

Doing More . . . Using Less . . .

Velocity Software Inc. / WAVV 2010

When running Linux on IBM System z makes sense...
cents

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Agenda

- Today's "legacy system"! Times have changed.
- How changes in IT are affecting your installation.
 - IT Trends & Directions
 - TCO Considerations
- Measure, Track, and Report - Why bother?
- Results – What should you expect?
- Tools of the trade: The good, the bad, & the sad

Background

- This session is based on actual customer experience & history as it relates to migrations from x86 (commodity) server “farms” to Linux on z.
- The issues and problems they encountered along the way.
- Their efforts to resolve those issues and problems.
- How they overcame, adapted, and succeeded.

Definition: “Legacy System”

➤ *“A legacy system is an old computer system or application program that continues to be used because the user (typically an organization) does not want to replace or redesign it.”*

en.wikipedia.org/wiki/

IT has a new set of issues.

- The “legacy systems” of the 90s are creating more issues to deal with than the mainframe of the 70s.
 - A nightmare to manage & administer.
 - Increasingly expensive to maintain.
 - And now, an ever growing list of IT issues.

Today's legacy systems are the byproduct of the “add another rack” IT generation of the 90's . . .

What everyone wants from IT . .

*Access to data any time, from
any device, and from any
where.*

Even from the beach . .

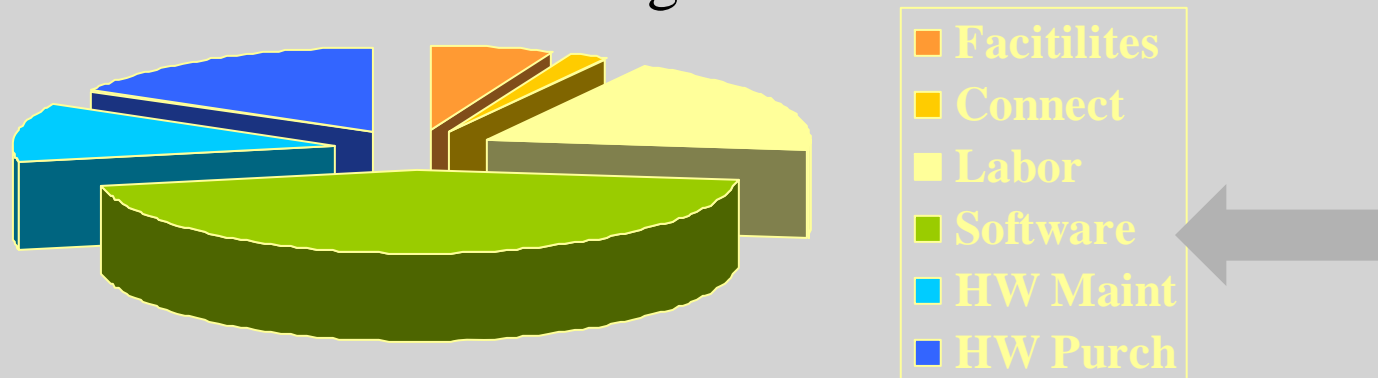


Challenges to the IT Professional . .

- Environmentals –
 - ✓ Space, Heat, Power, “Green” Efforts
- Administrative
 - ✓ Maintenance, Upgrades, Charge Back, Capacity Planning, Performance, DR, Data Security, and more
- Internal IT Pressures
 - ✓ Migrations, Consolidations, Compliance Issues, Maximizing Resources
- Industry Strategies & Directions
 - ✓ Cloud / Storm / SUN-down / Sky-BLUE/ CloudBurst

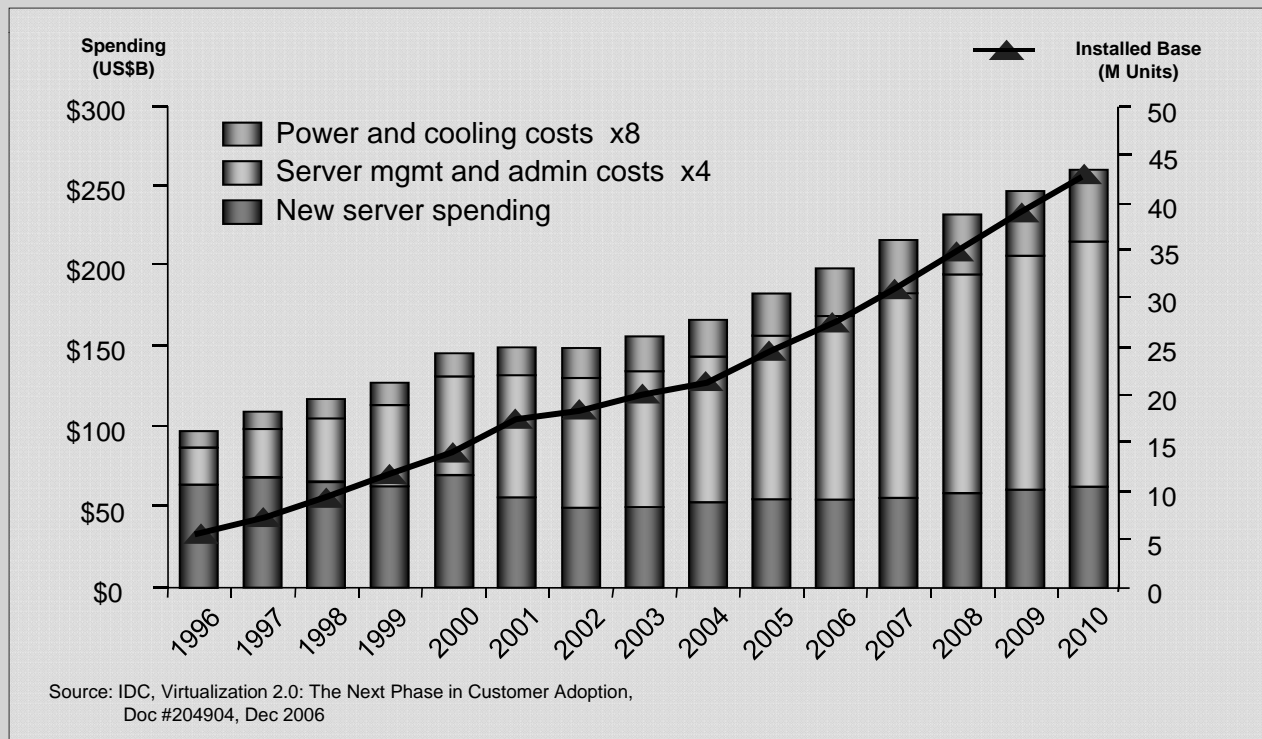
IBM's Project "BIG Green"

- Consolidation of several thousand Linux servers to 30 IBM z10s.
- 80% Reduction in Energy
- 85% Reduction in Floor Space
 - 1,600 for z10s vs 11,600 square feet for Distributed
- Categories as a % of Gross Savings:



What is the greatest problem with your primary data center ?

“Power and Cooling will be a top 3 issue with all CIOs in the next 6 to 12 months.” ^{“P”} Michael Bell – Gartner Group



*This
projection is
now a reality*

IBM's Mainframe Cloud Agenda

- Focus on Mainframe Strengths
 - Extend System z's massive virtualization capabilities
- Leverage System z efficiencies
- Offer System z (mainframe) customers value beyond that seen via other platforms / solutions and doing so transparently to the broader community. (90 Day Free Trials on IFLs)

“Keeping your head above the clouds” STG Tech Conference 09

IBM's Cloud Website: <http://www.ibm.com/ibm/cloud/>

System z for Cloud

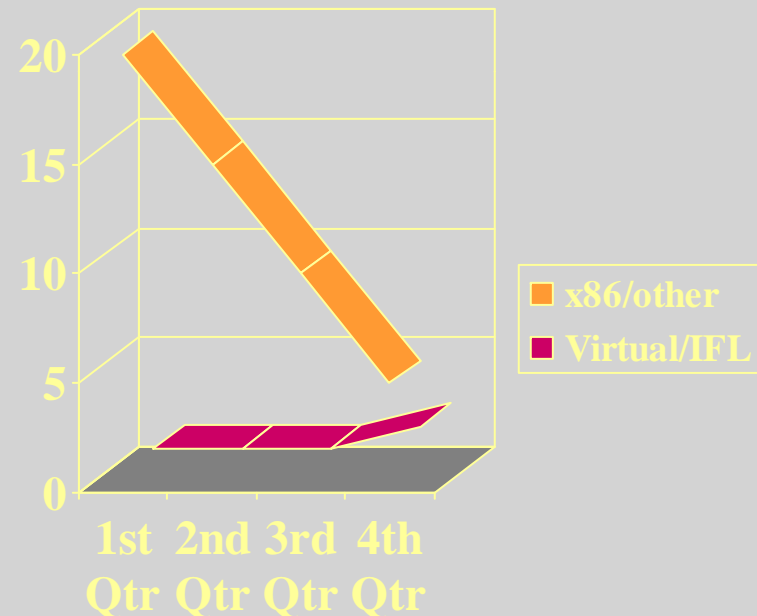
“As the IT world prepares for cost-cutting in 2009, server virtualization seems like one of the few technologies bound for continued growth and success. . . . The IBM System z may be the best enterprise-class virtualization platform available today . . .”

Enterprise Strategy Group – January 2009 Report “IBM System z: The Enterprise Server Virtualization Platform.”

Internal IT Study for TCO

- Determine consolidation ratio for given workloads (Linux, Windows, etc.)
- Estimate annual cost to operate virtualized servers for 3-5 years.
- Compare this to stand-alone provisioning or public Cloud offerings like Amazon
- $N \leq PPR * PUR * CPF$ supports that the more servers you can consolidate to virtual, the lower your cost.

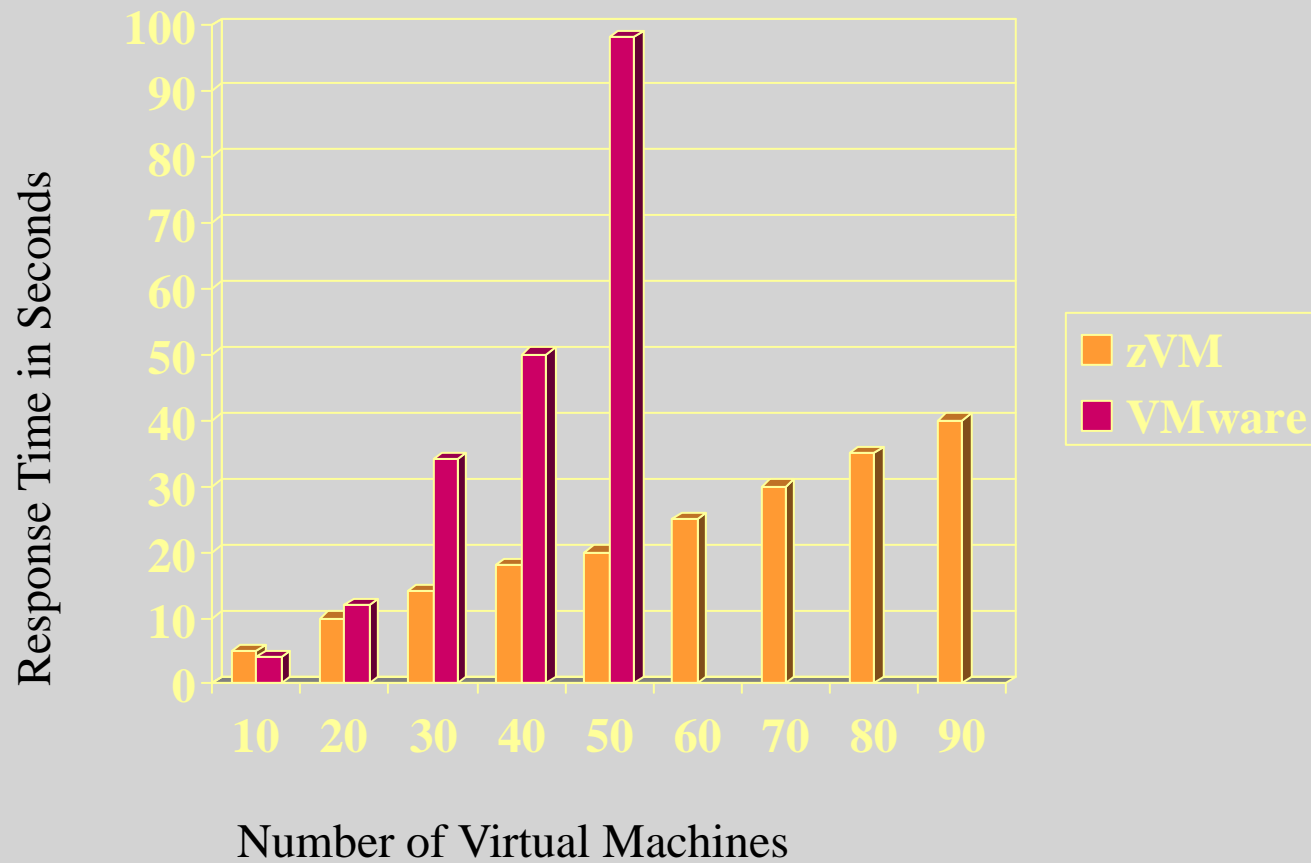
Server Migration : x86 vs. zLinux



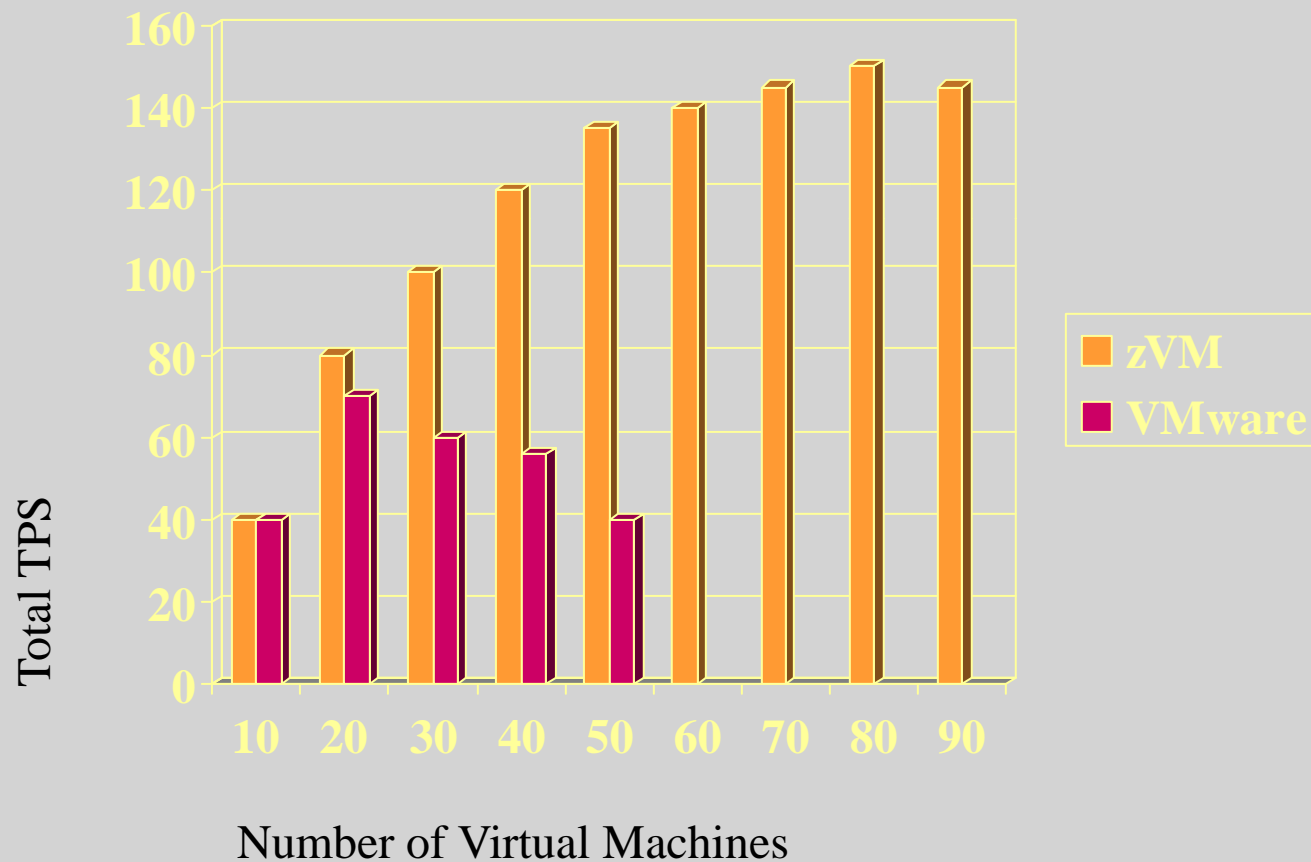
Consolidation Math

$N = \# \text{ of virtual servers} / \text{Proc Perf Ratio} / \text{Proc Util Ratio} / \text{Cores per Frame}$

Response Time Comparison

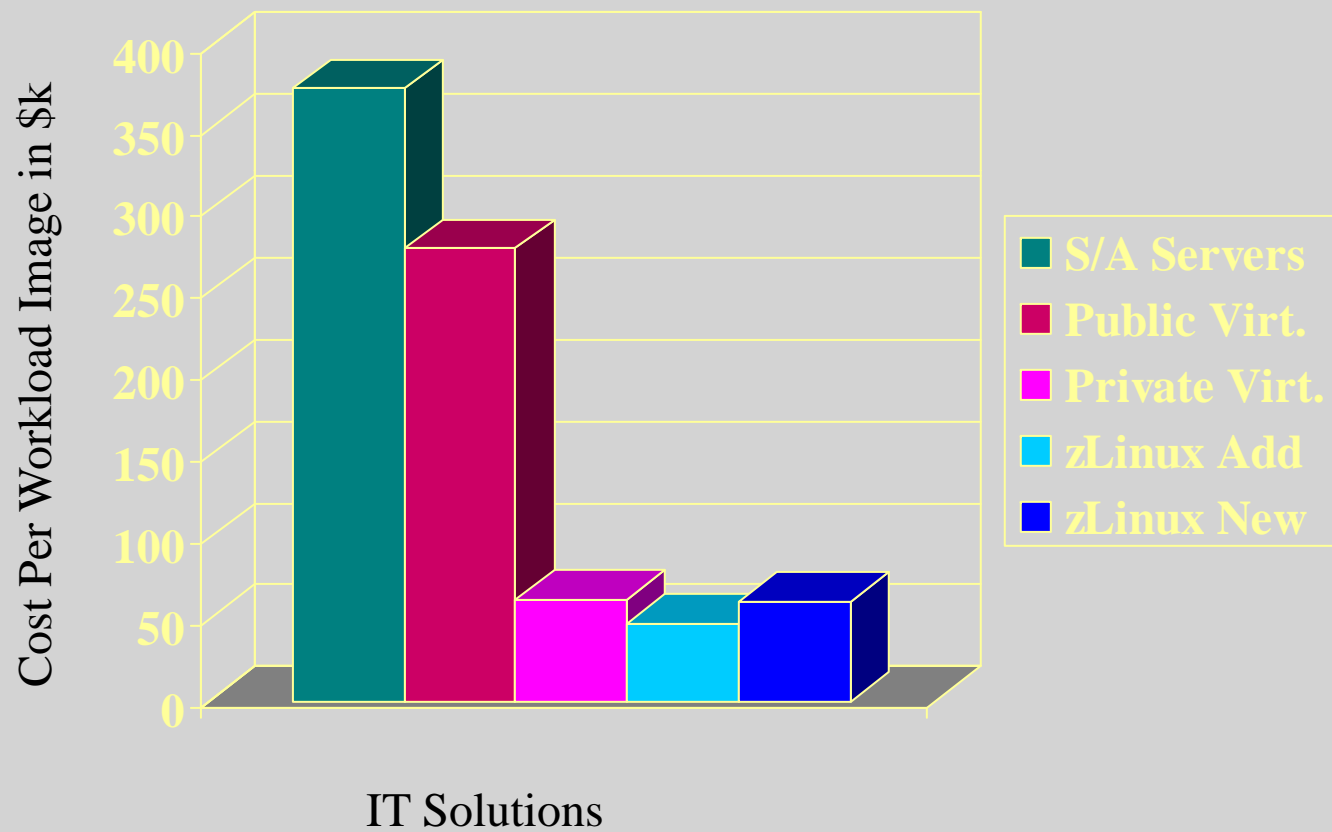


Throughput Comparison



But keep in mind, not everything was meant to run on z . .

Cost Per Image for Linux Servers



Detailed Cost Breakdown - 5 yr TCO

Platform	100 x3250	100 Amazon Large EC2	VMware & Five x3950 – 8ways	7 IFLs on z10
Hardware	\$5,000,000	\$2,800,000	\$1,080,000	\$2,030,000
Software	\$21,490,000	\$20,840,000	\$2,380,000	\$1,520,000
Facilities and Administration	\$11,020,000	\$4,020,000 (admin only)	\$2,760,000	\$1,210,000
Total Cost for 100 Images	\$37,510,000	\$27,740,000	\$6,220,000	\$4,780,000
Cost per image	\$375,100	\$277,400	\$62,200	\$47,600

Centralized = Better

Mainframe = Centralized

- IBM's System z "Server" (Mainframe) does centralized better than any other platform. It has proven efficiencies and economies of scale :
 - Environmentally
 - Administratively
 - Maintainability
 - Software
 - Hardware
 - other



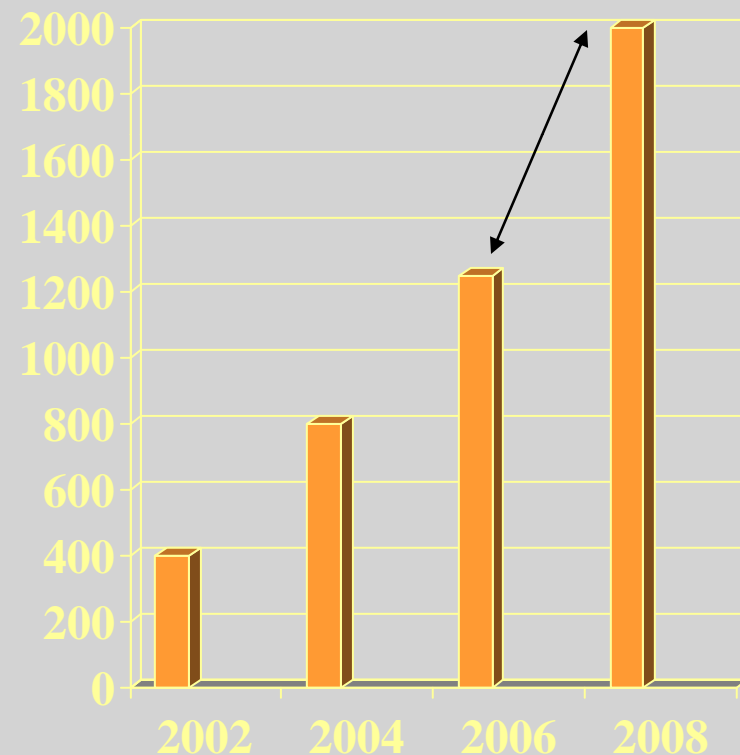
The Mainframe Scales !

When asked to rate.... Linux on the mainframe... Scalability received the strongest rating overall.... 93% projected that their use of IBM's Integrated Facility for Linux (IFL) would increase or remain steady.... while 42% projected that their use of the IFL would grow between 21% and 40%, and 10% projected that it would grow more than 76%.

Computerworld 6/23/09 : "Linux on the Mainframe Continues to Expand" & CA Sponsored Survey

System z Rising

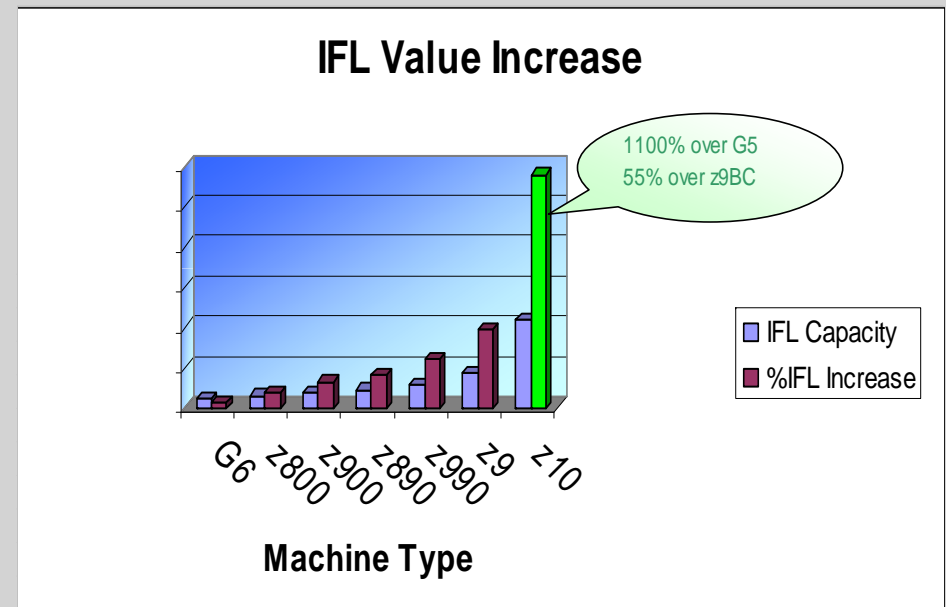
- More than 1300 customers are using System z for Linux.
- In 09, IBM added 54 new “mainframe” customers for the purpose of Linux
- Customer experience and results support the current strategy to migrate Linux applications to System z.



The number of Linux IFLs sold/year doubled between 2006 and 2008.

Unique Value of the IFLs

- Run at full MIPS even on sub-capacity models
- If/when you upgrade, the IFLs move up in power at no additional charge.
- IFL's have increased in power by roughly 55% over each previous generation or 1100% since G5.



Don't get yourself in a "hole" . .



Some applications run better on z than others. It's a good idea to understand the difference when migrating to Linux on z.

What applications make a best fit?

- WebSphere MQ Series
- DB2 Connect
- CICS Transaction Gateway , IMS Connect for Java
- SAP
- WebSphere and JAVA applications development
- WebSphere Application Server (WAS), Portal
- Domino
- Network Infrastructure, FTP, NFS, DNS etc...,
- Oracle Database
- Applications requiring top end disaster recovery model
- ComServer and Communications Controller for Linux
- Virtualization and Security Services
- InfoSphere/Cognos
- Communicate Pro (VoIP)

*High Availability,
High I/O Bandwidth,
Security and DR Requirements
Simplifying the Support Model
Shortening end-to-end Path Reqs
Reduction in Network Traffic
Collocation of Applications
Consolidation of diverse loads*

*“Selecting Projects for System z”
Bill Reeder, IBM Corp.*

What applications make a good fit?

- UDB (DB2)
- Informix, (IDS)
- Apache web serving
- SAMBA
- TIM/TAM (LDAP Services)
- TSM
- Existing Linux Workloads

Evaluate Server Choices

Correct Application Availability

Supporting Applications

Political Issues within the Org.

Potential Porting Issues

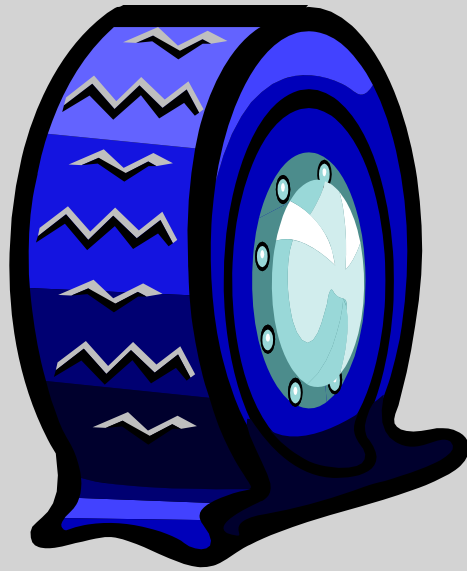
What applications are difficult to move?

- ISV and IBM applications that have not yet ported their application to run on Linux on System z
- Applications that by design run at VERY High sustained utilization which I will define here as >95%.
- Stand-Alone single applications as the only Linux for System z applications
- Applications that are too internally sensitive to try and move
- This URL is a link to the IBM software running and supported to run under Linux on System z.

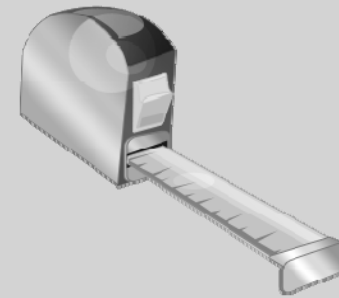
<http://www-1.ibm.com/servers/eserver/zseries/os/linux/software.html>

The question then becomes

*Do you keep buying new tires, or do you get
the front end aligned ? ? ?*



*Why bother to Measure, Track,
and Report ?*



Responsible IT professionals should always consider

- Performance Management to ensure service levels are met.
- Capacity Planning to ensure future needs are met.
- Operational Alerts that detect issues such as looping, exceeding disk capacity, etc., and doing so for hundreds/thousands of servers concurrently.
- Charge back and accounting information to allow your business to charge for resources consumed.

Real Life Situations

- Financial in NY Area - Crit Sit / 2 months / SRM parms wrong – sles8 server wouldn't initialize
- State of Montana - Crit Sit / 1 month / Linux Server Looping, 1 IFL offline
- University Crit Sit - Response Time issues.
- Financial in DFW Area - System spikes every 5 minutes
- Industrial – Decided to buy 20G of Storage rather than use best practices and set the correct parms..
- Industrial #2 – “We keep adding IFLs.”

Large Insurance Company

- Pain Points –
 - Too many servers
 - Space, Power, Cooling
 - Inability to Allocate Resources Where Needed
 - New Apps - Time/Expense of Basic Trials and Testing
- Today – (strategy deployed in less than 4 months)
 - +550 Servers on 2 Boxes / Dynamic Capacity Options
 - 100,000 Active Users
 - Zero Production Outages Since 2005
 - \$3M/Year in Savings

Some installations are smaller:

- One CEC (system)
- Two IFLs (one production, one test)
- 20 Linux Servers replaced, more planned
- Proof of Concept – 90 Days (free trial – including zVPS)
- Savings – space, power, admin, etc.

However, accomplishing the basics does create certain challenges . . . As you move forward, what should you expect?



Would you trust your systems performance to an astrologist?



Prerequisites

- A single suite of products that can deliver whatever is necessary to manage performance on z/VM and zLinux.
 - Keeps cost to a minimum.
 - Simplifies service, upgrades, education, etc.
 - Single vendor interface
- A vendor with a history for delivering best-of-breed products and support.
- A cross industry install base with references in all major geographies.

Velocity Software Inc.

- Founded in 1988 by former IBMers.
- Velocity products are used by several hundred installations worldwide; many are IBM showcase customers.
- IBM uses Velocity's products internally and makes frequent references to our products in their Redbooks.
- We have a working relationship with IBM System z labs in Endicott(z/VM), Poughkeepsie(zOS), and Boeblingen(zVSE).
- Velocity has been a participant in every VM Early Support Program since 1988 and a PartnerWorld member since 89.
- Velocity presents research at many conferences including:
 - SHARE, GSE, CMG, WAVV, and Local Linux User Groups

Velocity Software Delivers :

- Total Data Accuracy
 - When necessary, identifies and corrects inaccurate data.
- Complete Data Collection
 - Variety of Platforms (NT, Linux, SUN, HP, etc)
 - Standard Interfaces (SNMP and NETSNMP)
 - Concurrently across 100s or 1000s of servers.
- A 100% Data Capture Ratio
 - Best in the industry . . . Why measure incomplete data . . . ?
- Minimum impact on processors by monitoring agents.
 - Velocity's target is .1% or less of ONE processor

Not All Performance and Systems Management Tools are Created Equal

z/VM – Linux Requirement	Velocity Software Product	All Other Vendors
Support All Linux	YES	NO
Charge Back Accounting	YES	NO
Capacity Planning Info.	YES	NO
Low Cost Operation	YES	NO
Low Overhead Agents	YES	NO
Performance Serv. (zTUNE)	YES	NO
Performance Education	YES	NO
Included in IBM Redbooks	YES	NO
Standard Open Linux Agent	YES	NO
Network Perf. Monitoring	YES	NO
Accounting – VM Level	YES	NO
Accounting – Linux Process	YES	NO
Accounting – Linux Applic.	YES	NO
MXG and MICS Interfaces	YES	NO

zVPS Overview

- zVPS is Velocity's Performance Suite. It is a collection of several components including:
 - zMON
 - zVWS
 - zVIEW
 - zPRO (optional)
 - zTUNE (optional)

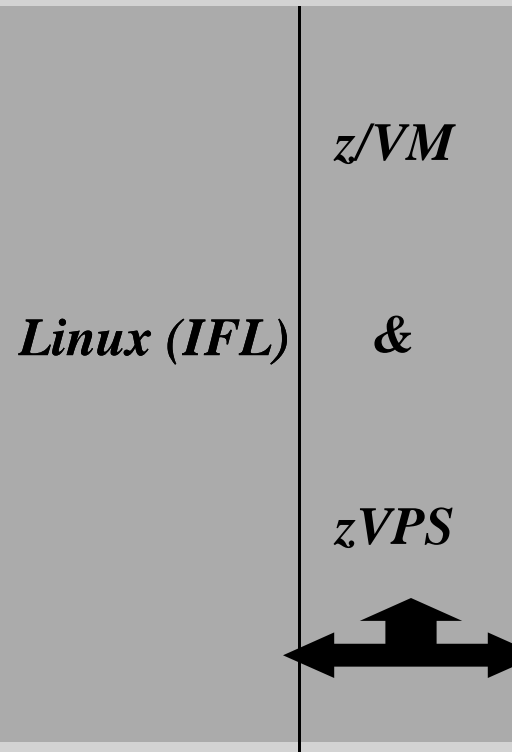
zVPS Overview (cont)

- Provides real time metrics on all facets of server performance including z/VM, Linux, and other distributed servers (SUN, Windows, etc.)
- Full function capacity planning and interfaces to planning tools such as MXG and MICS
- Complete and accurate charge back accounting information for Linux applications and z/VM.
- Operations alerts for up to 1000s of virtual servers and immediate detection of performance issues.

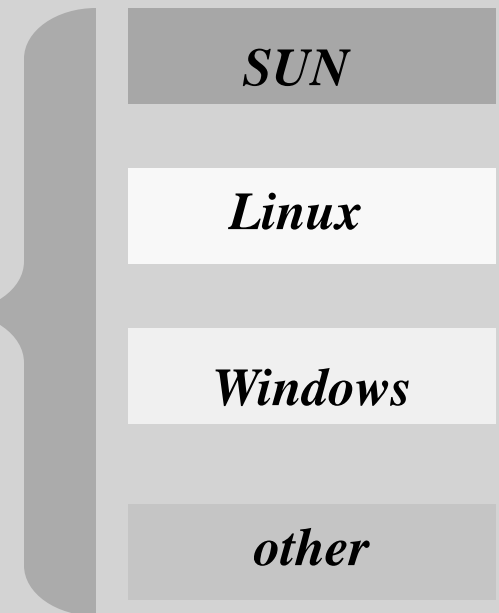
zVPS Example:

IBM System z

*zVPS can monitor
and measure the
activity of Linux on
System z in addition
to distributed servers
like SUN Solaris,
Linux, HP, Windows,
and more.,*

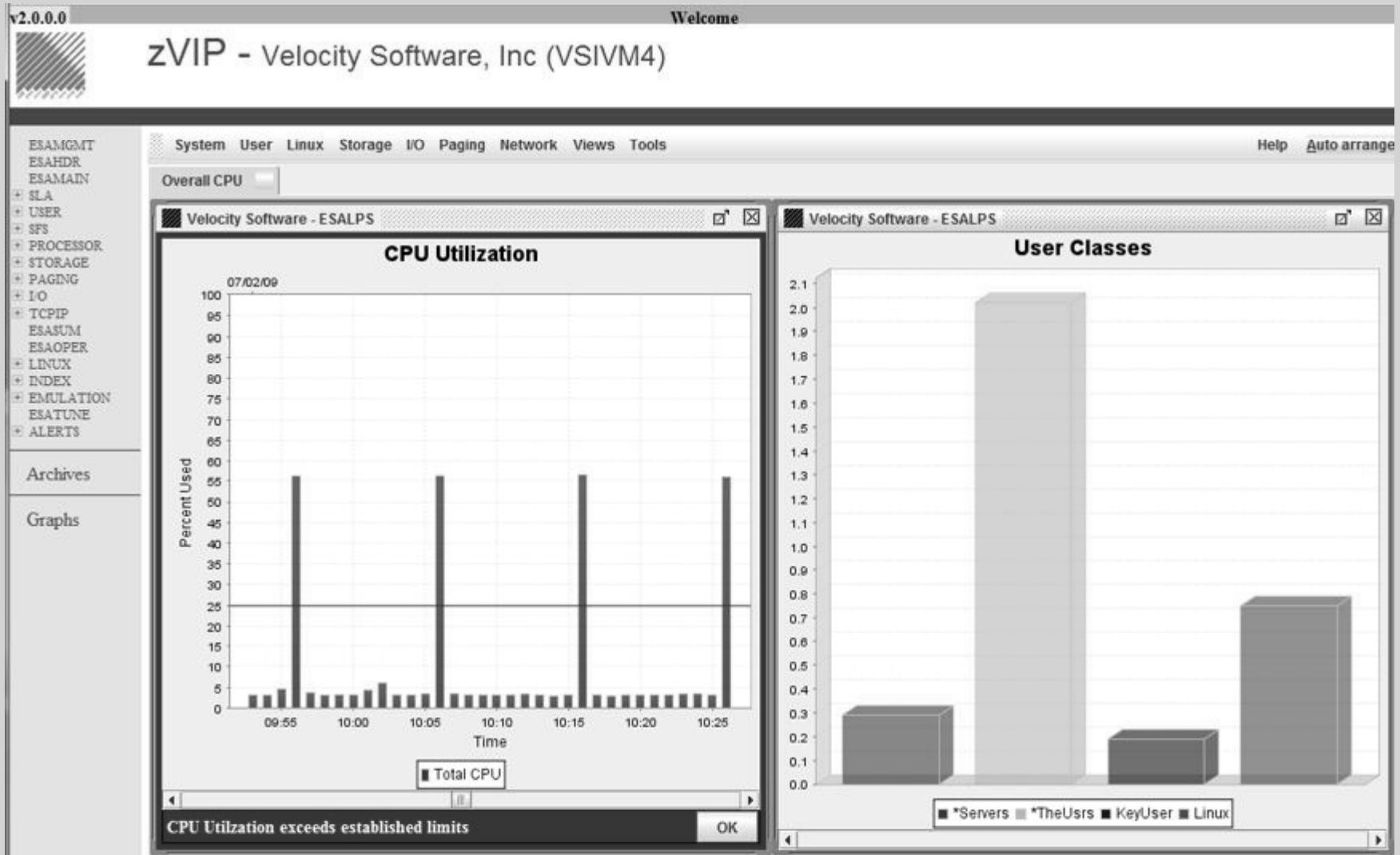


Distributed Servers (x86)

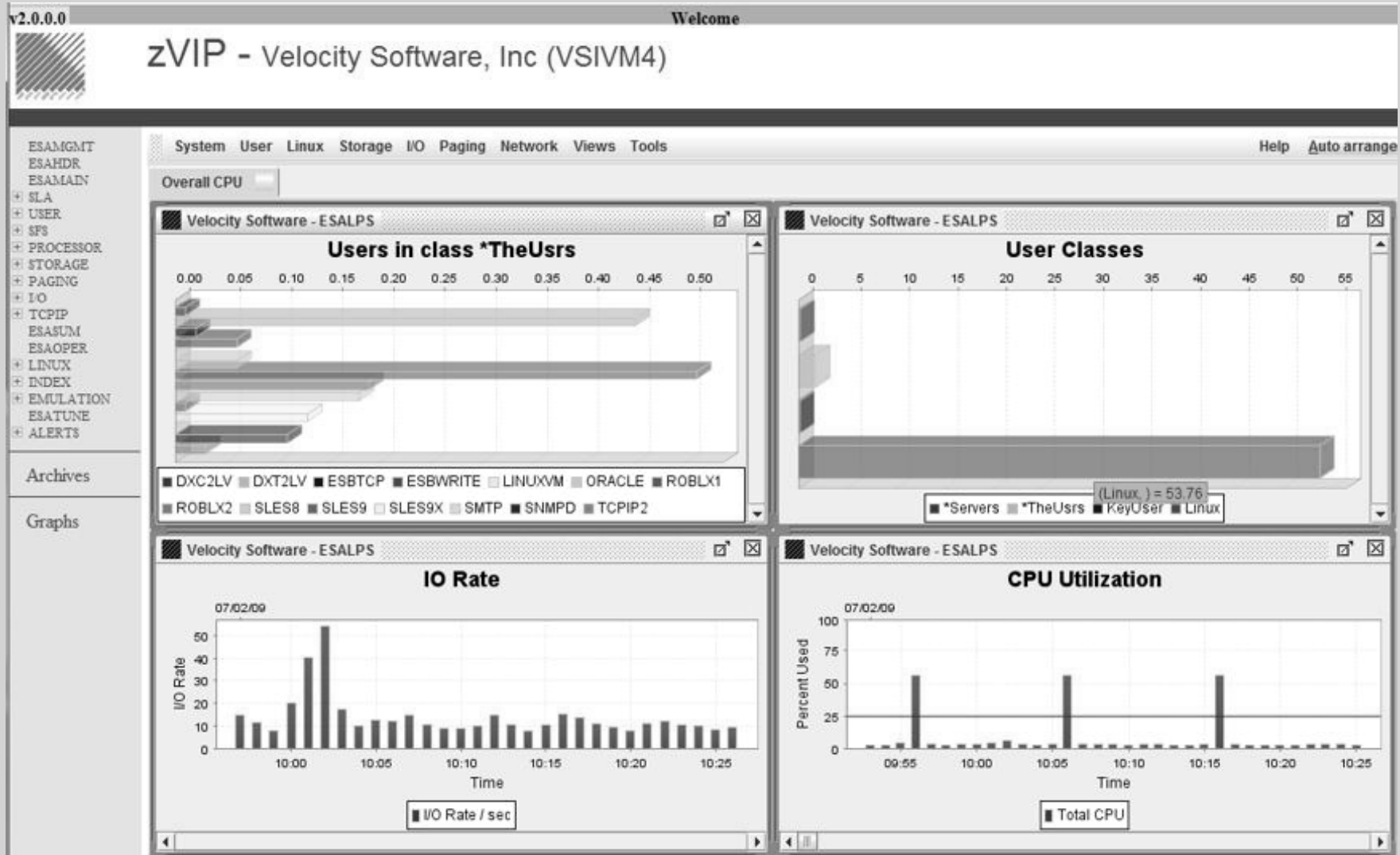


*Net: You can determine the level of use for
any server in your network.*

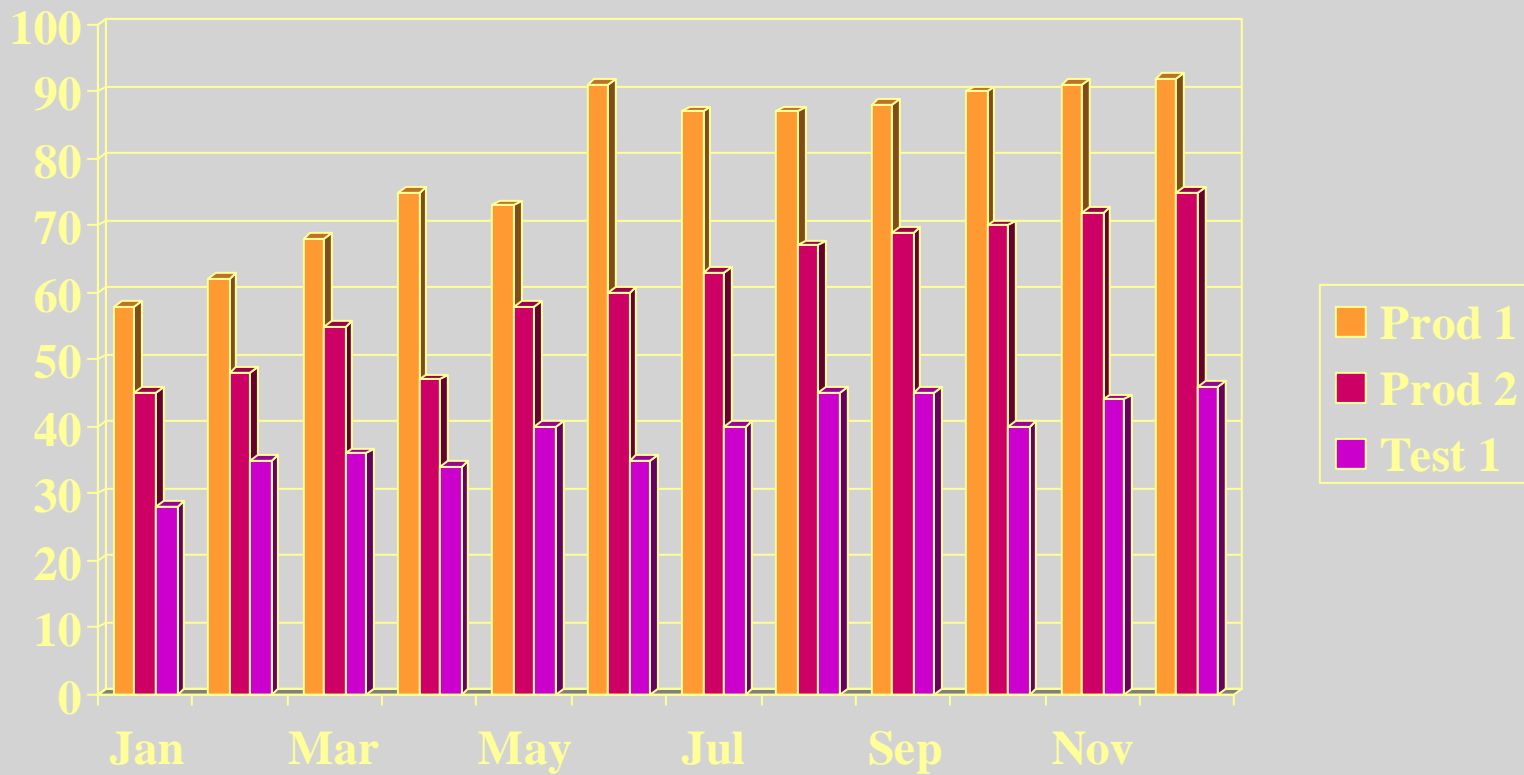
zView's Graphical Interface for zVPS



zView's Graphical Interface for zVPS



LPAR Processor Utilization - 12 Month Trend Analyses



zPRO

Cloud Enablement Tool for Systems Administrators

- Cloning for Linux Servers, Solaris, VSE, CMS users and more.
- Provides administrators the ability to define servers based on “golden images”.
- Manages z/VM security (RACF)
- (Eventually replaces z/VM Dirmaint.)



zPRO The PROfessional manager for z/VM from Velocity Software, Inc.

System Status | Manage Users | Subsystems | Performance | Security | Tools | Help | Feedback

zPRO Server Management

Logout

Gold List	Options
DEMO	
DEMOC1	
DEMORO	

Factories

	View	Clone	

Work zone

Create a single userid Create multiple userids

New userid: DEMOY7 Password: ●●●●

Type of minidisk allocation: AUTOG Location of minidisk allocation: GWORK

Action log

07/29/2009 07:36:21 AM	Adding new user DEMOY7 to directory	
07/29/2009 07:35:45 AM	Cloning of DEMOC1 to create DEMOX012 complete	
07/29/2009 07:35:45 AM	DEMOC1 0191 copy to DEMOX012 complete	
07/29/2009 07:35:28 AM	DEMOC1 disk 0191 being copied to DEMOX012 0191	
07/29/2009 07:35:28 AM	User directory entry DEMOX012 created from model DEMOC1	
07/29/2009 07:35:11 AM	Adding new user DEMOX012 to directory	
07/29/2009 07:35:07 AM	Cloning of DEMOC1 to create DEMOX011 complete	
07/29/2009 07:35:07 AM	DEMOC1 0191 copy to DEMOX011 complete	

zTUNE

- Configuration analysis to ensure best possible configuration for performance.
- Dozens of Automated “health checks” for both Linux and z/VM.
- Analyses of your Capacity and Performance data.
- Recommendations to improve performance and to optimize resources whenever it’s requested.

Velocity works as an extension of the local team.

Summary

- We are committed to providing the best z/VM performance products available.
- Our zVPS Product Suite is a complete set of Performance and Systems Management tools designed exclusively for z/VM and Linux on IBM System z
- We provide excellent product support services, and education.
- Our install base is both global and diverse.
- Velocity Software is the recognized leader in this space by most of IBM's z/VM – Linux “showcase” accounts.

Proven Performance from Velocity Software

The next step is yours . . .

