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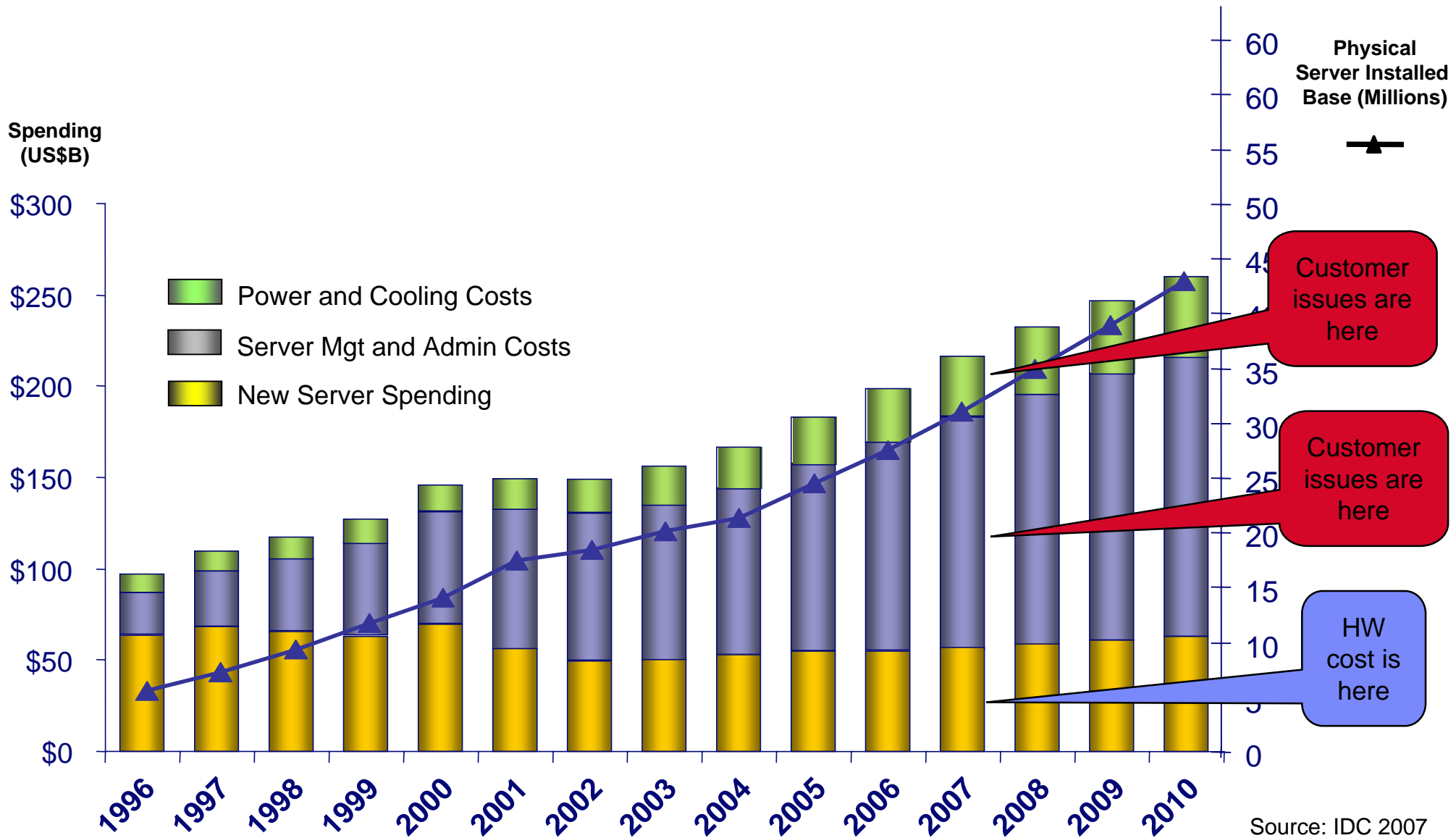
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SHARE

Orlando, FL

February 2008

Complexity is driving the cost of IT

Spending (US$B)

- ▇ Power and Cooling Costs
- ▇ Server Mgt and Admin Costs
- ▇ New Server Spending

Physical Server Installed Base (Millions)

Customer issues are here

Customer issues are here

HW cost is here

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 ?
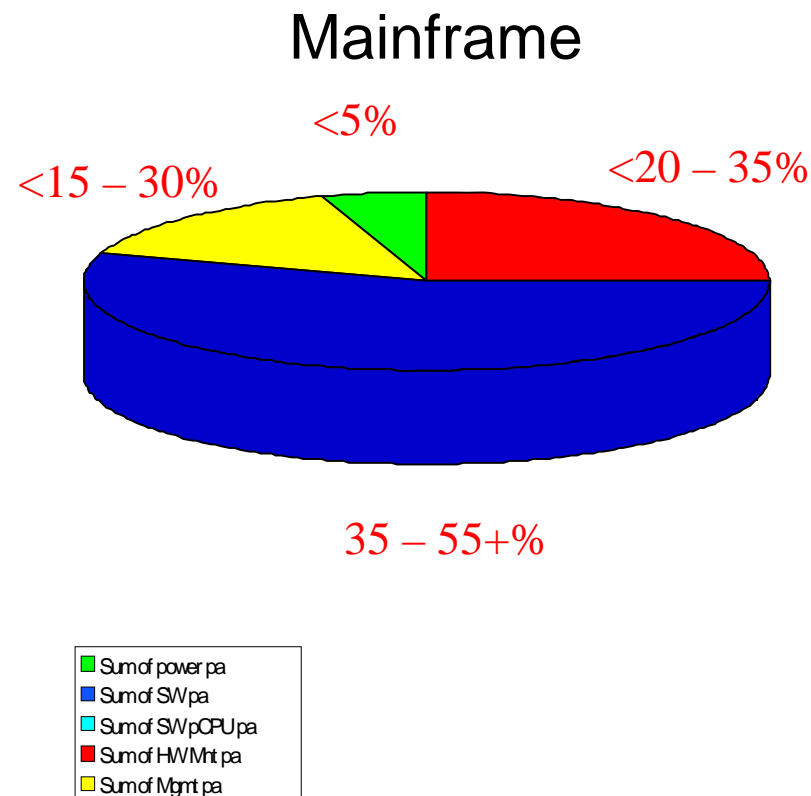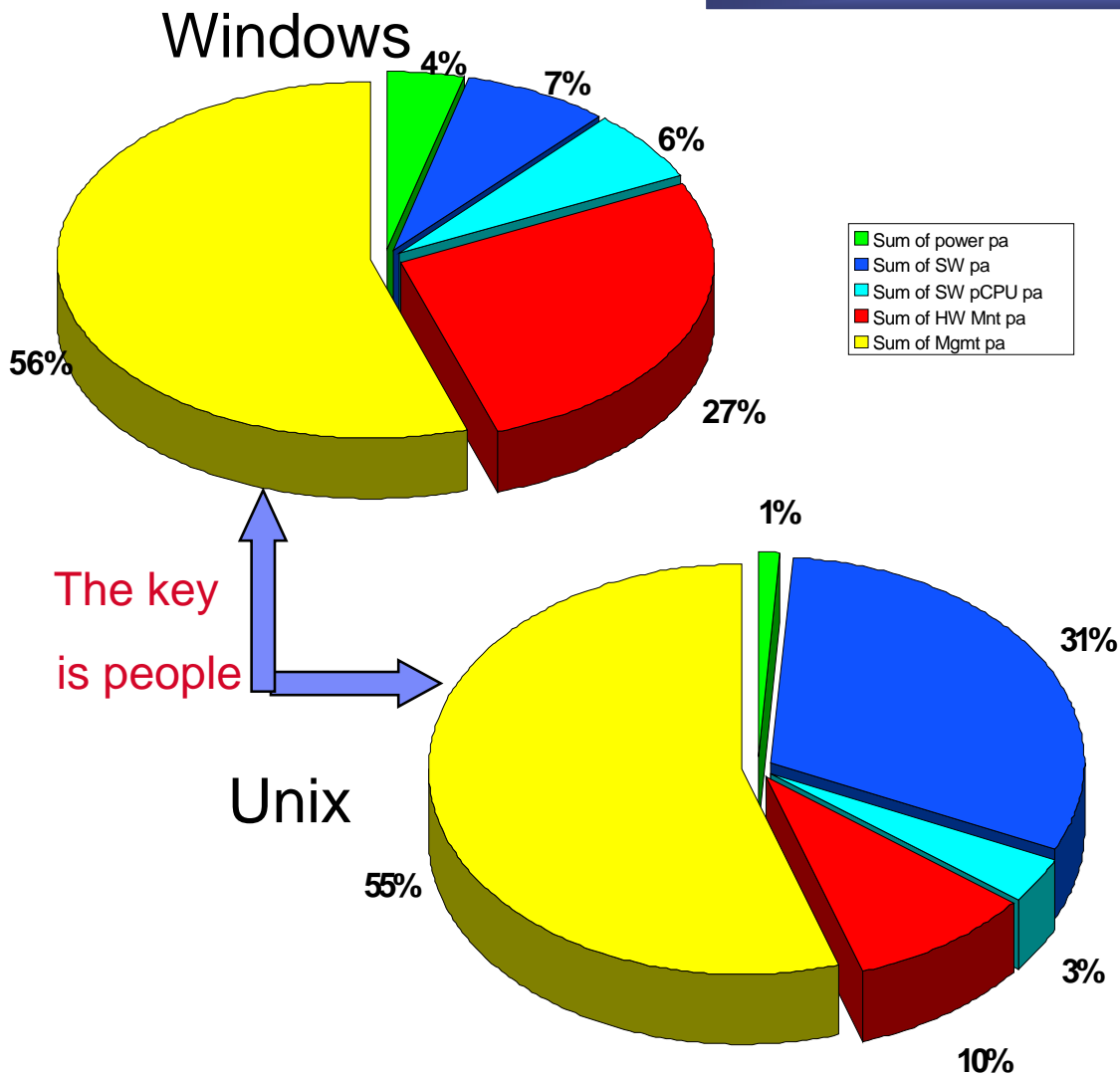   - Do you need to hire additional people

Throughout the past 10+ years the cost dynamics of supporting corporate IT infrastructures has changed significantly as has the landscape.

1995

Hardware
65%

Other
7%

People
14%

Software
14%

Present

Software
28%

Hardware
17%

Other
10+%
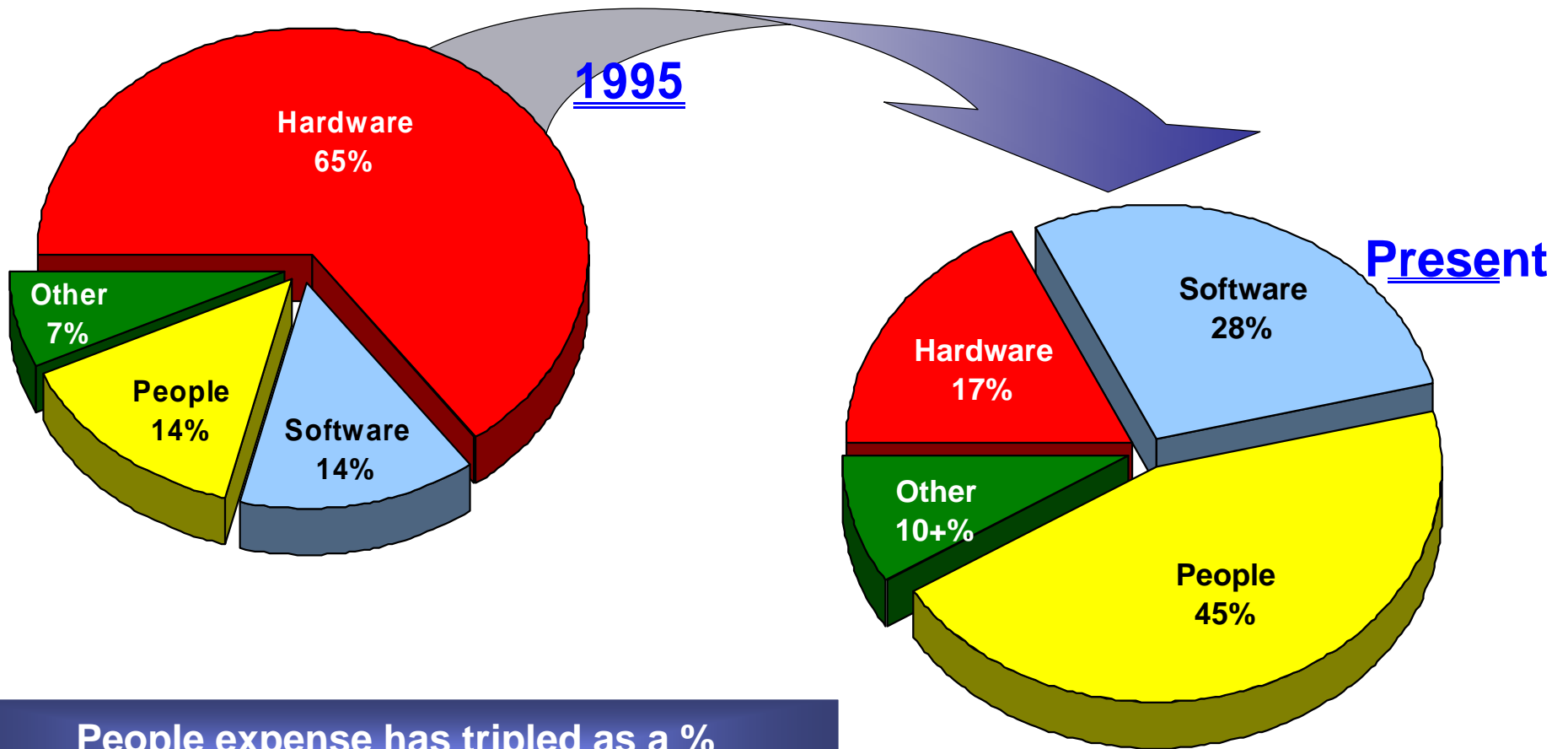
People
45%

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

4%

7%

6%

27%

Sum of power pa
Sum of SW pa
Sum of SW pCPU pa
Sum of HW Mnt pa
Sum of Mgmt pa

56%

The key
is people

Unix

55%

1%

31%

3%

10%

Sum of power pa
Sum of SW pa
Sum of SW pCPU pa
Sum of HW Mnt pa
Sum of Mgmt pa

Mainframe
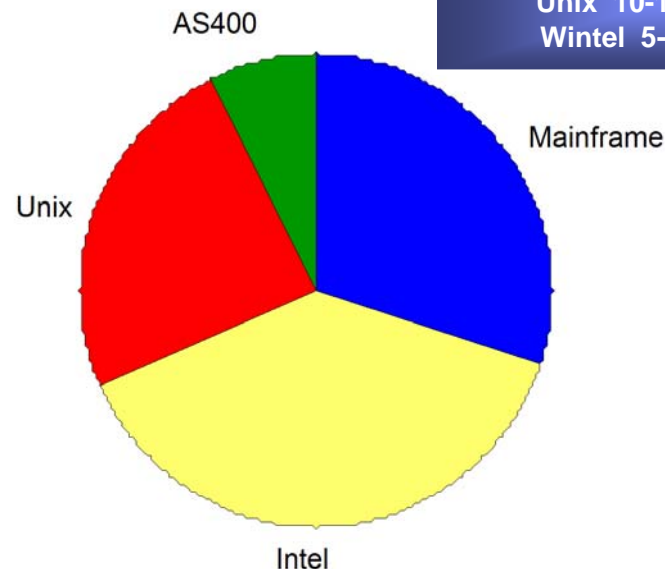
<5%

<15 – 30%

<20 – 35%

35 – 55+%

Installed vs. Used capacity

Installed Capacity:
33M tpms*
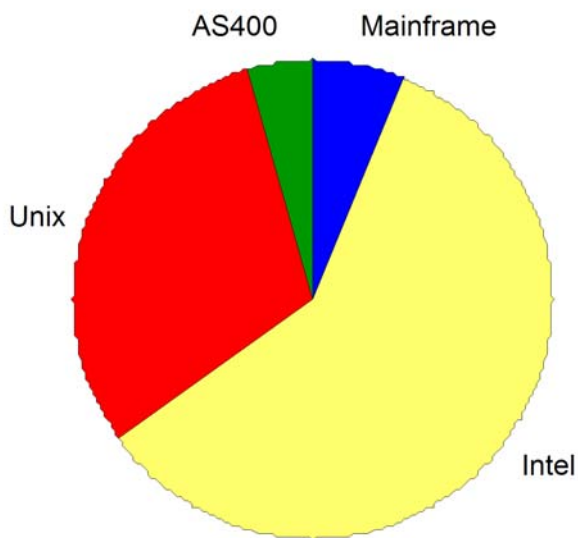
Used Capacity:
4M tpms*

Typical Utilization
Mainframe 80 – 95%
Unix 10-15% now 15-30%
Wintel 5-7% now 5-12%

* system capacity (tpms) is an approximation of the transaction processing capability of each system. It cannot be compared to other commercial ratings or benchmarks and is invalid outside of the context of this IBM study.

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
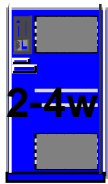
- **Mainframe**

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

- **UNIX and Intel**

  - Proliferation of servers
  - Lower systems utilization
  - Staffing growth
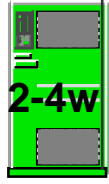 - Inexpensive HW (perception)

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?
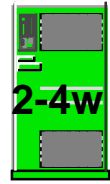- How many applications/types of workload do you have?

e-business Servers - Complexity and Cost
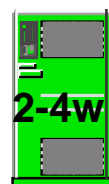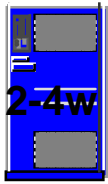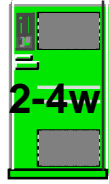
2-4w Web/App

2-4w App F/O

2-4w Development

2-4w Test

2-4w Web/AppD/R & QA

2-4w D/R F/O

2-4w Messaging

2-4w Messaging F/O

2-4w Test/Education

2-4w Integration

2-4w Messaging D/R & QA

2-4w D/R F/O
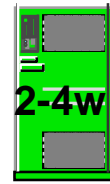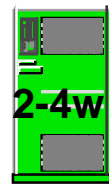
8w Database
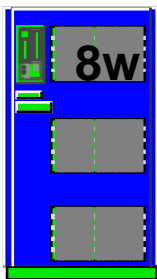
8w Database F/O
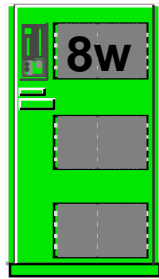
8w Database D/R & QA

8w D/R F/O

? **?** **?**

Hardware
- 3 primary production servers
- 16 total servers
  - 5:1 ratio
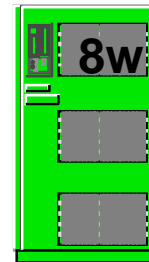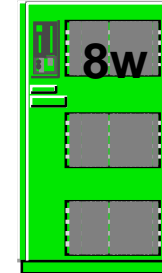
Software
- 32+ processors for database software
  - ~ $1.8M for 3yrs
- 15+ processors for application software

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

	Mainframe	UNIX	Intel
People Efficiency	**Very Good**	**Average to Low**	**Very Good** **tend to be cloned infrastructure applications**
Prime Shift Utilization	**Very high (65-85%)**	**Fair/Good (10-20%)**	**Very low (1- 8%)**
Online Availability	**Excellent (99.9-99.95%)** ** DB2® avail. = 99.98%*	**Fair/Good (98.5-99.7%)** ** Oracle avail. = 99.35*	**Not known (97.0-99.0%)**
Total Spend / Year	**.. M$ / year**	**.. M$ / year**	**.. M$ / year**
Usual Incremental Cost Ratio to Mainframe	**1.0**	**0.9 – 1.5 x** *** IBM System p 0.75 - 1.25x*	**<1.0 - 4.0 x**
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

Are facilities an issue?

Lots of 1w, 2w, 4w boxes

Unk	37
16	1
13	1
12	3
11	1
8	10
4	107
2	50
1	55

(0 — 20 — 40 — 60 — 80 — 100 — 120)
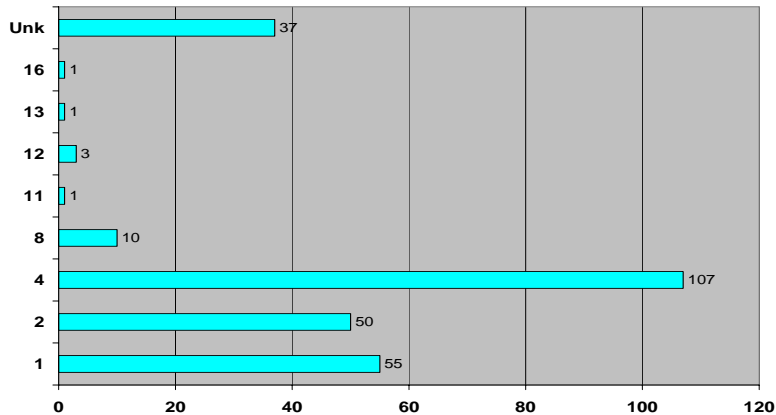
Multiple operating system releases

AIX

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	6
5.2.0.05	6
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

(0 — 10 — 20 — 30 — 40 — 50 — 60 — 70 — 80)
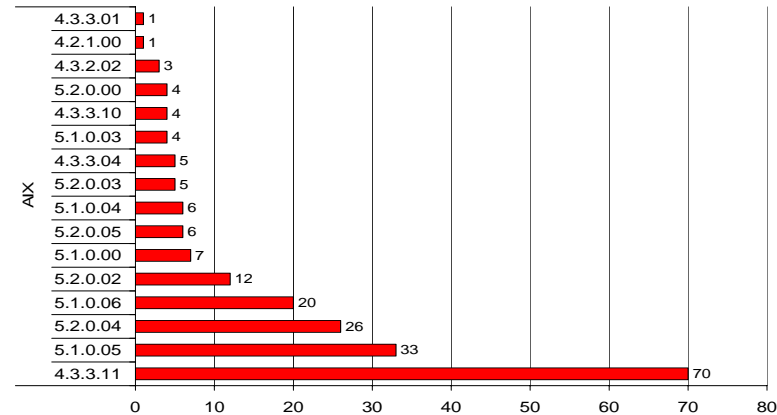
Many servers are old

3 + Years Old

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

Server Count

(0, 50, 100, 150, 200, 250)

1996 1997 1998 1999 2000 2001 2002 2003 2004
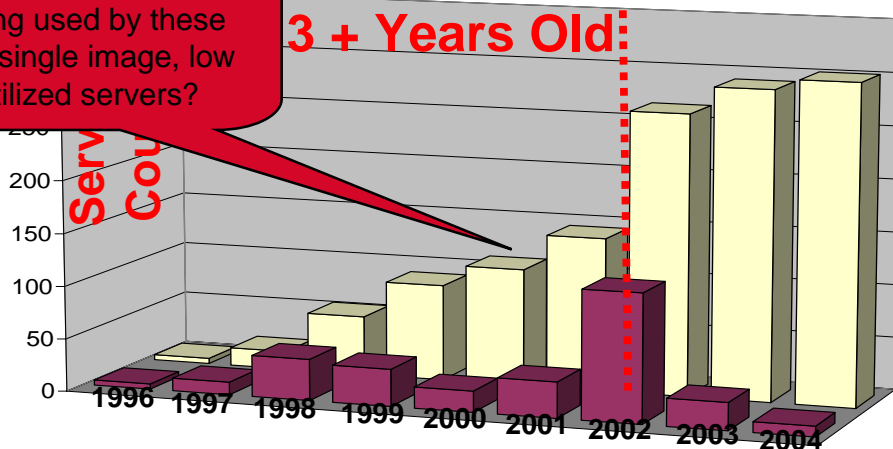
Servers are under utilized

(0 — 1000 — 2000 — 3000 — 4000 — 5000 — 6000 — 7000 — 8000 — 9000 — 10000 — 11000 — 12000 — 13000)
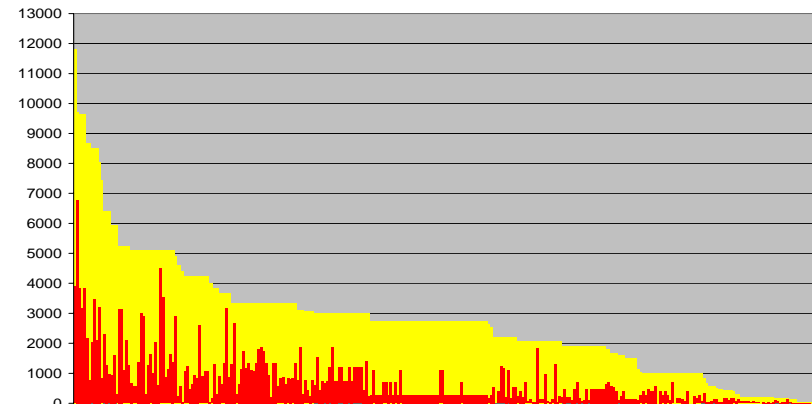
Source: Scorpion Study 1999 - 2007

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.

Used Capacity

MF
Wintel
iSeries
Unix

Power Draw

MF
iSeries
Unix
Wintel

Ratio
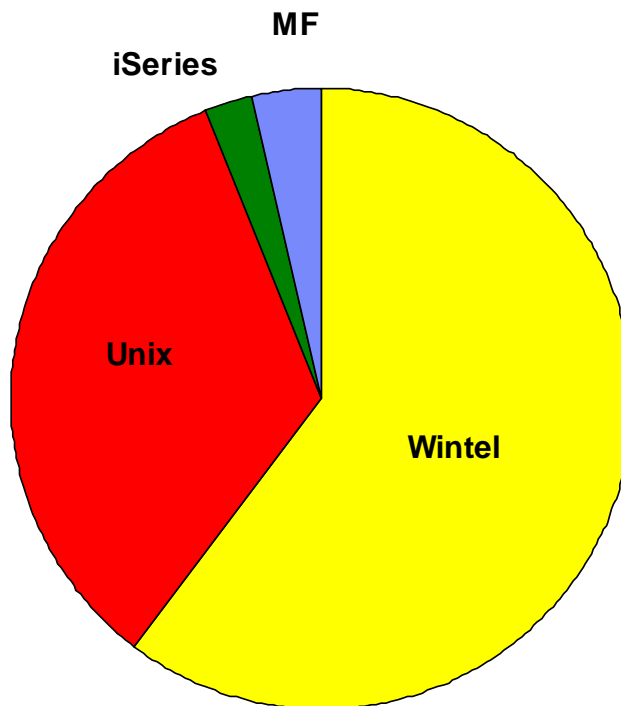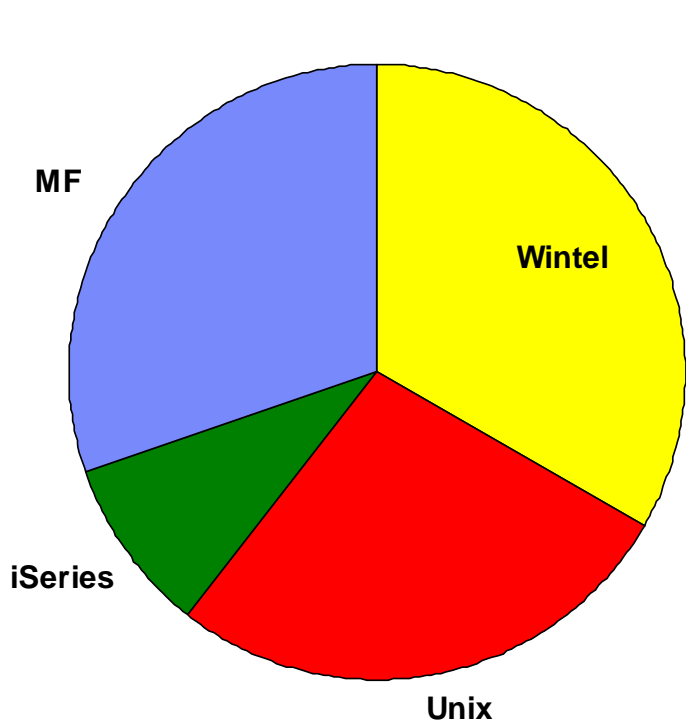
Watts / Used RIP	
Wintel	16.7
Unix	11.4
iSeries	2.6
MF	1.1

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

WebSphere 4.0

E3500

UDB
wudbprod2

UDB
wudbprod1

V880

WebSphere prod 1
WebSphere prod 2
WebSphere prod 3
WebSphere prod 4
WebSphere prod 5
WebSphere prod 6
Database prod 1
DW prod 1

280R

External HTTP prod1
External HTTP rod2
External HTTP prod3
External HTTP prod4
External HTTP prod5
External HTTP prod6
?? webev1

280R

Internal HTTP prod1
Internal HTTP prod2
Internal HTTP prod3
Internal HTTP prod4

4800

Oracle Prod prod2
Oracle Prod prod1

U2

Source: Scorpion Study 1999 - 2007

Customer Example:
Distributed SUN Server Solution – perception…

isn't always reality!

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

WebSphere

E3500	V880	V880	280R	280R	4800	U2
UDB wudbprod2	D/R	Websphere prod 1	External HTTP prod1	Internal HTTP prod1	Oracle Prod prod2	
UDB wudbprod1	D/R	Websphere prod 2	External HTTP rod2	Internal HTTP prod2	Oracle Prod prod1	Development
Test	D/R	Websphere prod 3	External HTTP prod3	Internal HTTP prod3	Test	Development
Test	D/R	Websphere prod 4	External HTTP prod4	Internal HTTP prod4	Test	Development
	D/R	Websphere prod 5	External HTTP prod5	Test		Development
	D/R	Websphere prod 6	External HTTP prod6	Test		Development
	D/R	Database prod 1	?? webev1	D/R		Development
		DW prod 1	Test	D/R		Development
		Test	Test	D/R		Development
		Test	D/R	D/R		Development
		Test	D/R	D/R		Development
		Test				
		Test				
		Test				

E250

Development

E10000 Domains

Development	Development	Development
Development	Development	Development
Development	Development	Development
	Development	

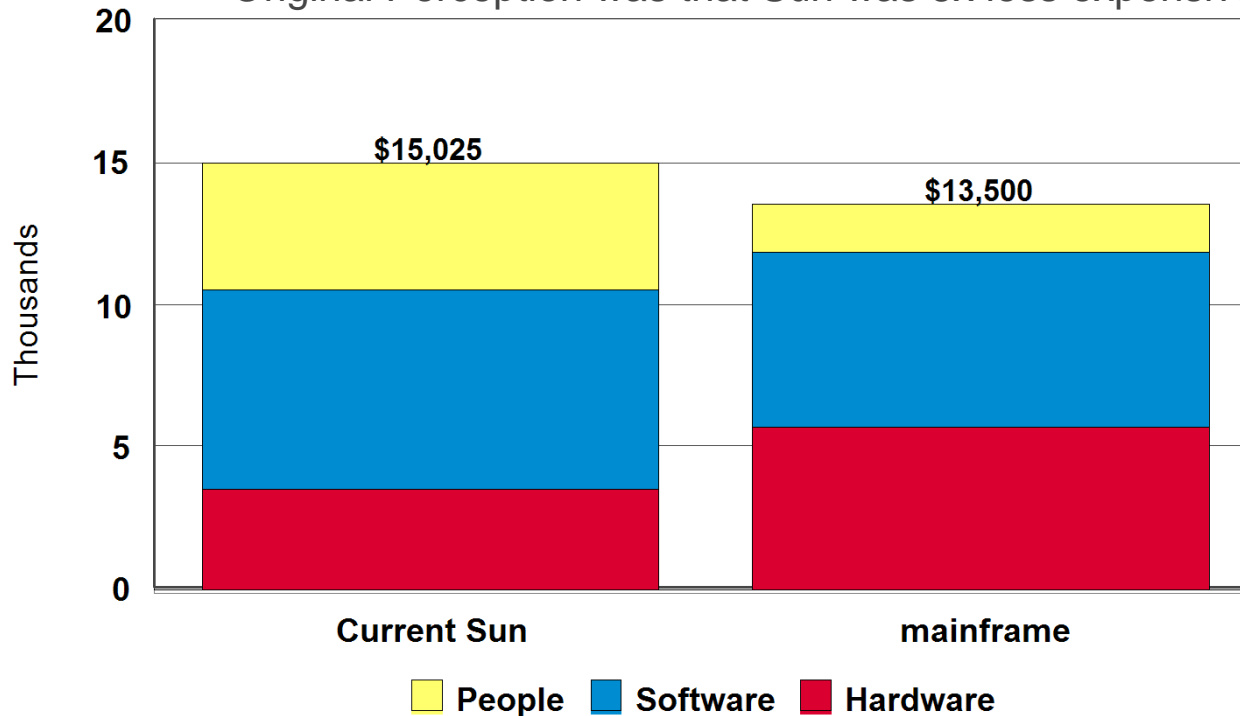*Source: Scorpion Study 1999 - 2005*

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

Chart — Thousands (y-axis 0 to 20):
- Current Sun: **$15,025**
- mainframe: **$13,500**

Legend: ☐ **People** ■ **Software** ■ **Hardware**

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

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
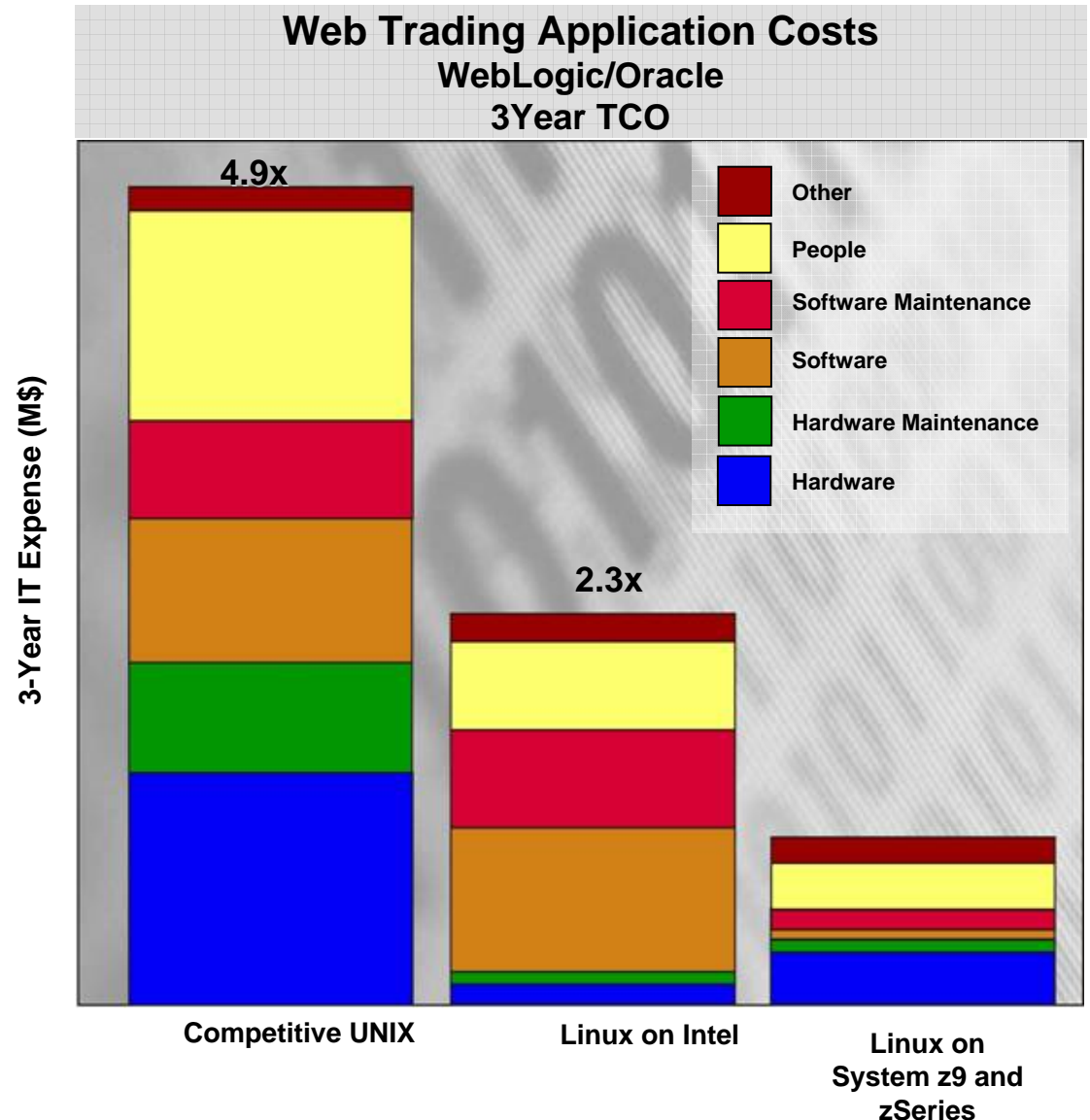
"zAAP's & zIIP's too"

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

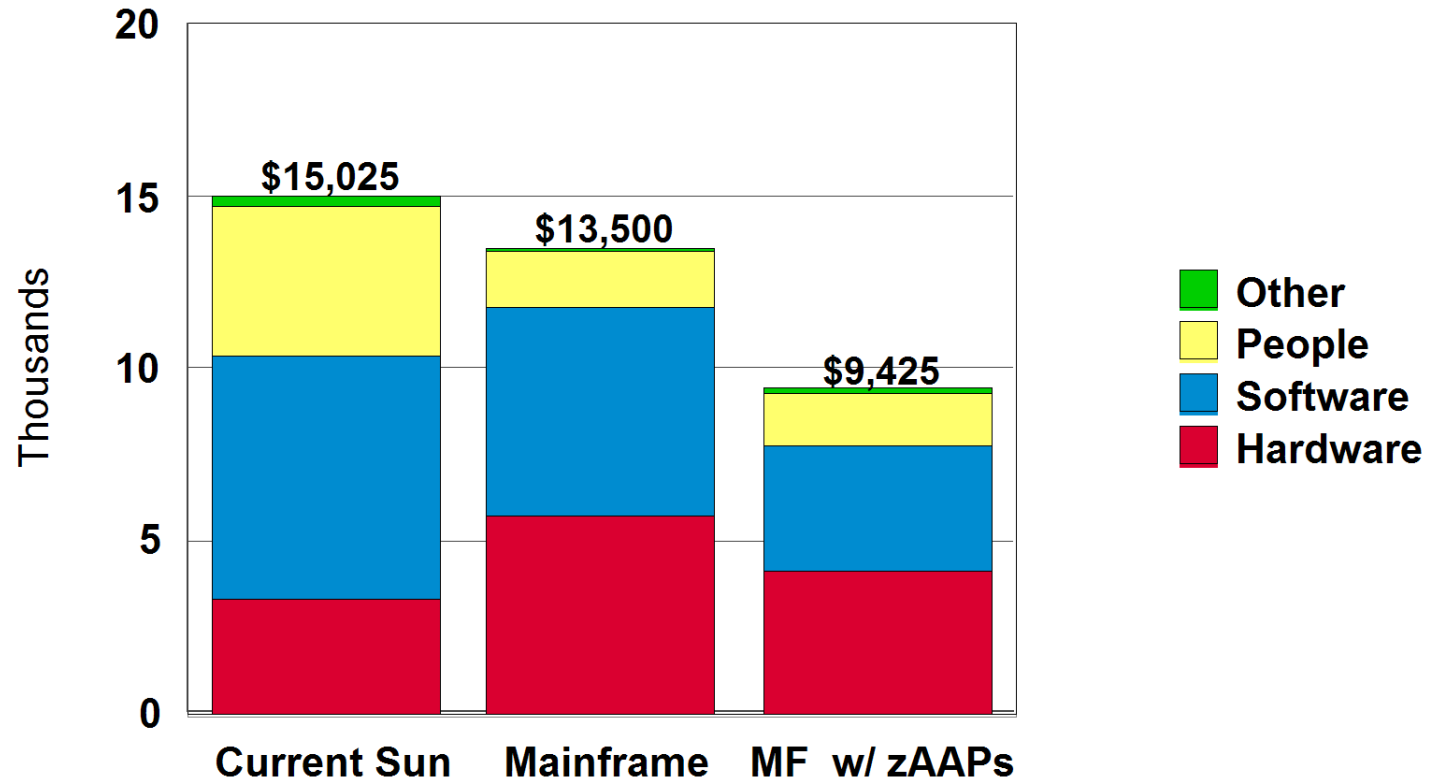- Increased processor utilization

Source: Capricorn whitepaper

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

Web Trading Application Costs
WebLogic/Oracle
3Year TCO

Legend:
- Other
- People
- Software Maintenance
- Software
- Hardware Maintenance
- Hardware

3-Year IT Expense (M$)

4.9x — Competitive UNIX

2.3x — Linux on Intel

Linux on System z9 and zSeries

Source: Scorpion Study 1999 - 2007

What about zSeries Application Assist Processors (zAAPs)?

3 Year Cost of Ownership

Legend:
- 🟩 Other
- 🟨 People
- 🟦 Software
- 🟥 Hardware

Current Sun: $15,025
Mainframe: $13,500
MF w/ zAAPs: $9,425

With zAAP processors, zSeries savings would have been 37%

Source: Scorpion Study 1999 - 2007

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

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

http://www-306.ibm.com/software/info/television/index.jsp?lang=en_us&cat=systemz&item=xml/A361366R16875X50.xml

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.nsf/n/cres6x3lc8

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