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

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SHARE
San Jose, CA
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Lab Services Mission and Profile

- Accelerate the adoption of new products and offerings.
- Deliver technical training tailored to customer needs
- Team with GTS and IBM Business Partners to optimize deployment of service offerings
- Develop processes to link Clients and Development

Our competitive advantage

- Leverage relationships with the Labs to build deep technical skills and exploit the expertise of our developers
- Provide timely skills transfer to our services teams and business partners
- Tightly integrated Lab Services and Technical Training

Helping our clients win the race!

- Enterprise Systems
- Business Systems
- Mainframe
- Power Systems
- Modular Based Systems (System x/Blade/Clustered Solutions)
- System Storage
- IT Consolidation / Virtualization
- Data Center Services / Systems Management
- Training Services
WW STG Lab Services & Training Delivery Teams

<table>
<thead>
<tr>
<th>Geo</th>
<th>Lab Services</th>
<th>Training Services</th>
<th>Total Lab Srv + Tech Training</th>
</tr>
</thead>
<tbody>
<tr>
<td>AG</td>
<td>285</td>
<td>70</td>
<td>355</td>
</tr>
<tr>
<td>Europe</td>
<td>54</td>
<td>90</td>
<td>144</td>
</tr>
<tr>
<td>AP</td>
<td>67</td>
<td>30</td>
<td>97</td>
</tr>
<tr>
<td>Total</td>
<td>406</td>
<td>190</td>
<td>596</td>
</tr>
</tbody>
</table>

596 person team across 17 IMTs delivering a full portfolio of services and Technical Training
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
Published on: 11 Jan 2007

*The Mainstream -- January 2007 -- Issue 22*

http://www-306.ibm.com/software/swnews/swnews/swnews.nsf/n/cres6x3lc8
Have you heard 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
Full Burden Cost vs. Incremental Cost

- Full burden cost is typically reflected in a chargeback system
  - Mainframe chargeback pools are typically 50% overstated
- Incremental cost is the “real” cost a customer will pay for additional capacity
- Cost Comparisons – Full Burden vs. Incremental
  - Incremental cost is 20 – 25% of the full burden cost
  - Hardware cost is typically 3x greater
    - 3 – 5 yr depreciation and blexed leases
  - Software cost is typically 4 – 5x greater
    - Capacity discounts (PSLC), New Workload pricing
    - ISV contracts have a significant impact
  - People costs
    - How many additional people are really needed
  - Facility costs
  - Allocations

- Chargeback methodology should not be used for comparing the cost of adding or removing a workload
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
- 56%
- 27%
- 7%
- 6%
- 4%
- 1%

Unix
- 55%
- 31%
- 10%
- 3%
- 1%

Mainframe
- <20 – 35%
- <5%
- <15 – 30%
- 35 – 55+%
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>Metric</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</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>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></td>
<td>* DB2® avail. = 99.98%</td>
<td>* Oracle avail. = 99.35</td>
<td></td>
</tr>
<tr>
<td>Total Spend / Year</td>
<td>.. M$ / year</td>
<td>.. M$ / year</td>
<td>.. M$ / year</td>
</tr>
<tr>
<td>Usual Incremental Cost Ratio to Mainframe</td>
<td>1.0</td>
<td>0.9 – 1.5 x</td>
<td>&lt;1.0 - 4.0 x</td>
</tr>
<tr>
<td></td>
<td></td>
<td>** IBM System p 0.75 - 1.25x</td>
<td></td>
</tr>
<tr>
<td>Typical Incremental to Current Cost Ratio</td>
<td>20 - 25 %</td>
<td>50 - 60%</td>
<td>50 - 60%</td>
</tr>
</tbody>
</table>

* 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

Many servers are old

Servers are under utilized

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

Multiple operating system releases

Source: Scorpion Study 1999 - 2007
Current State - Environmental costs are LOW on System z

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.

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)

Original Perception was that Sun was 5x less expensive

Source: Scorpion Study 1999 - 2007

IBM eServer™ zSeries® savings 10% / 3 year TCO
Specialty engines on System z9 and eServer

"IFL'S"  "ZAAP'S"  "ZIIIP'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%

Source: Scorpion Study 1999 - 2007
Recent customer studies
These two alternatives (VMware and Mainframe) differ in level of risk and estimated transition cost, but both are favorable from a business perspective and address the majority of workloads at XYZ.

<table>
<thead>
<tr>
<th>Sizing</th>
<th>Current</th>
<th>Alt.Case.2</th>
<th>Alt.Case</th>
<th>3 Year Projection</th>
</tr>
</thead>
<tbody>
<tr>
<td>server type</td>
<td></td>
<td>x3950(8) 7150NDC</td>
<td>z9-EC IFL</td>
<td></td>
</tr>
<tr>
<td>total #CPU</td>
<td>3,106.92</td>
<td>640</td>
<td>64</td>
<td></td>
</tr>
<tr>
<td>used #CPU</td>
<td></td>
<td>640</td>
<td>64</td>
<td></td>
</tr>
<tr>
<td>#Log.Servers</td>
<td>1550.00</td>
<td>1550</td>
<td>1550</td>
<td></td>
</tr>
<tr>
<td>#Phys.Servers</td>
<td>1486.84</td>
<td>40</td>
<td>64</td>
<td></td>
</tr>
<tr>
<td>avg.Log.srv RIP</td>
<td>596.9</td>
<td>217.9</td>
<td>32.9</td>
<td></td>
</tr>
<tr>
<td>total capacity RIP</td>
<td>887,486.6</td>
<td>337,800.0</td>
<td>51,072.0</td>
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</tr>
<tr>
<td>total workload RIP</td>
<td>40,240.7</td>
<td>40,240.7</td>
<td>40,240.7</td>
<td></td>
</tr>
<tr>
<td>average utilization</td>
<td>4.53%</td>
<td>11.91%</td>
<td>78.79%</td>
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</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>AOC: Annual Operating Costs</th>
<th>Win</th>
<th>WinStack-02</th>
<th>none</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Staff cost code</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SW cost code</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SW cost /CPU /yr</td>
<td>1,669</td>
<td>1,399</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>SW cost /Lsrv /yr</td>
<td>911</td>
<td>880</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>SW cost /Psrv /yr</td>
<td>207</td>
<td>207</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>SW m&amp;s /yr</td>
<td>6,905,008</td>
<td>2,267,484</td>
<td>0</td>
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</tr>
<tr>
<td>maint /yr</td>
<td>1,212,901</td>
<td>216,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>facilities /yr</td>
<td>1,229,994</td>
<td>89,698</td>
<td>24,769</td>
<td></td>
</tr>
<tr>
<td>staff cost /yr</td>
<td>1,733,426</td>
<td>1,733,426</td>
<td>1,733,426</td>
<td></td>
</tr>
<tr>
<td>SO services /yr</td>
<td>8,167,487</td>
<td>8,167,487</td>
<td>9,906,121</td>
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</tr>
<tr>
<td>depreciation /yr</td>
<td>6,624,310</td>
<td>1,241,760</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>total AOC</td>
<td>25,873,126</td>
<td>13,715,855</td>
<td>11,664,316</td>
<td>14,208,810 est.potential saving /yr</td>
</tr>
</tbody>
</table>

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Staffing Resources are dominated by Unix and Wintel machines and reflect the shared responsibilities between Infrastructure support and Application Development at ABC. Enhancing productivity to enable growth without additional staff will be highlighted in the business cases.

**Current State - Staff Efficiency is HIGH on System z**

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 1800+ server instances.
Windows Application servers – Virtualize on zVM/Linux where appropriate, with majority of work to virtualize on VMware.

<table>
<thead>
<tr>
<th>Sizing</th>
<th>Current</th>
<th>Alt.Case.3</th>
<th>Alt.Case.2</th>
<th>Alt.Case.5</th>
<th>5 Year Projection</th>
</tr>
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<tbody>
<tr>
<td>server type</td>
<td>x3950(4)7140ND</td>
<td>x3950(8)7140ND</td>
<td>z990 IFL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>total #CPU</td>
<td>1,278.00</td>
<td>400</td>
<td>272</td>
<td>21</td>
<td></td>
</tr>
<tr>
<td>used #CPU</td>
<td>400</td>
<td>272</td>
<td>21</td>
<td></td>
<td></td>
</tr>
<tr>
<td>#Log.Servers</td>
<td>676.00</td>
<td>676.00</td>
<td>676.00</td>
<td>676</td>
<td></td>
</tr>
<tr>
<td>#Phys.Servers</td>
<td>669.50</td>
<td>50</td>
<td>17</td>
<td>21</td>
<td></td>
</tr>
<tr>
<td>avg.Log.srv RIP</td>
<td>509.8</td>
<td>368.7</td>
<td>216.5</td>
<td>55.5</td>
<td></td>
</tr>
<tr>
<td>total capacity RIP</td>
<td>341,308.5</td>
<td>249,250.0</td>
<td>146,370.0</td>
<td>37,548.0</td>
<td></td>
</tr>
<tr>
<td>total workload RIP</td>
<td>24,457.2</td>
<td>24,457.2</td>
<td>24,457.2</td>
<td>24,457.2</td>
<td></td>
</tr>
<tr>
<td>average utilization</td>
<td>7.17%</td>
<td>9.81%</td>
<td>16.71%</td>
<td>65.14%</td>
<td></td>
</tr>
</tbody>
</table>

**AOC: Annual Operating Costs**

<table>
<thead>
<tr>
<th>Staff cost code</th>
<th>Win</th>
<th>VMwareEE</th>
<th>Win</th>
<th>VMwareEE</th>
<th>zVM.zLinux</th>
</tr>
</thead>
<tbody>
<tr>
<td>SW cost /CPU /yr</td>
<td>0.00</td>
<td>452.81</td>
<td>452.81</td>
<td>15,000.00</td>
<td></td>
</tr>
<tr>
<td>SW cost /Lsrv /yr</td>
<td>843.22</td>
<td>843.22</td>
<td>843.22</td>
<td>0.00</td>
<td></td>
</tr>
<tr>
<td>SW cost /Psrv /yr</td>
<td>9.70</td>
<td>9.70</td>
<td>9.70</td>
<td>0.00</td>
<td></td>
</tr>
<tr>
<td>SW m&amp;s</td>
<td>$576,512</td>
<td>$751,628</td>
<td>$693,348</td>
<td>$315,000</td>
<td></td>
</tr>
<tr>
<td>maint</td>
<td>$276,618</td>
<td>$180,000</td>
<td>$91,800</td>
<td>$294,000</td>
<td></td>
</tr>
<tr>
<td>facilities</td>
<td>$206,055</td>
<td>$49,225</td>
<td>$33,473</td>
<td>$8,289</td>
<td></td>
</tr>
<tr>
<td>staff cost</td>
<td>$2,225,180</td>
<td>$1,881,286</td>
<td>$1,881,286</td>
<td>$715,183</td>
<td></td>
</tr>
<tr>
<td>total cost</td>
<td>$3,284,365</td>
<td>$2,862,139</td>
<td>$2,699,907</td>
<td>$1,332,472</td>
<td></td>
</tr>
</tbody>
</table>

**OTC: One Time Costs**

| SW purchase | $6,357,500 | $862,500 | $586,500 | $315,000 |
| HW purchase | $6,357,500 | $2,725,086 | $1,099,254 | $3,297,000 |
| transition | $3,347,500 | $3,347,500 | $3,347,500 | $3,347,500 |
| total OTC | $6,357,500 | $6,935,086 | $5,033,254 | $6,959,500 |
| write off | $0 | $0 | $0 | $0 |

**5 Year Projection**

| OTC + 5x AOC | $22,779,325 | $20,705,781 | $18,257,388 | $13,327,859 |

**AOC Reduction**

<table>
<thead>
<tr>
<th>Current</th>
<th>Alt.Case.3</th>
<th>Alt.Case.2</th>
<th>Alt.Case.5</th>
<th>5 Year Projection</th>
</tr>
</thead>
<tbody>
<tr>
<td>$1,951,893</td>
<td>$1,459,284</td>
<td>$1,324,725</td>
<td>$1,089,364</td>
<td>$945,146</td>
</tr>
</tbody>
</table>

| SCON ratio Log | 100.0 :100 |
| SCON ratio Phy | 3,188.1 :100 |

**Net Cash Investment**

| $602,000 | $29,451,466 | $5 yr saving | 59% | %age AOC Reduction |

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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

- WebSphere MQ Series
- DB2 Connect
- CICS Transaction Gateway
- IMS Connect for Java
- Web Logic/WebSphere and JAVA applications development
- Applications requiring top end disaster recovery model
- LDAP security services
- IBI Web Focus
Recent Videos and article

Videos

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http://www-306.ibm.com/software/swnews/swnews/swnews.nsf/n/cres6x3lc8
Have a Great Afternoon!