9265 TCO: Comparing System z and Distributed Environments; Building the Business Case

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SHARE
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Complexity is driving the cost of IT

Source: IDC 2007
Have you heard or made these statements?

"My mainframe cost 2x, 5x, 10x compared to my distributed environment" Mainframe

“Mainframe software costs are expensive and are driving me off the platform” Mainframe

"We are on a get off the mainframe strategy“ Mainframe

"We keep adding servers and people“ Distributed

“Our infrastructure can not support our servers” Distributed

Pain Point: Despite the emergence of virtualization tooling on Unix and Windows architectures, most enterprises continue to buy more processing power than is needed and end up getting .. more to manage, more costs, more complexity
Chargeback

- Mainframe chargeback pools are typically 50 – 60% overstated
  - Software contracts
  - People
    - Operations and monitoring
  - Default bucket

- Chargeback methodology can not be used for comparing the cost of adding or removing a workload
  - Incremental cost is 20 – 25% of the full chargeback cost
    - Hardware price performance
    - Software flat slope, ISV’s?
    - Do you need to hire additional people
Throughout the past 10+ years the cost dynamics of supporting corporate IT infrastructures has changed significantly as has the landscape.

People expense has tripled as a %
Software expense has doubled as a %
Hardware is less than 1/3 of its original %
Server Annual Cost Distribution

These are typical customer examples

Windows
- Sum of power pa: 56%
- Sum of SW pa: 7%
- Sum of SW pCPU pa: 6%
- Sum of HW Mnt pa: 27%
- Sum of Mgmt pa: 5%

Unix
- Sum of power pa: 31%
- Sum of SW pa: 3%
- Sum of SW pCPU pa: 10%
- Sum of HW Mnt pa: 31%
- Sum of Mgmt pa: 1%

Mainframe
- Sum of power pa: <5%
- Sum of SW pa: <15 – 30%
- Sum of SW pCPU pa: <20 – 35%
- Sum of HW Mnt pa: 35 – 55+
- Sum of Mgmt pa: 1%

The key is people
Server utilization varies significantly by platform and that needs to be accounted for in the business case. The mainframe environment is used most efficiently, but is it the most or least expensive.
Datacenter Reality

- **Mainframe**
  - Well managed
  - Rock solid QoS
  - Expensive (perception)
  - Lowest TCO (reality)

- **UNIX and Intel**
  - Proliferation of servers
  - Lower systems utilization
  - Staffing growth
  - Inexpensive HW (perception)
Server Proliferation

- Describe a current application environment
  - Production
    - Database server? How many?
    - Application server? How many?
    - Messaging server? How many?
    - Failover servers? For each?
  - Additional Servers
    - Development servers? Multiple levels?
    - Test servers? Multiple levels?
    - Systems test? Multiple levels?
    - Quality Assurance servers?
    - Education servers?
  - Disaster Recovery
    - Do you have a DR site?

- How many applications/types of workload do you have?
e-business Servers - Complexity and Cost

Hardware
- 3 primary production servers
- 16 total servers
  5:1 ratio

Software
- 32+ processors for database software
  ~ $1.8M for 3yrs
- 15+ processors for application software
Why is utilization low?

- Use of response time as a measure of capacity
  - Buy rather than tune
- Backup, development, test, training and integration servers
- Peaked, spiky workloads on dedicated rather than shared hardware
- I/O Bound workloads, contention
- Utilization controlled to avoid system stress and outages
- Incompatible release levels
- Incompatible maintenance windows
# Summary of Server Scorecard Metrics

**Example**

<table>
<thead>
<tr>
<th></th>
<th>Mainframe</th>
<th>UNIX</th>
<th>Intel</th>
</tr>
</thead>
<tbody>
<tr>
<td>People Efficiency</td>
<td>Very Good</td>
<td>Average to Low</td>
<td>Very Good [tend to be cloned infrastructure applications]</td>
</tr>
<tr>
<td>Prime Shift Utilization</td>
<td>Very high (65-85%)</td>
<td>Fair/Good (10-20%)</td>
<td>Very low (1-8%)</td>
</tr>
<tr>
<td>Online Availability</td>
<td>Excellent (99.9-99.95%)</td>
<td>Fair/Good (98.5-99.7%)</td>
<td>Not known (97.0-99.0%)</td>
</tr>
<tr>
<td>Total Spend / Year</td>
<td>.. M$ / year</td>
<td>.. M$ / year</td>
<td>.. M$ / year</td>
</tr>
</tbody>
</table>

**Usual Incremental Cost Ratio to Mainframe**
- 1.0
  - **IBM System p 0.75 - 1.25x**

**Typical Incremental to Current Cost Ratio**
- 20 - 25%
- 50 - 60%
- 50 - 60%

* actual customer measurement
** based on multiple studies
Are Space and Facility Costs and issue in the Data Center?
A Typical Distributed Environment

**Lots of 1w, 2w, 4w boxes**

- **Unk**: 37
- **16**: 1
- **13**: 1
- **12**: 3
- **11**: 1
- **8**: 10
- **4**: 50
- **2**: 65
- **1**: 107

**Multiple operating system releases**

- **4.3.3.01**: 1
- **4.2.1.00**: 1
- **4.3.2.02**: 3
- **5.2.0.00**: 4
- **4.3.3.10**: 4
- **5.1.0.03**: 4
- **4.3.3.04**: 5
- **5.2.0.03**: 5
- **5.1.0.04**: 8
- **5.2.0.05**: 8
- **5.1.0.00**: 7
- **5.2.0.02**: 12
- **5.1.0.06**: 20
- **5.2.0.04**: 26
- **5.1.0.05**: 33
- **4.3.3.11**: 70

**How much power is being used by these old, single image, low utilized servers?**

**Many servers are old**

- **3 + Years Old**:
  - **1996**: 0
  - **1997**: 0
  - **1998**: 0
  - **1999**: 0
  - **2000**: 0
  - **2001**: 0
  - **2002**: 0
  - **2003**: 0
  - **2004**: 0

**Servers are under utilized**

Source: Scorpion Study 1999 - 2007
Power and cooling resources are dominated by Wintel machines. Although these resources are not yet constrained at ABC, costs are rising steadily and will continue to do so. Environmental costs will be included in the business cases.

Current State - Environmental costs are LOW on System z

**Used Capacity**

- **Wintel**
- **Unix**
- **iSeries**
- **MF**

**Power Draw**

- **Wintel**
- **Unix**
- **iSeries**
- **MF**

**Ratio**

<table>
<thead>
<tr>
<th>Watts / Used RIP</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wintel</td>
<td>16.7</td>
</tr>
<tr>
<td>Unix</td>
<td>11.4</td>
</tr>
<tr>
<td>iSeries</td>
<td>2.6</td>
</tr>
<tr>
<td>MF</td>
<td>1.1</td>
</tr>
</tbody>
</table>

Relative Internal Performance is a cross-architecture capacity metric used here. It is to be used only within the context of this study and cannot be compared to external benchmarks or other IBM performance ratings. Load or Used RIPS is the product of estimated utilization and RIP per instance for all 2000 server instances.
Customer Studies

- WebSphere® customer
- Hardware
  - 5000+ MIPS
  - 1000+ servers (25% UNIX)
- Software
  - WebSphere currently on Solaris
  - Oracle and DB2®

Customer perception:
Solaris environment is 1/5 the cost of the mainframe
Production SUN Server Architecture

Source: Scorpion Study 1999 - 2007
Customer Example:
Distributed SUN Server Solution – perception…

- Customer perception was that the mainframe was 5x the cost of the existing Sun implementation

Source: Scorpion Study 1999 - 2005
EEE Corp: WebSphere Business Case

Hardware at street prices
- some Sun equipment was "used"
Software based on customers’ actual environment
QoS & back-end connectivity not addressed

Software licenses
Proc. based - Oracle, WebSphere, DB2 Dev servers
Annual maintenance 20%
Average rate for servers $11.5K/yr (non proc. Based)

Source: Scorpion Study 1999 - 2007

Original Perception was that Sun was 5x less expensive

IBM eServer™ zSeries® savings 10% / 3 year TCO

Source: Scorpion Study 1999 - 2007
Specialty engines on System z9 and eServer zSeries

"IFL'S" "ZAAP'S" "ZIIP'S"
IFL capacity increases "just happen"

when you do a mainframe hardware upgrade

"ZAAP's & ZIIP's too"
TCO Impact of Mainframe Consolidations

Your TCO may vary:

- Potential for dramatic reductions in software expense for processor based licenses
- Significant reductions in power and cooling costs are typical
- People savings from virtualization
- Increased processor utilization

Source: Capricorn whitepaper

*Workload consolidation using Linux on a mainframe can result in significant TCO savings*

Source: Scorpion Study 1999 - 2007
What about zSeries Application Assist Processors (zAAPs)?

With zAAP processors, zSeries savings would have been 37%
What Makes the Best Fit for z

▪ **Leverage classic strengths of the zSeries**
  – High availability
  – High i/o bandwidth capabilities
  – Flexibility to run disparate workloads concurrently
  – Requirement for excellent disaster recovery capabilities
  – Security
  – Facilities - 15 yrs ago did you think facilities would be a mainframe strength

▪ **Shortening end to end path length for applications**
  – Collocation of applications
  – Consolidation of applications from distributed servers
  – Reduction in network traffic
  – Simplification of support model
Reducing TCO with System z

Chargeback methodology works against the mainframe
It feeds the “expensive” perception

Specialty engines can significantly lower the total cost of the mainframe

The typical total server to production ratio is between 3:1 or 5:1 for a distributed app.

The incremental cost of capacity on a zSeries is less expensive than distributed servers
UNIX - 0.9 – 1.5 x compared to mainframes
Windows - <1.0 - 4.0 x compared to mainframes

zSeries (z/OS) has a significant business case advantage in people, availability, facilities, and utilization

zSeries (Linux/VM) has a significant business case advantage in people, software, facilities, utilization, and failover
Recent Videos and article

Videos
Scorpion series part 1: Mainframe Cost Misconceptions
Scorpion series part 2: Server Proliferation and Utilization
Scorpion series part 3: Facility and Infrastructure Considerations
Scorpion series part 4: Saving Money with zIIPs, zAAPs and IFLs
Scorpion series part 5: Building a Business Case
Scorpion series part 6: The Best Fit for System z


The new TCO and the value of the mainframe
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http://www-306.ibm.com/software/swnews/swnews/swnews.nsf/n/cres6x3lc8
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