
Core 0	vCPU0	0	vCPU1	16	8	24
Core 1	vCPU2	1	vCPU3	17	9	25
Core 2		2		18	10	26
Core 3		3		19	11	27
Core 4		4		20	12	28
Core 5		5		21	13	29
Core 6		6		22	14	30
Core 7		7		23	15	31

KPIs Achivements

- KPI 1: 30% less Oracle licenses needed — 34% reduction
- KPI 2: 15% performance improvement — ~18% improvement
- KPI 3: x86 solution: storage data reduction at least 3:1 — 3,8:1 DRR

PowerStore DRR



Conclusion

- Performance and Capacity
  - PowerStore performance vs Exadata storage node optimization
  - PowerStore data reduction vs Exadata HCC
- Costs
  - Great TCO savings due to generic HW
  - Licenses –> pinning
- Availability
  - HA (OLVM Cluster) & DR (Data Guard)
- Flexibility