



**SHARE in Boston 7456
Oracle Solutions on
Linux for IBM System z
August 4, 2010**

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- Oracle 23 Years, PeopleSoft 23 Years, JD Edwards 35 Years, Siebel 13 Years
- Mission: Provide the strongest combination of solutions to maximize value of client investments

Mutual Executive Commitment

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- Dedicated, executive-led IBM Alliance Team

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- Hardware and Software support via Applications Unlimited

Market Leading Services Practice

- ~ 5,500 Successful Joint Services Projects
- > 10,000 dedicated to Oracle consultants worldwide

Vibrant Technology Collaboration

- Substantial investment in skills and resources
- Dedicated International Competency Center

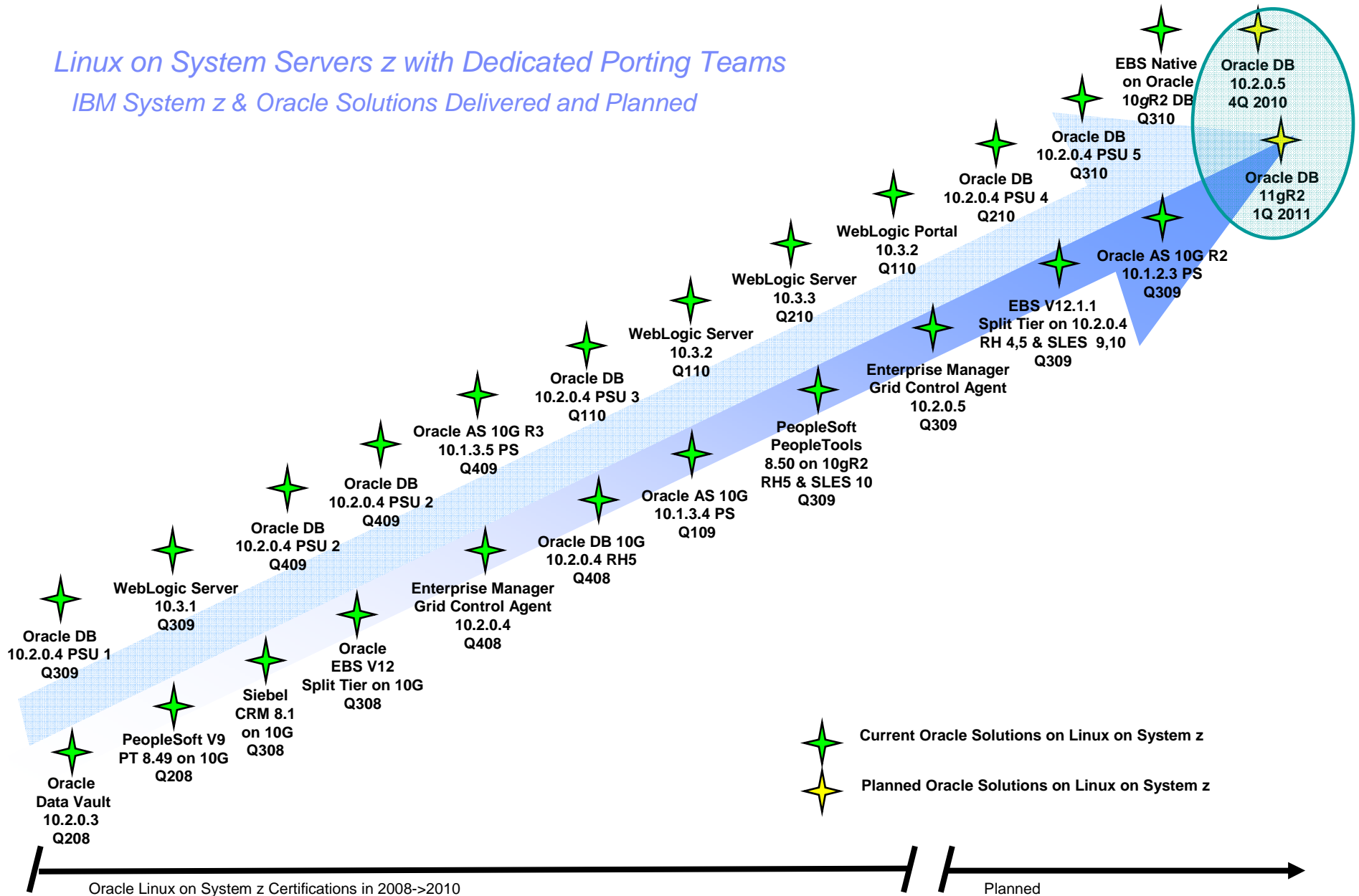
Unrivalled Joint Customer Support Process

- Dedicated On-Site Resources
- Significant Program Investments

Oracle E-Business Suite – The Newest Solution Delivered on Linux on System z Servers



Linux on System Servers z with Dedicated Porting Teams
IBM System z & Oracle Solutions Delivered and Planned



Oracle's Dedicated Level 2 System z Support

Enhancement to existing Support for Linux on System z Servers

- Manager, Raimund Reng
- System z skilled and knowledgeable
- WW Support
- Level 2 support team
- Request z team connected when z specific problems
- Joint User/Oracle/IBM Conference Calls



My Oracle Support Communities

- **Migration from the older Forum format**
- **Actively managed and moderated**
- **Encourages user posts**
- **Spotlight and highlight posts**
- **Specific community for System z customers**
- **Accessed via My Oracle Support (Metalink)**
 - ▶ **support.oracle.com, click on Community, Subscribe to and Click on zSeries Platforms**
- **Announcements will be made in Community Featured Section !**
 - ▶ **“Webinars” One hour “brownbag” type presentations given by Oracle Support**
 - ▶ **First one planned in December 2010**
 - ▶ **Topic will be ASM**
- **Join the Oracle zLinux community and help to shape the future:**
 - ▶ **Provide feedback**
 - ▶ **Exchange ideas**
 - ▶ **Get answers**
 - ▶ **Expand networks**
 - ▶ **Share successes**



International zSeries Oracle SIG

- **Independent User Organization**
- **Supported by IBM and Oracle**
- **Annual Conference**
 - Next is April 2011, Orlando (Oracle Collaborate)
- **Oracle and IBM requirements**
- **Longest running still active Oracle User Group**
- **Website www.zseriesoraclesig.org**
 - Presentations, Links, Bulletin Board

To meet the rapid growth of Linux, server virtualization and IT Optimization, IBM and Oracle have increased development and support investments to deliver complete, open and integrated solutions to our customers. Specifically, IBM and Oracle have:

- ✓ Expanded porting resources to make Oracle technology infrastructure current and complete for Linux on System z (“LoZ”)
- ✓ Dedicated resources to engage customers in design, proof-of-concept and benchmark activities.
- ✓ IBM is investing in >40 development and tech staff to bring LoZ solutions to market
- ✓ IBM is investing in hardware resources for Oracle development on LoZ
- ✓ Aligned our technical support organizations to simplify problem resolution
 - ✓ Dedicated Oracle System z team in Oracle Support
- ✓ Delivered 5 consecutive quarters of Parity of Oracle 10gR2 Database Patch Set (PSU) delivery on LoZ to other Oracle platforms
- ✓ Published IBM and Oracle customer collateral covering various topics regarding Oracle on Linux on System z, some examples include:
 - Joint FAQ: <http://www-03.ibm.com/support/techdocs/atsmastr.nsf/WebIndex/PRS4016>
 - Redbooks: [http://www.redbooks.ibm.com/abstracts/sg247634.html?Open Status on joint development 11g r2](http://www.redbooks.ibm.com/abstracts/sg247634.html?Open+Status+on+joint+development+11g+r2)

Thank
You



Linux on IBM System z

Implementing **Oracle** Database on Linux for System z

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Agenda

- Objectives
- Oracle DB on Linux on z (Loz) through the eyes of availability
- Getting started
 - Sizing
- Proof of Concept
 - z/VM, Linux, Oracle DB, disk
 - Load the database and test
 - Performance evaluation
- Production Readiness
- Oracle Applications
- Summary


Objectives

- Awareness of Oracle DB on Linux on z
- How to get started with Oracle DB in a systematic way
- How to run a competent Proof of Concept (PoC)
- How to measure the PoC's performance
- How to make the environment production ready

Presentation based on Oracle DB 10gR2



Linux on IBM System z

Oracle DB on Linux on z (Loz) through the
eyes  of availability

aka – Begin with the end in mind

Definitions

- **High Availability (HA)** – Provide service during defined periods, at acceptable or agreed upon levels, and **masks unplanned outages from end-users**. It employs Fault Tolerance; Automated Failure Detection, Recovery, Bypass Reconfiguration, Testing, Problem and Change Management
- **Continuous Operations (CO)** -- Continuously operate and **mask planned outages from end-users**. It employs Non-disruptive hardware and software changes, non-disruptive configuration, software coexistence.
- **Continuous Availability (CA)** -- **Deliver non-disruptive service** to the end user 7 days a week, 24 hours a day (there are no planned or unplanned outages).

The goal is to strive to provide **Continuous Availability**.



Definitions provided by the HA Center of Competence in Poughkeepsie,
NY

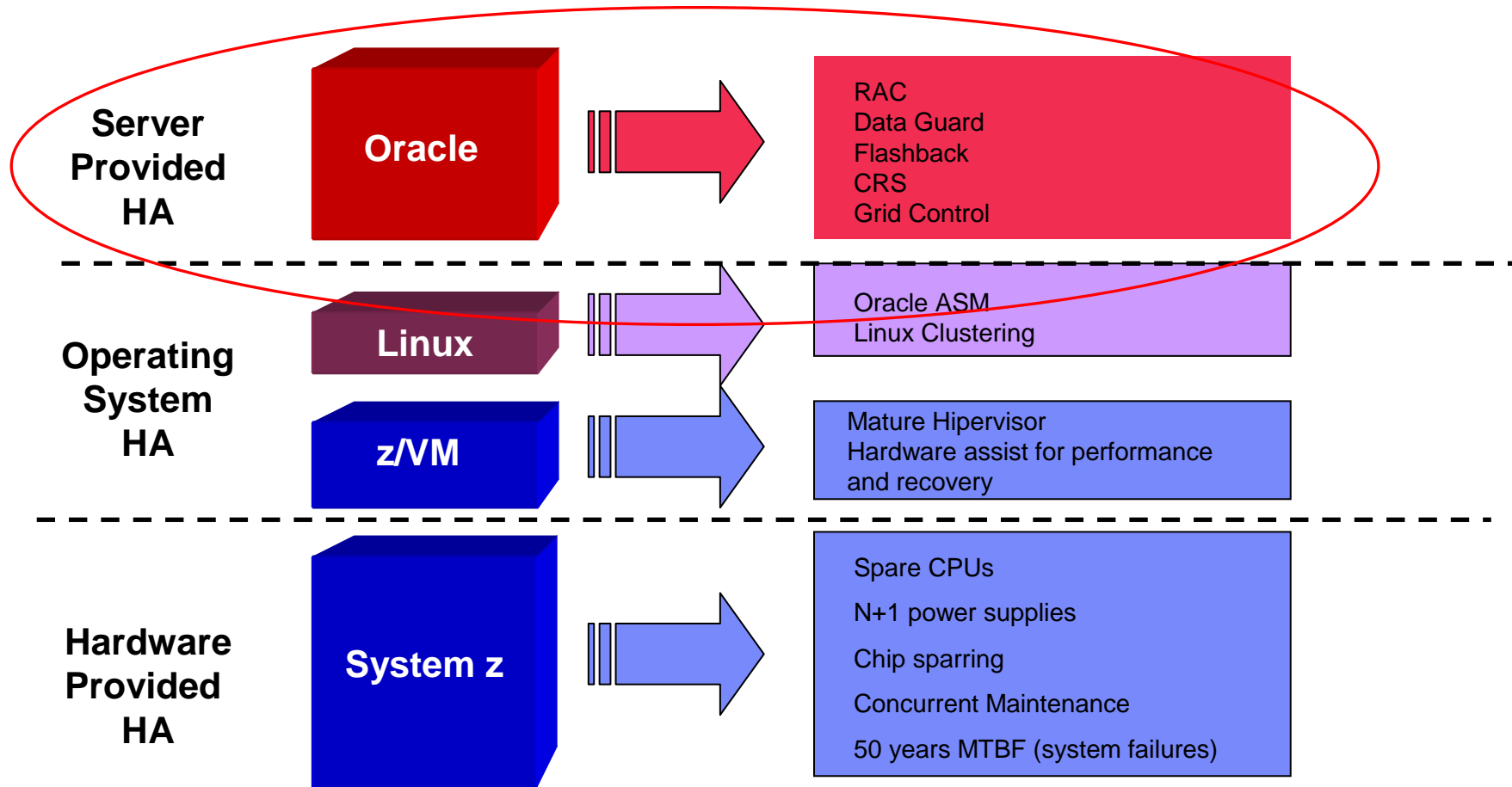
Fundamentals of High Availability

- **Redundancy, Redundancy, Redundancy** – Duplicate everything to eliminate single points of failure.

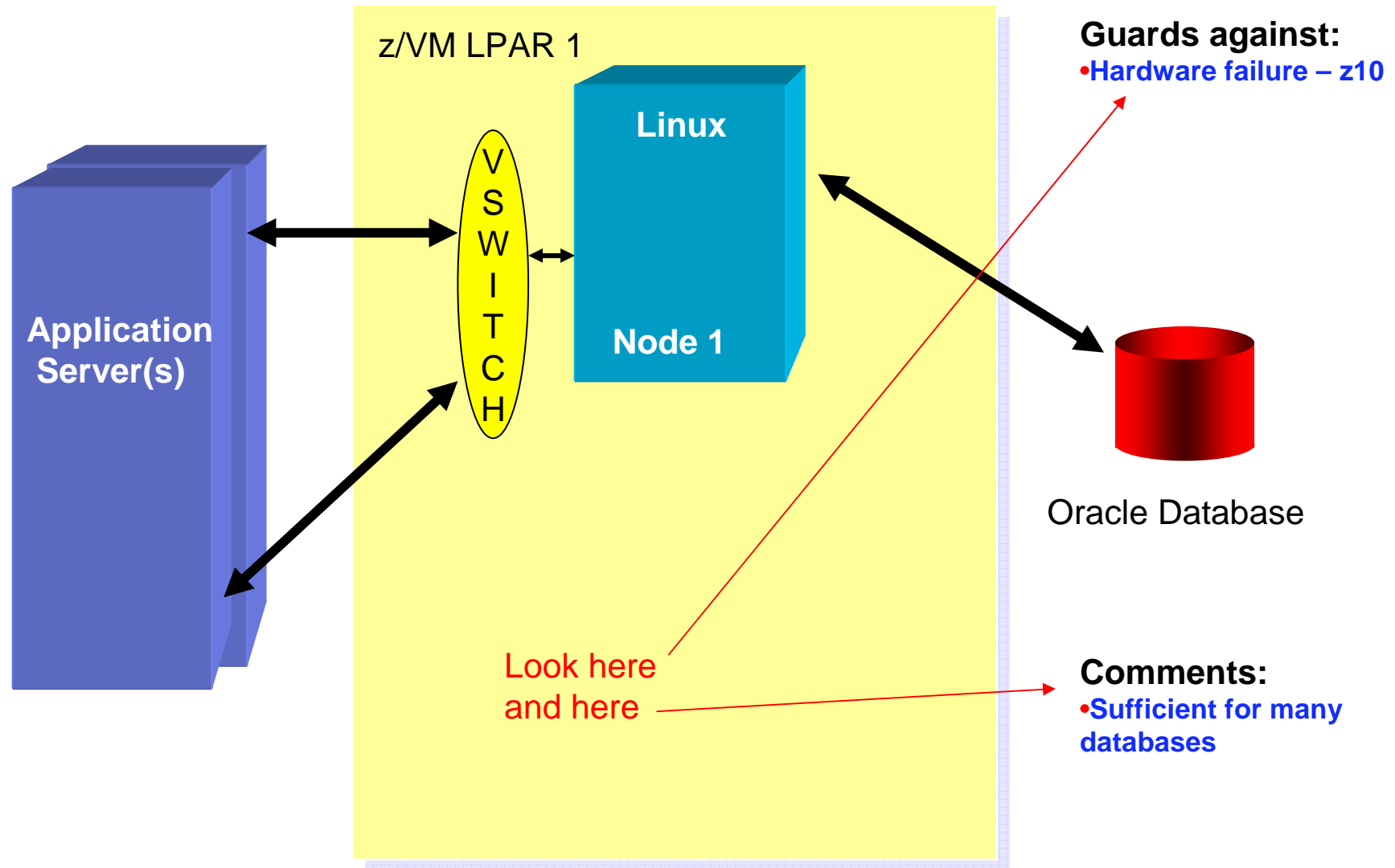
- **Protect Data Consistency** – Provide ability for data and file systems to return to a point of consistency after an unplanned outage.
 - Journaling databases
 - Journaling file systems
 - Mirroring
 - Routine database backups

- **Automate Detection and Failover** -- Let the system do the work in order to minimize outage windows.
 - Multipathing
 - VIPA
 - Monitoring and heart beating
 - Clustered middleware
 - Clustered operating systems

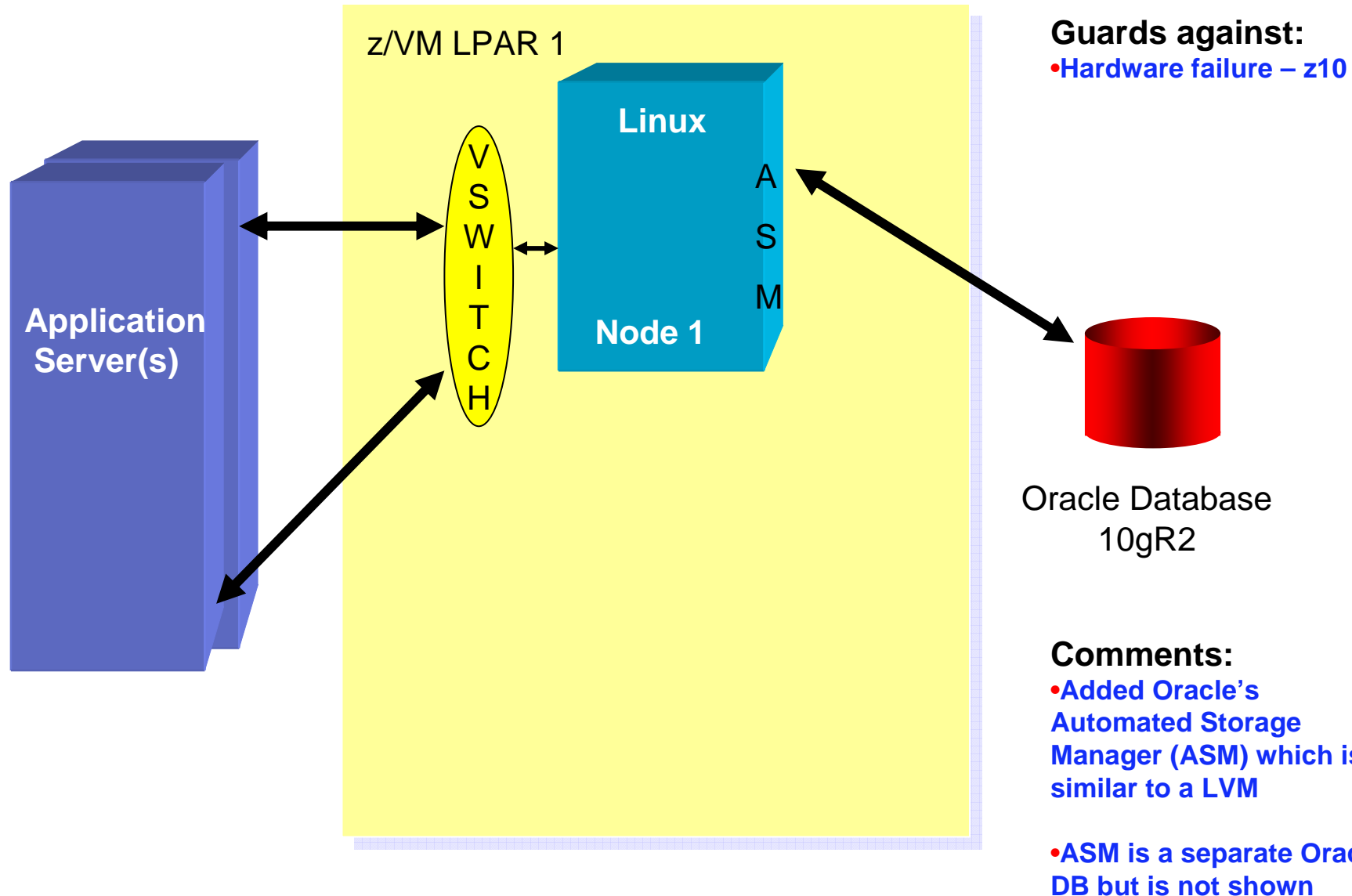
Building Blocks of HA for Oracle DB on Linux for System z



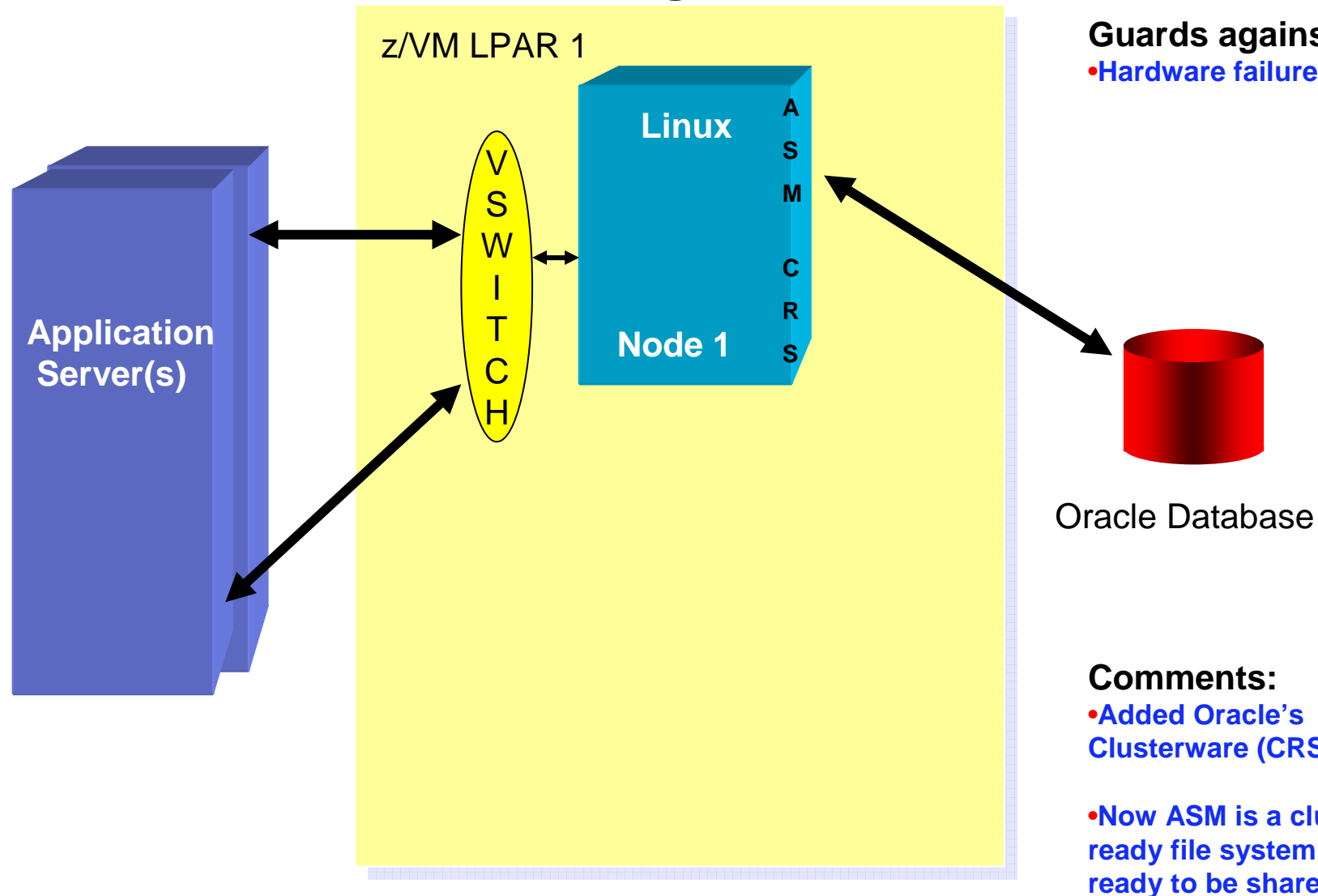
Oracle Database without Oracle MAA



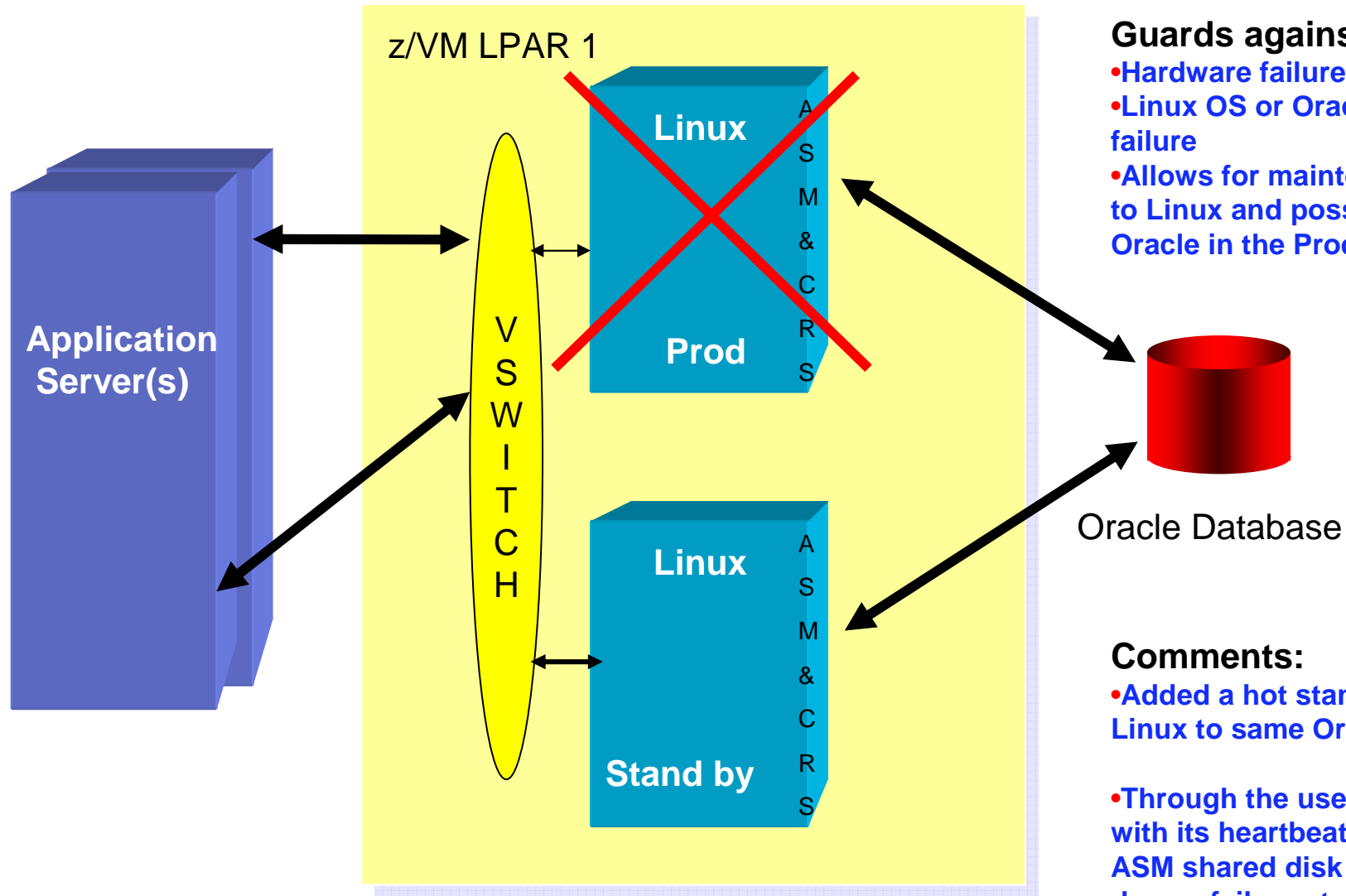
Oracle Database - building Oracle MAA



Oracle Database - building Oracle MAA



Oracle Database - building Oracle MAA - Hot standby



Guards against:

- Hardware failure – z10
- Linux OS or Oracle DB failure
- Allows for maintenance to Linux and possibly Oracle in the Prod guest

Oracle Database

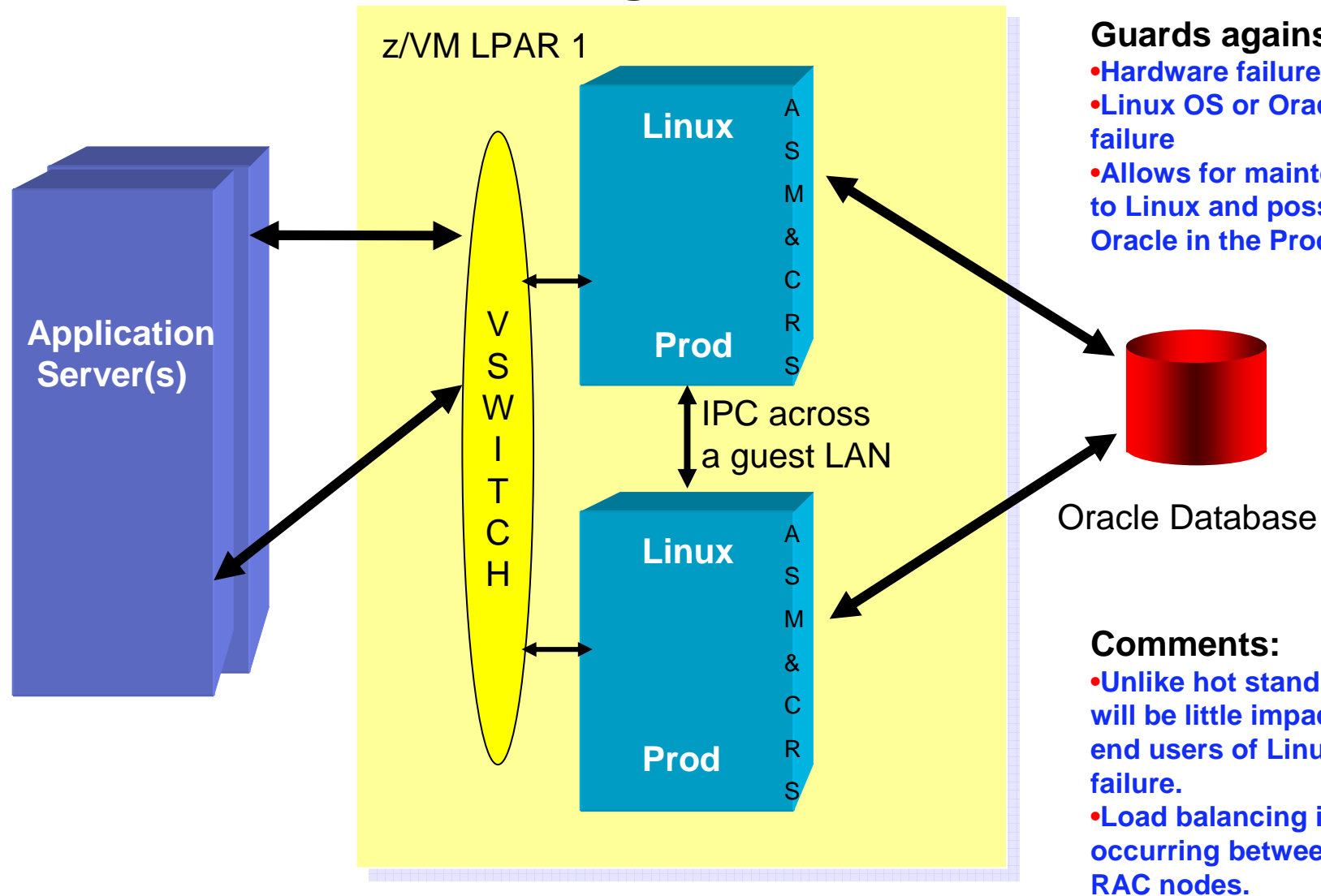
Comments:

- Added a hot standby Linux to same Oracle DB.
- Through the use of CRS, with its heartbeat, and ASM shared disk storage does a failover to the stand by Linux guest.

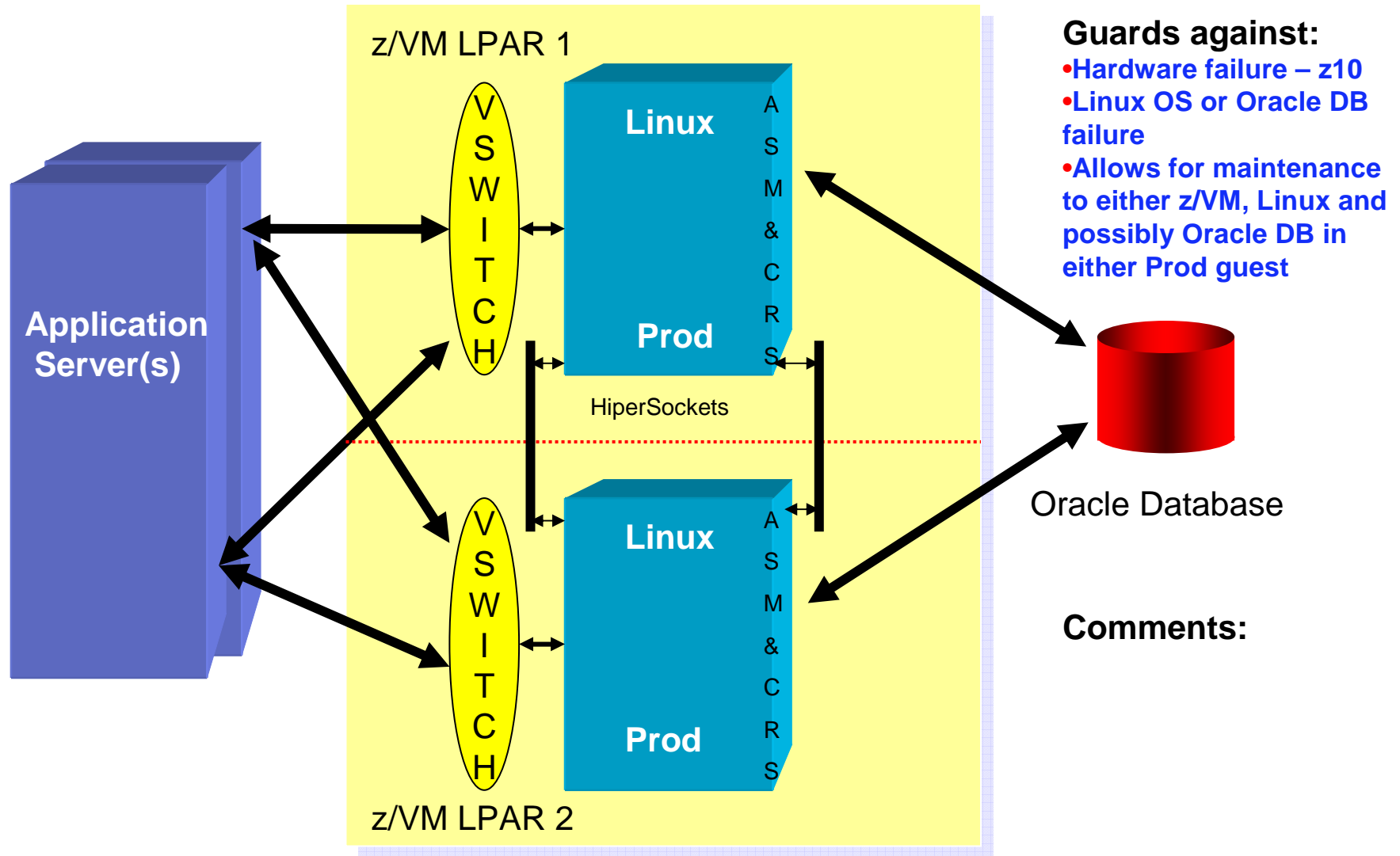
Oracle Hot Stand By Approach Comments

- Can also be accomplished across LPARs using HiperSockets connections.
- Can be accomplished across different System z platforms using appropriate network connectivity.
- Only allowed between Oracle databases using the same binaries (i.e. Linux on z in this case)
- An outage that can affect users can be of a short duration (short duration?)

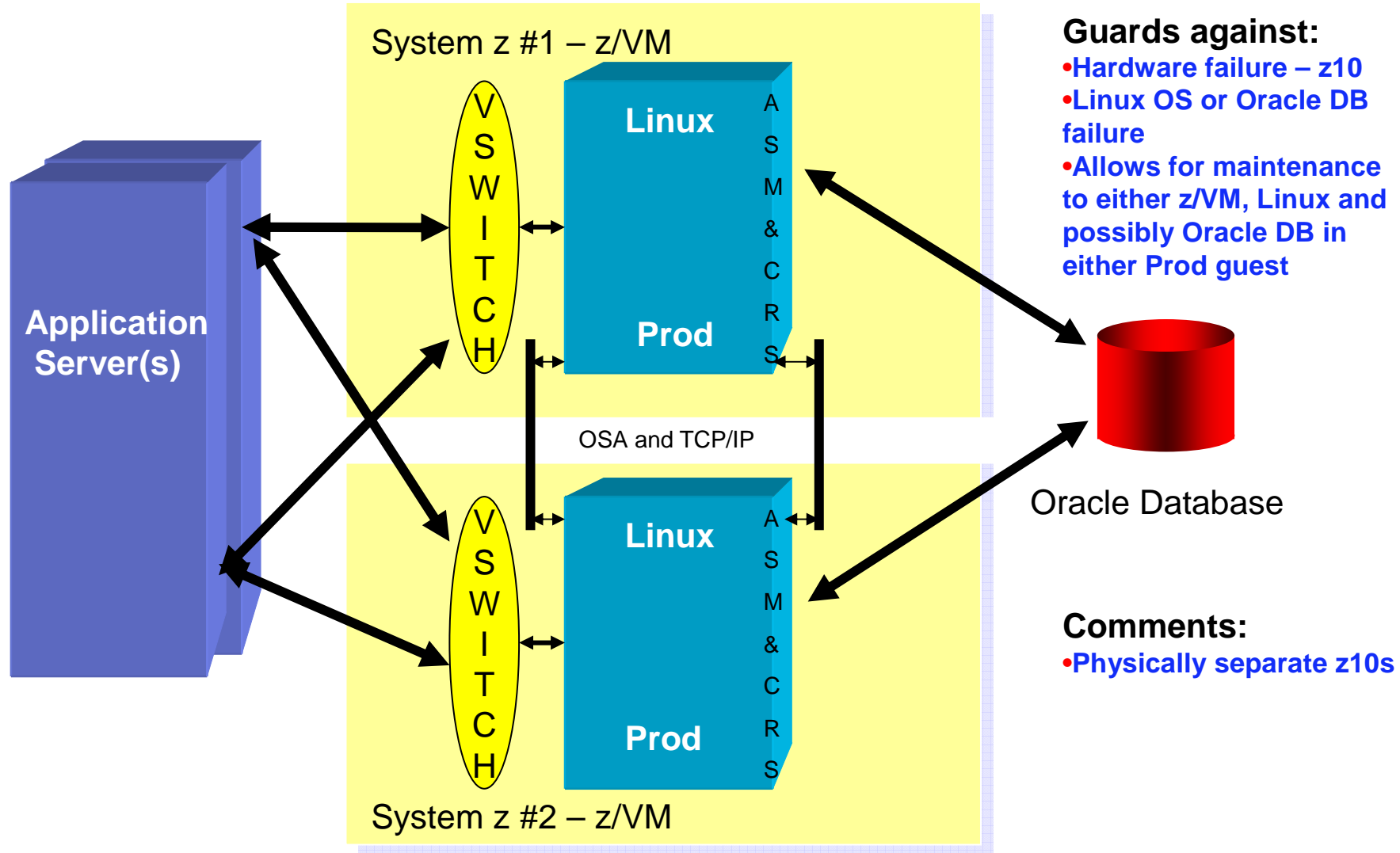
Oracle Database building Oracle MAA - RAC



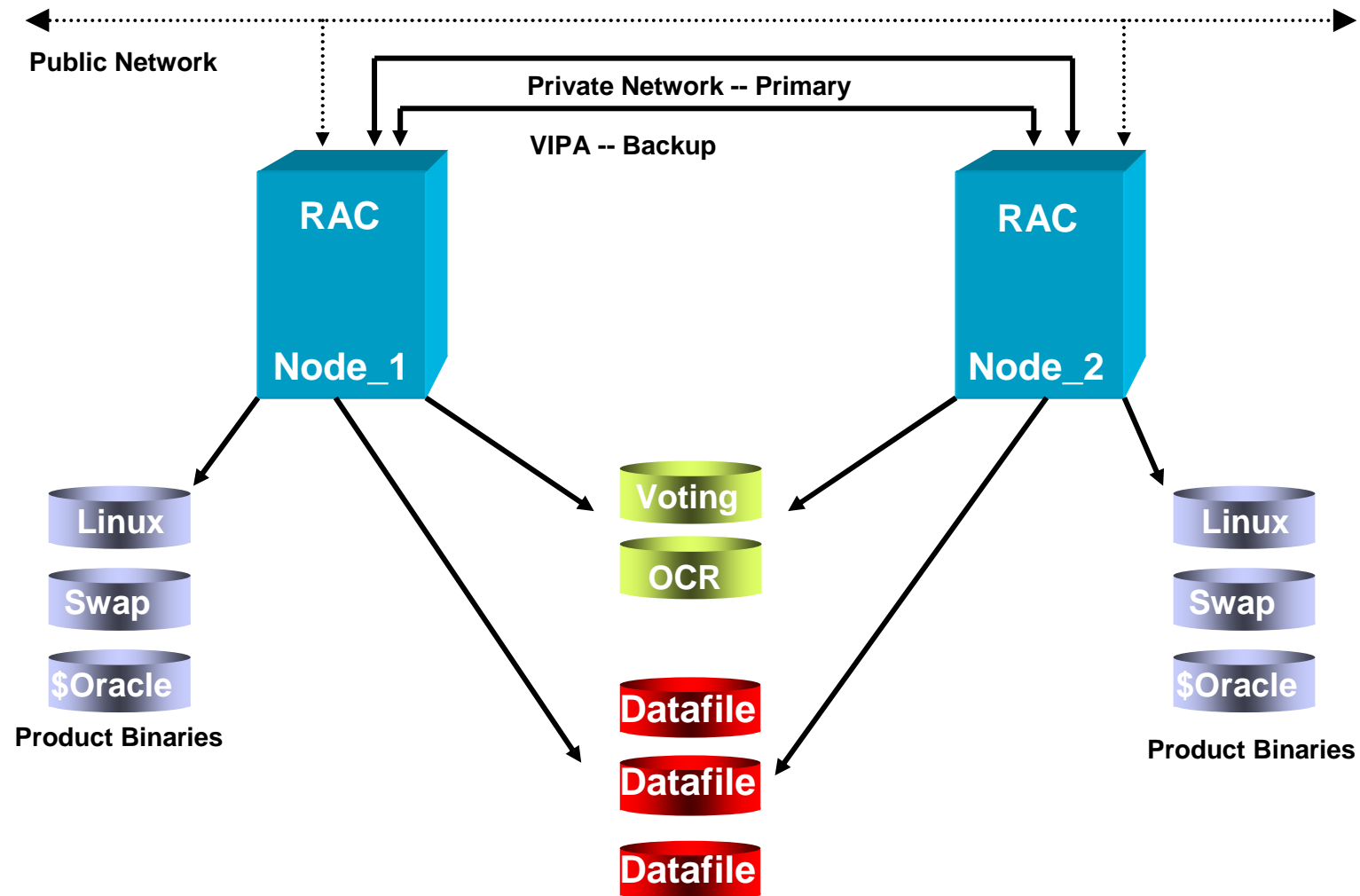
Oracle Database - building Oracle MAA - RAC



Oracle Database - building Oracle MAA - RAC



Overview of Major RAC Components



Oracle RAC as an HA Solution

- RAC implies a HA Solution
 - RAC provides high availability for database instances
- Have you taken into account single points of failure for:
 - Disk failures?
 - IPC Interconnect failures?
 - Are the servers on the same electrical circuit?
 - Are the servers under the same sprinkler?
 - If the nodes are in a different building, is it a single cable run?
 - Did you do appropriate capacity planning for a node or multiple node failures?
- Your availability is as solid as your planning for any platform on which you implement a RAC solution
 - If you plan well, it is a very Highly Available software solution

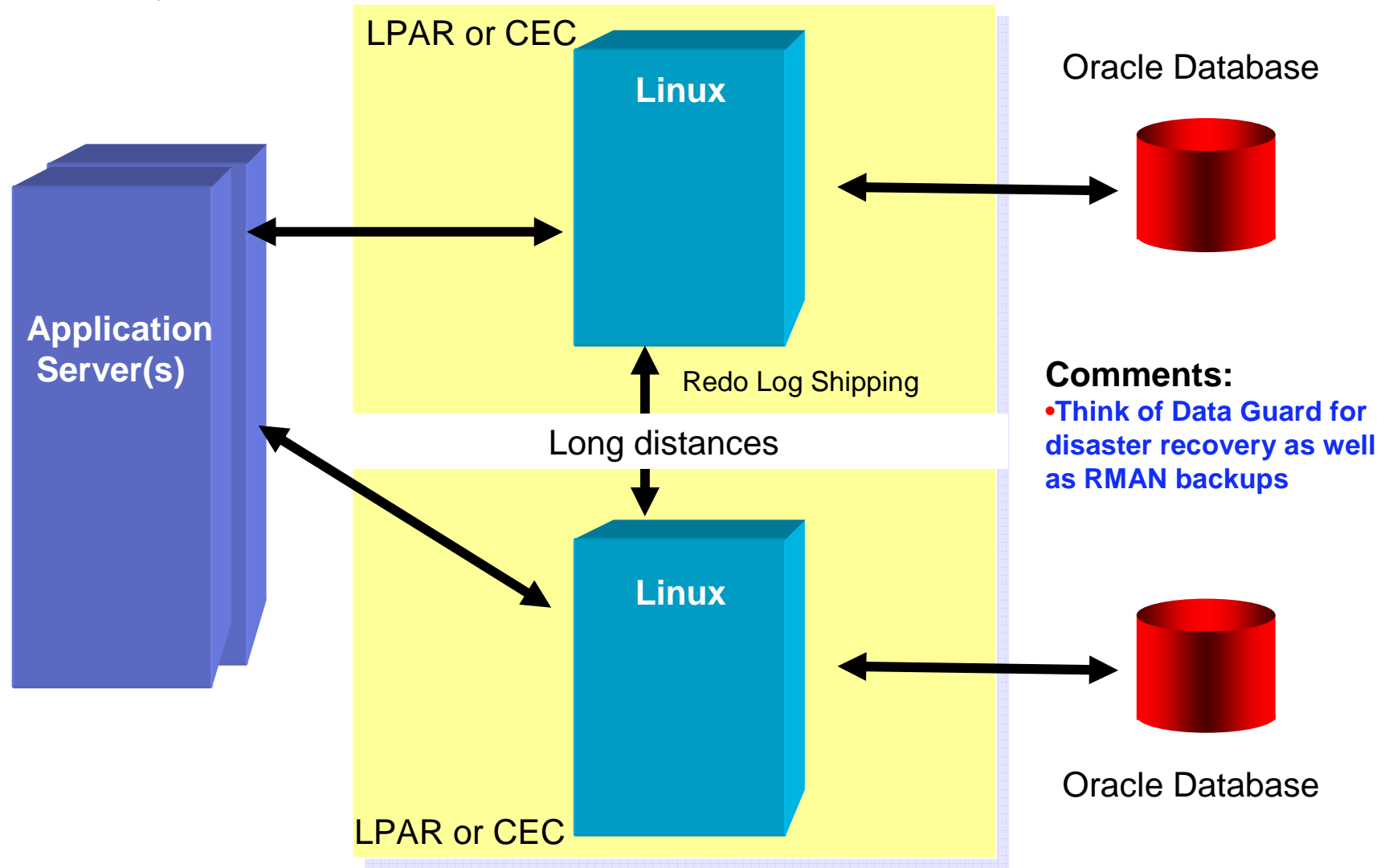
Deploying RAC for High Availability

- RAC – Real Application Clusters
 - Active/Passive configuration
 - One node processes work
 - The other node waits for the first node to fail
 - Active/Active configuration
 - All nodes process work
 - If any node fails the cluster is re-mastered.
 - Besides availability, RAC can be used for workload distribution
 - All work does not have to go through all nodes
 - Deploy
 - In the same LPAR for test/dev applications
 - Across LPARs for LPAR maintenance or software failures (most common implementation)
 - Across CECs when taking entire systems down is a “common” occurrence

Oracle Standby and Replication Solutions for Disaster Recovery

- Standby – replication to standby database
 - Oracle Data Guard
 - Uses redo log shipping for log apply or SQL Apply
 - Less data transmitted than replication
 - Sync or async
 - Various configurations of logical and physical standby databases
 - Data Broker monitors database and affects transition
 - Both production and standby databases must be installed from same CD/DVD
 - Support for heterogeneous systems not supported yet
 - Both systems must match for endian, chip set and headers
 - Data Guard generally deployed between CECs

Standby Database - Data Guard



High Availability with Oracle on Linux for System z

- System z - most highly available platform on the planet
 - Attention to detail over decades of engineering
 - Fault Tolerant (HA) design
 - Elimination of single points of failure
 - Driving to 100 years MTBF
- Oracle Maximum Availability Architecture
 - Best Practices based on Oracle technology
 - Best HA/DR in distributed database technology (Forrester, Oct 2006)
 - Spans all Oracle products
 - Constantly evolves with new releases
- Synergistic
 - Continue on your path with Grid using System z
 - Develop a Grid strategy for Oracle on Linux for System z
 - Take advantages of the HA/DR features of IBM and Oracle technologies

Information Sources

- <http://www.ibm.com/redbooks>
 - SG24-6482-00 Experiences with Oracle Database 10g on Linux for zSeries
 - SG24-7191-00 Experiences with Oracle 10gR2 Solutions on Linux for System z
 - SG24-7573-00 Using Oracle Solutions on Linux on System z
 - SG24-7634-00 Experiences with Oracle Solutions on Linux for IBM System z

- <http://www.oracle.com/ibm>
 - IBM platform information

- <http://otn.oracle.com>
 - (Select "Downloads")

- <http://www.vm.ibm.com/perf/tips>
 - General z/VM Tuning Tips

- <http://www-124.ibm.com/developerworks/oss/linux390/index.shtml>
 - Lot's of information on Linux for System z

- <http://www-128.ibm.com/developerworks/linux/linux390/perf/index.html>
 - Hints and Tips for tuning Linux on System z

- <http://www.zseriesoraclesig.org>
 - Special Interest Group of Oracle users on the mainframe (z/OS and Linux)

- <http://www.mail-archive.com/linux-390%40vm.marist.edu/>
 - Marist List Server

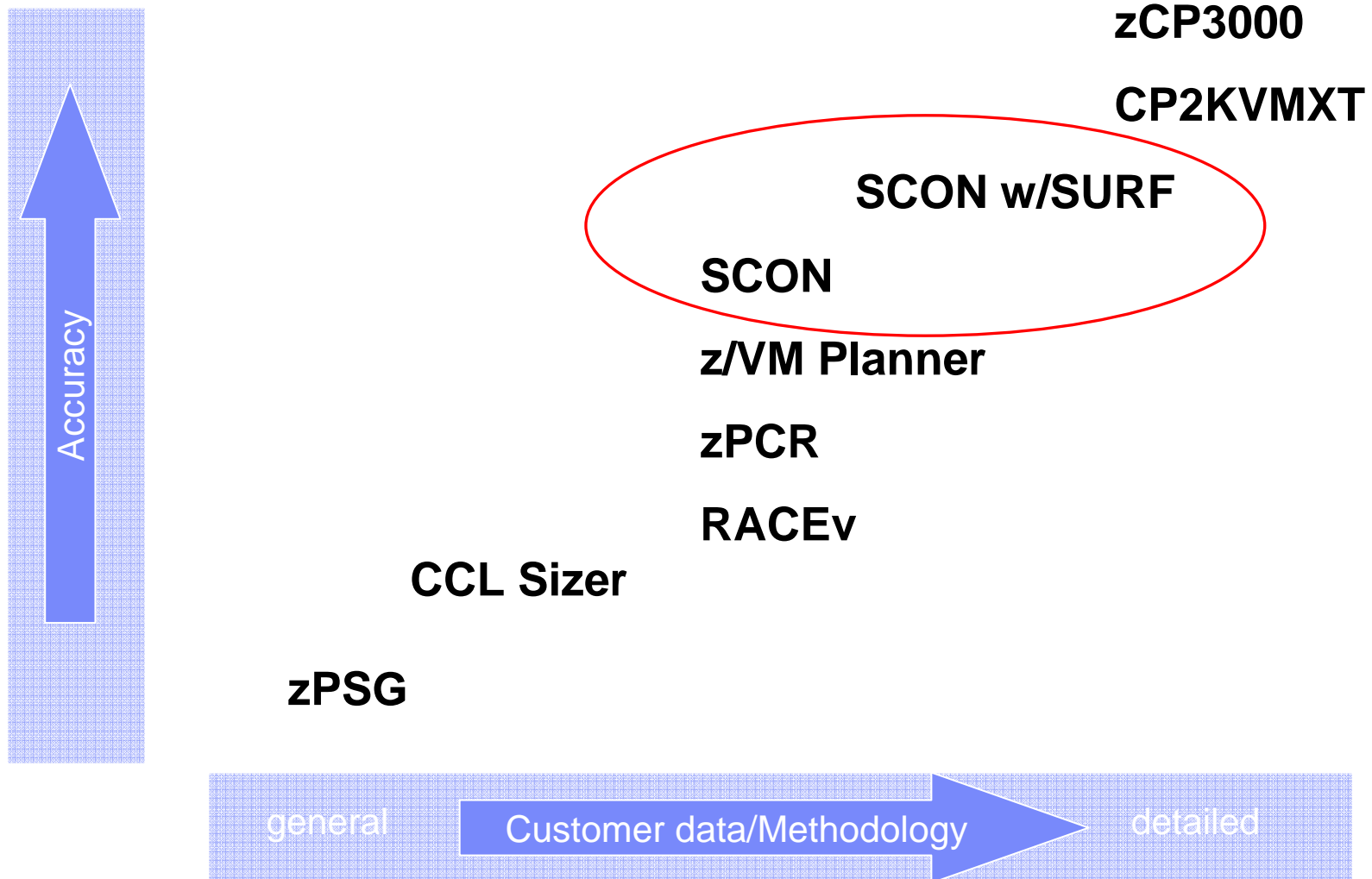


Linux on IBM System z

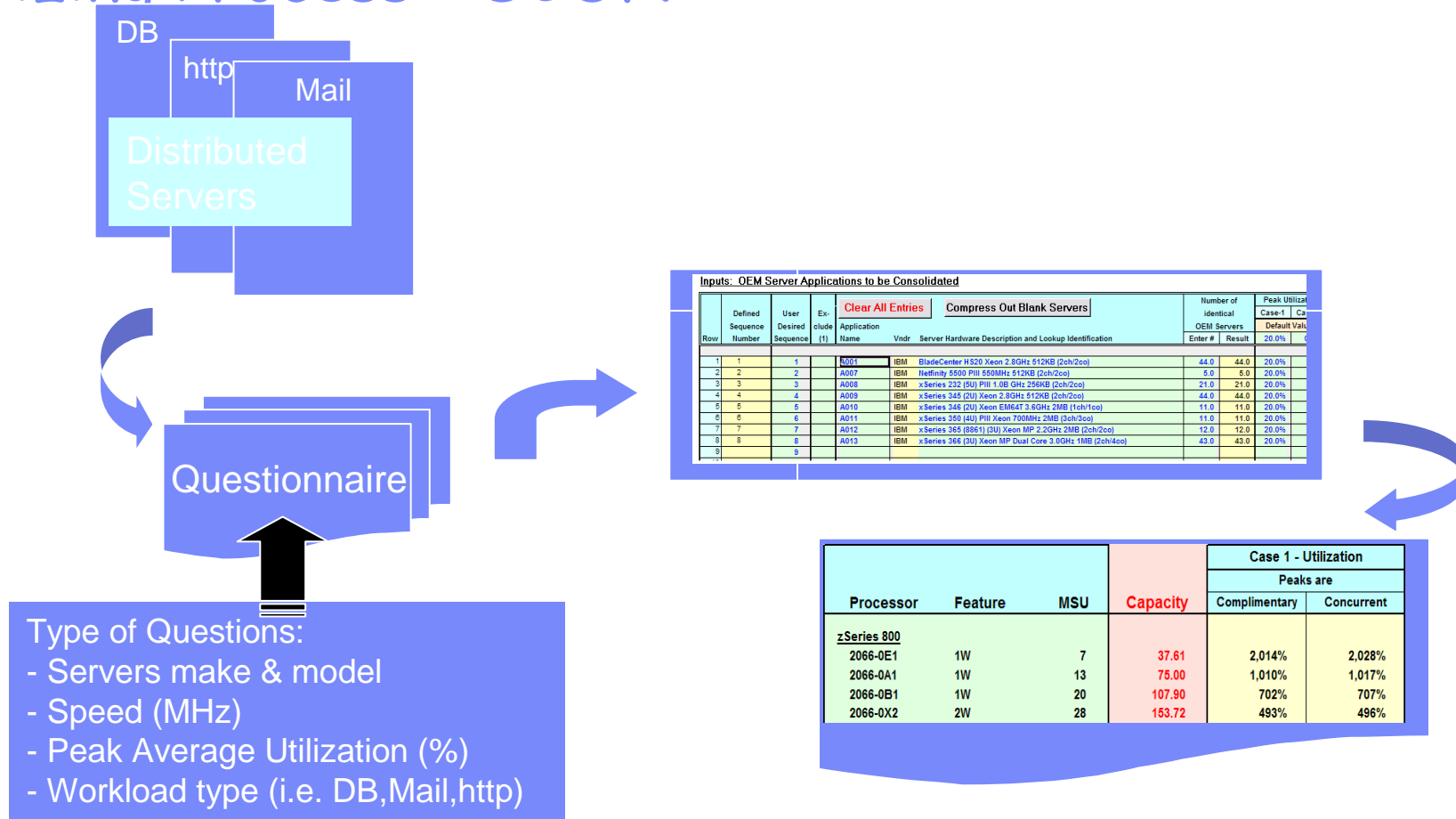
Sizing - the most important step

For PoC or full production

Mainframe Sizing Tools

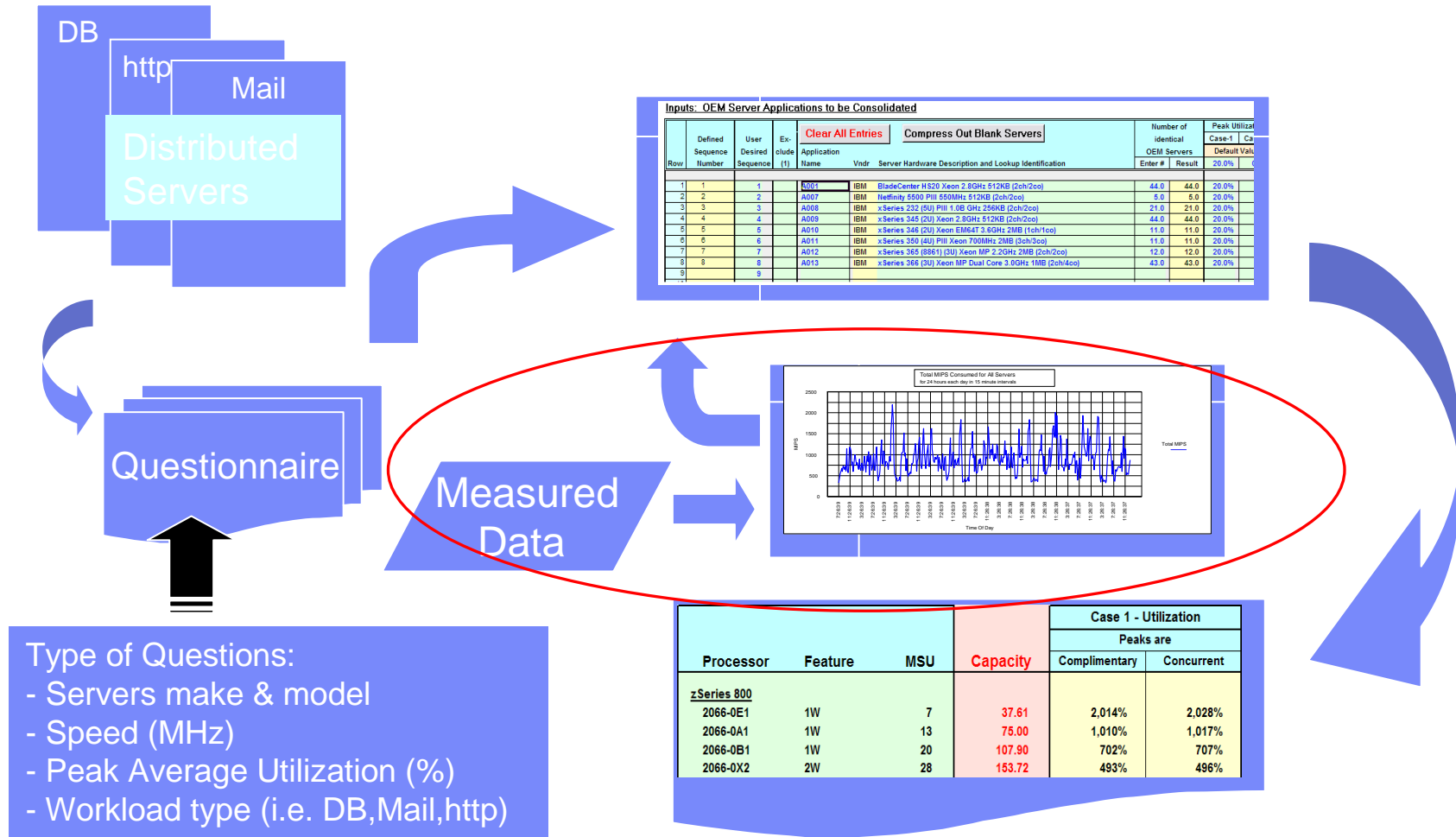


Mainframe Linux Server Consolidation Sizing Process - SCON



- Type of Questions:
- Servers make & model
 - Speed (MHz)
 - Peak Average Utilization (%)
 - Workload type (i.e. DB,Mail,http)

Mainframe Linux Server Consolidation Sizing Process - SCON with SURF

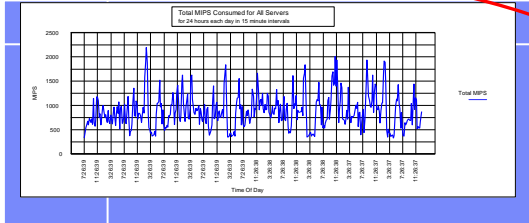


Type of Questions:

- Servers make & model
- Speed (MHz)
- Peak Average Utilization (%)
- Workload type (i.e. DB, Mail, http)

Inputs: OEM Server Applications to be Consolidated

Row	Defined Sequence Number	User Desired Sequence	Exclude (1)	Application Name	Vndr	Server Hardware Description and Lookup Identification	Number of identical OEM Servers		Peak Utilizat	
							Enter #	Result	Case-1	Ca
1	1	1		A001	IBM	BladeCenter H520 Xeon 2.8GHz 512KB (2ch/2co)	44.0	44.0	20.0%	
2	2	2		A007	IBM	Netfinity 5500 PIII 850MHz 512KB (2ch/2co)	5.0	5.0	20.0%	
3	3	3		A008	IBM	xSeries 232 (SU) PIII 1.08 GHz 256KB (2ch/2co)	21.0	21.0	20.0%	
4	4	4		A009	IBM	xSeries 345 (2U) Xeon 2.8GHz 512KB (2ch/2co)	44.0	44.0	20.0%	
5	5	5		A010	IBM	xSeries 346 (2U) Xeon EM64T 3.0GHz 2MB (1ch/1co)	11.0	11.0	20.0%	
6	6	6		A011	IBM	xSeries 355 (4U) PIII Xeon 700MHz 2MB (2ch/2co)	11.0	11.0	20.0%	
7	7	7		A012	IBM	xSeries 365 (8851) (3U) Xeon MP 2.2GHz 2MB (2ch/2co)	12.0	12.0	20.0%	
8	8	8		A013	IBM	xSeries 366 (3U) Xeon MP Dual Core 3.0GHz 1MB (2ch/4co)	43.0	43.0	20.0%	
9	9	9								



Processor	Feature	MSU	Capacity	Case 1 - Utilization	
				Complimentary	Concurrent
zSeries 800					
2066-0E1	1W	7	37.61	2,014%	2,028%
2066-0A1	1W	13	75.00	1,010%	1,017%
2066-0B1	1W	20	107.90	702%	707%
2066-0X2	2W	28	153.72	493%	496%

Oracle DB Memory sizing

- Obtain Oracle SGA and PGA sizes from all database instances
 - Prefer Advisory sizes from an AWR report.
- Calculate guest(s) virtual storage size (assume MB):
(SGA + PGA) + 256 MB for ASM + 512 MB for Linux* **
- Assume the sum all of the guest virtual sizes for production equals p and the sum of all guest virtual sizes for dev/qa/training equals t.
Real memory for guests = $p/.66 + t/ (.33)$ for z/VM memory over commit
 - Assumes multiple guests are involved. Not correct for a single guest
- System z memory = real memory for guests + memory for z/VM and expanded storage.

*Increase estimate when Oracle SGA is large and there are expected to be hundreds of dedicated server connections

** A large overall virtual storage requirement may result in larger Page Tables in Linux which require storage

PGA Memory Advisory from an AWR report

PGA Memory Advisory

- When using Auto Memory Mgmt, minimally choose a pga_aggregate_target value where Estd PGA Overalloc Count is 0

PGA Target Est (MB)	Size Factr	W/A MB Processed	Estd Extra W/A MB Read/ Written to Disk	Estd PGA Cache Hit %	Estd PGA Overalloc Count
896	0.13	148,138.91	182,994.64	45.00	1,297
1,792	0.25	148,138.91	173,054.91	46.00	1,197
3,584	0.50	148,138.91	30,487.16	83.00	0
5,376	0.75	148,138.91	30,487.16	83.00	0
7,168	1.00	148,138.91	29,701.39	83.00	0
8,602	1.20	148,138.91	12,032.42	92.00	0
10,035	1.40	148,138.91	12,032.42	92.00	0
11,469	1.60	148,138.91	12,032.42	92.00	0
12,902	1.80	148,138.91	12,032.42	92.00	0
14,336	2.00	148,138.91	12,032.42	92.00	0
21,504	3.00	148,138.91	12,032.42	92.00	0
28,672	4.00	148,138.91	12,032.42	92.00	0
43,008	6.00	148,138.91	12,032.42	92.00	0
57,344	8.00	148,138.91	12,032.42	92.00	0

It appears that the allocated memory of 7,168 MB is twice as large as required.

SGA Target Advisory from an AWR report

SGA Target Advisory

SGA Target Size (M)	SGA Size Factor	Est DB Time (s)	Est Physical Reads
2,304	0.25	317,428	14,503,025
4,608	0.50	282,694	11,631,530
6,912	0.75	270,413	10,965,119
9,216	1.00	263,535	10,396,434
11,520	1.25	258,791	10,003,449
13,824	1.50	255,418	9,725,864
16,128	1.75	252,915	9,517,935
18,432	2.00	252,150	9,454,517

It appears that the allocated memory of 9,216 MB might be reasonable.

Threads for dedicated servers

Decide on number of dedicated threads and multiply that by 4.5 MB for required real memory to include in guest sizing.

The logons current below may give a hint about number of threads.

Instance Activity Stats - Absolute Values

- Statistics with absolute values (should not be diffed)

Statistic	Begin Value	End Value
session cursor cache count	20,573	21,027
opened cursors current	186	91
workarea memory allocated	870,391	3,575
logons current	124	30

Obvious comments for sizing

- Garbage in, garbage out.
- Choose appropriate time frames that represent reasonable capacity usage
- Do not make guesses about the sizing input
- We must get the CPU capacity, I/O subsystem, and the memory at the correct levels before any testing starts
- Engage a System z - Oracle specialist to assist with sizing



Linux on IBM System z

Proof of Concept (PoC)

PoC part 1

- Engage a System z - Oracle specialist to assist with PoC planning
- Attend education
- Obtain IFLs and memory as per the sizing process
 - No zIIPs, zAAPs or CP's for this environment
 - Choose I/O subsystem (ECKD or SCSI)
- Install z/VM and it's performance tools
- Install Linux
 - Choose certified levels of SUSE or Red Hat (use My Oracle Support to verify supported levels)
 - Verify required Linux modules for Oracle have been installed
- Consider ECKD or 3390 disk for z/VM, Linux and Oracle binaries. Use SCSI disk for Oracle database
- Use Orion to validate the I/O subsystem even before a Oracle database is installed
 - Performs Oracle like I/O

Workshops - Washington Systems Center

- **No charge, Client Team Registration**
- **Offered in Various Cities across North America**
- **2.5 days, Attendees responsible for travel expenses**
- **Combination Workshops and Lab Exercises**

- **Customizing Linux and the Mainframe for Oracle DB Applications (LXOR6)**
 - **For clients considering a move of Oracle to Linux on System z**
 - **Topics include hardware technologies, software components, best practices, performance and tuning, performance tools, linux distributions, tools and services for sizing**
 - **Gaithersburg Dec 7-9, 2010, and New York, NY Oct 12-14, 2010**

- **Virtualization & Consolidation to Linux on System z (VC001)**
 - **Demonstrates the benefits of consolidating distributed servers onto Linux z**
 - **Business Seminar followed by Technical Workshop. Builds business case and demonstrates the benefits of consolidation & virtualization. Hands on Labs to perform consolidation of distributed apps to Linux on z, project and validate capacity requirements, review tools and project steps**
 - **Toronto November 2-4**

Storage - Testing with ORION - 1

ORION Simulates Oracle reads and writes, without having to create a database and helps to isolate I/O issues. When a database is optimally configured you can expect to get up to 95% of the throughput of Orion.

```
./orion_zlinux -run oltp -testname mytest -num_disks 2 -duration 30 -simulate raid0
```

```
ORION VERSION 11.2.0.0.1
```

```
Commandline: -run oltp -testname mytest -num_disks 2 -duration 30 -simulate raid0
```

```
This maps to this test: Test: mytest
```

```
Small IO size: 8 KB Large IO size: 1024 KB
```

```
IO Types: Small Random IOs, Large Random IOs
```

```
Simulated Array Type: RAID 0 Stripe Depth: 1024 KB
```

```
Write: 0% Cache Size: Not Entered
```

```
Duration for each Data Point: 30 seconds
```

```
Small Columns:, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40
```

```
Large Columns:, 0 Total Data Points: 22
```

```
Name: /dev/dasdq1 Size: 2461679616
```

```
Name: /dev/dasdr1 Size: 2461679616
```

```
2 FILES found.
```

```
Maximum Small IOPS=5035 @ Small=40 and Large=0
```

```
Minimum Small Latency=0.55 @ Small=2 and Large=0
```

Storage - Testing with ORION - 2

```
-run oltp -testname mytest -num_disks 2 -duration 30 -simulate raid0
```

This maps to this test:

Test: mytest

Small IO size: 8 KB Large IO size: 1024 KB

IO Types: Small Random IOs, Large Random IOs

Simulated Array Type: RAID 0 Stripe Depth: 1024 KB

Write: 0%

Cache Size: Not Entered

Duration for each Data Point: 30 seconds

Small Columns: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40

Large Columns: 0

Total Data Points: 22

Name: /dev/sda1 Size: 10737401856

Name: /dev/sdb1 Size: 10737401856

2 FILES found.

Maximum Small **IOPS=24945** @ Small=24 and Large=0

Minimum Small Latency=0.60 @ Small=12 and Large=0

Download - <http://www.oracle.com/technology/software/tech/orion/index.html>

Storage - Testing with Orion - 3

- Be careful of the options you choose. The writes are destructive.
- Perform Orion testing BEFORE installing the Oracle database to validate the I/O subsystem



OR



Moving data is like moving water – must have adequate flow through out

PoC part 2

- Install Oracle database – 10gR2
 - Consider starting with Oracle ASM versus LVM ext3 files
 - If using ext3 and LVM (i.e., not ASM) then verify Oracle init.ora has
`filesystemio_options = setall`
`disk_asynch_io=true`
to eliminate Linux double caching which wastes storage and CPU resources
- Create appropriate disk multipathing
 - Different for SCSI and ECKD
 - Consider running Orion again to test multi-pathing
- Load database from another Oracle database source
 - Use transportable tablespace or database for metadata when endian formats are the same
<http://en.wikipedia.org/wiki/Endian>
 - Additional steps, like rman conversions, are required for unlike endian formats
 - Import/export may be required when source database is older than 10gR2
 - **Recreate statistics for optimizer use**

Endian formats

```

SQL> COLUMN PLATFORM_NAME FORMAT A32;
SQL> SELECT * FROM V$TRANSPORTABLE_PLATFORM;
PLATFORM_ID PLATFORM_NAME                                ENDIAN_FORMAT
-----
1 Solaris[tm] OE (32-bit)                                Big
2 Solaris[tm] OE (64-bit)                                Big
7 Microsoft Windows IA (32-bit)                          Little
10 Linux IA (32-bit)                                     Little
6 AIX-Based Systems (64-bit)                              Big
3 HP-UX (64-bit)                                         Big
5 HP Tru64 UNIX                                          Little
4 HP-UX IA (64-bit)                                     Big
11 Linux IA (64-bit)                                    Little
15 HP Open VMS                                          Little
8 Microsoft Windows IA (64-bit)                          Little
9 IBM zSeries Based Linux                               Big
13 Linux x86 64-bit                                     Little
16 Apple Mac OS                                         Big
12 Microsoft Windows x86 64-bit                          Little
17 Solaris Operating System (x86)                          Little
18 IBM Power Based Linux                                 Big
20 Solaris Operating System (x86-64)                      Little
19 HP IA Open VMS                                       Little

```

PoC part 3

- Run PoC testing
 - Collect performance data by enabling:
 - z/VM Performance Toolkit
 - Note that you must now think about virtualization versus dedicated resources
 - sar and iostat data from the Linux on z guest(s)
 - AWR reports from the Oracle database
 - Review performance reports
 - z/VM
 - Understand CPU, memory, and paging consumption for the LPAR
 - Review virtual machine consumption of resources
 - Evaluate I/O performance (ECKD only)
 - Verify VDISK usage
 - Linux using sar and iostat
 - CPU, memory, swapping, and I/O performance for each guest
 - Oracle AWR report
 - I/O performance
 - SGA and PGA usage via automatic memory management (see previous chart)
 - Normal DBA tuning review
 - Review for performing SQL
 - Locking
- Rerun PoC if changes are made
 - Does the PoC validate the initial sizing?

PoC part 4

- Think in terms of virtualization – different mind set
 - Does that Oracle database require all of that memory it has in the non-virtualized environment
 - Should you have a active/passive setup in the same z/VM
 - Optimize use of resources
 - Did the guests get properly prioritized with respect to other guests
 - What workloads are peaking at the same time
 - CPU peak
 - Memory load
 - I/O subsystem
 - DBA's, Linux admins, and z/VM sys progs must work as a team

AWR - I/O statistics

Tablespace	Filename	Reads	Av Reads/s	Av Rd(ms)	Av Blks/Rd	Writes	Av Writes/s	Buffer Waits	Av Buf Wt(ms)
		10,790,012	222	12.28	2.25	4,845,015	100	411	54.38
		10,311,731	212	11.87	2.37	4,768,474	98	591	63.46
		2,030,575	42	22.91	1.23	2,551,704	53	3,857	141.84
		1,190,077	24	27.58	1.21	1,477,830	30	2,897	23.93
		1,143,880	24	19.50	1.18	1,593,814	33	2,904	87.73



AWR - other statistics

Operating System Statistics

Top 5 Timed Events

Event	Waits	Time(s)	Avg Wait(ms)	% Total Call Time	Wait Class
db file sequential read	6,073,284	74,443	12	35.5	User I/O
CPU time		64,668		30.8	
log file sequential read	173,131	8,093	47	3.9	System I/O
log file parallel write	189,657	3,668	19	1.7	System I/O
gc current grant 2-way	2,697,994	2,469	1	1.2	Cluster

Statistic	Total
BUSY_TIME	6,905,787
IDLE_TIME	1,288,223
IOWAIT_TIME	886,823
NICE_TIME	4,077
SYS_TIME	268,498
USER_TIME	6,493,552
LOAD	4
RSRC_MGR_CPU_WAIT_TIME	0
PHYSICAL_MEMORY_BYTES	33,711,116,288
NUM_CPUS	4

SQL ordered by Elapsed Time

- Resources reported for PL/SQL code includes the resources used by all SQL statements called by the code.
- % Total DB Time is the Elapsed Time of the SQL statement divided into the Total Database Time multiplied by 100

Elapsed Time (s)	CPU Time (s)	Executions	Elap per Exec (s)	% Total DB Time	SQL Id	SQL Module	SQL Text
180,654	58,111	12	15054.53	86.10	5000000000	PLACCUP	BEGIN ...
88,004	35,905	174	505.77	41.94	5000000000	PLACCUP	BEGIN :1 := ...
25,374	3,294	167	151.94	12.09	5000000000	PLACCUP	INSERT ALL WHEN ...
16,124	2,939	174	92.67	7.68	5000000000	PLACCUP	INSERT INTO ...
12,080	5,048	3,519	3.43	5.76	5000000000	PLACCUP	INSERT INTO ...
8,754	4,475	167	52.42	4.17	5000000000	PLACCUP	UPDATE ...
8,313	1,293	167	49.78	3.96	5000000000	PLACCUP	INSERT INTO ...
6,177	1,484	167	36.99	2.94	5000000000	PLACCUP	INSERT INTO ...
5,545	2,357	15,590,673	0.00	2.64	5000000000	PLACCUP	SELECT ...
3,590	216	163	22.02	1.71	5000000000	PLACCUP	INSERT INTO ...
3,275	1,682	167	19.61	1.56	5000000000	PLACCUP	UPDATE ...

[Back to SQL Statistics](#)
[Back to Top](#)

SQL ordered by CPU Time

- Resources reported for PL/SQL code includes the resources used by all SQL statements called by the code.
- % Total DB Time is the Elapsed Time of the SQL statement divided into the Total Database Time multiplied by 100

CPU Time (s)	Elapsed Time (s)	Executions	CPU per Exec (s)	% Total DB Time	SQL Id	SQL Module	SQL Text
58,111	180,654	12	4842.56	86.10	5000000000	PLACCUP	BEGIN ...
35,905	88,004	174	206.35	41.94	5000000000	PLACCUP	BEGIN :1 := ...
5,048	12,080	3,519	1.43	5.76	5000000000	PLACCUP	INSERT INTO ...
4,475	8,754	167	26.79	4.17	5000000000	PLACCUP	UPDATE ...
3,294	25,374	167	19.73	12.09	5000000000	PLACCUP	INSERT ALL WHEN ...
2,939	16,124	174	16.89	7.68	5000000000	PLACCUP	INSERT INTO ...
2,357	5,545	15,590,673	0.00	2.64	5000000000	PLACCUP	SELECT ...
1,682	3,275	167	10.07	1.56	5000000000	PLACCUP	UPDATE ...
1,484	6,177	167	8.89	2.94	5000000000	PLACCUP	INSERT INTO ...
1,293	8,313	167	7.75	3.96	5000000000	PLACCUP	INSERT INTO ...
216	3,590	163	1.33	1.71	5000000000	PLACCUP	INSERT INTO ...



Linux on IBM System z

Production Readiness

Production Readiness

- Did the PoC validate the initial sizing
 - If not, attempt to resize or use PoC information as the basis
- Did the PoC test the availability requirements established during the requirements phase (i.e., Oracle MAA)
 - Standalone DB
 - Active/Passive
 - RAC with Active/Active
 - Use of multiple physical z10 machines
 - Data Guard for DR
- Is there sufficient IFL capacity, memory, and I/O for production
 - Are you ready to measure capacity usage over the long term.
- Are the latest Oracle patches applied



Linux on IBM System z

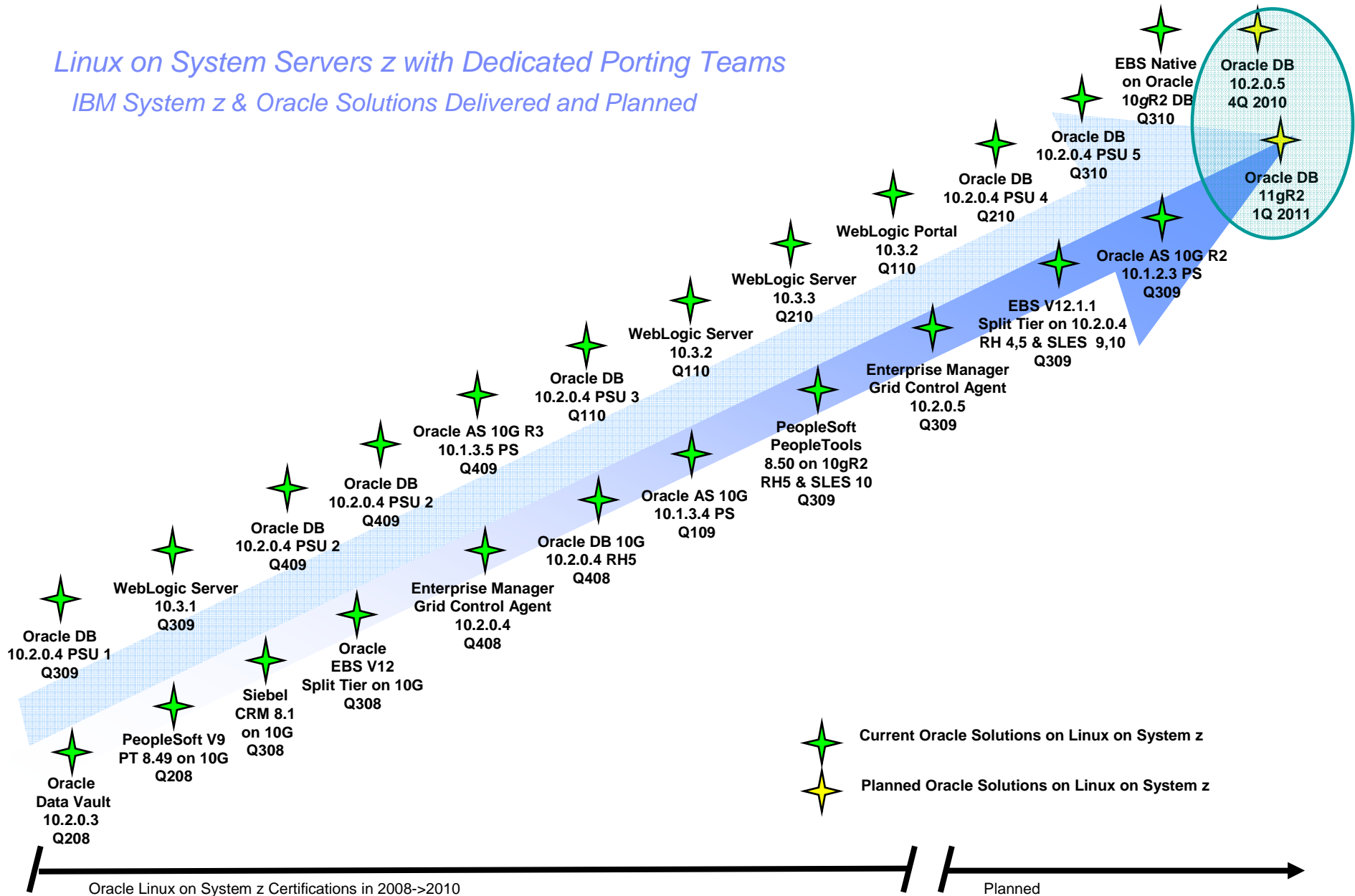
Oracle Applications

Discussion limited to Oracle DB on Linux on z

Oracle E-Business Suite – The Newest Solution Delivered on Linux on System z Servers



Linux on System Servers z with Dedicated Porting Teams
IBM System z & Oracle Solutions Delivered and Planned



Oracle ERP Applications on Loz and Oracle DB

- You must verify the certification levels of the application with regard to all aspects of the infrastructure
 - Just because the database is certified does not mean the application is
 - Just because the application is certified does not mean the database is
- PeopleSoft, and Siebel run in split tier mode with the database tier supported on Loz
 - With PeopleSoft the batch tier is supported as well
- E-Business Suite runs in both split tier mode and now native mode with both apps and database on Linux on System z
- Helpful documents
 - PeopleSoft
 - <http://w3-03.ibm.com/support/techdocs/atsmastr.nsf/WebIndex/PRS3278>
 - E-Business Suite
 - <http://www-03.ibm.com/support/techdocs/atsmastr.nsf/WebIndex/PRS3345>
 - Siebel
 - <http://www-03.ibm.com/support/techdocs/atsmastr.nsf/WebIndex/PRS3277>
 - IBM Oracle Alliance
 - <https://w3-03.sso.ibm.com/sales/support/information/oracle>

Certification Example for PeopleSoft

A1 PeopleTools 8.49

A Application, Batch, and Database Server Support Matrix

B PeopleTools 8.49.03 is the minimum version required for 8.49 certifications, exceptions are noted when a higher patch version is required.

Application, Batch, and Database Server Support Matrix

PeopleTools 8.49.03 is the minimum version required for 8.49 certifications, exceptions are noted when a higher patch version is required.

DBMS Type	DBMS Version	DBMS Conn Product	DBMS Conn Version	Platform	Platform Version	Server Make	Server Model	Support Status	Supported Tiers
Oracle	10.2.0.3.0 64-bit	See Certification FAQ		Red Hat Enterprise Linux	4.0 64-bit	IBM	zSeries	Supported	Batch Server or DBMS Server
Oracle	10.2.0.3.0 64-bit	See Certification FAQ		SUSE Enterprise	9 64-bit	IBM	zSeries	Supported	Batch Server or DBMS Server
Oracle	10.2.0.3.0 64-bit RAC	See Certification FAQ		Red Hat Enterprise Linux	4.0 64-bit	IBM	zSeries	Supported	Batch Server or DBMS Server
Oracle	10.2.0.3.0 64-bit RAC	See Certification FAQ		SUSE Enterprise	9 64-bit	IBM	zSeries	Supported	Batch Server or DBMS Server
Oracle	10.2.0.4.0 64-bit	See Certification FAQ		SUSE Enterprise	10 64-bit	IBM	zSeries	Supported	Batch Server or DBMS Server
Oracle	10.2.0.4.0 64-bit RAC	See Certification FAQ		SUSE Enterprise	10 64-bit	IBM	zSeries	Supported	Batch Server or DBMS Server

Partial screen shot - incomplete

Definition of a core/IFL/processor for Oracle pricing

- With regard to Oracle pricing, one core equals one IFL
 - z10 is a quad core processor
 - One processor has four cores – not relevant
 - Oracle prices on cores
 - If you have 7 IFLs then you have 7 cores
 - A generic 8 way processor with quad core chips - Oracle pricing is still done by cores
 - 8 way probably means 8 quad core processors
 - 32 cores for Oracle licensing purposes
 - Oracle pricing
 - <http://www.oracle.com/corporate/pricing/pricelists.html>
 - <http://www.oracle.com/corporate/contracts/library/processor-core-factor-table.pdf>

Is it zLinux or Linux on z

- There is some confusion for non-z people about the term zLinux
- Is zLinux a special Linux distribution, NO.
- Let us call it **Linux on z** for more clarity.

Summary

- Proper sizing in advance is important; really, it is.
- Think virtually with regard to allocation of resources
- PoCs with smaller and less important Oracle databases might be a good start
- Oracle database on Loz can handle ERP sized databases
- Oracle database on Loz can handle data warehouse applications
- IBM and Oracle continue to work together and invest in improving the Oracle on Loz solution

Patch Set Update – Linux on z

- **Policy Change on Patch Set Update (PSU)**
 - Beginning with the October 2009 Critical Patch Update release, Oracle will now deliver Patch Set Updates for all platforms on the release date including Linux on z.
- **What is a PSU and when is it provided?**
 - PSU is a bundle of patches Oracle recommends to apply. It consists of CPU, Generic patch bundle, RAC patch bundle and Data Guard patch bundles
 - Quarterly released
- **Benefit for Linux on z Customers**
 - Verified and tested before provided to the customer
 - Easy database maintenance
 - Recommended patches now also available for Linux on z
 - Reduces problem situation and downtime.
- **What About Critical Patch Updates (CPUs)?**
 - In the future single Critical Patch Updates are only available on request via service request (SR)

Raimund Reng, Oracle Support – September 2009