

Server Consolidation

Considerations for Consolidating Onto

Linux^R

and IBM @server^R

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Ottawa, Ontario

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....And About Server Consolidation

Strategic Planning Assumption: Through 2005, consolidation will be the leading concern of IS management as it struggles to control costs and server sprawl (0.7 probability).

Source: Gartner Symposium ITXPO, Nov. 2002, Data Centre Consolidation, Authors J. Krischer & A. Butler. Document # 23JESC 14.

AGENDA

- **What is Server Consolidation ?**
- **PartitioningThe Role of Technology**
- **eServer....How IBM Has Implemented Linux Partitioning Including Examples**
- **Server Consolidation How to (Would You Like to) Get Started**

....But first:...**What is @server** ...

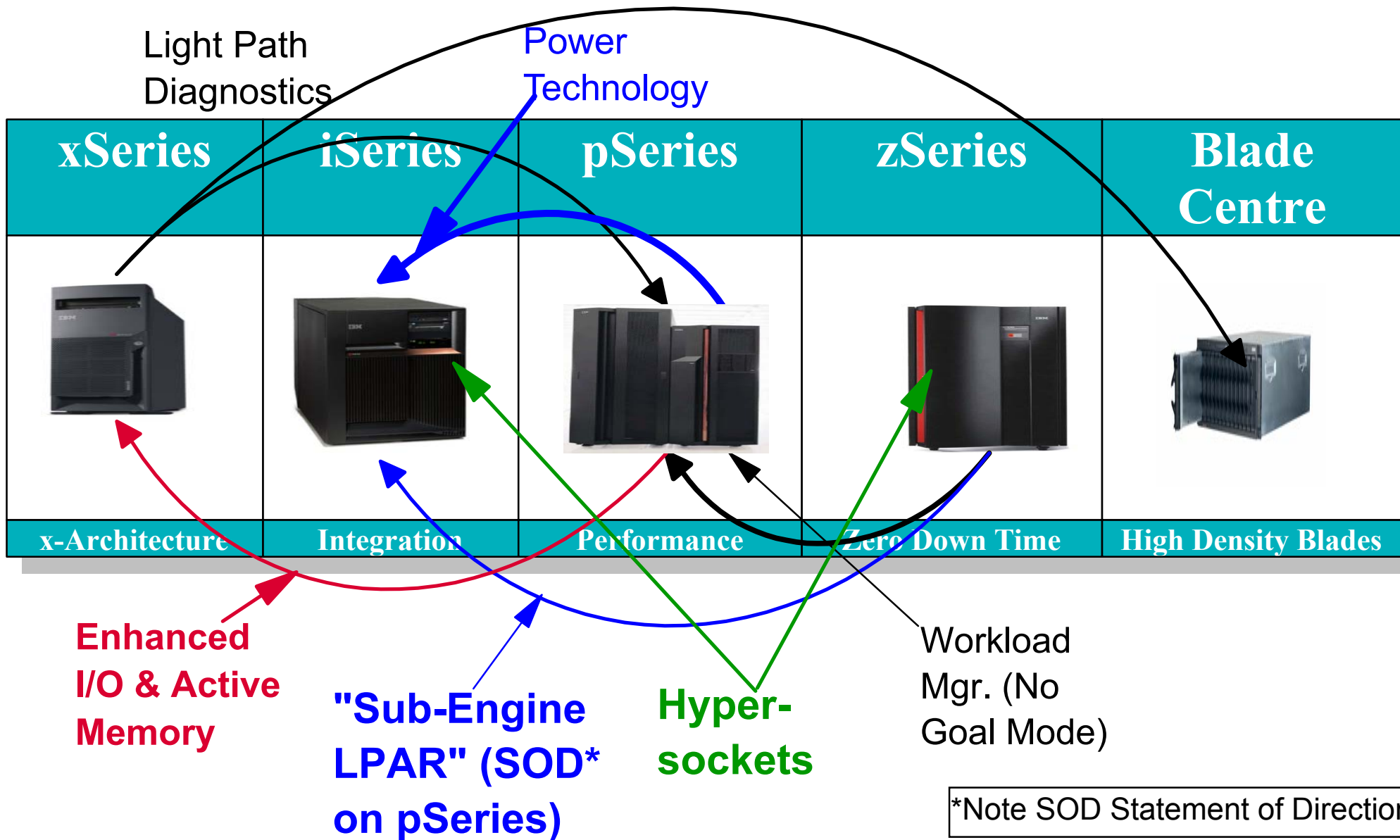
What is IBM @server

xSeries	iSeries	pSeries	zSeries	Blade Centre
(Netfinity) Wintel, Novell	(AS/400)	(RS/6000)	(S/390)	
x-Architecture	Integration	Performance	Zero Down Time	High Density Blades

Strategy: "Bring Them Closer Together"


- Share features/functions across all brands
- Linux on each

Strategy: Share features/functions....we are executing



Strategy: Virtualization with IBM Hypervisor *

(No...why ??)

xSeries	iSeries	pSeries	zSeries	Blade Centre
<p>No</p> 				<p>No</p> 
x-Architecture	Integration	Performance	Zero Down Time	High Density Blades

*Note: Hypervisor = Virtualization
A Key Technology Component
of IBM's "ON DEMAND" Strategy

Note * Hypervisor function separates the
physical attributes of the hardware and
underlying technology from the requirements of
the applications.

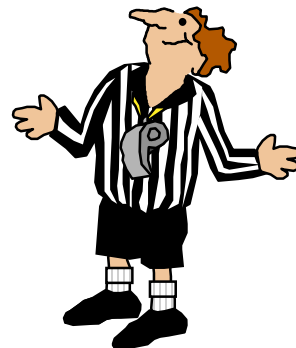
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What is Server Consolidation ?

The Optimization of Information Technology (IT) resources through the centralization and/or reduction of heterogeneous servers to meet specific and measurable IT department and/or organization goals.....

Huh ?



What is Server Consolidation ?

The Optimization of Information Technology (IT) resources

through the centralization and/or reduction of heterogeneous servers to meet **specific and measurable IT department and/or organization goals.....**

IT Resources

Hardware
can include
storage



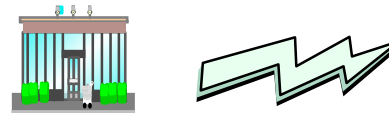
Software
applications
middleware
data



Staffing



Other..
you specify



What is Server Consolidation ?

The Optimization of Information Technology (IT) resources through the centralization and/or reduction of heterogeneous servers to meet

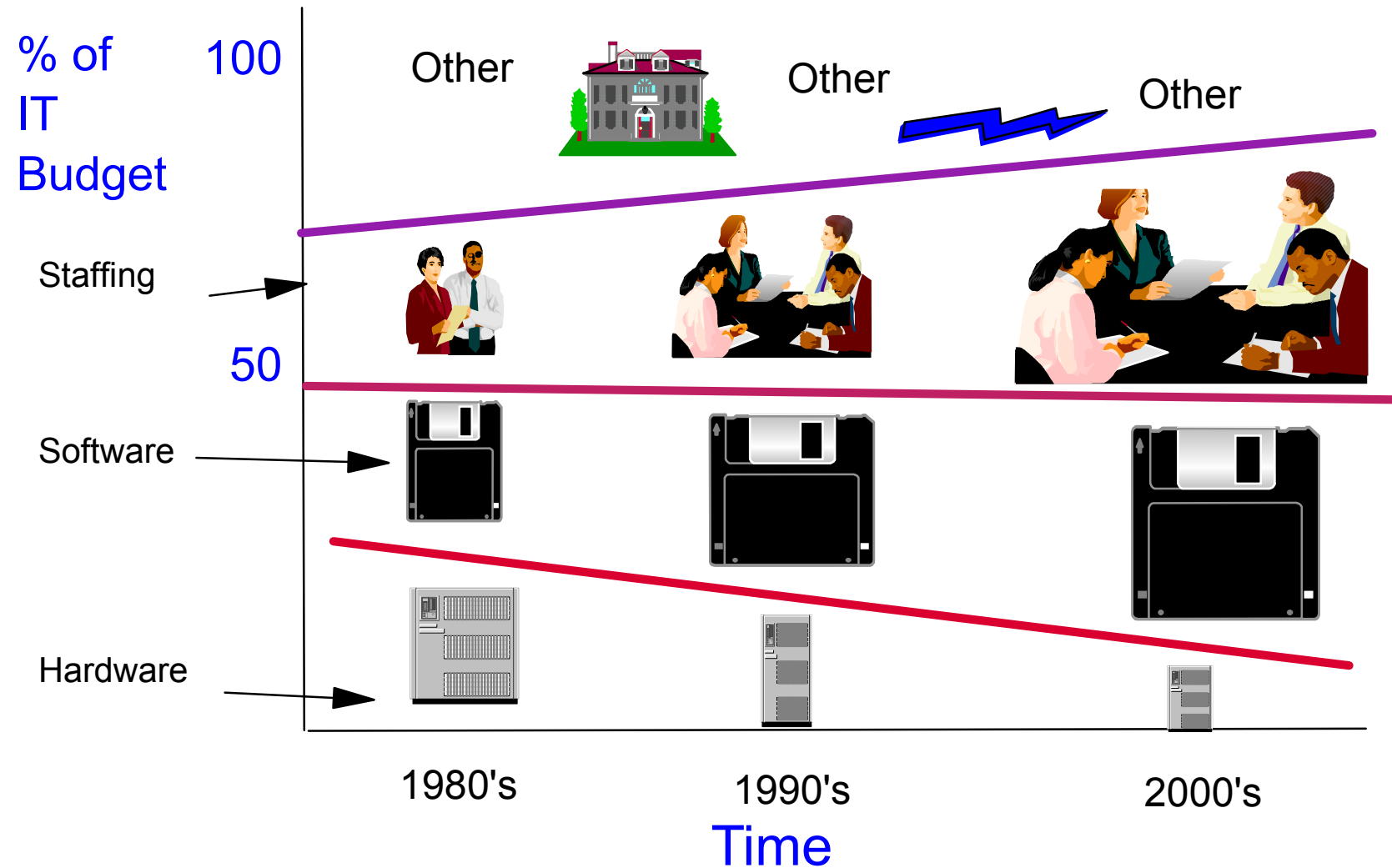
specific and measurable IT department and/or organization goals.....

IT Resources



**TCO.....we will revisit ...

Resources ...more than Technology



It's costing people five to seven times the acquisition costs of storage to manage it. Mark Lewis, HP executive, May 2002.

But....Technology is important...

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But Technology is Important...according to Gartner

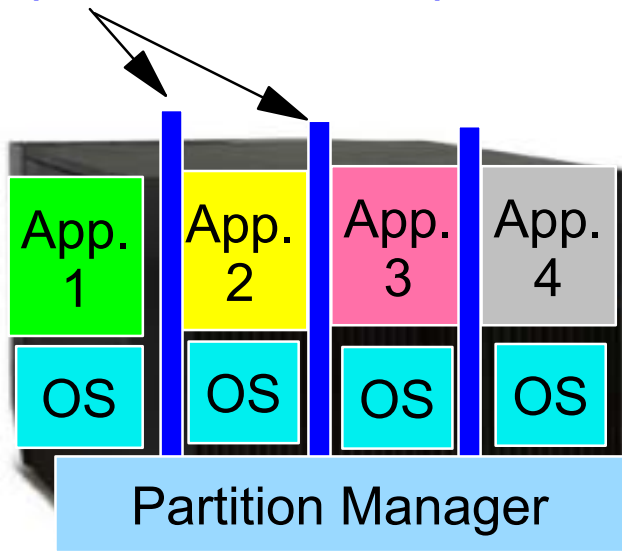
Conclusions: Although some server consolidation can be done independent of technology solutions, the best ROI can only be achieved using technology.

Strategic Planning Assumption: Through 2007, **Rationalization** (Consolidation) will offer the greatest potential for meaningful ROI for server consolidation (0.7 probability).

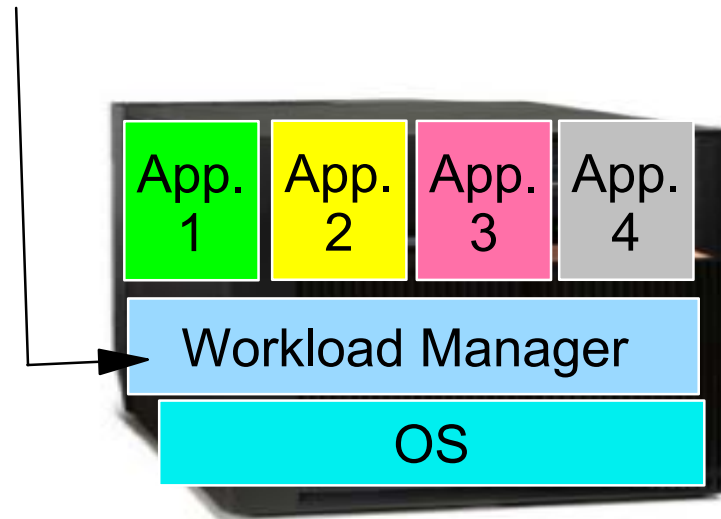
Source: Gartner, The Technology of Server Consolidation, 21st Annual Data Centre Conference, December 2002 ,Author John Phelps

Gartner: Rationalization Consolidation...How: 2 Ways

Partitioning (Hard...boundaries)



Workload Management Allocated Server Shares

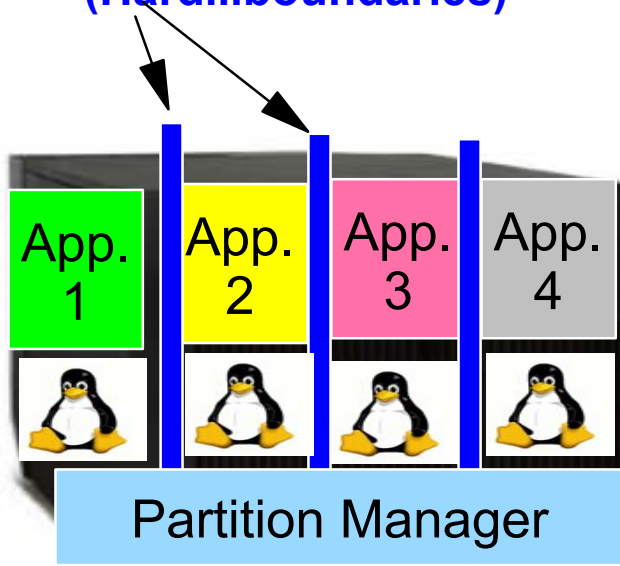


The ability to configure a single system, capable of running a single instance of an operating system, into multiple smaller systems, each capable of running its own copy of an operating system.

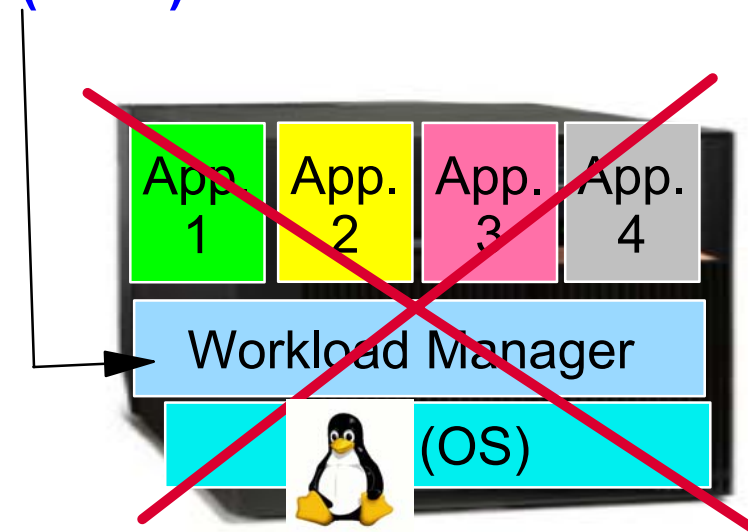
The techniques used to enable diverse workloads to effectively run together in a single instance of an operating system by balancing resource consumption to achieve business goals, especially during peak utilization periods

Rationalization...Linux Plays Only In Partitioning

Partitioning (Hard...boundaries)



Workload Management (WLM)



Not Available for
Linux....yet**











**IBM ships WLM's standard with zSeries (zOS), iSeries (OS400) and pSeries (AIX)

A strategy for
each IBM
@server



IBM Strategy: For Linux Rationalization using Partitions

IBM Hypervisor Function

xSeries	iSeries	pSeries	zSeries	Blade Centre
No	✓	✓	✓	No
 	 	 	 	 
x -Architecture	Integration	Performance	Zero Down Time	High Density Blades

(NO... Hypervisor Function is Provided by VMware^R Corp.)

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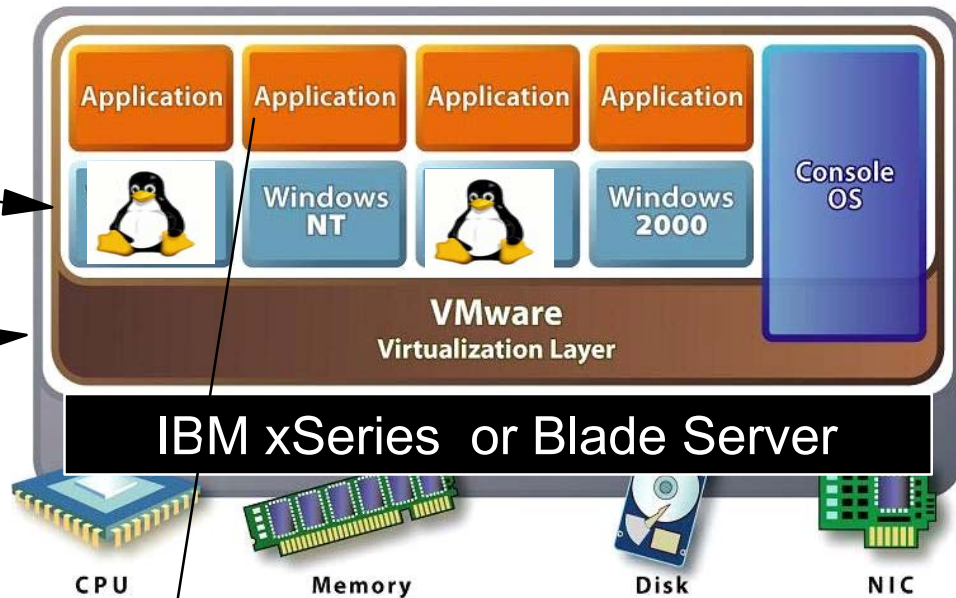
xSeries and Blade Server Linux Consolidation

VMware ESX^R Server

Virtual Servers

VMware Hypervisor

One Server



Ideally "infrastructure applications"

xSeries: VMware is Ideal for

Intel Infrastructure Applications **

- Print, Web, Firewall
- File rather than heavy database serving
- Relatively light on I/O
- Always configured for peak workload..yet
- Server Utilization is low...often less than 10%

****Caution...Ensure third party vendors will support their applications and/or middleware**

VMware...ready for Prime Time

"By embracing virtualization technology and standardizing on VMware for managing our software development environments, Merrill Lynch has seen a 40 - 50% cost savings." (Source VMware)

With a modest \$50k investment in VMware software, we realized a savings of over \$755k in direct IT costs by reducing our server sprawl and consolidating SAN architecture over VMware - Wendy's (Source VMware)

xSeries: Linux at E*TRADE Financial.. (no WMware)

Vision

- ✓ Provide a highly available Web site to give clients virtually anytime, anywhere account access

Challenge

- ✓ Upgrade a mission-critical server farm and reduce costs while embracing open-source technology

Solution

- ✓ Ninety IBM eServer xSeries 330 servers running Linux for a cost-effective, high-performance solution

Value

- ✓ Significant cost savings, a rapid return on investment and global brand enhancement

“Our new IBM eServer xSeries servers are four times faster than the ones we replaced.”

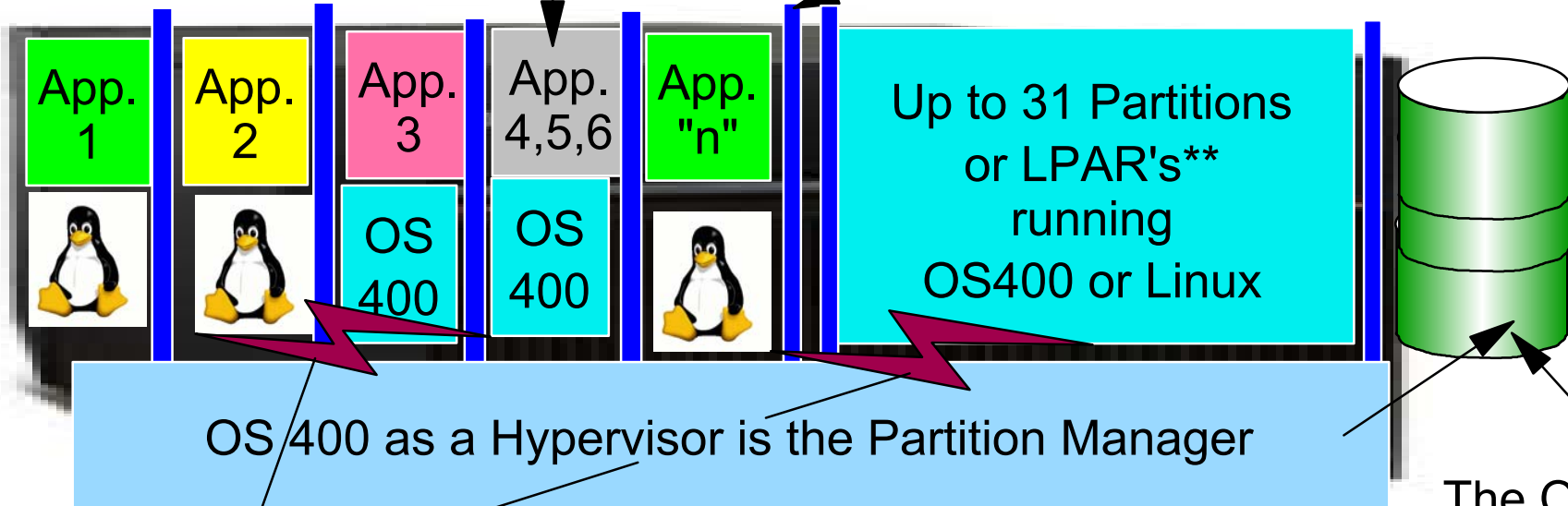
—Josh Levine, CAO, EQTRADE Group, Inc.

The screenshot shows the E*TRADE Financial website interface. At the top, there is a navigation bar with links for 'Home', 'Accounts', 'Investing', 'Banking', 'Lending', and 'Plan & Advice'. Below this is a secondary navigation bar with links for 'Getting Started', 'Products & Services', 'Account Features', 'Business Solutions', 'Access Us', and 'About Us'. The main content area features a 'Where do you want to start?' section with links for 'Investing', 'Banking', 'Lending', and 'Get Advice'. A prominent advertisement for 'Higher yields' is displayed, featuring a man sitting at a desk. To the right, there is a 'Log On' form with fields for 'User Name', 'Password', and 'Start In'. Below the login form is a 'Markets' section showing stock prices for Nasdaq, DJIA, and S&P 500. The date and time 'September 04, 2002 5:35 PM ET' are displayed in the top right corner.

iSeries: Linux Consolidation Strategy

OS400 has a Workload Manager

An LPAR can be as small as 1/10th of an engine



OS 400 as a Hypervisor is the Partition Manager

The OS400 Hypervisor and Integrated iSeries Disk provide a SAN solution

Virtual Lan's allow for data exchange between LPARs without going through a traditional physical LAN

**LPAR's are dynamic...add/remove resources, no re-IPL

Case Study: Consolidation of Intel Servers to iSeries

Customer Objectives / Statement of Challenges

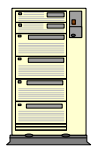
- × Proliferation of Intel Servers...each configured for "peak workload"..infrastructure applications.
- × 9 More Intel Server installations "in plan"
- × Distributed (Direct Attach) Storage for each
- × Challenges across systems management, back-up and other disciplines

Customer and IBM explored iSeries alternatives.

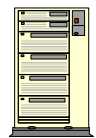
Case Study: Consolidation of Intel Servers to iSeries

Before... Distributed Intel Servers Running Linux and Windows mixed workloads. iSeries for legacy workloads.

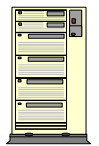
("Intel Infrastructure / other Applications")



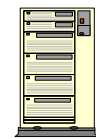
Linux
Firewall



Windows
Notes



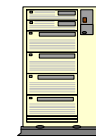
Linux
DMZ



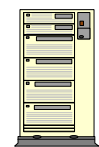
Windows
Notes apps.



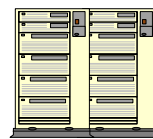
Linux
Misc. apps.



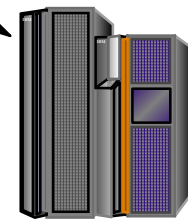
Windows
File/Print



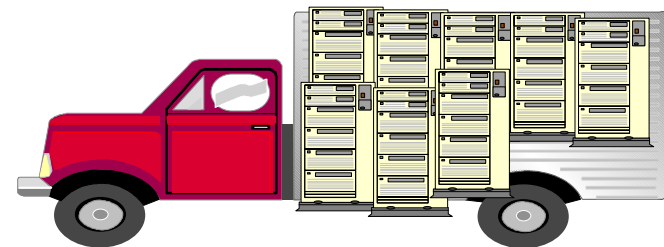
Linux
Web



Windows
Misc. apps.



Plan

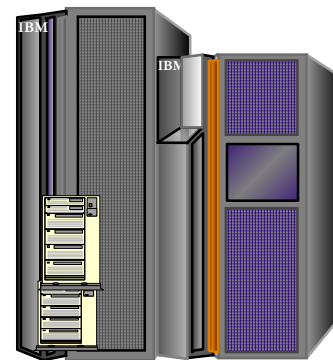
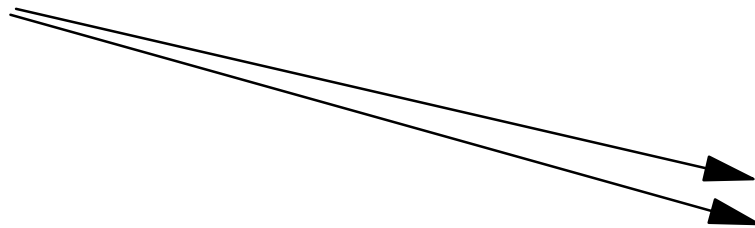


9 More Servers

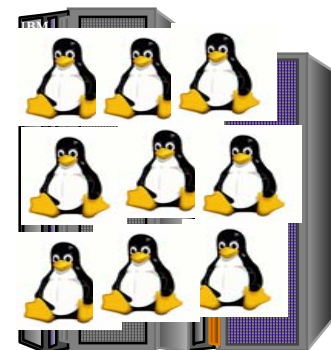
Case Study: Consolidation of Intel Servers to iSeries

After: 2 IBM iSeries Servers

- ✓ Legacy Applications
- ✓ Notes and Notes Apps.
- ✓ 2 Integrated Windows Servers using IXS Feature



- ✓ **iSeries Linux Only Server**
- ✓ **9 LPARs**
- ✓ **Does current Linux workloads and will absorb new Linux workloads**

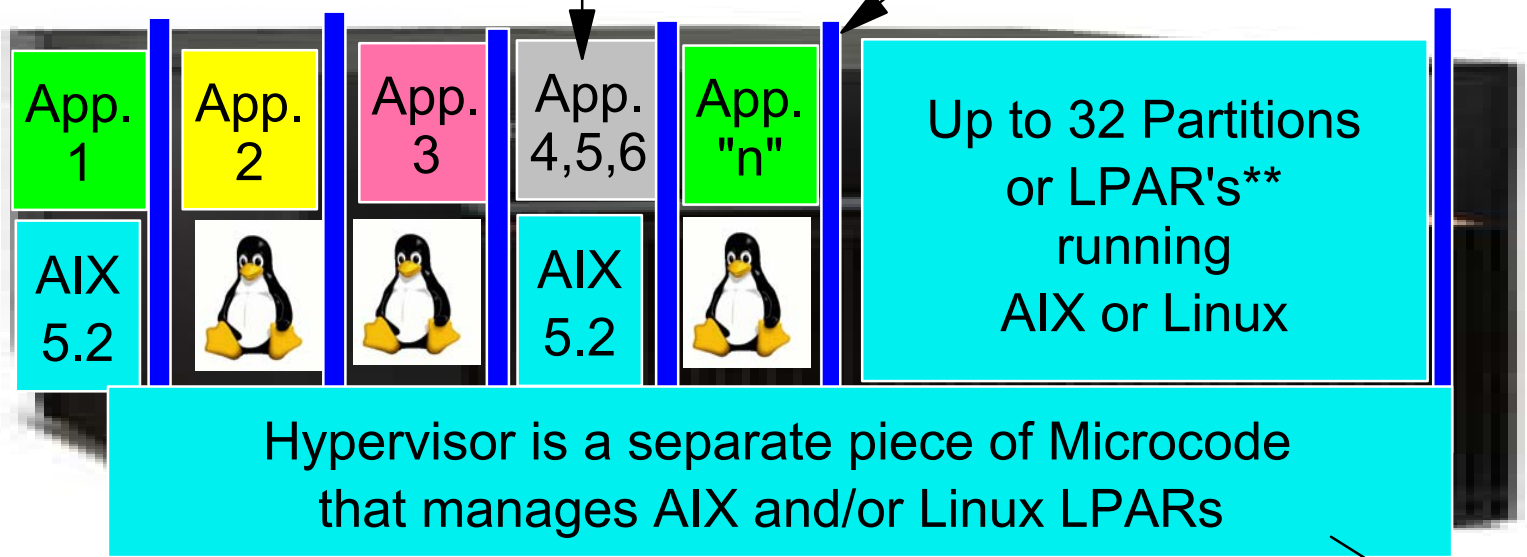


(Not all apps lend themselves to consolidation)

pSeries: Linux Consolidation Strategy

Aix has a Workload Manager

In offering partitions as small as one engine** (processor) the pSeries leads Sun and HP Unix.



Therefore Linux could run natively with no AIX on the server

**S.O.D. Statement of Direction: pSeries will have sub-engine LPAR

pSeries Linux References

1. Large U.S. Universities have a joint agreement for using pSeries as a portal to search and download large** documents.
2. Transportation company in Asia uses pSeries for ticketing**.
3. Not for profit organization using pSeries for deep** (heavy computational) computing.

**pSeries/Linux = robust processing of large database workloads, Grid & High Performance Computing

And the best reference of all...

Oracle Pours Funds Into Linux App Development

By Barbara Darrow, CRN

Internet Week March 26, 2003.

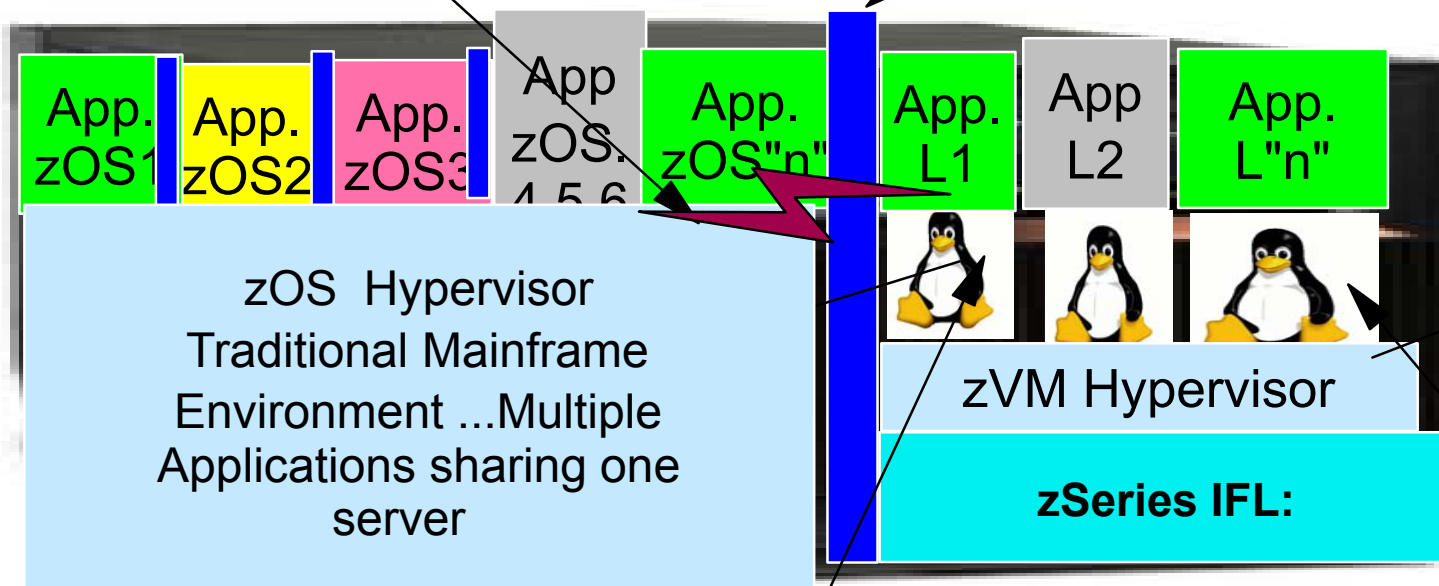
In its continuing Linux push, Oracle is putting its money where its mouth is. The database powerhouse says it will now finance and support development of third-party Linux applications in an effort that could cost the company as much as \$150 million this year.

"We will provide incentives, technical and financial to all our ISVs to develop, market and sell on Linux," said Robert Shimp, vice president of database product marketing at Oracle.

zSeries (Mainframe): Linux Strategy With zOS

Hypersockets provide for virtual communications between Linux applications and zOS applications at up to 7x Lan speeds.

There is a "hard engine" boundary separating the IFL(s) from traditional mainframe environment.



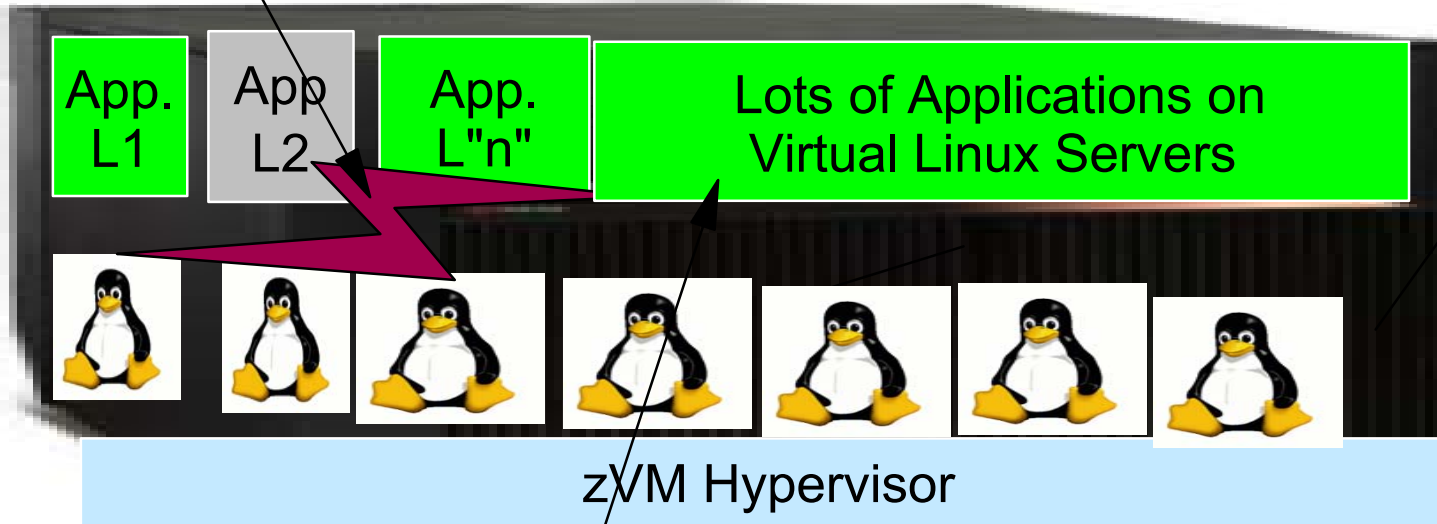
Can manage hundreds of Linux Virtual Servers

Dynamic LPARs managed by zVM

All applications... Infrastructure or "heavy workloads."

zSeries (Mainframe): Linux Strategy Without zOS

Hypersockets (Virtual Lanes)



Can manage hundreds of Linux Virtual Servers on a dedicated Linux Server

Dynamic LPARs

All applications... Infrastructure or "heavy workloads."

A zSeries Case Study

Before...typical server farm



9

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I
X

Typical CHALLENGES

- Every New Application Initiative = 3 to 5 new servers
- Lots of Data Duplication
- High Cost of Change to stay "current"
- Direct Attach Storage....Storage Management
- Ave. Server Utilization = 15%
- "per engine" software licensing



35

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Business Case for zSeries Linux Consolidation

zSeries/Linux saves \$ 560 K

35 Intel Servers	\$ 780 **	zSeries IFL 2 CP	\$ 1700
9 Unix Servers	550	Other Hardware	300
"Middleware"	1050	Middleware & Linux	
Business Recovery	400	Including Support	570
Network Planning	320	Network/Facilities	210
Staffing	600	Staffing	360
	-----		-----
Total	\$ 3700	Total	\$ 3140

**Dollars in Thousands Canadian

Reference: ING Canada:

MONTREAL, QC, July 2, 2003 -- ING Canada has signed an agreement with IBM to implement innovative IT services that will support ING's continuing growth and help better serve its insurance clients across Canada. A new IBM eServer zSeries server running Linux will be used to support many of ING's applications, as well as maintenance and enabling services to sustain the company's growth in Canada. ING,

Various Proofs of Concept with other Canadian Organizations.

Another Reference for Linux on zSeries

Softbank Uway Consolidates 45 Unix Servers onto IBM's latest eServer™ zSeries

Online university admission applications
will be processed by IBM eServer™ z990 running Linux

Data storage will be consolidated on IBM TotalStorage™ ESS 800

Seoul, 30 June, 2003 -- Softbank Uway, a leading company in online university applications announced today that it is replacing 45 database servers and web servers from HP and Sun with IBM's latest mainframe eServer™, the z990

zSeries Linux & Oracle

Experiences with Oracle for Linux on zSeries

Revised: April 10, 2003 ISBN: 073842515X

264 pages Explore the book online at

<http://www.redbooks.ibm.com/abstracts/sg246552.html>

zSeries ...Superior Partitioning

Strategic Planning Assumption: Through 2006, UNIX and Windows 2000 systems will not achieve the level of workload management functionality on a single system that zOS delivers, due to effort, cost and performance impact (0.9 probability).

Source: Gartner, The Technology of Server Consolidation, 21st Annual Data Centre Conference, December 2002 ,Author John Phelps

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Pick the Right Methodology

You are asking how to get more value from your Information Technology (IT) Investments...

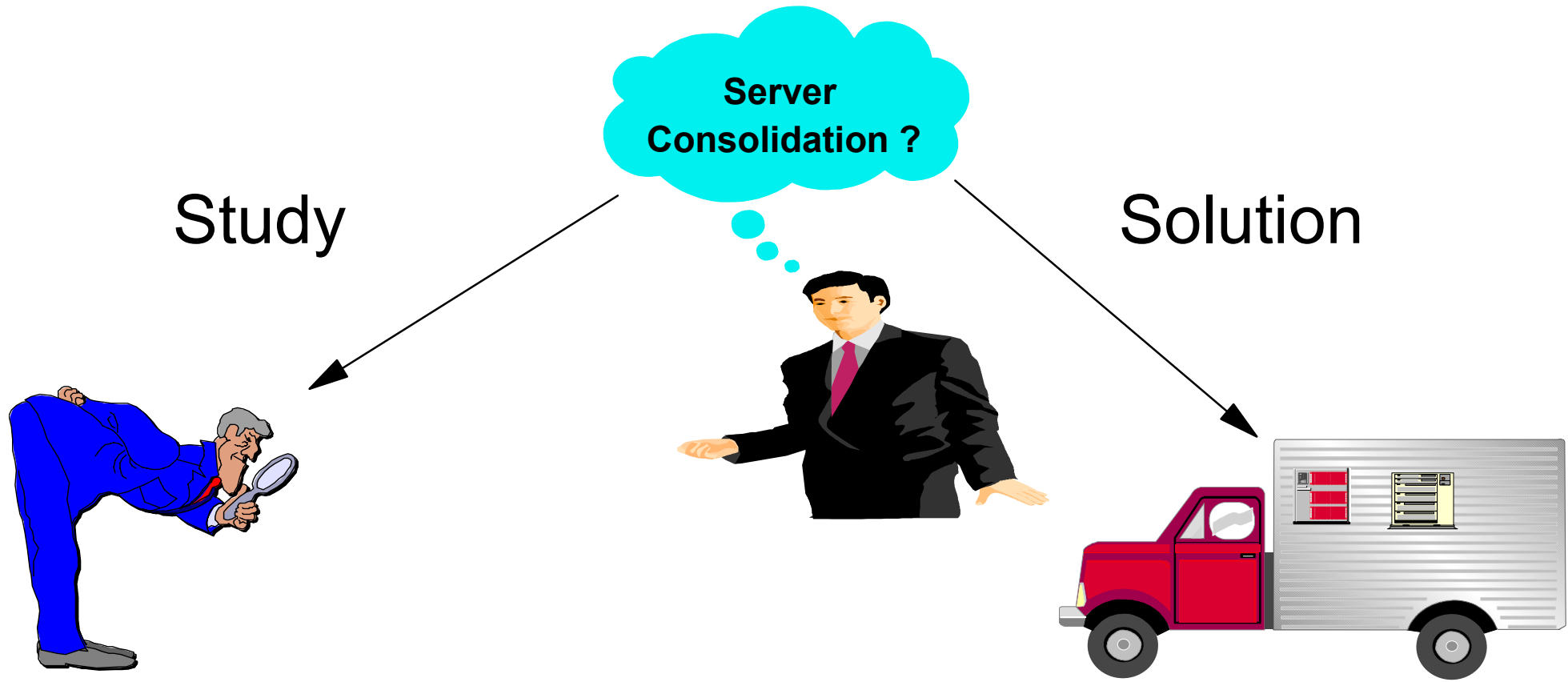
and in response...

We offer three **initiatives**:

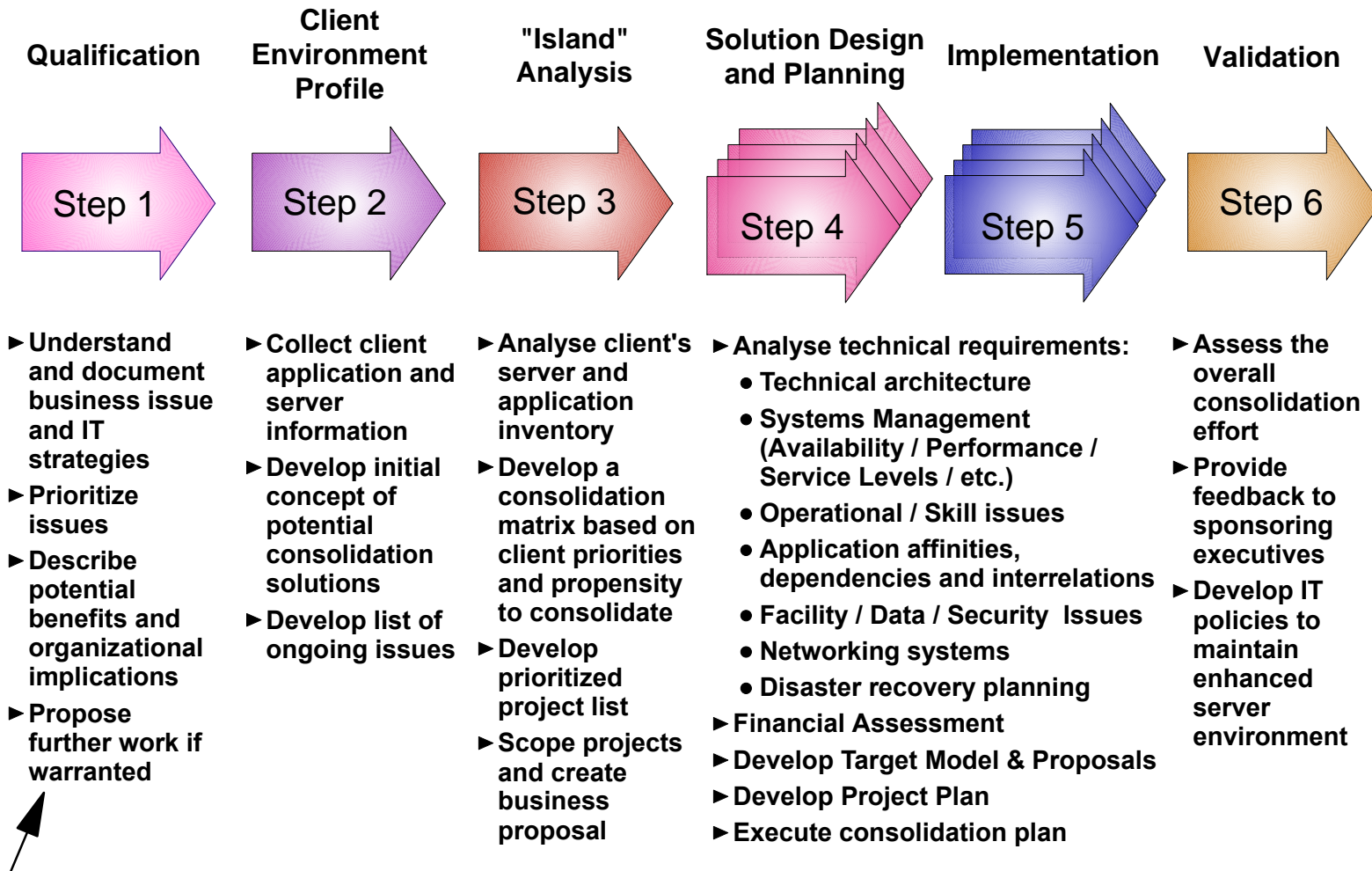
Initiative	Targeted to Your	Objective
Server Consolidation	IT Department	Optimize Selected IT Resources ...TCO
IT Optimization	IT Department	Implement Best Practices and/or Process Improvement based on the "7 Pillars" of IT service delivery
"On Demand"	User Department(s) and IT Department	Redefine Business Processes and the use of technology within those processes

Assuming Server Consolidation

Will that be ???



Study or Solution ... We Have a Methodology...ALIGN



Objectives and Scope

Vendor and Platform Neutral

Study → and/or → Solution

Platform and Vendor Neutral

Platform and Vendor Specific

3 to 20 weeks...depending

Qualification

Client Environment Profile

"Island" Analysis

Solution Design and Planning

Implementation

Validation

Step 1

Step 2

Step 3

Step 4

Step 5

Step 6

Step 2 is the tough one as the data may not be readily available.

Customer may halt the study after the first 3 steps.

The ALIGN Methodology Can Include TCO... Which

According To Gartner:

"TCO is really about **process improvement and best practices** that result in lower costs and improved service levels," said the Gartner Inc. analyst, who is known as the "Father of TCO," during a keynote speech here yesterday at the research firm's IT Asset Management and TCO Summit.

TCO is a **management issue, not a technology issue**, he said. "You can't just buy technology and lower your [IT] costs."

Source: Computer World, Gartner Summit: June 11, 2003. (Story by Thomas Hoffman):

process improvement and best practices.. where have you seen this before... (hint...chart # 38, IT Optimization)

We Can Study TCO: Key Consideration ...Which Attributes Are In Your TCO Model?

Acquisition Costs

- Servers
- Storage
- Networking
- Other hardware

Revenues

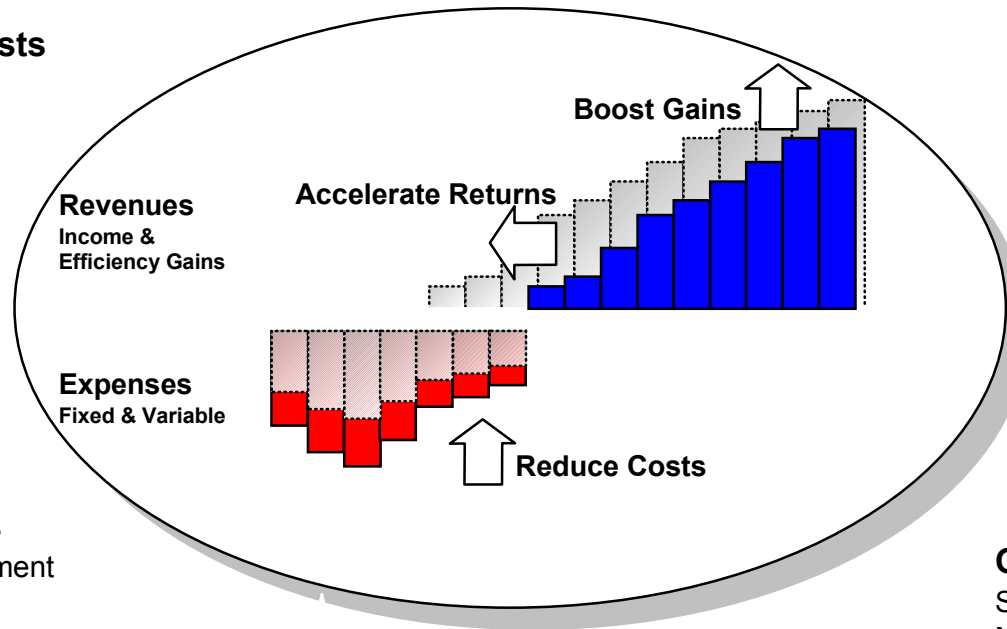
Income & Efficiency Gains

Expenses

Fixed & Variable

Disposal Costs

- Hardware replacement
- Lease cancellation
- Service Contracts cancellation
- Software license cancellation



Recurring Costs

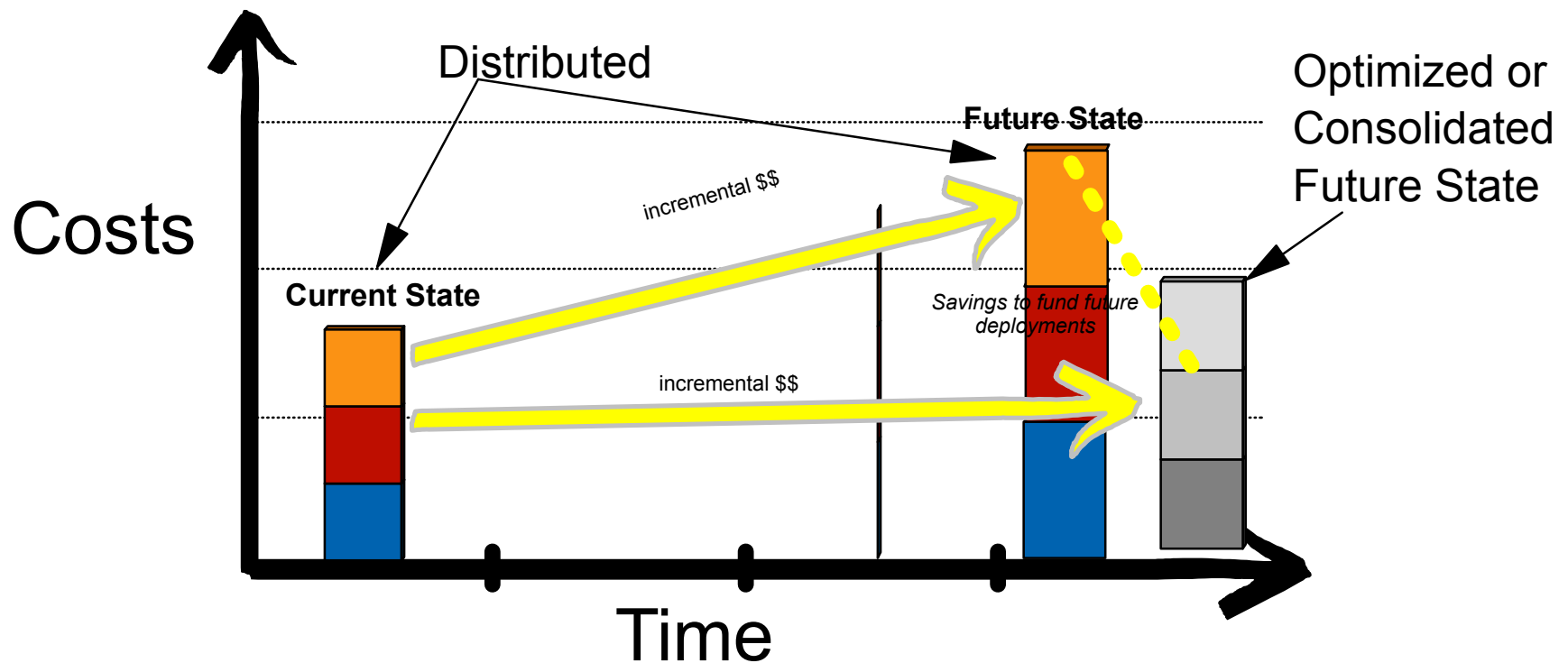
- Asset Depreciation
- Rent & Utilities
- Maintenance & Support
- Finance Charges
- Software usage fees
- Insurance
- Cost of Downtime
- People
- Taxes

One-time Costs

- Solution Design
- Migration
- Installation
- Training
- Disaster Recovery
- Other

Costs of Growth, Costs of Change, Cost per user ??

Considerations for TCO



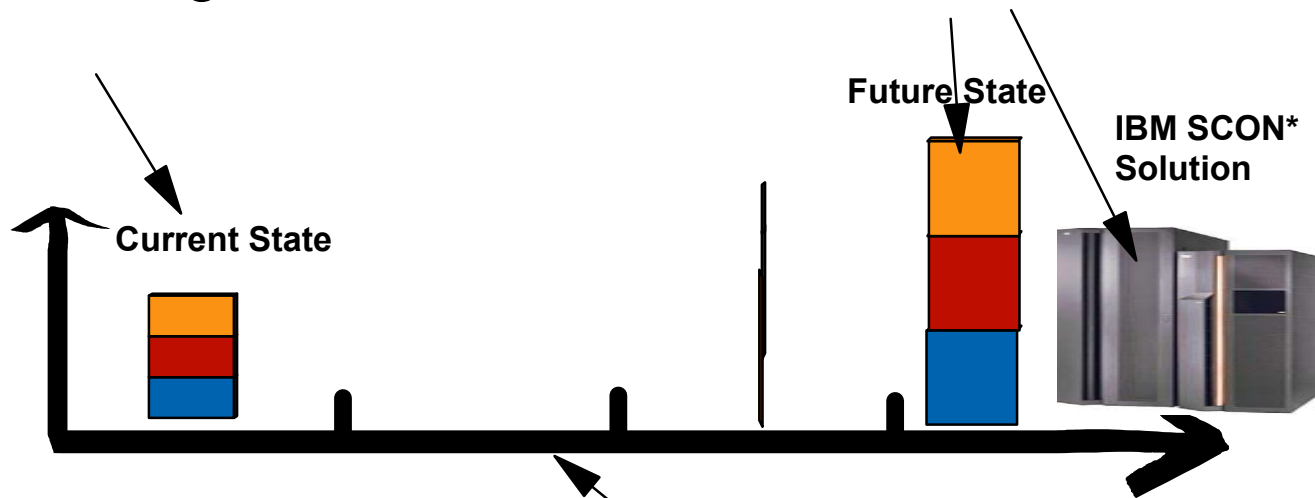
A TCO study can document current and future states in both distributed and optimized environments.

Considerations for TCO

Lesson Learned: Server Consolidation is usually justified when combined with other "attributes" driving change within the current environment.

Software Licensing:
by engine ??

Our Solution: compare to
"future state" (tougher if you compare to current)



Objectives or
Challenges:
Can you quantify.

Term: (as long as the
oldest server
you are consolidating)

* SCON =
Server
Consolidation

We would appreciate the opportunity to show how Server Consolidation, Linux and IBM @server could be of value to You

Suggested Reading

- Best Practices In Information Technology ...ISBN 0-13-756446-5 , JAMES W. CORTADA (IBM Consulting Group)
- The Squandered Computer: ISBN: 0-9620413-1-9, Paul A. Strassmann
- (Gartner) Data Centre Consolidation, Document # 23JESC 14, J. Krischer & A. Butler. (Paper Presented at Gartner ITXPO, Cannes France, November 2002)
- (Gartner) The Technology of Server Consolidation, Document # LSC21, 12/02 J. Phelps, December 2002 (Paper Presented at the 21st Annual Data Centre Conference)
- (Gartner) Server Partitioning: Perspective: DPRO-113258, 20, J. Phelps & J. Wright February 2003
- Understanding Relative Server Capacity: IBM @server Magazine, Mainframe Edition, Page 40, J. Temple , March 2003,

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Revised January 9, 2003

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