Making System z the Center of Enterprise Computing

Mark Neft
Accenture

August 5 at 3:00 pm in room 305
Sessions # 7167
Presentation Abstract:

• How to exploit the best aspects of z/OS and Enterprise Virtualization to create a cost effective and highly reliable application Eco System. The presentation will use real examples of combining z/OS and Linux on System z to create a cost effective and highly reliable enterprise solution. This includes leveraging DB2 with zIIP engines, and Java, COBOL and Oracle RAC all running on Linux on System z, to create a simplified and scalable solutions. I will also highlight some of the cost savings models illustrating how this solution reduced Oracle software cost by over 80% and mainframe costs by 30% or more.

• Learn how to enable z/OS workload to run on Linux for System z

• Review case studies of Oracle and COBOL application running on System z
Objectives

• Review the value proposition of the System z in enterprise computing
  • What is Mainframe Optimization
  • What are the options on the mainframe
    • Uber- virtualization
    • Oracle super scaling
    • Enabling COBOL - z/OS workload to run on Linux for System z

• The mainframe is not dead and neither is COBOL
Mainframe Optimization (MFO)

- MFO is an approach that positions the best of z/OS to enable Linux on System z

- Why is it important today?
  - Typically the Mainframe is the single largest line-item on an IT budget
  - IT budgets are getting reduced by 10% - 50%
  - The mainframe is the logical place to start

- How to reduce costs by 20%-80% without leaving the mainframe
There are five key aspects to Mainframe Optimization:

1. Understanding your baseline costs
2. Server Consolidation – “Uber-virtualization” of distributed platform to System z / Linux
3. Oracle Consolidation – Consolidate multiply Oracle instances onto a smaller foot print and reduce the number or Oracle licenses
4. Partial Migration – z/OS based applications to Linux on System z
Mainframe Optimization

Prioritizing the work and measuring the benefits during the journey

- Accommodate changes in business imperatives
- Proactively understand the affects of the different levers within portfolio
- Measure and monitor the progress – focus on the quantifiable results

Continuously prioritize the portfolio

Show the progress using a business view

Business focus view showing the results keeps IT aligned with the changing business imperatives

Illustrative Key of Complexity:
- Orange = High
- Blue = Normal
- Yellow = Medium
- Others = not in scope
Server consolidation
- Running the organization in a box

- Levering the tried and true LPAR technologies enables organization to exploit cost effective, scalable, and stable Open Source deployment
  - The ability to co-locate tightly coupled solutions
  - The ability to optimize hardware during functional consolidation
  - The ability to prioritize (share) hardware to meet business needs now (Dev/Test/Prod)

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<th>System Integration</th>
<th>User Acceptance</th>
<th>Production</th>
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<td>Misc</td>
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<td>System Test DB-02</td>
<td>UAT Test DB-02</td>
<td>Prod DB-02</td>
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Virtual hardware platform
SAN / NAS
Value Proposition: Oracle Consolidation

Global Company

• Achieve super scalability on a small footprint
• Oracle software costs reduced by 85%*
• Physical footprint reduced by 80% (3 Racks vs. 15 racks)**

• Background
  • 2 Node OracleRac Cluster
  • >36TB
  • Single tables of 3+ Billion rows
  • Full primary and foreign keys
  • Indexes
  • Referential Integrity turned on

• Results Achieved
  • Over 7 hours the application averaged >240,000 TPS
  • Multi-row inserts / updates
  • CPU utilization was ~50% on the Oracle server
  • Application is Java running on the IFL as well

* Oracle would have required 224 Intel processors to support the same load or 4 node Superdome plus equivalent hardware for just production DR
** excluding Disk
Oracle
- Achieve Super Scalability on a Small Footprint
Value Proposition: Application Migration

Small Application Migration
A small application currently costing $1.5M/year to operate becomes $0.1M or a five year savings of over $6M (Including the cost of migration)

Partial Application Migration*
Moving a portion of a 5,000 MIP application to an IFL allows a cost reduction of $40-55M and a cost avoidance savings of $70-$90M
* Patent Pending

Illustrative cost comparisons:
Example 1:
z/OS $XX/CPU Hour vs IFL $Y.Y/YCPU Hour

Illustrative cost comparisons:
Example 2:
z/OS engine $ XXX vs. IFL engine XXX / 90
Comparable Intel server required 5-10 more or 2-3x

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Mainframe Application Configuration

Typical

Mainframe

z/OS

Web Services

3270

MQ

CICS

TRAN01

...

TRAN0N

Batch

DB/2 sysplex

CICS

TRAN01

Batch

z/OS

Web Services

MQ
Mainframe Application Configuration
Coexistence with the IFL

- `z/OS`
  - Web Services
  - 3270
- `MQ`
- `CICS`
  - TRAN01
  - ...
  - TRAN0N
- `Batch`
- `DAEMON / TRAN01`
- `DB2 Connect`
- `DB/2 sysplex`
- `zIIP`

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Mainframe Application Configuration
Coexistence with the IFL

![Diagram of Mainframe Application Configuration]

- **z/OS**
  - Web Services
  - 3270

- **MQ**
  - Daemon / TRAN01

- **CICS**
  - TRAN01
  - ...
  - TRAN0N

- **Batch**

- **DB/2 sysplex**
  - zILP

- **IFL**
  - Daemon / TRAN01
  - Batch
  - DB2 Connect

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Mainframe Application Configuration Coexistence with the IFL

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z/OS
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DB/2 sysplex
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IFL
- Daemon / TRAN01
- Batch
- Dispatched thread
- DB2 Connect

Web Services

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DB2 Connect
Mainframe Application Configuration Coexistence with the IFL

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z/OS

DB/2
sysplex

zIIP

Daemon / TRANs
Batch
Dispatched thread
DB2 Connect

Web Services

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Let z/OS enable Linux on System z to be a safe place for Mission Critical Enterprise Applications
Summary of CICS Workload Migration

- Trans ABC & EFG response time increased from .4s to 12s
- CPU utilization on CECA remained consistent
  - XYPA and XYPC decreased (This is good)
  - XYOA and XYUA increased (out of scope workload)
- CPU Utilization on CECB remained consistent due to growth in XYOB and XYUB (out of scope workload)
- CPU Utilization decreased for both CICSONE and BATCHONE work
  - XYPA saw largest decrease (savings of 1 engine) ~ 760 MIPS
  - XYPC saw decrease (saving of .5 engines) ~ 380 MIPS
  - 1705 QAZ jobs ran on 3/17 - 3525 QAZ jobs ran on 6/3
- CPU Utilization for MQ increased 5-7% on all 4 lpars
- CPU Utilization for DDFPTS increased - transactions doubled
- IFL utilization increased from 15% to 60% (This is good)
- ZIIP utilization increased (10% - 20%) (This is a good)
- Coupling Facility Utilization remained consistent
  - Requests to QSP0PTSQUEUES1 decreased by 87%
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Summary
- Uber - Virtualization on a Small Footprint

- Leverage existing floor space
- Dynamic load balancing
- Development and test can share the same hardware
- No physical network equipment required to connect internal servers
- Internal servers can remain on separate virtual LANS
- Simplified and reduce cost for DR

<table>
<thead>
<tr>
<th>LPAR - A</th>
<th>LPAR - B</th>
<th>Prod</th>
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Things to watch out for

- Having just senior leadership sponsorship is not good enough
- Agree on what the objectives are
  - Reduce COST vs GP MIPS vs TOTAL MIPS vs etc…
- Pick something simple to pilot first
- Understand the current production workload and don’t get roped into supporting things that don’t happen today

- Other things to consider
  - Change the code on z/OS and validate the same code works in both places
  - Start setting up the operations early
  - Don’t be surprised during testing that you find things that really don’t work in production today
Uber-virtualization
everything that works together under one umbrella
Contact Information

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