G26

Linux on zSeries: The Business Case for Server Consolidation

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zSeries® EXPO
FEATURING Z/OS, Z/VM, Z/VSE
AND LINUX ON ZSERIES

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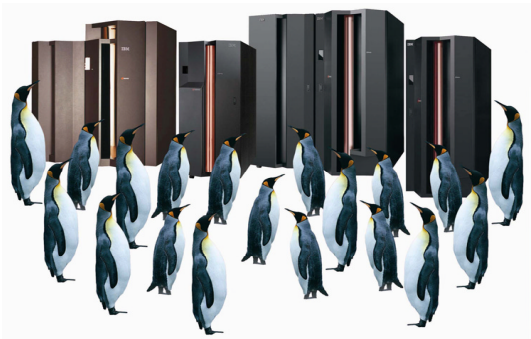

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Notes:

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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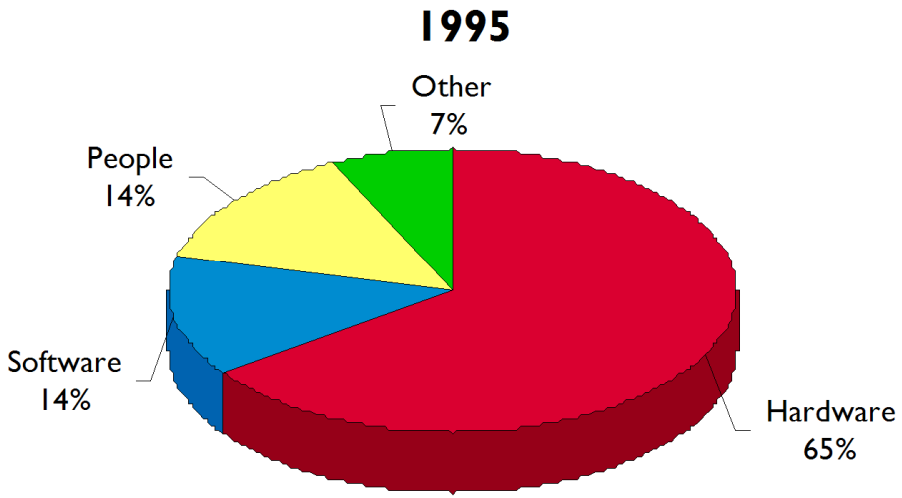
Have you heard/made these statements?

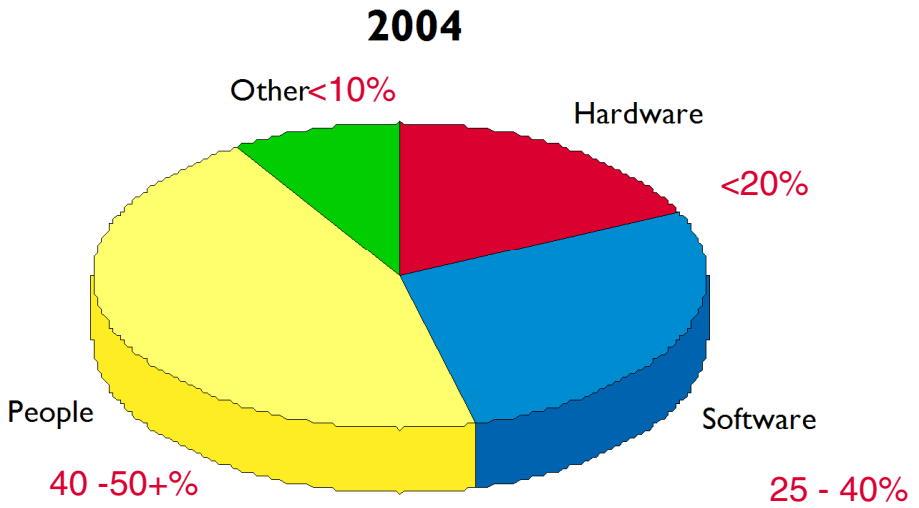
" My mainframe cost 2x, 5x, 10x compared to my distributed environment"

" Mainframe software cost are expensive and are driving me off the platform"

"We are on a get off the mainframe strategy"

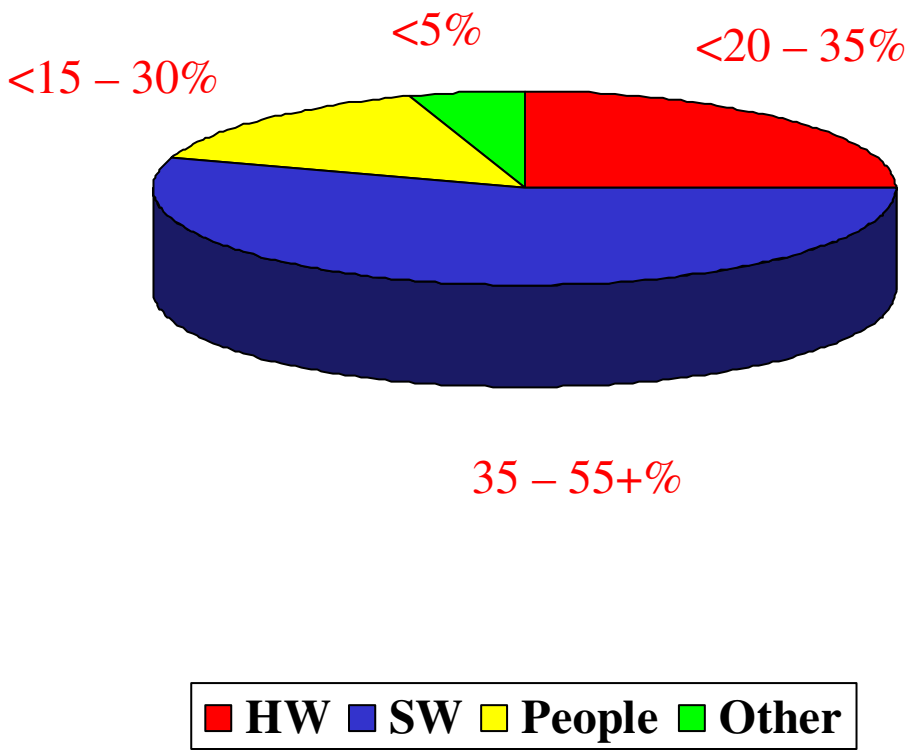
The changing expense profile





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

Mainframe Spending Distribution



- Software cost are highly visible
- Incremental people costs are minimal
- Facility costs are minimal

Datacenter Reality

Mainframe

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

Distributed (Unix and Windows)

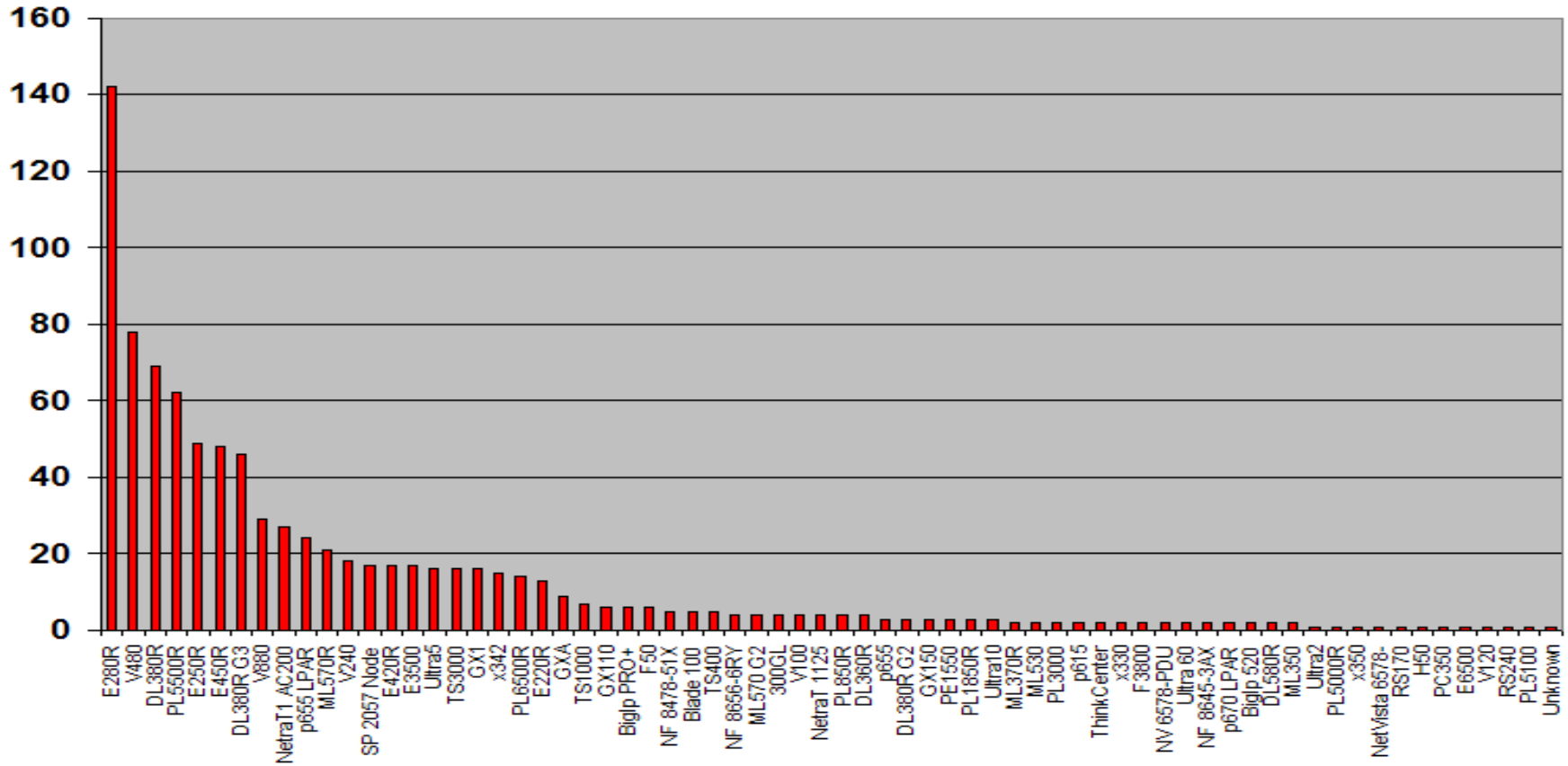
- Proliferation of servers
- Lower systems utilization
- Staffing growth
- Inexpensive HW (perception)
- TCO (it depends)

Politics

"Organizational Challenges"

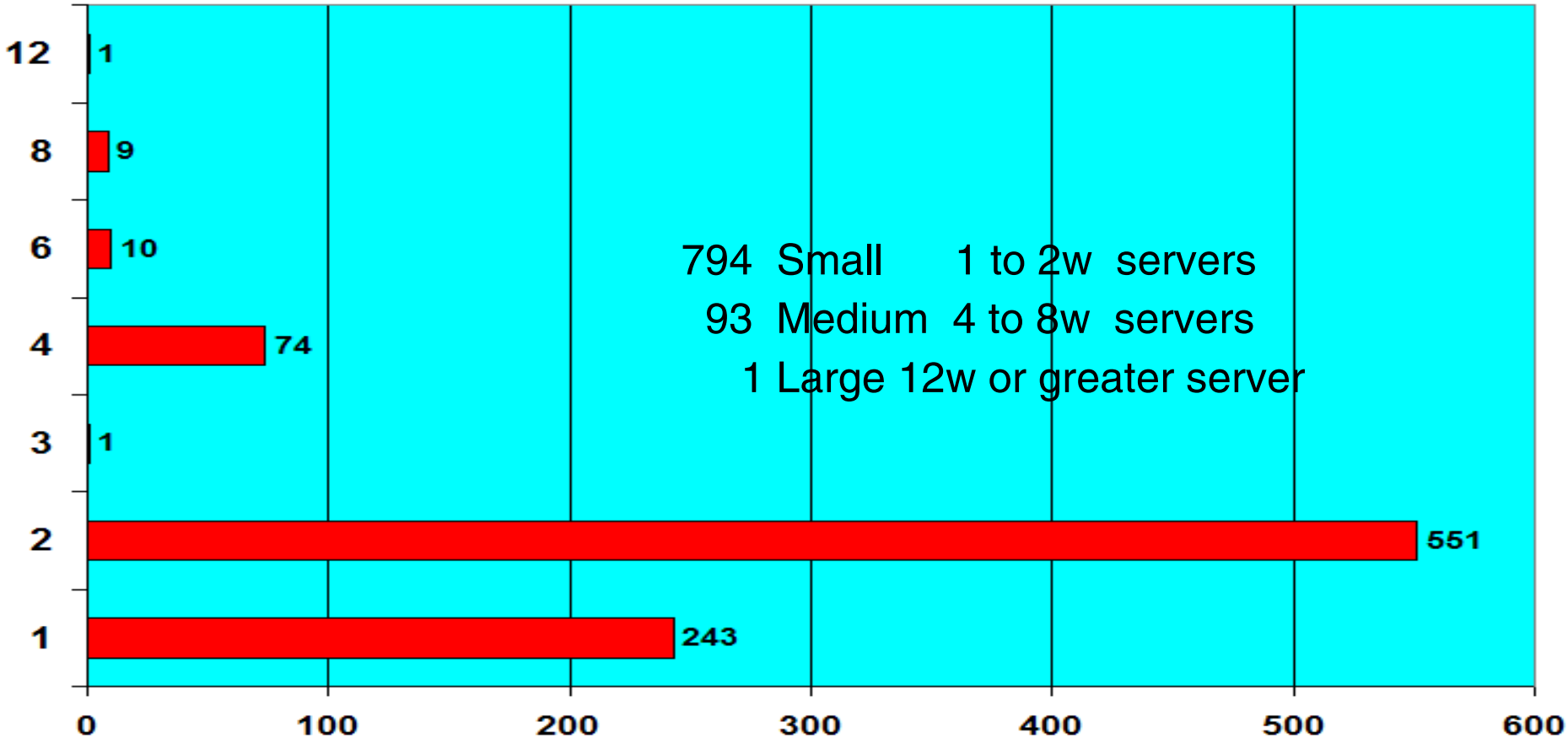
How Many Servers do you have?

We counted 67 different models alone (40+ of those are Intel based).

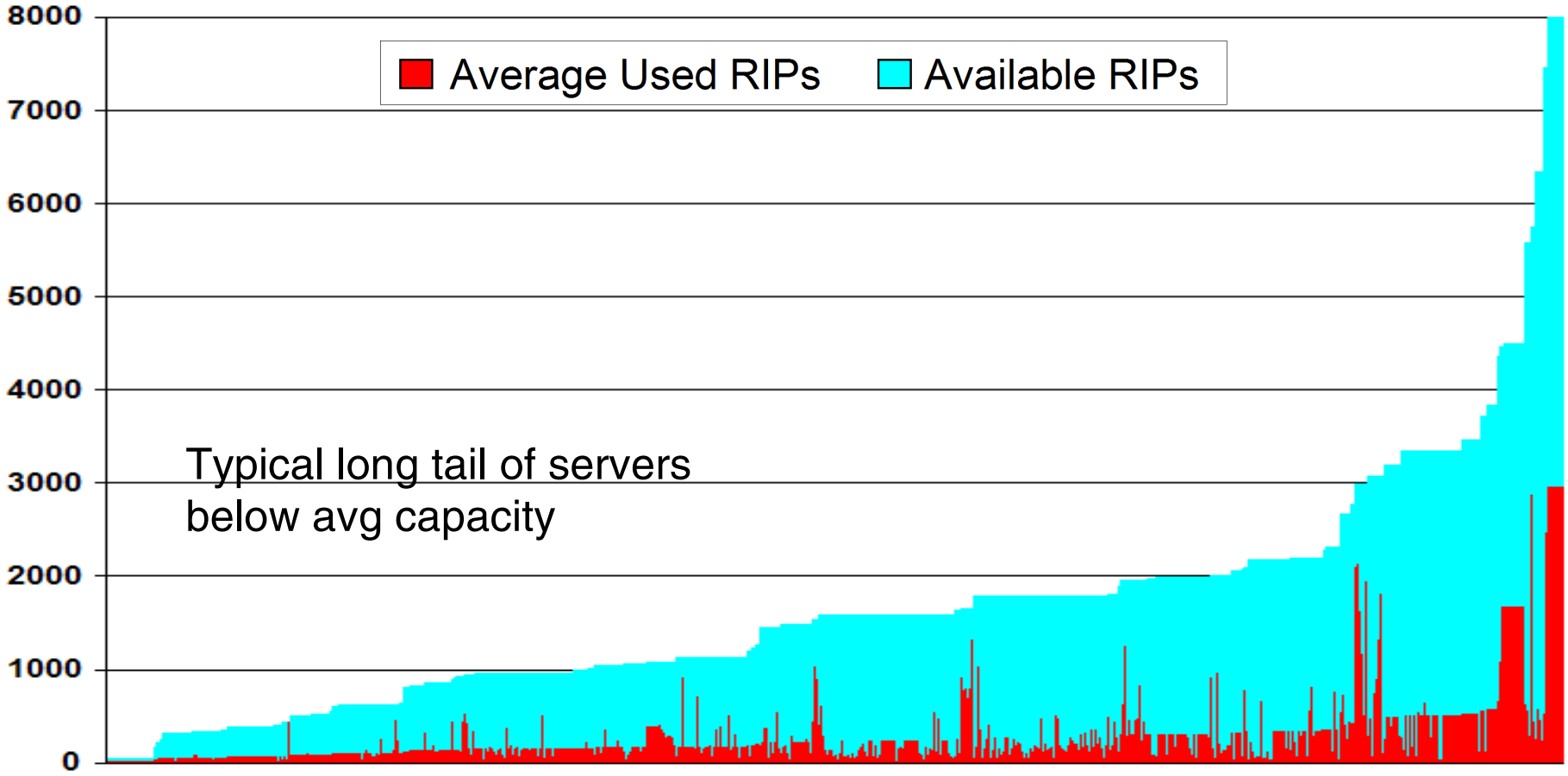


What Does your Server Profile Look Like?

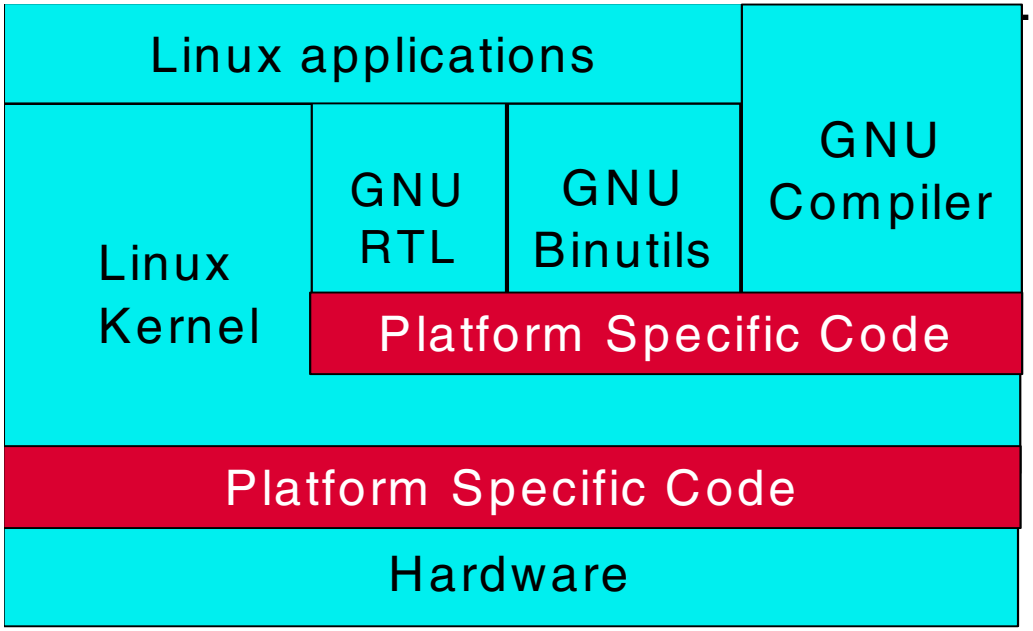
Well suited to new virtualization and/or high density hardware packaging techniques



What is your average used vs. available capacity?



Linux and zSeries – a great relationship



What Linux brings to zSeries customers

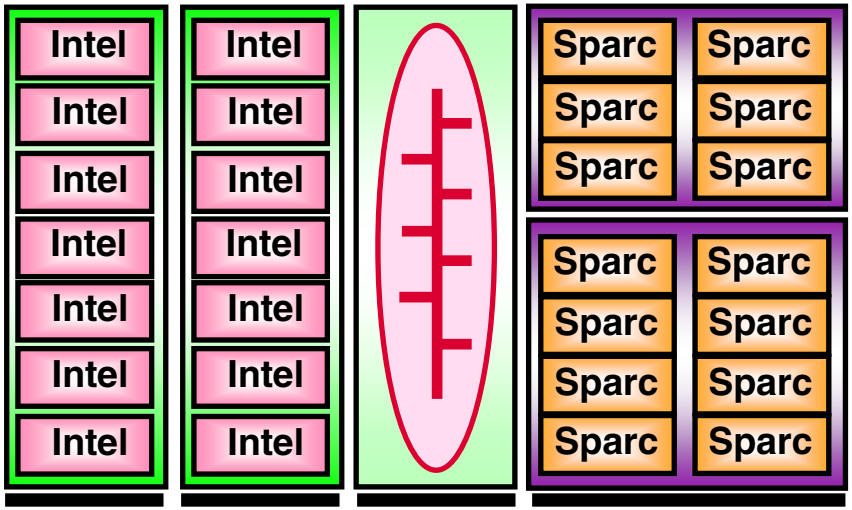
- High quality, stable, secure operating environment
- Evolves rapidly to meet business challenges
- A large selection of applications, middleware, and tools
- Economical – available from multiple distributors
- A large number of skilled administrators and programmers

What zSeries brings to Linux users

- Legendary mainframe reliability
- Designed to support multiple, diverse workloads simultaneously
- Complete workload isolation
- Unmatched scalability
- Unique virtualization function that lets you run and manage many Linux servers on a single zSeries server

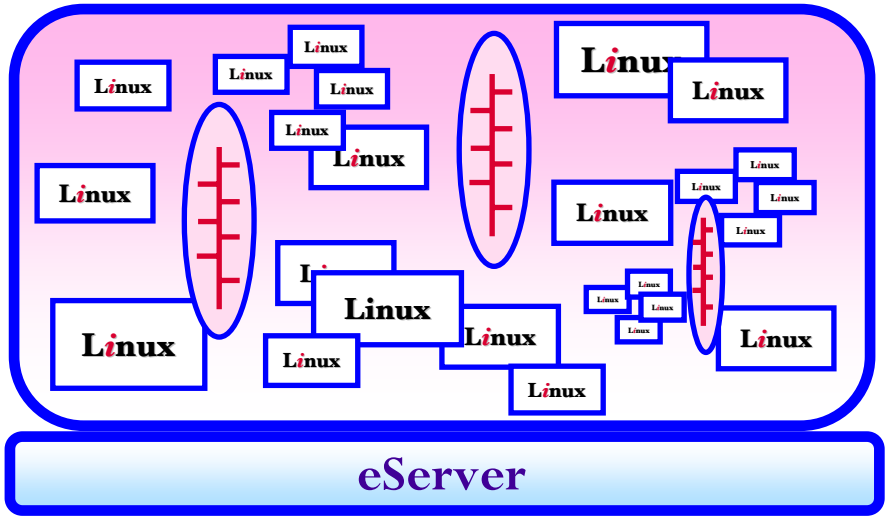
A dramatic impact to the bottom line

Traditional Server Farm



- Discrete servers incur incremental expense for hardware, maintenance, power, cooling, floor space ($$$)
- Partitions based on physical hardware, processor boundaries and dedicated adapters.
- Each server requires physical network ports and cables ($$$)
- Time to deploy new servers requires days or weeks at best ($$$)
- Testing on / fall-back to real servers ($$$)
- High availability ensured by spares and re-boots
- 100% continuous availability is cost prohibitive for large population of servers

Server Farm & Network in a Box Virtual Blades



- Pooled physical resources, reduce costs without sacrificing server autonomy
- Truly logical partitions based on software definitions, easily portable and repeatable.
- Virtual LAN: Virtual, high-speed, inter-server connectivity
- Deploy new servers on-demand (<$$$)
- Saves testing / fall-back time and resources (<$$$)
- Architecture designed for high availability
- eServer infrastructure & practices: comprehensive disaster recovery, continuous availability

zSeries Consolidation "Sweetspots"

Ideally suited for I/O intensive applications

Most effective for consolidation of low / moderately loaded servers

Most effective for consolidating servers that peak at different times

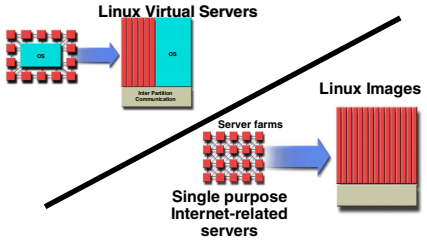
Enhance existing zSeries investment with Linux applications

Consolidate infrastructure servers on available zSeries logical partitions or virtual servers

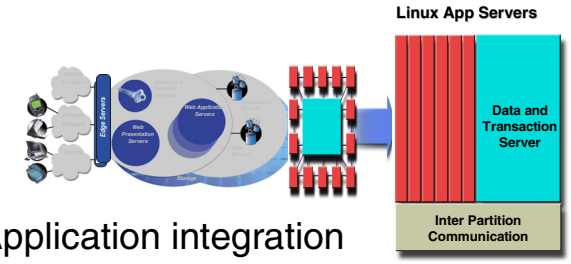
Consolidation opportunities

File and Print (SAMBA)
Web serving (Apache)
e-mail
Network Infrastructure DNS, FTP, DHCP
Workload management
Databases
Applications accessing legacy data

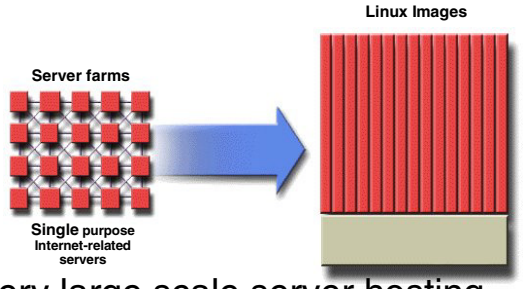
Infrastructure consolidation



Distributed application servers



Application integration



Very large scale server hosting

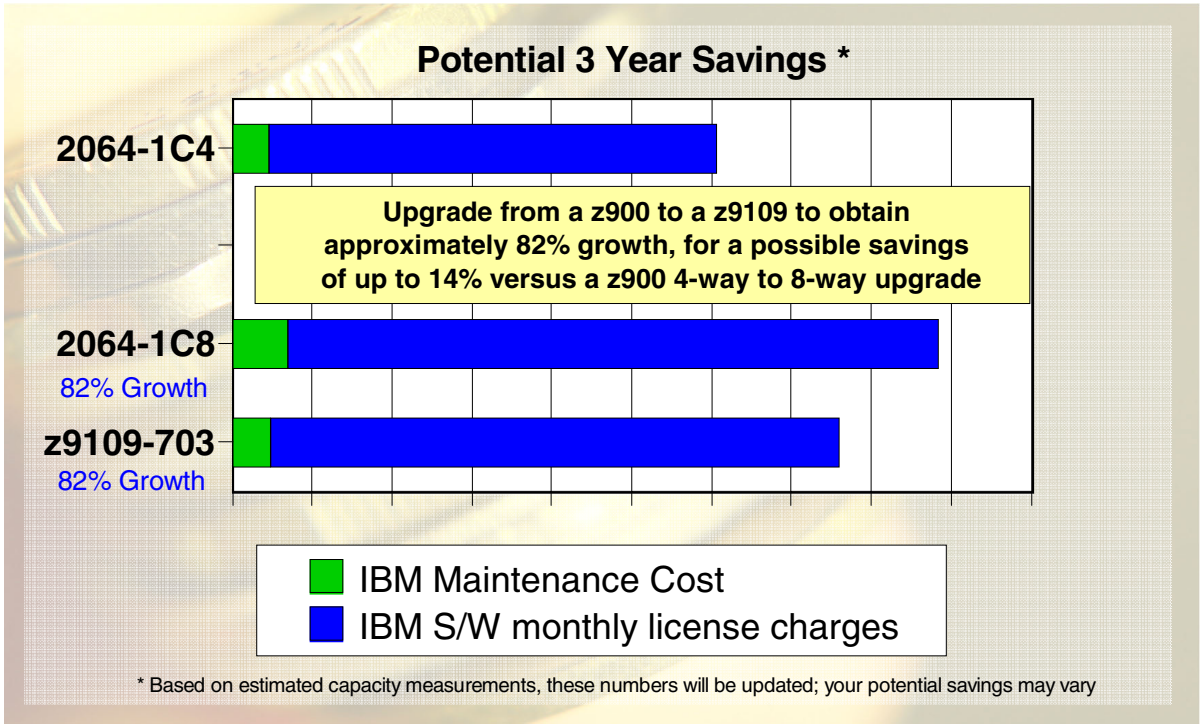
What is new on z9 109?
- a financial perspective

Mainframe Charter Continues to Enhance Economic Value

- Investment protection with upgrade paths from z900 and z990
  - –Typically priced on incremental MIPS
- Lower price per MIPS. Average price per MIPS on zSeries decreased 19% from 2002 to 2003, and 23% from 2003 to 2004
  - –Price/performance Improvement will continue on IBM System z9
- Operating costs are declining across the board with each successive generation
  - –System z9 maintenance cost down up to 46% from z900
  - –System z9 delivers a 19% reduction in chargeable MSUs from z900
- New workloads aggressively priced
  - –Specialty engines delivered up to a 51% Total Price/performance Improvement from z900
  - –Typically no charge MES upgrades on IFLs and zAAPs
  - –System z9 memory pricing as low as $8K per GB*
  - –IBM plans to announce a version of New Application License Charges (NALC) intended to help improve the price performance of z/OS in certain new workload environments by delivering sub-capacity pricing. The offering and associated terms are targeted for availability in 2H2006.

Replace Your z900, running z/OS with a z9-109, and Save!

- System z9 innovations that can help transform your economics
  - zSeries specialty engines . . . more capacity at same price . . and typically no charge on upgrades to z9-109
  - Greater virtualization with up to 60 Logical Partitions (LPARs)
  - Better asset utilization with On/Off CoD for Unassigned Engines
  - Enhanced resiliency with Capacity Backup (CBU) on specialty engines
  - Availability improvements with nondisruptive** book, memory and MBA add/repair/replace
  - Nondisruptive** microcode upgrades in select environments



Ongoing savings can help you offset the cost of your hardware investment.

Savings driven by:

- **Lower-priced IBM hardware maintenance on z9-109-S08-703**
- **Lower-priced z/OS on a full capacity z9-109-S08-703 with WLC versus z/OS with WLC software pricing on your z900**
- **Lower software pricing on certain other IBM MLC software for z9-109**

- Hardware configuration based on general purpose central processors only (no IFLs, zAAPs nor CFs) and similarly configured for costing purposes. z/OS software stack based on z/OS, including DFDSS, DFHSM, DFSORT®, RMF™, SDSF and Security Server, CICS®, IMS™ Database Manager and DB2 Universal Database™ (UDB).

** Customer preplanning is required and may require purchasing additional hardware resources

Replace Your z900 + 2 IFLs with a z9-109 + 2 IFLs and Save!

- System z9 innovations that can help transform your economics
  - zSeries specialty engines . . . more capacity at same price . . . and typically no charge on upgrades to z9-109
  - Greater Virtualization with up to 60 Logical Partitions (LPARs)
  - Better asset utilization with On/Off CoD for Unassigned Engines
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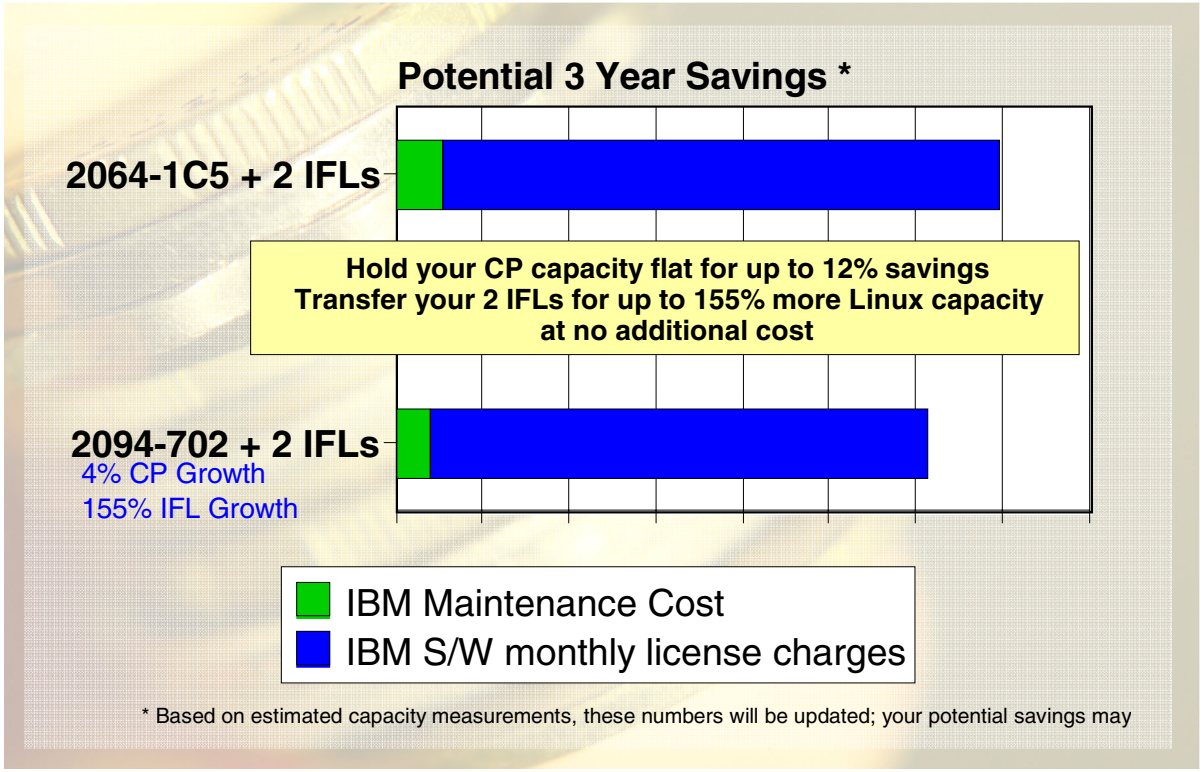


Ongoing savings can help you offset the cost of your hardware investment.

Savings driven by:

- **Lower priced IBM hardware maintenance on 2094-S08-702**
- **Lower priced z/OS on a full capacity 2094-S08-702 with WLC versus z/OS with WLC software pricing on your z990**
- **Lower software pricing on certain other IBM MLC software for z9-109**

Additional Value considerations:

- **HW cost avoidance possible of up to $250K for z900 IFL Linux Capacity**

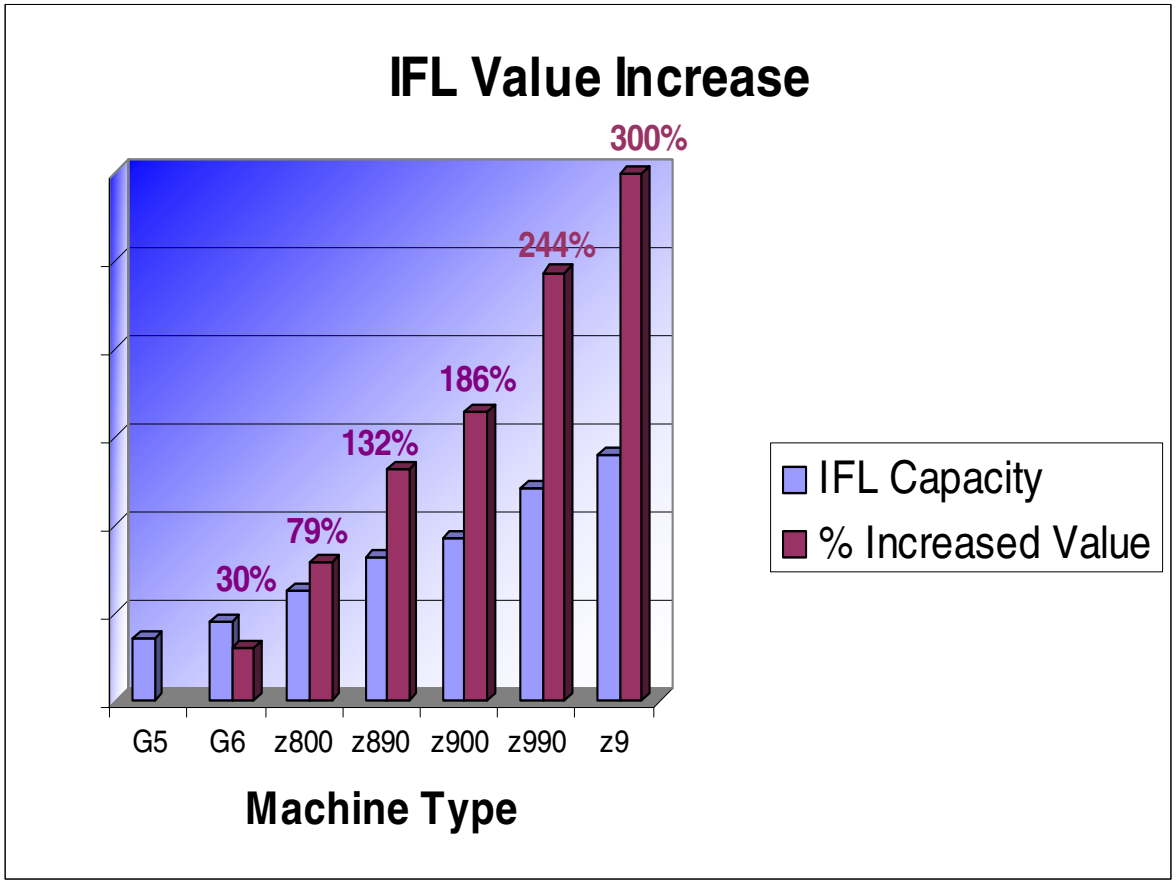
- For potential savings calculation, hardware configuration based on general purpose central processors only (no IFLs, zAAPs nor CFs), and similarly configured for costing purposes. z/OS software stack based on z/OS, including DFDSS, DFHSM, DFSORT, RMF, SDSF and Security Server, CICS, IMS Database Manager and DB2 UDB.

** Customer preplanning is required and may require purchasing additional hardware resources

** IFL capacity increases "just happen" when your customer does a mainframe hardware upgrade*

Unique Value of IFL

- IFL Price has remained constant
- IFLs move with upgrades
- 30% more capacity!!!
- zAAP follows same model
- Distributed model over same time:
  - 2 Technology Refreshes (New Hardware)
  - 2 System migrations

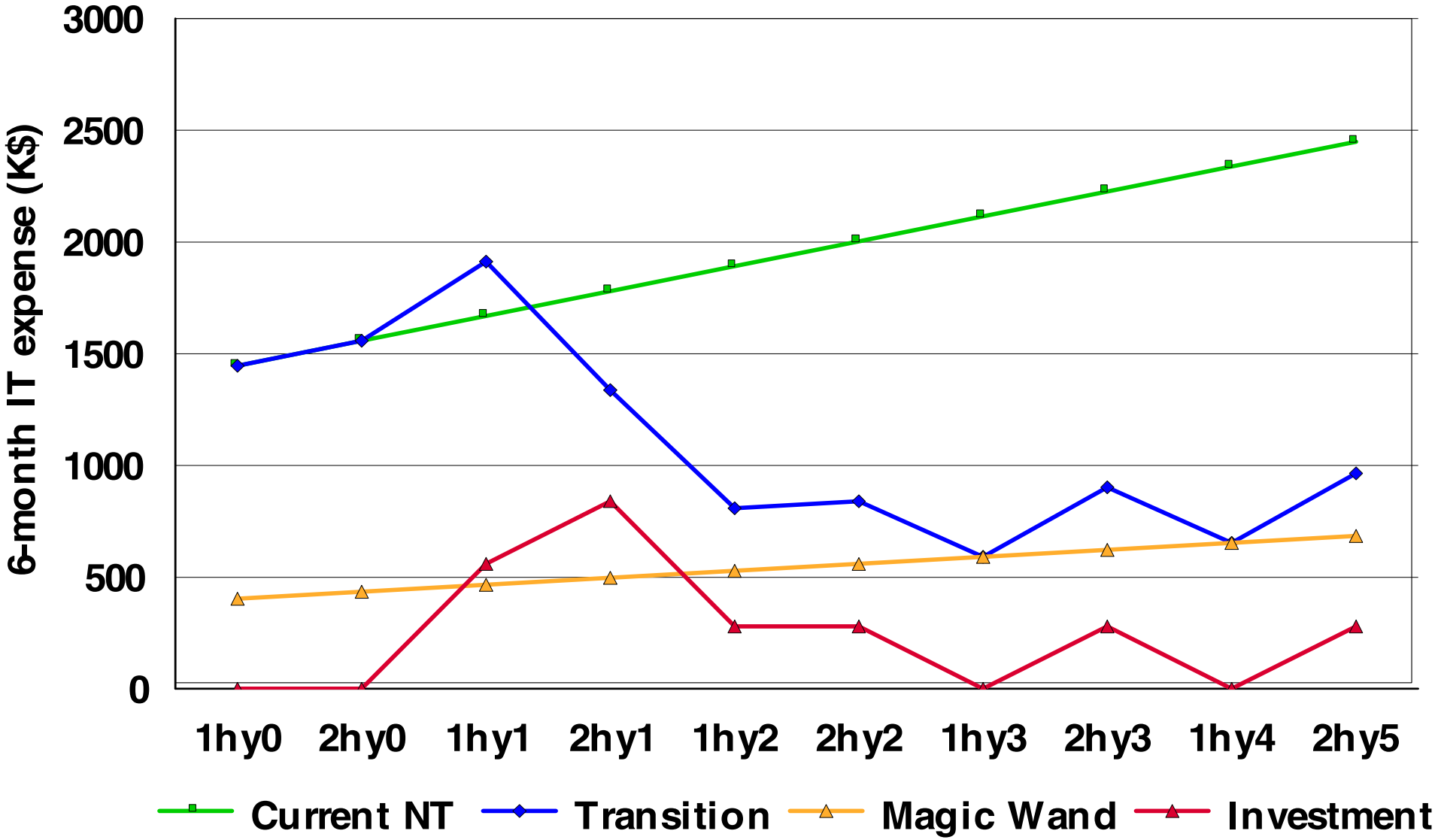


Customer Studies

6 Case Studies: from Windows or Competitive Unix to ...

	Type	Current Servers	Target Solution Area	3-Year Saving
1	NT infrastructure	300 Windows	1 z-VM (100 Linux, 7 IFLs)	~50%-60%
2	Large web portal	39 Solaris	39 x-Linux (2&4w)	~60%-70%
3	Oracle datamarts	110 Competitive Unix	2 p-AIX-HACMP (24w)	~55%-60%
4	Intranet servers	81 Windows	21 x-Windows (2w)	~40%-45%
5	Web trading	24 Unix domains	1 z-VM (24 Linux)	~60%-70%
6	Non-prod Windows	144 Windows	18 x-Windows 4w, VMWare	~35%-40%

#1 Windows to Linux on zSeries



Web Trading Application

An on-line trading system

- ►300 concurrent users peak load

#1 server is the internet front-end to the system

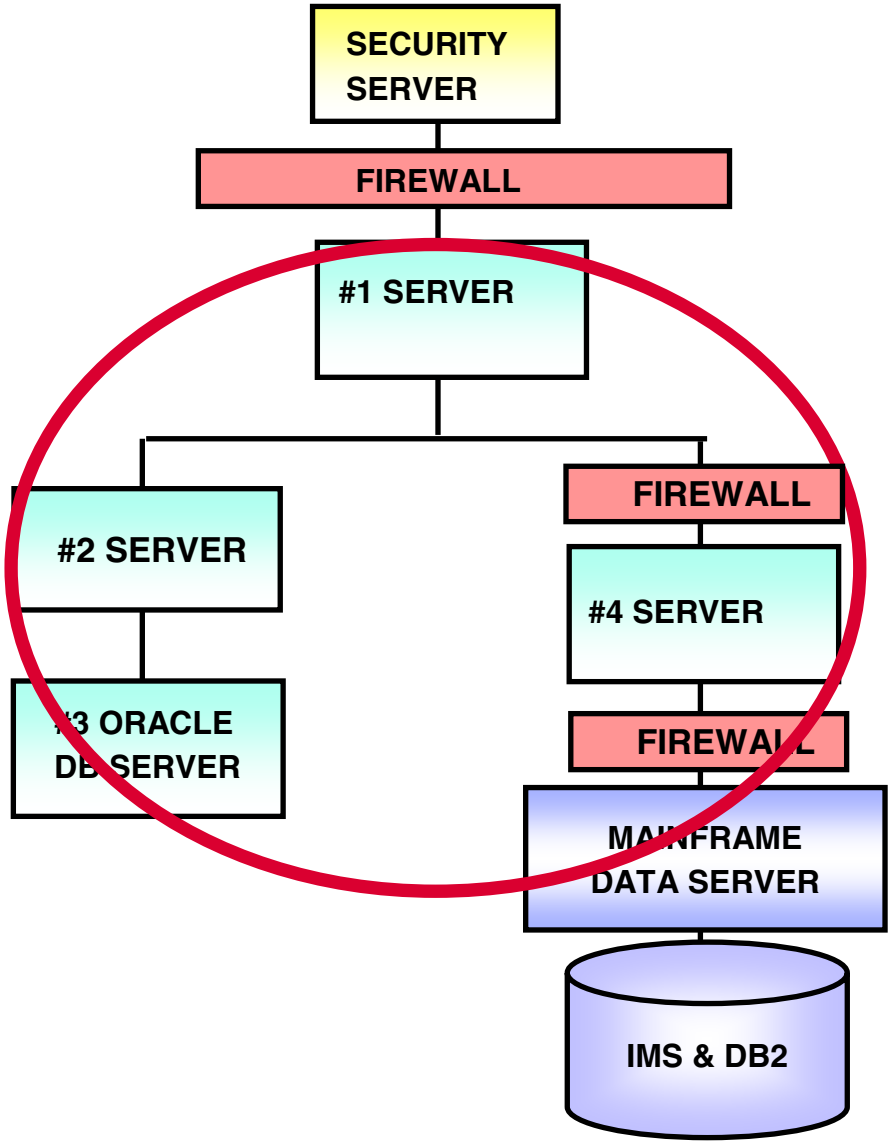
- ►software provided by third party

#2 server provides real time market data and 'what if' processing

- ►customer profile stored in the Oracle DB Server (#3)
- ►triggers to send out email/text msgs
- ►links to other trading servers

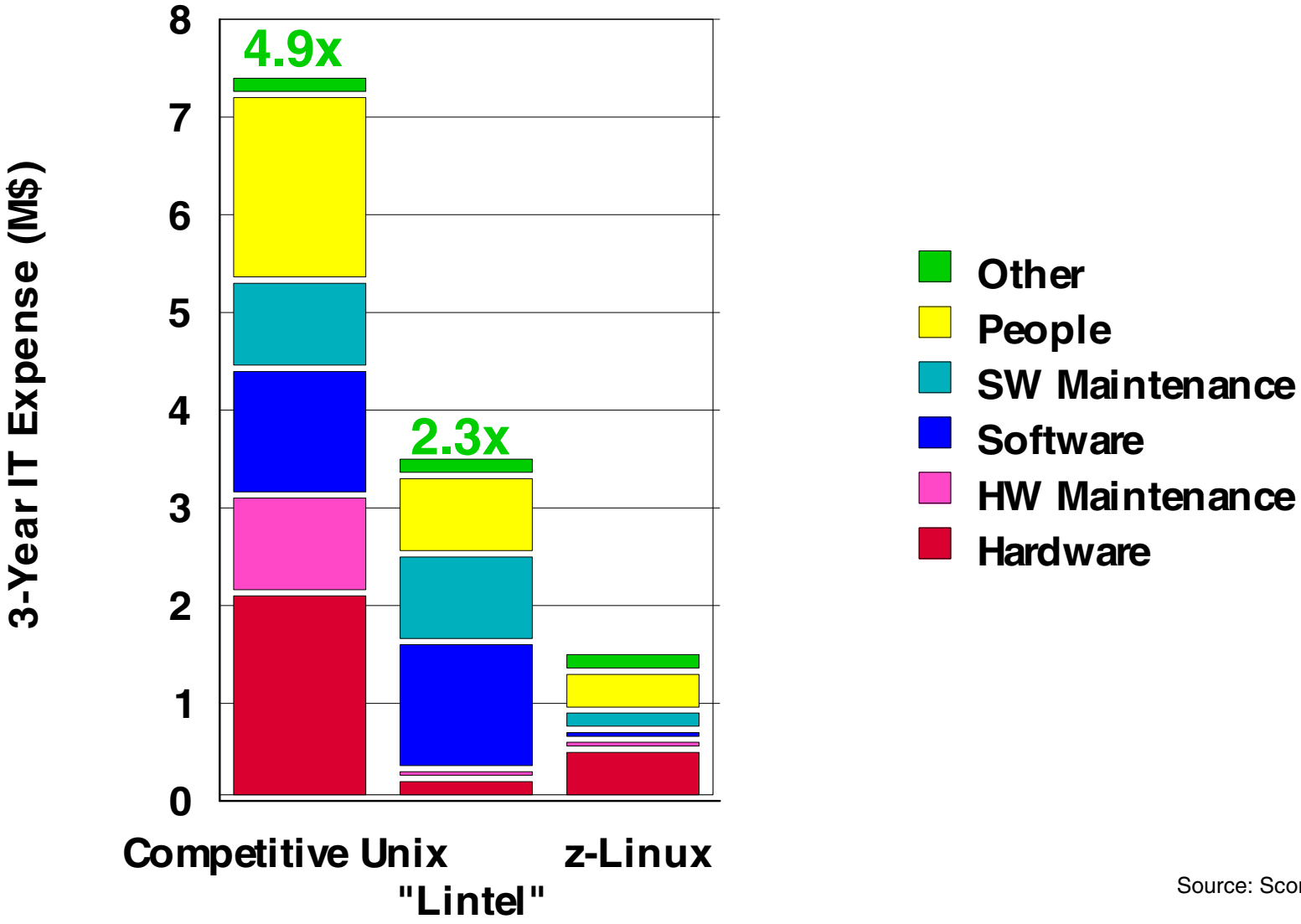
#4 application server manages the trading transactions

- ►links to the mainframe back end



Web Trading Application Costs

WebLogic/Oracle



Source: Scorpion Study 1999 - 2005

Competitive Unix 3-year cost ~ 4.9 x z-Linux
Lintel/Windows 3-year cost ~ 2.3 x z-Linux

Customer example - Public Sector

Primary Recommendation: Consolidate 20 mixed function servers and 3 Wintel DB2 Connect Servers, 23 OS images to 2 IFL's running 13 Linux OS images.

Technical Solution Studied: Migration of 23 mixed function servers to 2 IFLS. Running 13 Linux guest images under z/VM

Potential Benefits/Effects/Solution Considerations:

Reduction in number of servers from 23 to 2 IFLs**. Reusing the 2 existing IFL's not in use z/VM allows for creation of many Linux guests, well beyond 13. **Affording growth and future positioning.

***Increase utilization** from 20% to 42%. We believe the utilizations reported for the current Unix environment maybe erroneous and merit investigation. Few production apps are in the Unix environment yet maintains a 20% avg. utilization. If the utilization is lower.. The utilization on the IFL's will be lower too.*

Large hardware base simplification and consolidation.

Higher server utilization and management via z/VM and Linux Guests

Position key DB2 dependent applications** like DB2 Connect, OC WebConnect on the mainframe **to minimize network traffic.

Allows for the potential future positioning of Linux based J2EE, web application serving and other application constructions on the mainframe if the need arises.

Revitalize existing investment in the mainframe environment and reclaim dormant capacity.

Mainframe storage requirement will need to be analyzed.

A more detailed analysis is recommended as a next step.

Source: Scorpion Study 1999 - 2005

Public Sector – customer example

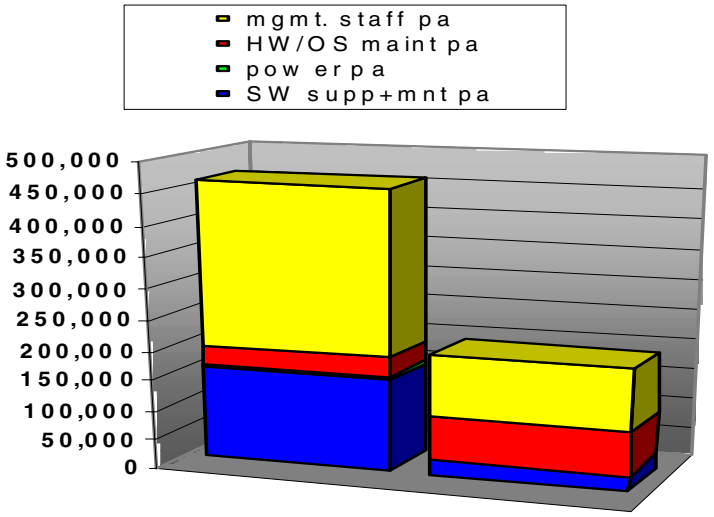
Legacy Unix IFL

Sizing	Current	Alt.Case
server		z900-IFL
total #CPU	29	2
used #CPU		2
used #images	23	13
new servers		2
avg.image.cap	25.1	21.1
total capacity	577.2	274.0
total load	116.0	116.0
average util'n	20%	42%

ARC: Annual Recurring Costs		
SW supp/CPU pa	331.03	0.00
SW supp/Srvr pa	6,291.30	11,000.00
mgmt. staff pa	270,955.14	100,000.00
HW/OS maint pa	30,800.00	72,000.00
power pa	5,365.50	0.00
SW supp+mnt pa	154,300.00	26,400.00
total ARC	**461,420.64**	**198,400.00**

OTC: One Time Costs		
Purchase		106,000.00
Other Trans. Costs		100,000.00
total OTC	**0.00**	**206,000.00**

5yr Cost Comparison		
OTC + 5x ARC	2,307,103.22	971,000.00



1.8 :1 SCON ratio

263,020.64 saving pa

649% RoI 5yr

206,000.00	**OTC**
0yr 0m	Project Time
0yr 9m	**Payback Period**
1,336,103.22	**5yr saving**

Source: Scorpion Study 1999 - 2005

Linux here; Linux there; Linux, Linux everywhere

One Size Does Not Fit All

- **Choose zSeries when**
  - **Availability and failover important (ie, Scheduler)**
  - **IP Bandwidth to z/OS important**
  - **Management costs already covered**
  - **Dynamic resource shifting appropriate for load**
  - **Real time Engine Orchestration/Provisioning**
  - **Interesting licensing implications**
  - **Current under utilized capacity can be redeployed to :**
    - **Faciliate large Linux consolidations of smaller workload (depending on chars)**
    - **Supplement dynamic system development environment needs (pilot, release staging, QA, etc.)**
    - **Exploit situational application co-residence benefits with other mainframe apps.**
    - **Take advantage of other application specific situations.**

Linux on zSeries: A Consolidated Solution

Greater utilization of resources

Requires **less support staff** (20% - 50% less)

Has higher hardware reliability (therefore less downtime costs)

Can share software resources (which saves $$$)

Has lower software costs (savings are significant for application software)

Failover is provided by virtual server (therefore less hardware is required)

Power consumption and floor space are minimized (which saves $$$)

** IFL capacity increases "just happen" when your customer does a mainframe hardware upgrade*

Z9 109 Financial Summary

zSeries is a strategic platform for IBM and customers

zSeries is cost competitive in an ‘apples to apples’ comparison

Software is not inexpensive on distributed platforms

zSeries cost (software, maintenance, memory,and hardware) are all being reduced with the z9 109 announcement

IFL capacity increases ‘just happen’ on business as usual capacity upgrades

Have a Great Day!

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