Consolidating Oracle to Linux on System z

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Oracle Database
Oracle Application Server
Oracle Applications

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NOTES:
Performance is in Internal Throughput Rate (ITR) ratio based on measurements and projections using standard IBM benchmarks in a controlled environment. The actual throughput that any user will experience will vary depending upon considerations such as the amount of multiprogramming in the user’s job stream, the I/O configuration, the storage configuration, and the workload processed. Therefore, no assurance can be given that an individual user will achieve throughput improvements equivalent to the performance ratios stated here.

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IBM Oracle Relationship

- Driven on System z by market acceptance of
  - Linux and Oracle’s position in the market
  - Quality of the IBM System z and virtualization of Linux
- IBM Investment at Competency Centers
  - Four z990s
    - Over 100 CPUs
  - Hundreds of Virtual Linux machines
- IBM Support
  - Competency Centers in
    - Redwood Shores, CA
    - Montpellier, France
    - Tokyo, Japan
  - Field Support
    - Tiered structure
- Oracle
  - Similar field organization built around System z
    - Oracle Technical Sales being educated on Linux on System z
  - IBM technical sales educated on Oracle technology stack and applications
Virtual Machine Partitioning
Efficiently Exploiting the Entire Mainframe Complex

A Virtual Machine simulates the existence of a dedicated real machine, including processor functions, storage, and input/output resources.

Linux for System z Opportunity - ‘The Server Farm in a Box’

*IFL – Integrated Facility for Linux
Oracle Products Available for Linux on System z

- The Technology Stack
  - Oracle9i Release 2 Enterprise Edition
  - Oracle Database 10g Release 1 and 2 EE
  - Oracle Application Server AS 10g
    - AS 10g 10.1.2 Base
    - AS 10g 10.1.3 J2EE
    - AS 10g 10.1.3.1 SOA
    - AS 10g 10.1.4 Identity Manager (Oblix)
  - Oracle Clustered File System V2 (OCFS2)

- Linux Distributions used for Oracle in Linux for System z
  - Novell SuSE SLES8/9 and Red Hat EL4
  - Novell and Red Hat will continue to be the distributions for Oracle certifications on System z Linux

- On the way
  - SLES10 soon
  - RHEL5 soon after

Oracle Applications Available for Linux on System z

- Oracle Applications
  - PeopleSoft Enterprise
  - Siebel CRM
  - Oracle E-Business Suite 11i (11.5.10.2)

- All the applications are a Mixed Platform Architecture
  - Only Oracle Database 10gR2 certified for above applications with Linux on System z
  - The middle tier, regardless of application server, must be implemented on a platform other than System z
Oracle Applications Available for Linux on System z

Oracle Applications Middle Tiers

- PeopleSoft Enterprise
  - None certified for the Application
    - Websphere
    - Tuxedo
    - BEA Weblogic
- Siebel CRM
  - Not ported yet
- Oracle E-Business Suite 11i (11.5.10.2)
  - Current middle tier certification is Oracle9iAS

E-Business Suite Architecture

End User

Any certified middle tier

System z Linux

Browser Interface

Presentation
Use Interaction

Application Portal
GUI Services
Reporting
Business Process Mgt
Mobile Services
Concurrent Processing
Integration
App & Sys Mgt

Oracle9iAS Application Server

Oracle 10gR2 Database

Data Storage
Data Intensive Logic

Application Portal
GUI Services
Reporting
Business Process Mgt
Mobile Services
Concurrent Processing
Integration
App & Sys Mgt

Chart 10
Applications Unlimited for System z
Preserving Customers Investment

Siebel & PeopleSoft

- All existing infrastructure products currently supported by applications will continue to be supported into the future
- Supports your investments in IBM technology and products
- Including hardware, operating systems, databases and middleware
- No forced upgrades to Fusion Application, maintain lifetime support of current application
- System z Siebel and PeopleSoft customers’ investment in DB2 is preserved
- Current Customers can add new modules using DB2
- New customers can install Siebel or PeopleSoft with DB2 database on z/OS

Is Anyone Really Doing Oracle on Linux on System z?

- Yes!
  - Many customers in production with both Oracle9i and Oracle 10g
  - We believe there to be over 300 production customers with Oracle on Linux for System z
- References available
- Any restrictions? No!
  - Database with application server (or compiled application)
  - Some with stored procedures
  - Some with no stored procedures
  - Some with ISV applications
  - Etc
- Examples
  - Telemar (Brazil) running approx 30 IFLs on a z9-EC
  - approx 100 virtual machines
  - DGTIC (Quebec Gov)
  - Moving over 100 databases to z9-EC on 5 IFLs
  - Very large RAC installation
  - Many single IFL installations
Why Oracle for Linux on System z

Value Statement
- The best TCO characteristics can be obtained from consolidating many servers with low CPU utilization and taking advantage of the virtualization capabilities of z/VM.
  - Lower hardware and software costs
  - Ease of operations
  - Simplified infrastructure
- However, Linux scales well in an LPAR or with z/VM and may resolve other issues or problems such as availability.
  - The new System z9 EC/BC class machines compete with most other technologies (We’re fast)
  - Great scalability for consolidation or single large databases
- Linux provides for a common skill base on all architectures it runs on

System z differentiators
- Inherited hardware quality of service
- Proximity to z/OS
- Unmatched virtualization capabilities

Why Oracle for Linux on System z

- Oklahoma DHS
  - The zSeries running Linux offers a reliable, stable and open-standards platform that employees can now rely on to provide 24x7 availability for critical data.

- Idaho Power Company
  - The cost benefit analysis was proven to be true. A corporation can successfully use Linux technology in a zSeries environment to provide increased database and application performance, and realize real server consolidation and reduced licensing and support costs.

- AP Customer running large RAC Clusters
  - “The combination of Linux and the IBM System z9 EC servers provides an ideal platform for business-critical databases which need high performance and high availability to process large transactional volumes.”

- DGTIC (Quebec government)
  - Initially, project was done for the $ savings, now the important gains:
    1. The flexibility of the solution
    2. Disaster recovery
    3. $ savings
Selecting a System z

Consolidating 4 Sun Boxes running Oracle. Each with
- 2 CPs each @ 750 Mhz (total of 8 CPs)
- 15 % average utilization or non-concurrent peaks of 60%

In all cases - consolidated 8 Sun CPs into less than 1 IFL
About 4 times that on the new EC class System z

Selecting an Application

- Where to start
  - Performance on System z CPUs comparable to CPUs on other platforms of similar speed.
    - CPU speed is not the entire story – it’s in the architecture!
      - Now we have speed too!
    - Biggest advantage is with applications with mixed CPU and I/O
  - Start with databases that are on lower utilized servers
    - System z with z/VM provide excellent virtualization capabilities
    - System z has definite advantage with applications that have mixed CPU and I/O
  - Development and Test are good choices to start
    - Good planning is essential.
      - If you don’t know where you are going, you won’t know when you get there.
  - IBM can
    - Perform sizing estimates
    - Assist with planning and initial installation needs
Selecting an Application

- One last thought
  - Test workloads selected for Linux on System z
    - Most difficult part of process
  - Benchmark testing (e.g. TPC-C) may not provide results needed to make a consolidation technology decision

HA Solutions for Oracle on System z Linux

1. Instance Failover, single database
   - Oracle Instance fails (processes and memory structures on a server)
   - Instance moved to another server
   - Scripts generally needed to transition
   - Same physical database (most likely clustered file system)

2. RAC – clustered database solution
   - Active/Passive
   - Active/Active

3. Standby – replication to standby database or clustered database
   - Oracle Data Guard
   - IBM GDPS/PPRC
   - OEM Replication
Key Success Factors

- Use z/VM 5.2
- Memory is critical
  - Right-size the virtual guest; less is better even with z/VM 5.2
- Monitor resources – excellent tools available
  - IBM Performance Toolkit
  - ESAMON from Velocity Software
  - Omegamon from Tivoli
- Paging and swap space necessary
  - Both should use memory devices
  - Use Best Practices for setting up paging space
- Avoid I/O bottlenecks
  - Distribute data in the ESS across arrays
  - Stripe the LVM (or use Oracle ASM)
  - Use either FICON or FCP

Information Sources

  - SG24-6552-00 Experiences with Oracle9i for Linux on zSeries
  - SG24-6482-00 Experience with Oracle Database 10g on Linux for zSeries
  - SG24-7191-00 Experiences with Oracle 10gR2 Solutions on Linux for System z
  - SG24-6669-00 Linux for IBM System z9 and zSeries
- [http://www.oracle.com/ibm](http://www.oracle.com/ibm)
  - IBM platform information
- [http://otn.oracle.com](http://otn.oracle.com)
  - (Select “Downloads”)
  - General zVM Tuning Tips
  - Lots of information on Linux for zSeries
  - Hints and Tips for tuning Linux on System z
- [http://www.zseriesoracle.org](http://www.zseriesoracle.org)
  - Special Interest Group of Oracle users on the mainframe (z/OS and Linux)
- [http://www.mail-archive.com/linux-390%40vm.marist.edu/](http://www.mail-archive.com/linux-390%40vm.marist.edu/)
  - Marist List Server