

# Velocity Software

## **Self Service (PaaS) for Linux on z Simple and Effective**

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**“<http://VelocitySoftware.com/edge.pdf>”**

Velocity Software - Positioning

zPRO Version 1 Lessons

zPRO Version 2 Objectives

Management Requirements

- zVPS Introduction
- Operations Support

zPRO Installation in 10 minutes or less

zPRO Demonstration

- **Founded in 1988**
  - Original Focus on VM/XA Performance Analysis
- **Current Focus**
  - z/VM and Linux on System z Performance Management
  - Network Performance Management
  - Application Performance Management (Oracle, JVM)
  - Operational Support (Alerts, Operations Console)
  - Distributed servers
  - Enabling z/VM for web based systems management
  - Self Service

# Velocity Software, World Wide Involvement

IBM

Draft Document for Review August 13, 2005 9:22 am

## Experiences with Oracle 10g Database for Linux on zSeries

Installing a single instance of Oracle Database 10g

Installing Oracle 10g RAC

Using ASM

Kathryn Arrell  
Laurent Dupin  
Dennis Dutczewich  
Terry Elliott  
Bruce Frank  
Chris Little  
Barton Robinson  
Tom Russell

Redbooks

ibm.com/redbooks

Sg24-4862

Sg24-8104

**Sg24-8159**

IBM

Draft Document for Review November 13, 2012 5:05 pm

## Experiences with Oracle 11gR2 on Linux for System z

Installing Oracle 11gR2 on Linux on System z

Managing an Oracle environment

Provisioning an Oracle environment

Sam Amsawelu  
Kathryn Arrell  
Gaylan Braselton  
Arnette Chevi  
Damian Gallagher  
Ivan Dobel  
Heinrich Gersch  
Romain Pochard  
David Simpson

Redbooks

ibm.com/redbooks

IBM

Draft Document for Review February 5, 2014 10:03 pm

## Experiences with Oracle Database 12c Release 1 on Linux on System z

Setting up Linux for Oracle DB 12c R1

Installing Oracle DB 12c R1 RAC

Upgrading to Oracle DB 12c R1

Mike Ebberts  
Kathryn Arrell  
Sam Amsawelu  
Gaylan Braselton  
Terry Elliott  
Leon Rich  
Barton Robinson  
David Simpson

Redbooks

ibm.com/redbooks

User group focus, presenting frequently:  
SHARE, WAVV, VMWorkshop, CMG  
GSE UK, GSE Germany, UKzLUG, Italian,  
JoziLinux, Cavmen, Hillgang, MVMUA,  
MVMRUG, IBM Technical Universities,....

- **z/VM Performance Education**
  - Performance Workshop (No Charge for zVPS Users)
    - June (Binghamton University, New York)
    - November (Johannesburg )
  - One day Performance Management seminars world wide

# Who is Velocity Software

27 years of growth

200+ Installations (zVPS)

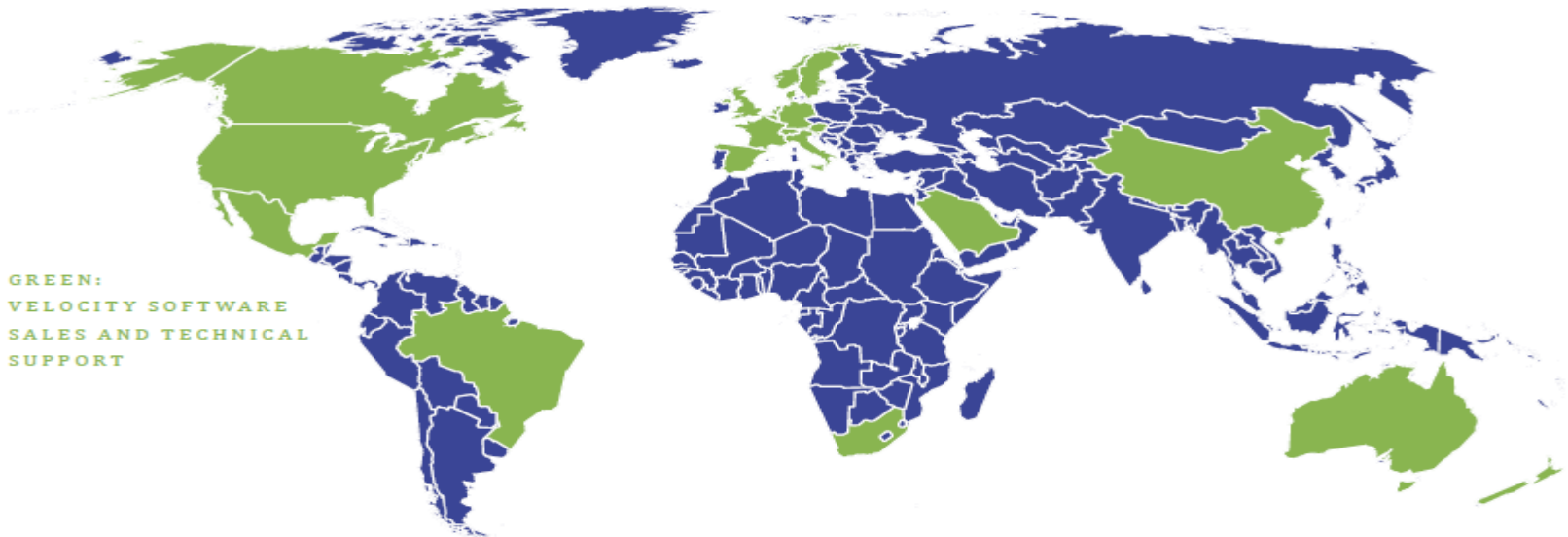
22 countries (now, 28 countries registered for this webex!)

6 continents

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## Velocity Software's Sales and Technical Support Map

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# zPRO Version 1 Functionality

## zPRO Version 1 shipped 2010

- Implemented cloud (private PaaS) before cloud was a buzzword
- Full cloning support
- A LOT of web based management functions (RACF, SFS, Spool....)

## System Status – Users, Spool, Devices

### Manage users

- Cloning, Directory Maintenance, Expirations
- IP Address Maintenance, Free space, minidisk

## z/VM Admin – SFS, RSCS

## Security – RACF

## HELP – z/VM (CMS, CP), zVPS DOC

# Lessons learned from zPRO Version 1

## Target Market – Who is it?

- Skills challenges
- Time challenges

## Installation Challenges for “target market”

- Too complex (supporting 28 countries? NOT CHEAP)
- SMAPI “difficult”, requires installation and support time and skills
- Additional virtual machines added complexity

## SMAPI (Systems Management API)

- Common interface for Linux
- Often the single most difficult part of zPRO installation
- Not necessary if using native z/VM

## Java - Too heavy, device restrictive



# Design objectives for zPRO Version 2

## Fast Installation

- 10 minute Installation (Assuming zVPS installed)
- NO SMAPI!
- NO JAVA
- No Linux or MS servers required
- Any browser (no java enablement requirements)
- Fast setup

## Directory Management, Security Support

- DIRMAINT or VM:Secure / VM:Direct
- VM:Secure or RACF or not

## Release 2.1: Targets Self Service requirements

# Design objectives for zPRO Version 2

## Ease of use important, z/VM skills not needed

- Easy enough for an 11 year old to create his own server
  - “Dad, can I build my own Minecraft server on your mainframe?” (BC12)
- iPad
- smart phones
- Meet installation requirements

## Non-invasive architecture

- No hooks, no dependencies
- Everything keeps running if zPRO removed
- (Automatic expirations would not happen)

# “Managed Service” Management Requirements

## Service Level Management (Performance Management)

- Chargeback functions
- Capacity Planning
- Operational Alerts
- Performance Analysis

# zVPS Management Features

## Performance Data Base (PDB) – Fully integrated

- z/VM (all subsystems, lpar, CPU, virtual machines)
- Linux on z (CPU, filesystems, process data)
- Network data (tcp, udp, ip, interface)
- Distributed servers (linux, MS, others)

## Capacity Planning - Enterprise support

- PDB used by MXG, UIE, MICS

## Operational Requirements

- zALERT – alert to email, text message, snmp, etc
- zOPERATOR – Management console
- Snmp alerts for enterprise console

# z/VM Performance - zVPS

Traditional model (1989)

**zMON: Real time analysis**

- Uses Standard CP Monitor

**zMAP: Performance Reporting**

Post Processing

Creates Long Term PDB

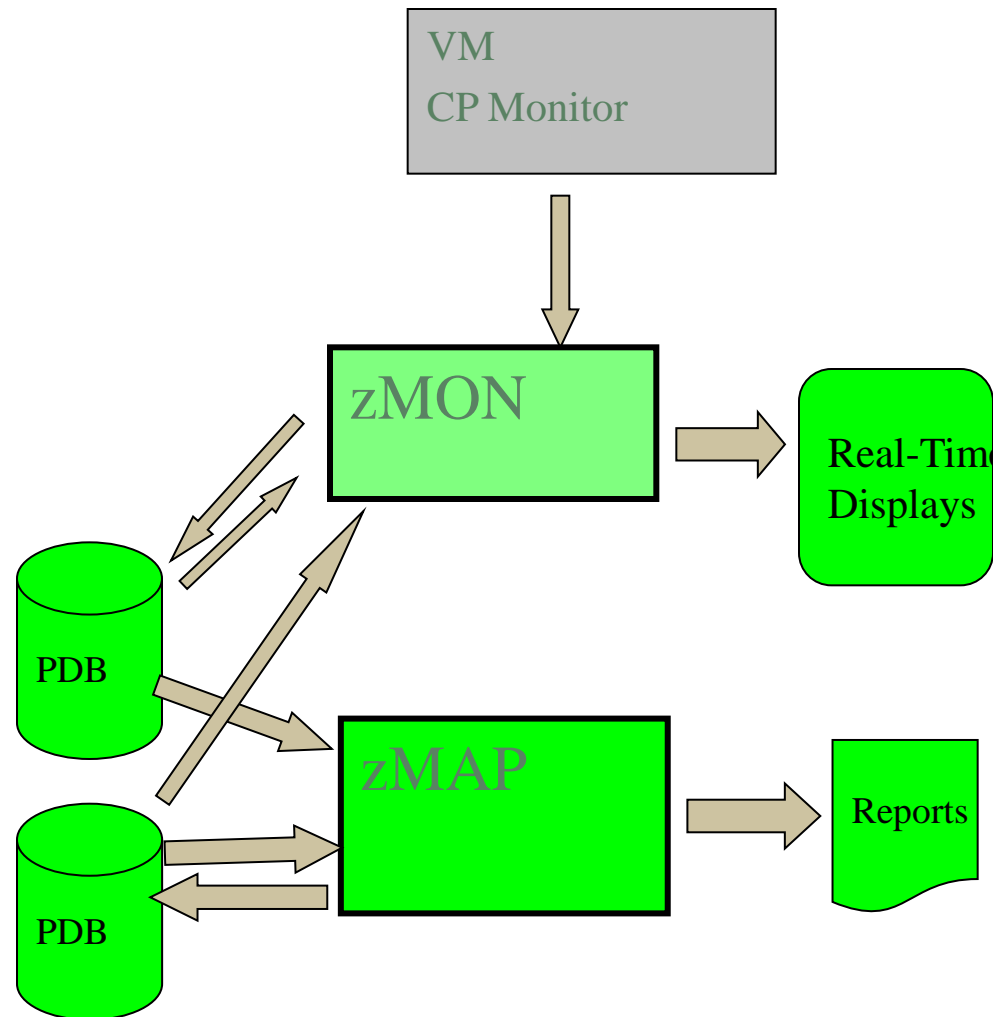
PDB or monwrite data input

**PDB (Performance DataBase)**

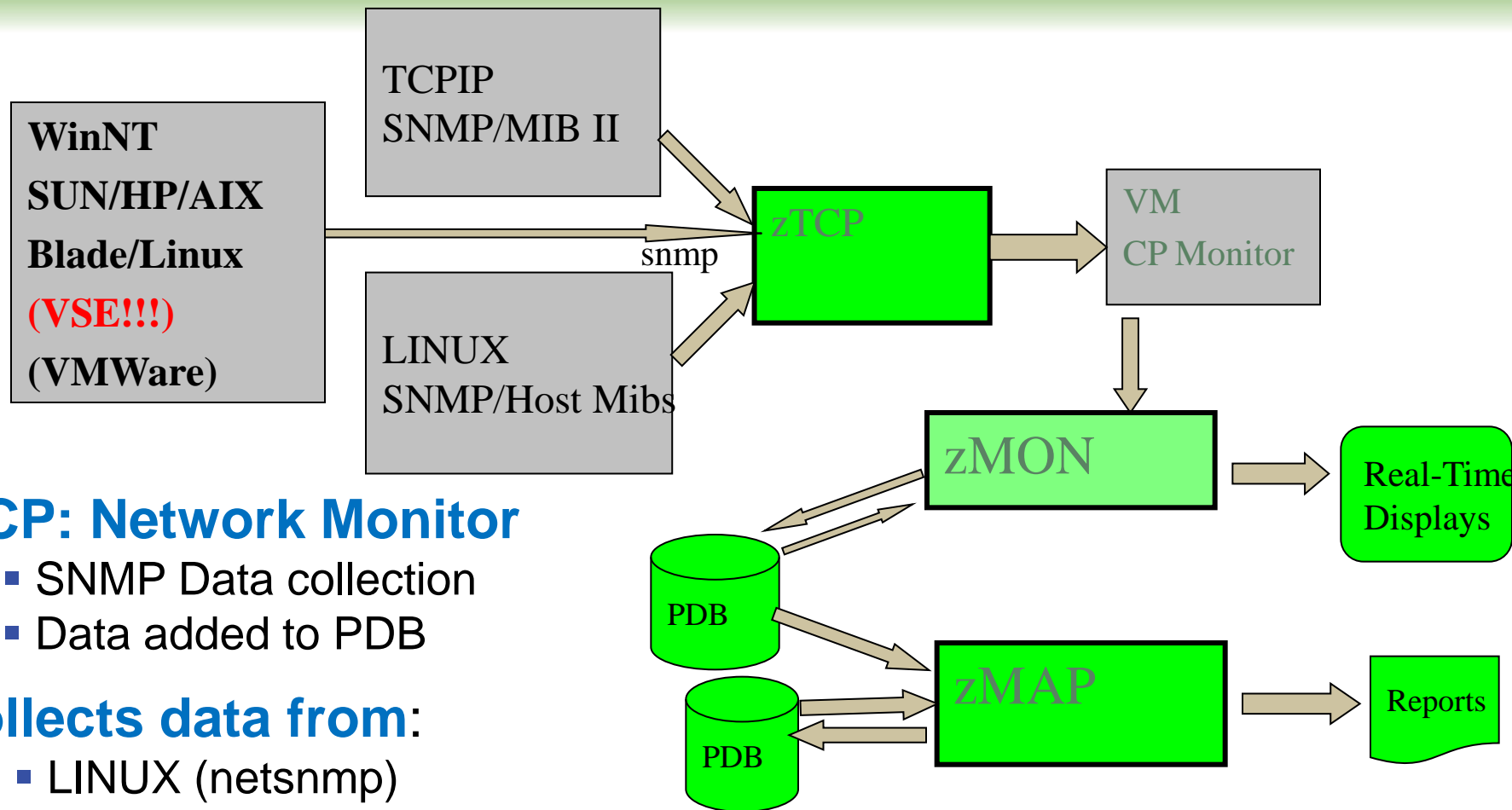
Complete data

By Minute, hour, day

Monthly/Yearly Archive



# Added Linux and Network Data Acquisition



## zTCP: Network Monitor

- SNMP Data collection
- Data added to PDB

## Collects data from:

- LINUX (netsnmp)
- NT/SUN/HP (native snmp)
- Printers/Routers....

# Process Capture Ratio

- High cpu capture ratio

Screen: ESALNXV Velocity Software

1 of 1 LINUX Virtual Processor Analysis Repo NODE BLAKEMC									
Time	Node	VM ServerID	<Linux Pct CPU>			<Process Data>			Capture Ratio
			Total	Syst	User	Total	Syst	User	
15:13:00	BlakeMC	BLAKEMC	15.9	0.1	15.8	15.9	0.1	15.8	1.000
15:12:00	BlakeMC	BLAKEMC	16.0	0.1	15.9	16.0	0.1	15.9	1.000
15:11:00	BlakeMC	BLAKEMC	16.1	0.1	16.0	17.0	0.1	16.9	1.061
15:10:00	BlakeMC	BLAKEMC	15.8	0.1	15.7	14.7	0.1	14.6	0.929
15:09:00	BlakeMC	BLAKEMC	16.1	0.1	16.0	17.3	0.1	17.2	1.074

Screen: ESALNXP Velocity Software

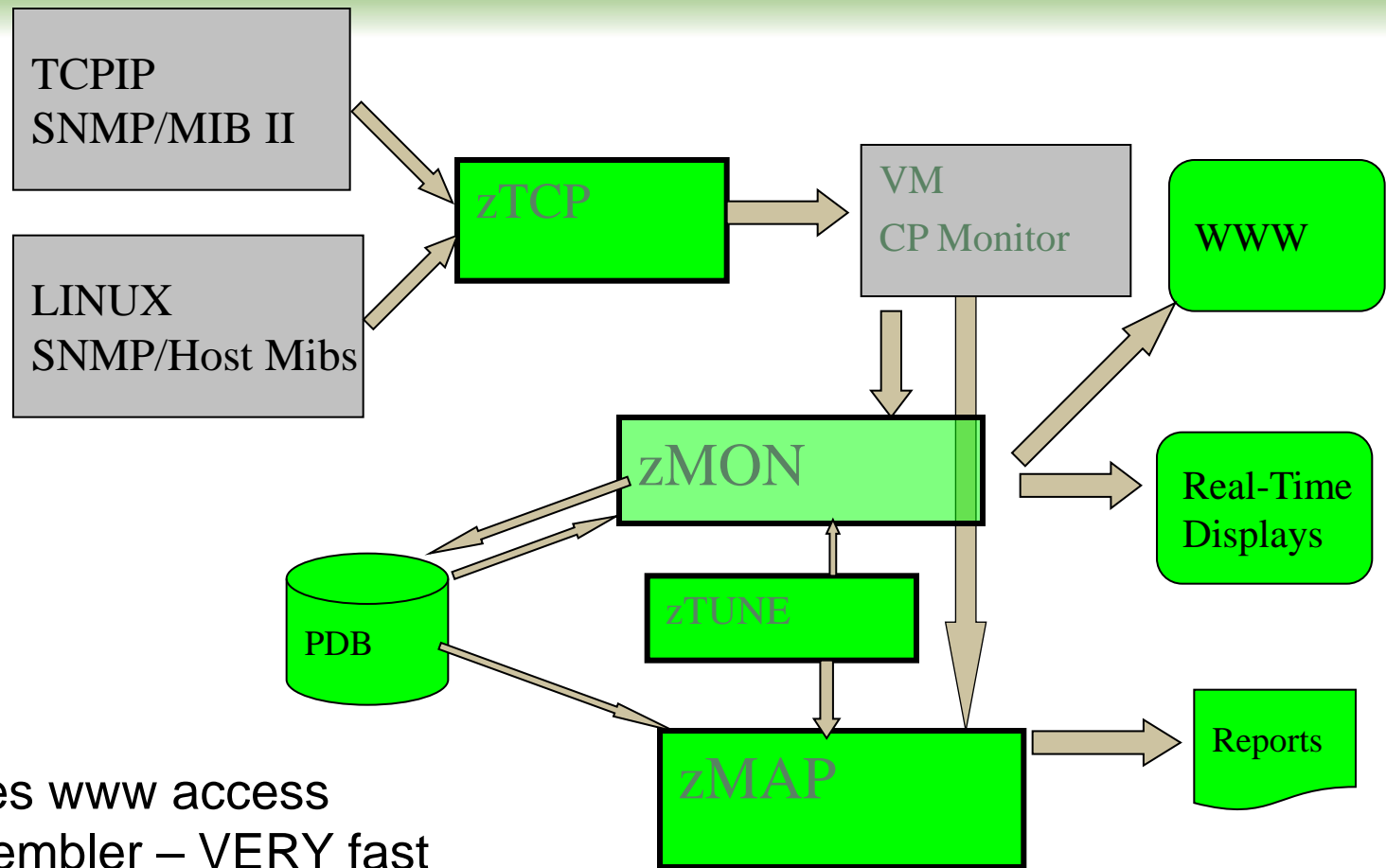
1 of 3 VSI Linux Percent Usage by Process NODE BLAKEMC									
<-Process Ident-> nice prty <-----CPU Perc									
Node	Name	ID	PPID	GRP	valu	valu	Tot	sys	user
15:01:00									
BlakeMC	*Totals*	0	0	0	0	0	15.0	0.1	14.9
	cron	2568	1	2568	0	20	0.0	0	0
	screen	6432	1	6432	0	20	0	0	0
	java	6500	9887	6500	0	20	14.9	0.0	14.8
	screen	9886	1	9886	0	20	0	0	0
	bash	9887	9886	9887	0	20	0	0	0
	snmpd	29210	1	29209	-10	10	0.0	0.0	0.0

Screen: ESALNXC Velocity Software

1 of 2 Linux Process Configuration

Node	PPID	PID	Process	Path
BlakeMC	1	2702	mingetty	/sbin/mi
	1	2703	ttyrun	/sbin/tt
	1	2704	agetty	/sbin/ag
	1	2705	agetty	/sbin/ag
	1	2706	agetty	/sbin/ag
	1	6432	screen	SCREENon
	6432	6433	bash	/bin/bas
	6432	6440	bash	/bin/bas
	6432	6447	bash	/bin/bas
	6432	6455	bash	/bin/bas
	6432	6462	bash	/bin/bas
	6432	48083	bash	/bin/bas
	6432	48116	bash	/bin/bas
	6432	48124	bash	/bin/bas
	6432	48712	bash	/bin/bas
	6432	48760	bash	/bin/bas
	6432	48769	bash	/bin/bas
	1	9886	screen	SCREEN01
	9886	9887	bash	/bin/bas
	9887	6500	java	javas-wo
	1	29210	snmpd	/usr/sbi
	1	48777	screen	screenas
	1	48778	screen	SCREENec
	1	48779	bash	/bin/bas
	1	48833	screen	SCREENas
	1	48834	bash	/bin/bas
	1	48887	screen	screenas
	48779	10142	screen	screenas

# zVPS (Velocity Performance Suite)



zVWS Provides www access  
Written in assembler – VERY fast

zTUNE: Rules based analysis, solve performance problems fast



# zTUNE Performance Services

- New installations lack z/VM and Linux on z/VM tuning skills
- Velocity Software's objective is to ensure our customer performance problems are resolved – quickly.
- zTUNE includes **configuration guidance**, health checks when ever installation requests, and assistance in all areas of Linux on z/VM and z/VM performance
- no more **“performance was unexplainably bad so we abandoned the project”**

# Health Checker for z/VM, Linux: zTUNE

- Focus on simplifying problem resolution
- Customer reports application people complain about zLinux performance:

```
Report: ESATUNE          Tuning Recommendation Report
Monitor initialized:
```

```
-----
The following changes are suggestions by Velocity Software
USR2 User LINUX160 is paging excessively (75.0 per second)
    This user can be protected using SET RESERVED
```

```
SPL5 Spool utilization is 100% full.
    Perform Spool file analysis and purge large
    spool files, or force users currently writing
    excessively to spool.
```

```
*****zTUNE Evaluation *****
```

```
XAC1 User total PROCESSOR WAIT excessive at 33 percent.
    Current reporting threshold set to 20.
    This is percent of inqueue time waiting for
    specific (PROCESSOR)resources to become available.
```

```
LPR3 LPAR share is too low, causing USER CPU Wait
    VM LPAR allocated share: 0.94 percent of total
    VM LPAR used 389 percent of allocated share
```

# Why Performance Analysis

## Why Performance Analysis: Service Level Mgmt

- Diagnose real time service issues
- Manage “large” Shared resource environment
- Any application may impact other applications

## Infrastructure Requirements

- Analyze all z/VM Subsystems in detail, real time
  - (DASD, Cache, Storage, Paging, Processor, TCPIP)
- Analyze Linux
  - (applications, processes, processor, storage, swap)
- Historical view of same data important (What changed?)
  - Why are things worse today than yesterday?
  - Did adding new workload affect overall throughput?

# Challenges With Linux Performance Management

## 1. Operational cost of infrastructure

- 2% of a CPU per server costs 1 IFL per 50 servers,
- Velocity uses snmp, targets less than .1% of ONE processor with one minute data collection per Linux server
- Net-snmp enhancements provided. (SUSE includes 1<sup>st</sup> release)

## 2. Accuracy and integration of data

- Virtualized CPU accounting must be normalized
- Correlate Linux system data, Linux process data with z/VM data

## 3. Capture ratios

- Data must be complete to be useful for full performance management
- Target 100% capture ratio to process level

## 4. Skills

- Skills are lacking, access to skills critical when there are performance problems.

# Linux Requirements Summary

- **Linux (virtualized) and networks add requirement**
  - **Correct data**
  - **Complete data**
  - **Low cost data**
- **Support requirements:**
  - z/VM 3.x, 4.x, 5.1, 5.2, 5.3, 5.4, 6.1, 6.2, 6.3 (+z13)....
  - SLES 7,8,9,10, 11 (Installations still have 7 and 8)
  - RHEL 3,4,5, 6
  - Other platforms in enterprise (VSE, VMWare, SUN, P, **MicroSoft**)
- **Must support performance management:**
  - Performance tuning
  - Capacity planning
  - Operational alerts
  - Chargeback/Accounting

# zView – Browser based user interface

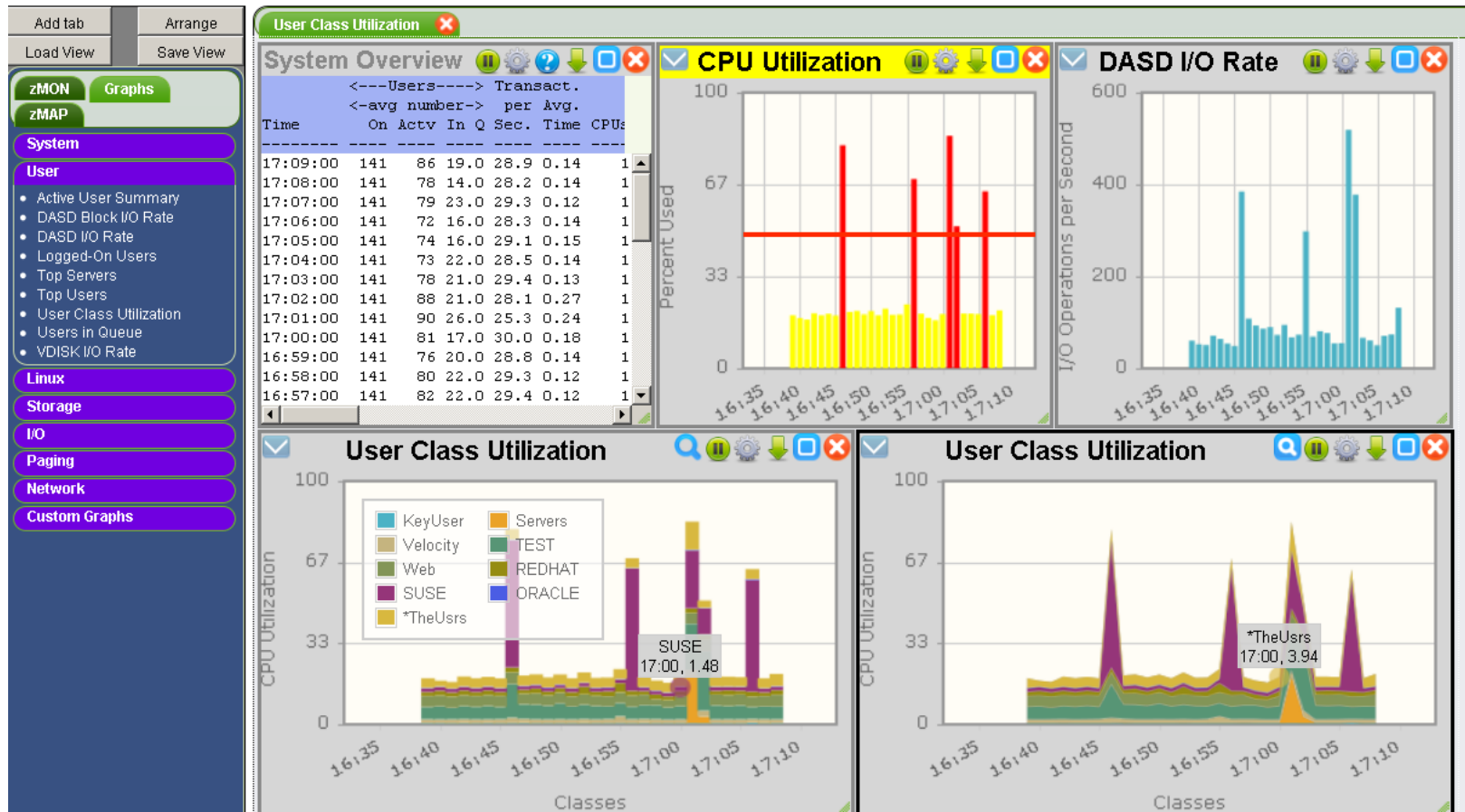
- **zVWS – Velocity Software WebServer**
  - Native z/VM,
  - Assembler, VERY VERY FAST
- **Web server applications**
  - zView, zPro, Portal, zAlert, zOperator
  - VelocitySoftware.com, LINUXVM.ORG, etc
- **zVIEW:**
  - Graphical, browser based, no java
  - Live demo: “[demo.velocitysoftware.com/zview/zview.cgi](http://demo.velocitysoftware.com/zview/zview.cgi)”

# How do YOU view performance?

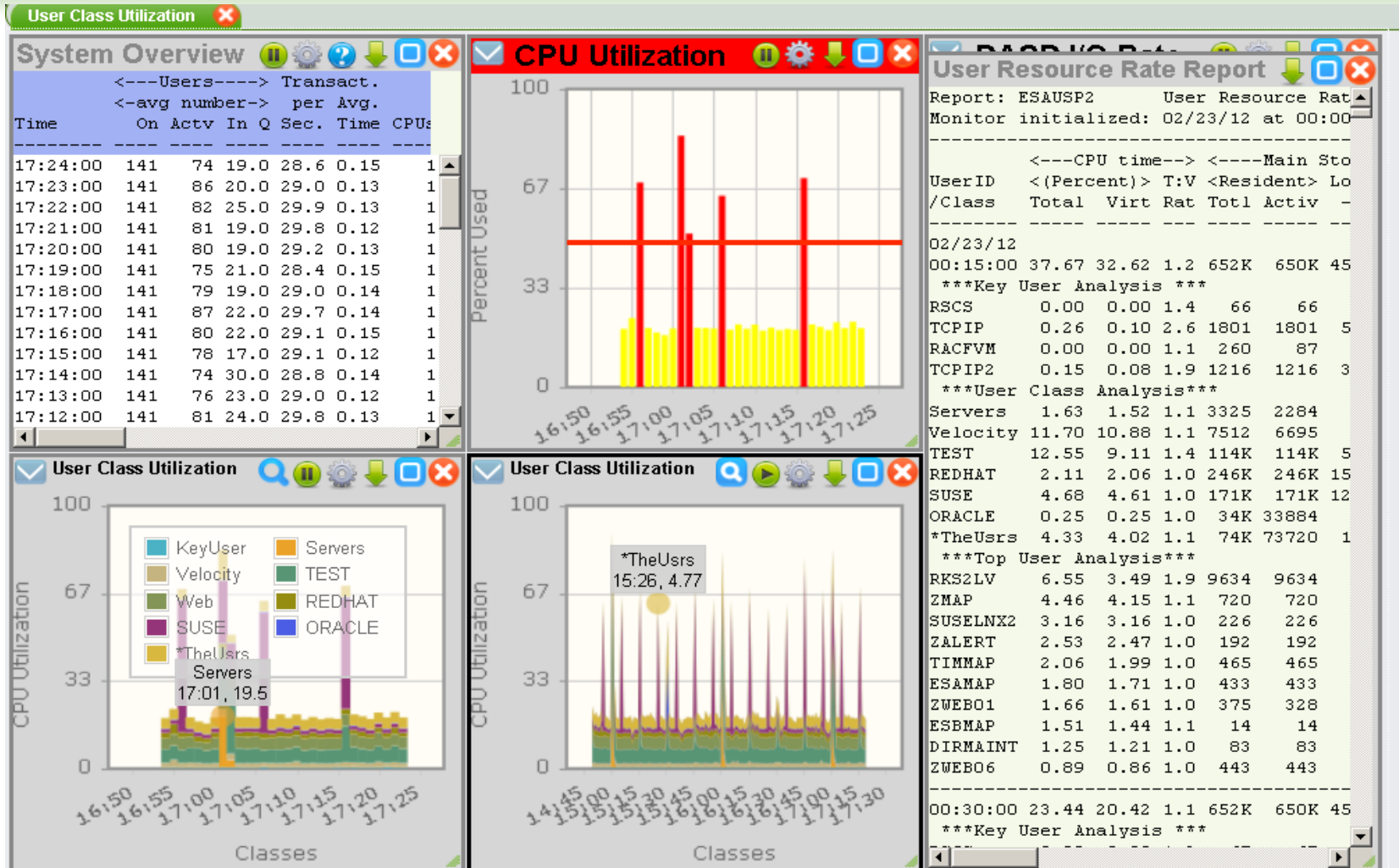
zVIEW Version 40D0



## zVIEW - Velocity Software - VSIVM4 Performance Displays for zVM and Linux on System z



# Display Everything, How about yesterday?





# zALERT – Automate problem detection

## 3270 Style Alerts (50+ sample alerts provided)

```
Screen: LINALERT Velocity Software 25 Mar 2015 06:42:29
----- Exceptions Analysis Alerts -----

Type Description
LNDX / area on oracle is 79.51% full
LNDX /opt area on oracle is 82.24% full
LNDX /home area on oracle is 59.02% full
LNDX / area on RH5X161 is 32.54% full
LNDX / area on S11R20RA is 81.56% full
LNDX /boot area on S11R20RA is 24.42% full
LNDX /opt area on S11R20RA is 95.80% full
LNDX /mnt/oracle area on S11R20RA is 53.23% full
LNSU Swap utilization for Linux node BlakeMC is 13.86%
LNSU Swap utilization for Linux node S11R20RA is 39.71% full
```

zVIEW - Velocity Software - VSIVM4 (DEMO)  
Performance Displays for zVM and Linux on System z

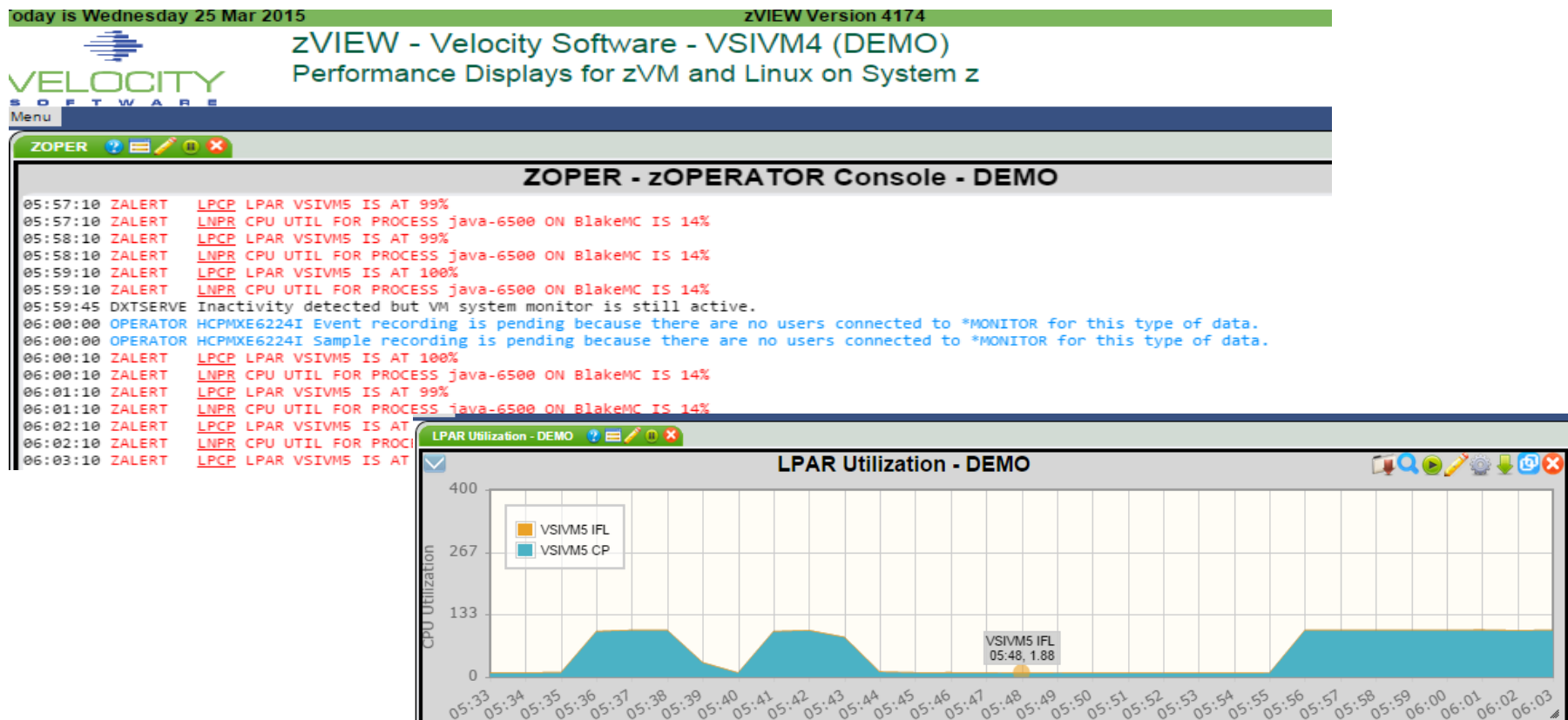
Or Browser based  
Click Thru  
or SMS, email...

LINALERT - Exceptions Analysis Alerts - 15/03/25 at 06:47 - DEMO	
Code	Alert Description
LNSU	CPU utilization on Linux node BlakeMC is 13.86%
LNDX	/ area on lxsugar is 90.74% full
LNDX	/usr area on lxsugar is 57.59% full
LNDX	/ area on opensuse is 39.71% full
LNDX	/home area on opensuse is 53.23% full
LNDX	/iso/sles11s area on opensuse is 100.00% full
LNDX	/iso/s11sp2- area on opensuse is 100.00% full
LNDX	/iso/s11sp2- area on opensuse is 100.00% full
LNDX	/iso/s11sp3- area on opensuse is 100.00% full
LNDX	/iso/s11sdk- area on opensuse is 100.00% full
LNDX	/iso/s10sp2 area on opensuse is 100.00% full
LNDX	/iso/r64 area on opensuse is 100.00% full
LNDX	/iso/r62 area on opensuse is 100.00% full
LNDX	/iso/s10v1 area on opensuse is 100.00% full
LNDX	/iso/r7 area on opensuse is 100.00% full
LNDX	/iso/sles11s area on opensuse is 100.00% full
LNDX	/iso/s12-1 area on opensuse is 100.00% full
LNDX	/iso/s12-2 area on opensuse is 100.00% full
LNDX	/iso/s12sdk1 area on opensuse is 100.00% full
LNDX	/iso/s12sdk2 area on opensuse is 100.00% full
LNDX	/ area on oracle is 79.51% full
LNDX	/opt area on oracle is 82.24% full
LNDX	/home area on oracle is 59.02% full
LNDX	/ area on redhat5 is 52.26% full
LNDX	/ area on redhat5x is 32.54% full
LNDX	/ area on redhat6 is 95.80% full
LNDX	/mnt area on redhat6 is 53.23% full
LNDX	/ area on redhat6 is 30.08% full
LNDX	/ area on redhat6x is 94.92% full
LNDX	/dev/shm area on redhat6x is 51.42% full
LNDX	/ area on redhat64 is 36.09% full
LNDX	/boot area on rhel7v is 23.79% full
LNDX	/ area on roblnx2 is 78.74% full

# zOPERATOR – Management Console

## Operator Function browser based

- Click Thru for problem analysis – LPCP example



# Self Service / Cloud Infrastructure Summary

## Performance management Provided by zVPS

- Chargeback functions – Complete data source
- Capacity Planning – Full PDB
- Operations - zALERT, zOPERATOR
- Performance Analysis – zVIEW, zTUNE

## Security and Directory Manager Options

- RACF, VM:Secure, native z/VM
- Dirmaint

# zPRO Version 2.1 Installation

## ZADMIN Virtual Machine

- needs class A for xautolog and force (Or change priv cmd class)
- RACF / VMSecure authority if controlled environment
- SFS Authority to enroll users

**Other - Did I remember to say no smapi???**

## RACF / DIRMAINT Administrators are pre-defined

- ZVPS, BARTON, TONY

## “Golden Images” exist

- GOLDVM, GOLDLXRO, GOLDCMS, GOLDLXFB
- (z/VM golden image, Read-only linux, Class G CMS user, Linux guest using FBA)
- (minecraft internal only)

## DASD groups defined to directory manager

- DEMOECKD                      DASD group for ECKD cloning
- DEMOFBA                      DASD group for FBA cloning

# zPRO Version 2.1 Installation

## Self service user authorization (“demouser ZPUSER”)

```
/* Quotas
group: demo
account: ss0001 ss0002 ss0003 ss0004

auth: user clone run delete
auth: selfserv control
auth: eckd-grp demoeckd
auth: fba-grp demofba

userlist: DEMO*  GOLD*

/* Privileges
menu: selfserv.create selfserv.password selfserv.startusr
menu: selfserv.stopuser selfserv.modify selfserv.deluser
menu: selfserv.quota
```

# zPRO Version 2.1 Installation

## Self service group definition (“DEMO ZPGROUP”)

```
/*  
/*  Resource limits  
/*  
osa_Max: 30  
IP_Max: 10  
dasd_Max: 20  
fcp_Max: 20  
vcpu_Max: 50  
storage_Max: 100  
user_Max: 10  
mdisk_Max: 20
```

# zPRO Version 2.1 Installation

## Install zPRO

Download, Configure product, install (1-2 minutes)

## Update ZADMIN authorities (from DIRMAINT authorized user)

Add Privilege class "A"

Add OPTION LKNOPAS

Add IUCV ALLOW statement

DIRM SEND AUTHFOR CONTROL, receive, edit, add "ZADMIN"

DIRM FILE AUTHFOR CONTROL

Issue DIRM RLDCODE

## RACF authorization to create server profiles

RAC ALTUSER ZADMIN SPECIAL OPERATIONS

## Logon to ZADMIN, remember password


STOP

DIRM NEEDPASS NO

## Restart web servers

Browser: ["demo.VelocitySoftware.com/zprov2"](http://demo.VelocitySoftware.com/zprov2)

# zPRO V2 Build a guest from a Golden Image

 **Self Service**

TDNVSI  
Settings

**Self Service**

- ← Back
- CREATE
- DELUSER
- MODIFY
- PASSWORD
- QUOTA
- STARTUSR
- STOPUSER

> zPro > Self Service

**Build Linux Server**

**IMAGE TO COPY**  
GOLDCMS

**New ID**

**Password**

**Verify Password**

**Account No.**

**No. Cpus**  
1

**Memory Size**  
1 G

**Days to expiration**  
2


☐ **Auto Start Server**

Process Request

 **PROVEN PERFORMANCE**



# zPRO V2 Build a guest from a Golden Image

 **VELOCITY**  
SOFTWARE

**Self Service**

> zPro

**Self Service**

- ← Back
- CREATE
- DELUSER
- MODIFY
- PASSWORD
- QUOTA
- STARTUSR
- STOPUSER

### Build Linux Server

**IMAGE TO COPY**  
GOLDVM ▼

**New ID**

**Password**

**Verify Password**

**Account No.**  
ss0001 ▼

**No. Cpus**  
1 ▼

**Memory Size**  
1 G ▼

**Days to expiration**  
2

☐ Auto Start Server

Process Request

# zPRO V2 Self-Service Multi-tasking

**Self Service**

- ← Back
- CREATE
- DELUSER
- MODIFY
- PASSWORD
- QUOTA
- STARTUSR
- STOPUSER

> zPro > Self Service

**Delete a server** ✕  
**Server Id**

**Change a user's password** ✕  
**User Id**  
  
**New Password**  
  
**Verify password**

**Boot/IPL a server** ✕  
**Server Id**

# zPRO V2 Self-service Mobile (iPhone, iPad)

••••• AT&T 14:34 100%

demo.velocitysoftware.com

**Self Service**

**User Id**

JDACMS

**New Password**

**Verify password**

Process Request

Cancel

< > Done

Yep, am at lunch but just created your servers



- **No charge trial zVPS**

- Onsite Installation support
- Performance analysis included
- Two hour installation time (zVPS)

- **No charge trial zPRO**

- 10 minute installation time (zPRO)
- zVPS customers can download for free
- 1<sup>st</sup> 30 installations receive \$10K/CEC/year pricing model
- New installations, contact: [sales@VelocitySoftware.com](mailto:sales@VelocitySoftware.com)

# Our challenge – you are all too busy...

... busy fighting your own battles

Thank you for attending



**"I don't have time to see any crazy salesman; I have a battle to fight."**

Please contact [Sales@VelocitySoftware.com](mailto:Sales@VelocitySoftware.com)