

VELOCITY  
SOFTWARE

## Enterprise Monitoring and Performance Management in 2022

Barton Robinson, CTO  
Velocity Software, Inc.  
[Barton@velocitySoftware.com](mailto:Barton@velocitySoftware.com)

# *Introduction to Velocity Software*

Performance Management is a process

Performance Management: zVPS

- Architecture is critical

Introduction to 30+ years of Velocity Software

- Founded 1988, VM/XA released 1989
- Continuous enhancements

Meeting current requirements (Docker, MongoDB, Splunk)

Modernizing z/VM (after 50 years, why not?)

– easily with zPRO

# Introduction to Barton

1975: IBM San Francisco test data center (VM,VS1,DOS/VS)

1977: IBM Branch Systems Engineer, DOS/VS, VS1, SMPE

1981: Poughkeepsie VM Planning (tdy)

- VM/XA Migration Aid – became VM/XA, VM/ESA, now z/VM
- HPO 1,2,3 – High Performance Option

1983: IBM Washington System Center

- HPO Performance Tuning Guide

1985: IBM: Sr. Mgr: San Jose Performance Evaluation Lab

1988 Velocity Software – first performance monitor for vm/xa

- PROFS/Office Vision was 75% of corporate email
- 1999: The mainframe was dead
- 2001: Linux on the mainframe (performance relevant again)

# What I've learned about Performance Management

## Performance Management is a process

- Performance Analysis
- Operational Alerts
- Capacity Planning
- Accounting/Charge back

## My Product Objectives:

- Accuracy, longevity, scalability, extensible
- Minimize complexity
- Ease of use, support
- Modernization

# Performance Management is a Process

## Performance Analysis

- Understanding system, application performance
- Resolving current performance issues (z/VM, Linux, network)
- 0

## Operational Alerts

- Supporting 100's/1000's of servers in many locations
- Defining and automating operational support

## Capacity Planning

- Providing input to the financial acquisition process

## Accounting / Charge back

- Building a financial model for resource billing

Performance management can NOT be the performance problem

# Issues With Linux Performance Management

## Operational cost of running agents

- 2% per server costs 1 IFL per 50 servers,
- Velocity targets less than .1% (point one percent) of ONE processor with one minute data collection per Linux server
- (One current installation complains about 20 ifls for agent....)

## Data Accuracy not easy

- Virtualized CPU (SMT) accounting must be normalized

## Capture ratios

- Data must be complete,
- Capture ratio normally at 100% to the process level

## Skills

- Skills are lacking in managing highly virtualized environments
- Access to skills critical when there are performance problems.

## Performance Management Education (on demand)

Velocity Software's Tuning Guide "[VelocitySoftware.com/customer](http://VelocitySoftware.com/customer)"

## Tuning Topics Table of Contents

- **Performance Tuning and Analysis**
  - [z/VM Performance](#)
  - [Linux Performance](#)
  - [z/VSE Performance](#)
  - [z/OS Performance](#)
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- **Chargeback / Accounting**
  - [z/VM Performance Chargeback](#)
  - [Linux Performance Chargeback](#)
  - [z/VSE Performance Chargeback](#)
  - [z/OS Performance Chargeback](#)
  - [CICS Performance Chargeback](#)

Velocity Software Performance  
workshop, annually 2 days

June 14-15, Binghamton, New York

["VelocitySoftware.com/seminar/workshop.html"](http://VelocitySoftware.com/seminar/workshop.html)

## Correct data

- Linux in virtualized environments was very wrong (bogomips?)
- “stealtime” implemented, but often misunderstood
- Linux in **SMT environment** – challenging (not intuitive)
- Capacity of SMT environment increases by how much?
- (<http://VelocitySoftware.com/SMT.HTML>)

## Capture ratios (is the data valid?)

- Do we know where our resources are being utilized?
- Compare data from multiple sources (HMC, z/VM, Linux, etc)
- (“<http://VelocitySoftware.com/handouts/capture.html>”)



# Product Longevity - Data Sources

## Longevity requires consistency and standards

- Correct data implies standard data
- Data sources must be consistent, low overhead, integrated
- zVPS uses standard sources (mostly....)

z/VM: CP Monitor (IBM) Exclusively

Networks: snmp mib-ii (standard, open source)

Linux: netsnmp (standard with Linux, “z” and “x”)

- Netsnmp is 1% “agentless” agent (ucd mib, host mib)
- Velocity Software snmp mib (“z” and “x”) replaces most metrics for .1%
- ALL Distributions (suse, redhat, ubuntu), all releases (z & x)

VSE: IBM mib, Velocity Software mib, CICS (DMF) (2021)

- (“<http://VelocitySoftware.com/vsecics.html>”)
- BSI/CSI TCPIP from the vendors

z/OS: SMF records (IBM/logstream) (70/30/75/113,CICS, DB2, etc)

# Performance Mgmt Requirements

## Single “modern” simple pane of glass for all platforms, geographies

- No enterprise has only one platform or just one location
- One user interface minimizes learning curves
- Evaluate multiple systems, networks, platforms in one view

## Minimize Overhead of performance management

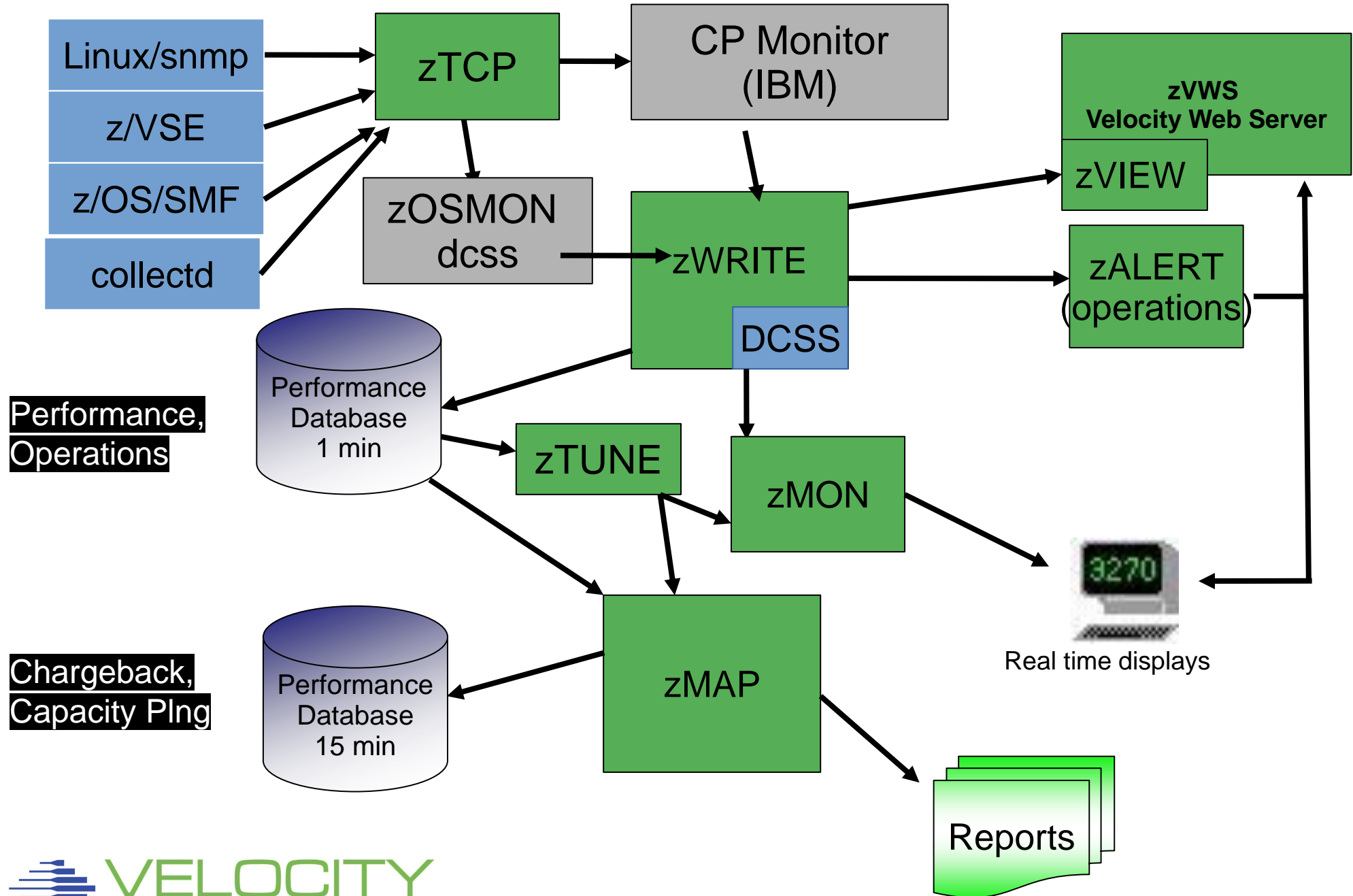
- Processor costs of performance management can be large
- Many (z/OS) installations run 15-minute granularity to reduce overhead
- “Only run this when there is a problem” is not performance management

A target of less than 1% of CPU resource for performance management is a reasonable target

- Diagnostic tools are not management tools

## Simple Architecture that is easily extended

# zVPS Infrastructure for 30+ years



## zVWS: Native z/VM Webserver

- CMS Based
- Written in Assembler, because that is just fast
- Generalized server

## VelocitySoftware.com

- **Velocity-Software.com**
- **VelocitySoftware.net**
- **Linuxvm.org**
- **VMWorkshop.org (no, we did not hijack the workshop, we ARE the workshop)**
- **GGWSC.ORG**

## Velocity Applications

- **zView**
- **zPortal**
- **zPRO (No smapi, no java, No linux server requirements, no complexities)**

## High cpu capture ratio

### Report: ESALNXV LINUX Virtual Processor Analysis Report

Node/Name	VM ServerID	<Linux Total>	Pct Syst	CPU User	<Process Total>	Data Syst	Capture Ratio	Prorate Factor
10:03:00								
NEALE1	LNEALE1	100.0	11.4	88.6	100.2	11.5	88.7	1.000

### Report: ESALNXP LINUX HOST Process Statistics Report

node/Name	<-Process ID	Ident-> PPID	GRP	Nice Valu	<-----CPU Tot	Percents sys	user	syst	usrt
10:03:00									
NEALE1	0	0	0	0	100	0.43	3.35	11.0	85.4
kswapd0	100	1	1	0	0.12	0.12	0	0	0
snmpd	1013	1	1012	-10	0.13	0.03	0.10	0	0
sh	3653	3652	30124	0	52.7	0	0	9.37	43.3
gmake	9751	9750	30124	0	43.4	0.02	0.02	1.37	42.0
sh	10129	9751	30124	0	0.02	0.02	0	0	0
sh	10130	10129	30124	0	0.63	0.03	0.23	0.28	0.08
cc1	10307	10306	30124	0	3.12	0.18	2.93	0	0
rpmbuild	30124	16382	30124	0	0.07	0.03	0.03	0	0
sh	30125	30124	30124	0	0.02	0	0.02	0	0
gmake	30126	30125	30124	0	0.02	0	0.02	0	0

Report: ESALNXC

LINUX Process Conf

Node/Name	<-Process ID	Ident-> PPID	GRP	<-----Pr Path
10:03:00				
NEALE1				
init	1	0	0	init [3]
migratio	2	1	0	migratio
ksoftirq	3	1	0	ksoftirq
events/0	4	1	0	events/0
khelper	5	4	0	khelper
kblockd/	6	4	0	kblockd/
cio	41	4	0	cio
cio_noti	42	4	0	cio_noti
kslowcrw	43	4	0	kslowcrw
apldata	96	4	0	apldata
aio/0	101	4	0	aio/0
pdflush	5266	4	0	pdflush
pdflush	26647	4	0	pdflush
kswapd0	100	1	1	kswapd0
kmcheck	158	1	1	kmcheck
syslogd	976	1	976	/sbin/sy
klogd	979	1	979	/sbin/kl
snmpd	1013	1	1012	snmpd
portmap	1030	1	1030	/sbin/po
rpciod	1034	1	1	rpciod
lockd	1035	1	1	lockd
sshd	1072	1	1072	/usr/sbi
sshd	16272	1072	16272	sshd: bu
sshd	16288	1072	16288	sshd: bu
sshd	16290	16288	16288	sshd: bu
bash	16291	16290	16291	bash
python	16312	16291	16291	python
do-bui	16313	16312	16291	/bin/sh
bb_do	16382	16313	16291	/usr/bin
rpmb	16415	16382	16415	rpmbuild
rpmb	30124	16382	30124	rpmbuildc

# Monitoring Extensions Included

## Not just “System” Performance Management....

- Oracle (vsiora)
- JVM
- GPFS
- Docker (vsidkr)
- MongoDB Enterprise

## **IBM Secure Service Container** (collectd – open source)

Linux/x86 (Microsoft, ESX too) can also be monitored

zOPERATOR - Fully integrated operations (modern,browser) console

zALERT: Performance data alerting and notification

- Interface to SNMP management console (NETCOOL, HPOpenView)
- User tailored alerts
- Web based alerts

# Monitoring Extensions: OpenShift ???

Collectd is an open source performance data collector for containers

- Secure Service Container – project validated with IBM
- OpenShift?

## Instructions for openshift to export data:)

Create a yaml file with below content

```
apiVersion: v1
kind: ConfigMap
metadata:
  name: cluster-monitoring-config
  namespace: openshift-monitoring
data:
  config.yaml: |
    prometheusK8s:
      remoteWrite:
        - url: http://<external\_supported\_tool\_url> ←-----The important part
          basicAuth:
            username:
              name: remoteWriteAuth
              key: elastic
            password:
              name: remoteWriteAuth
              key: password
```

Apply created yaml file, with correct Remote URL and its credentials OR TLS  
crts.



# zVPS Enterprise View is scalable

## Single pane of glass

- Data from “Many” multiple LPARs(50) / geographies(3)

The screenshot displays the 'Enterprise Performance Summary' interface for zVPS. The page is organized into a grid of LPARs, grouped by data center (DC1, DC2, CDL). Each LPAR entry includes a name, time (08:48), IFL Total, and a percentage value. A red box highlights the text 'some installation' in the top right area of the interface.

DC1	DC2	CDL
V1P1: 08:48   IFL Total (48)   726.84%	V2P1: 08:48   IFL Total (48)   796.48%	VLB1: 08:48   IFL Total (52)   2840.84%
V1N1: 08:48   IFL Total (18)   817.16%	V2P5: 08:48   IFL Total (40)   897.73%	VLB5: 08:48   IFL Total (48)   646.12%
P107: 08:48   IFL Total (40)   1016.40%	P209: 08:48   IFL Total (56)   1572.48%	ZS02: 08:48   IFL Total (16)   9.82%
P113: 08:48   IFL Total (24)   558.13%	P213: 08:47   IFL Total (40)   1173.87%	
V1P2: 08:48   IFL Total (48)   1134.08%	V2P2: 08:48   IFL Total (48)   846.38%	VLB2: 08:48   IFL Total (36)   2868.00%
V1N2: 08:48   IFL Total (24)   837.95%	V2P6: 08:48   IFL Total (40)   454.40%	VLB6: 08:48   IFL Total (28)   2287.44%
P108: 08:48   IFL Total (20)   594.27%	P210: 08:48   IFL Total (64)   1739.40%	VLB8: 08:48   IFL Total (24)   1623.21%
P114: 08:48   IFL Total (24)   576.48%	P214: 08:48   IFL Total (56)   1265.42%	VLBX: 08:48   IFL Total (3)   99.90%
V1P3: 08:48   IFL Total (48)   876.80%	V2P3: 08:48   IFL Total (48)   812.27%	HIL1: 08:48   IFL Total (64)   185.85%
V1P4: 08:48   IFL Total (48)   1003.38%	V2P4: 08:48   IFL Total (48)   699.41%	HIL2: 08:48   IFL Total (60)   192.92%
P105: 08:48   IFL Total (40)   473.80%	P207: 08:48   IFL Total (56)   1429.15%	
P106: 08:48   IFL Total (40)   671.12%	P211: 08:48   IFL Total (44)   1222.53%	ZS01: 08:48   IFL Total (16)   113.72%
P109: 08:48   IFL Total (24)   263.91%	P215: 08:48   IFL Total (56)   1406.97%	
P110: 08:48   IFL Total (12)   372.45%	P216: 08:48   IFL Total (40)   1202.33%	
	P217: 08:48   IFL Total (40)   975.82%	
	P218: 08:48   IFL Total (40)   568.21%	
	P219: 08:48   IFL Total (48)   856.11%	
	P220: 08:47   IFL Total (44)   496.74%	
	P221: 08:48   IFL Total (44)   895.78%	
	P212: 08:48   IFL Total (44)   895.78%	
	P216: 08:48   IFL Total (40)   1202.33%	
	P220: 08:47   IFL Total (44)   496.74%	
	C203: 08:48   IFL Total (32)   862.11%	
	C204: 08:48   IFL Total (32)   585.28%	
	C205: 08:48   IFL Total (20)   139.26%	
	C206: 08:47   IFL Total (20)   685.34%	
	C207: 08:48   IFL Total (24)   649.58%	
	C208: 08:48   IFL Total (24)   992.82%	
	V2N1: 08:48   IFL Total (20)   805.03%	
	V2N2: 08:48   IFL Total (20)   1034.47%	
	V2N3: 08:48   IFL Total (20)   490.91%	
	V2C1: 08:48   IFL Total (24)   974.38%	
	V2C2: 08:48   IFL Total (24)   423.22%	



# zVPS Enterprise View – All LPARs in Enterprise

Tailorable, expandable, zoomable

Today is Monday 2 Dec 2013 zVIEW Version 4159

**zVIEW**  
Enterprise View - Velocity Software - VSIVM4 (DEMO)

VELOCITY SOFTWARE  
First level

VSIVM1				VSIVM2				VSIVM3(old)							
VM1	13/12/02	18:29	CP Total (2)	6.63%	VM2	13/12/02	18:29	IFL Total (1)	0.91%	VM3	13/12/02	21:29	024B42-0	99.22%	
Linux Nodes (Distributed Servers)				Linux Nodes (z/VM-Guests)				Linux Nodes (z/VM-Guests)							
LINUX9 (9)			3.93%		RH5X161			0.43%					000000-64	99.22%	
suselnx3 (9)			2.57%		RH5Z161			0.37%							
REDHAT (2)			2.30%												

Demo System V4				
Demo	13/12/02	18:29	IFL Total (1)	17.77%
Linux Nodes (z/VM-Guests)				
roblx1			2.83%	
redhat6			1.18%	
oracle			0.82%	
redhat56			0.47%	
redhat5x			0.43%	
lxsugar (2)			0.41%	
redhat64			0.31%	
sles8 (2)			0.31%	
sles10			0.29%	
redhat5			0.27%	
redhat3			0.25%	
redhat6x			0.24%	
suselnx2			0.22%	
sles11 (2)			0.22%	
sles11x			0.20%	
sles11x3			0.19%	
sles9x			0.18%	
scsil0s			0.17%	
sles10x4			0.17%	
sles9			0.16%	
Linux Nodes (Distributed Servers)				
linux93 (2)			100.00%	
opensuse (2)			8.97%	
JIRA (2)			5.88%	
vpnbrz			5.50%	
vpnbrc			4.76%	
mail (9)			3.42%	
vpnz			2.35%	

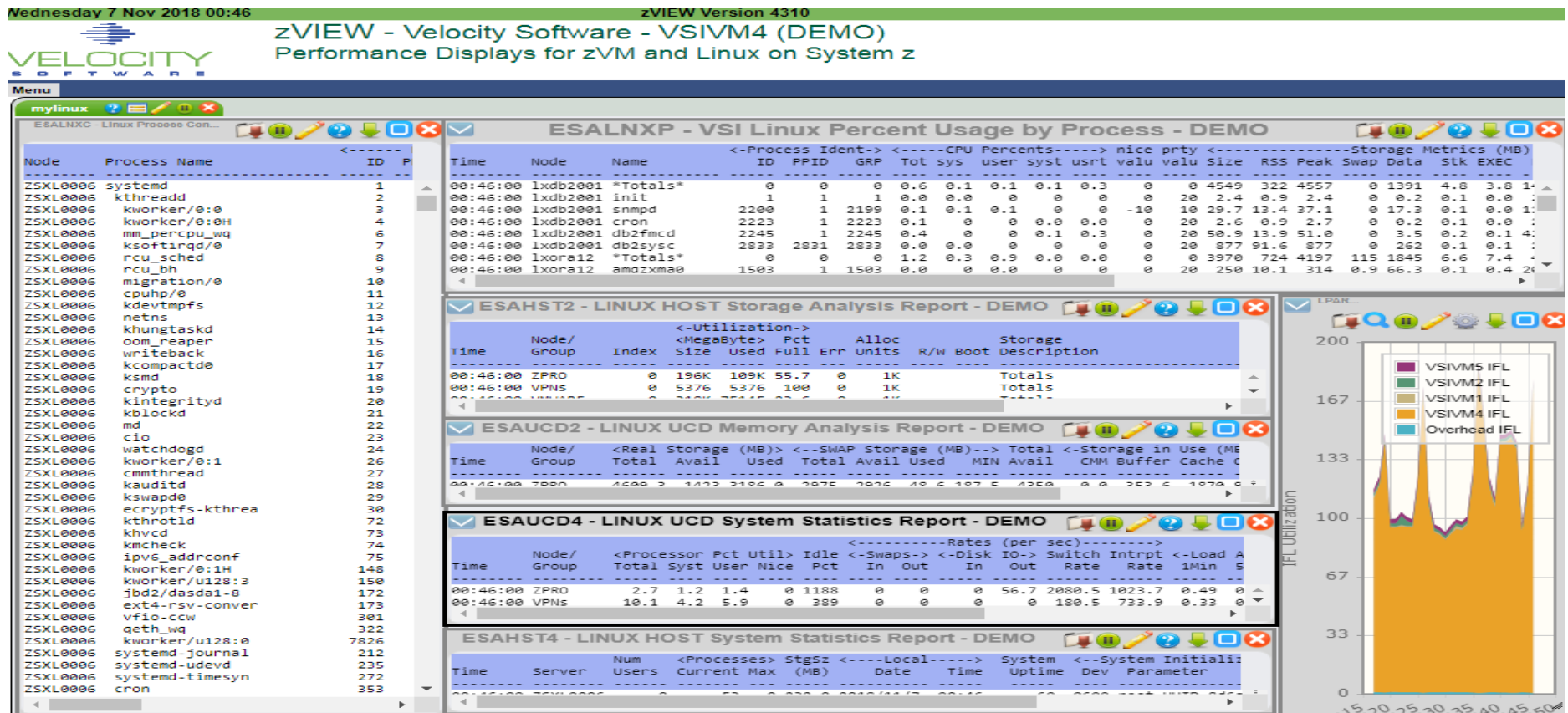
  

Second level				
Tims Test System	13/11/27	13:09	IFL Total (1)	0.10%
Linux Nodes (z/VM-Guests)				
redhat6			1.85%	
redhat6			1.50%	
redhat6			0.85%	
redhat56			0.57%	

# Linux (or VSE, z/OS) performance in one click

## End users define their environment(s)

- Linux administrators get most everything in one click
- Secure, no need for logon
- Fast and efficient



# zVPS Enterprise View – Access

## Very fast access

- VSE
- z/OS
- Linux

Cloud 1

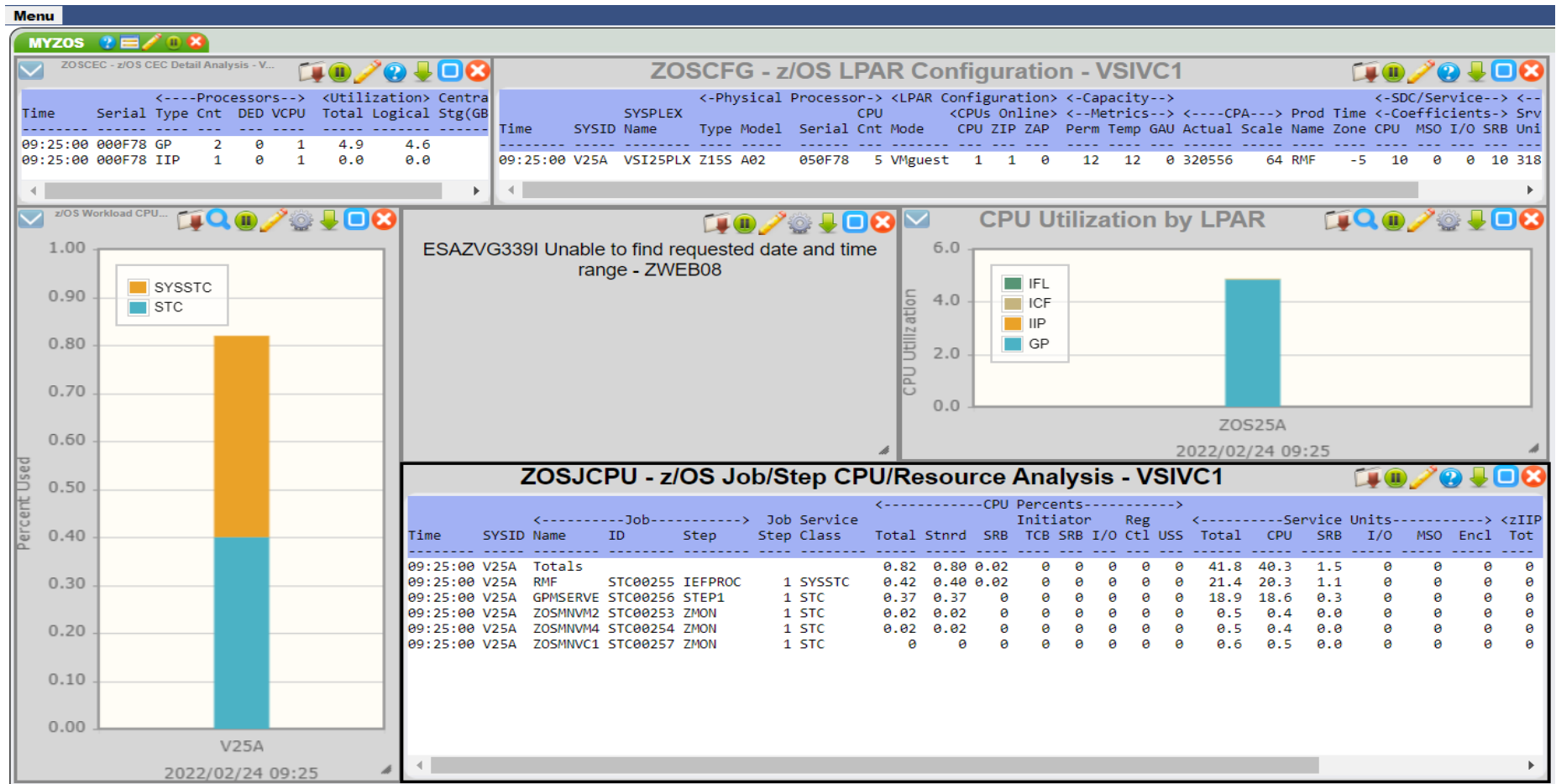
<u>VSIVC1</u>	14:08	<u>IFL</u> Total (4) ⊕	4.21%
zOS Systems			
<u>V25A</u>		4.60%	
<u>V25A</u>		0.02%	
VSE Systems			
<u>zvse61c</u>		1.17%	
<u>zvse61b</u>		1.07%	
<u>zvse62c</u>		0.89%	
<u>zvse62b</u> (2)		0.70%	
Top 15 Linux Nodes(z/VM-Guests)			
⊕ <u>MONG505A</u> (1)		0.47%	
⊕ <u>VSIEXTRN</u> (1)		0.31%	
⊕ <u>RHKS NFS1</u> (1)		0.22%	
⊕ <u>JSVEXTRN</u> (1)		0.15%	
⊕ <u>JSVSVR13</u> (1)		0.08%	
⊕ <u>S15PSTG1</u> (1)		0.06%	
⊕ <u>SLFSRV10</u> (1)		0.05%	
⊕ <u>JSVSVR10</u> (1)		0.04%	
⊕ <u>JSVWRK01</u> (1)		0.04%	
⊕ <u>CBSVR010</u> (1)		0.03%	
⊕ <u>JSVSVR12</u> (2)		0.03%	
⊕ <u>RS327001</u> (1)		0.03%	
⊕ <u>DSVSVR01</u> (1)		0.02%	
⊕ <u>GOLDVM71</u> (1)		0.02%	
⊕ <u>JSVSVR20</u> (1)		0.02%	
Remaining 1 servers		0.02%	
Top 5 Users			
<u>ZALERT</u>		0.66%	
<u>ZVWS</u>		0.49%	

Close

# z/OS performance in one click

End users define their environment(s) – z/OS at one click

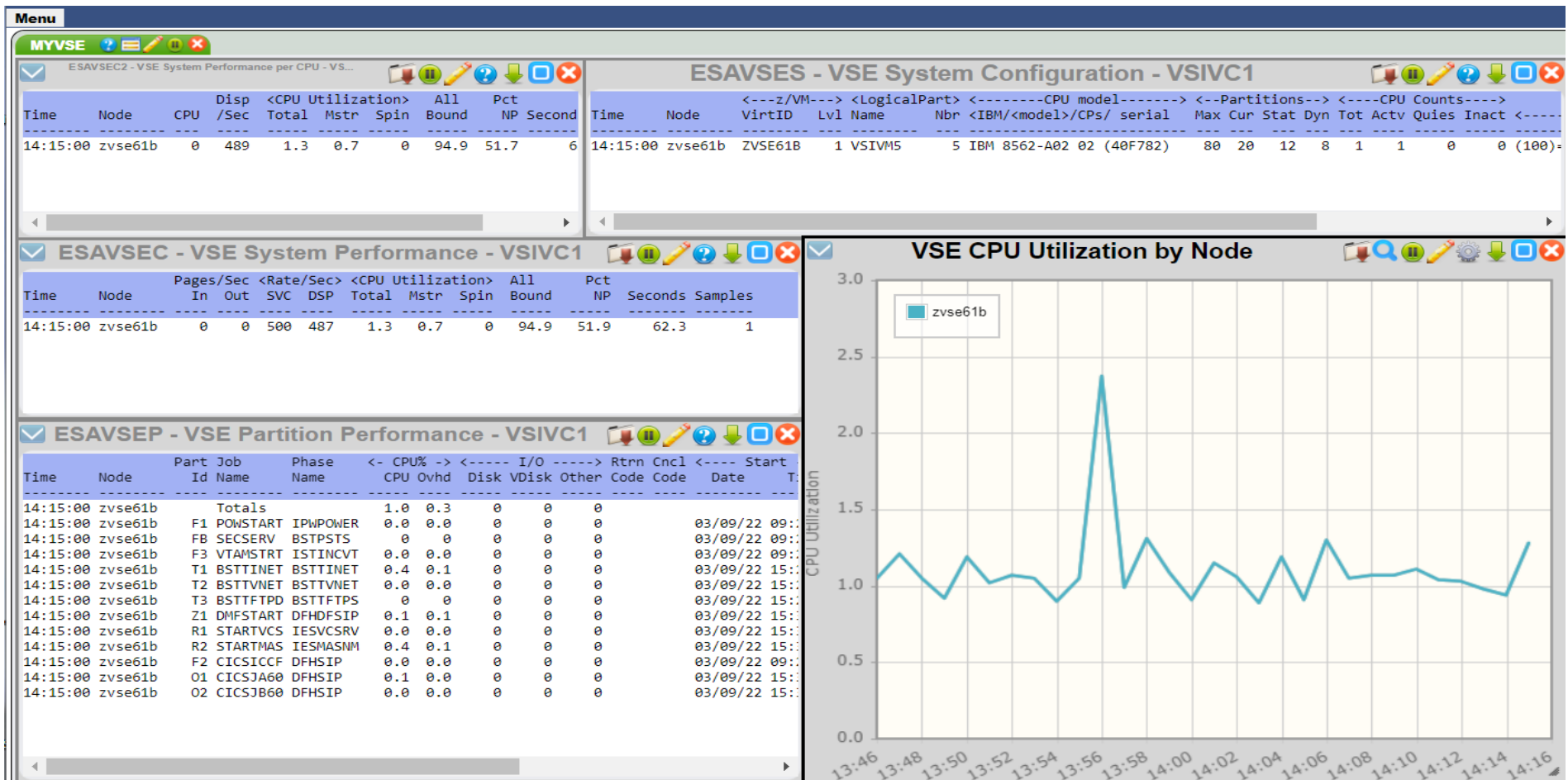
- Secure, no need for logon
- Fast and efficient



# zVSE performance in one click

End users define their environment(s) – z/VSE at one click

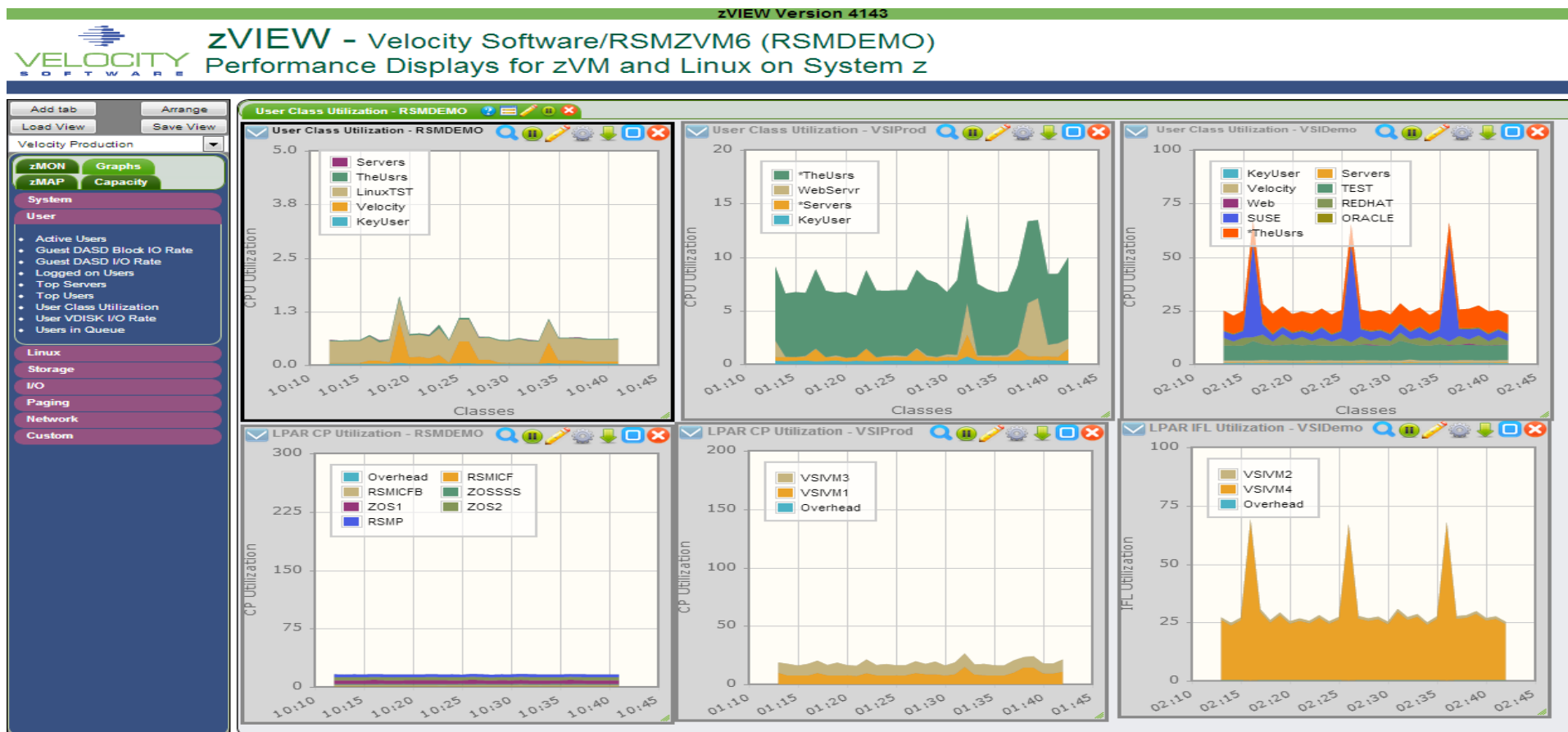
- Secure, no need for logon
- Fast and efficient, system partitions, jobs pretty chart at one click



# Multiple Systems On Single Pane

## Single pane of glass

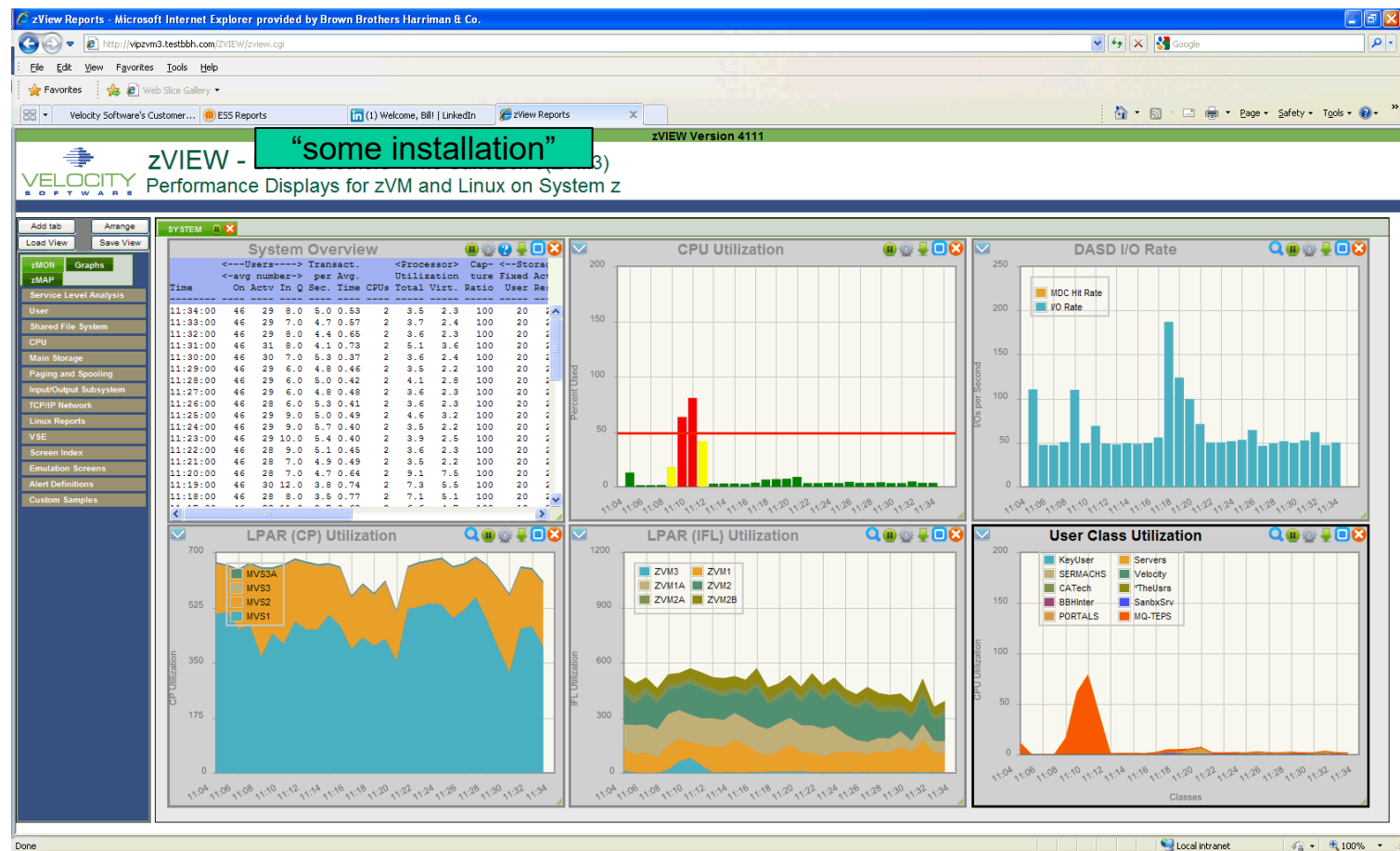
- Data from multiple LPARs / geographies
- Menu driven end user designed view



# End users define their environment(s)

## Not just for Systems Programmers

### Menu driven

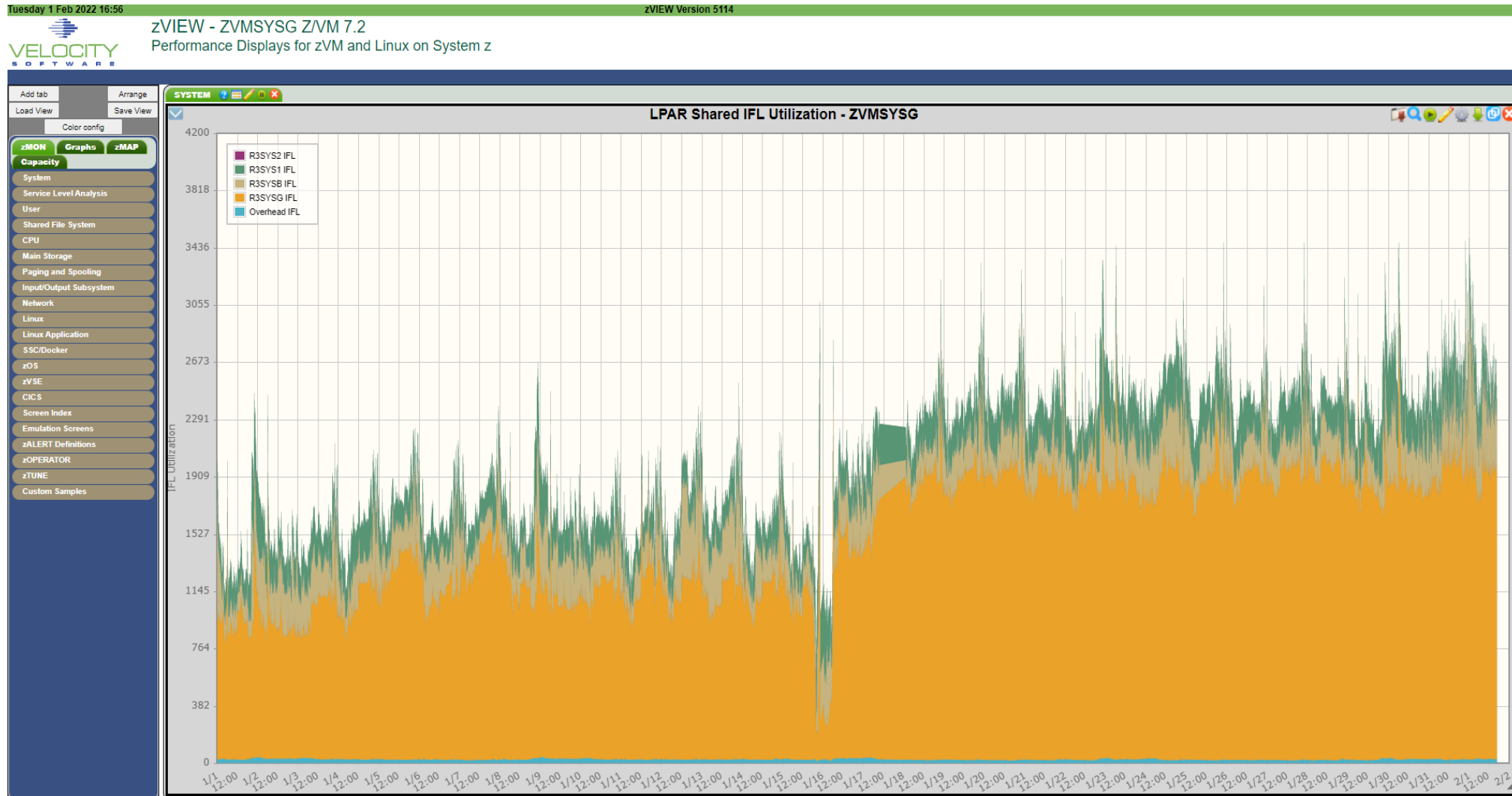




# Capacity Planning Dynamic Example....

## Dynamic Charts

- Data extracted from database dynamically to create graph





## 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 2
LNDX /opt area on S11R20RA is 95
LNDX /mnt/oracle area on S11R20RA
LNSU Swap utilization for Linux
LNSU Swap utilization for Linux
```

Today is Wednesday 25 Mar 2015 zVIEW Version 4174

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

Code	Alert Description
LNDX	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 redhats is 52.26% full
LNDX	/ area on redhatx is 32.54% full
LNDX	/ area on redhat56 is 95.80% full
LNDX	/mnt area on redhat56 is 53.23% full
LNDX	/ area on redhat6 is 30.60% full
LNDX	/ area on redhatx is 94.92% full
LNDX	/dev/sim area on redhatx 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

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

## zVPS Integrates into enterprise existing processes

- In 1990's VM was a silo, not integrated into enterprise IT
  - (how can two sysprogs support 50,000 O/V users?)
- z/VM is not a "silo"

## Capacity Planning

- MXG, MICS
- Mainview

## Operational Support into other management consoles

- Omnibus / netcool / snmp management consoles
- Snmp alerts
- Splunk, Instana (IBM)

## Chargeback / accounting

- Export of metrics (CSV, flat files)

# Performance Mgmt Summary

## Architecture critical

- Low overhead
- Easily enhanced
- Valid data
- No pre-requisites (need z/VM)

## Standard interfaces

- Provides simplicity
- Release to release just works
- Installation quick and easy

## Minimal Overhead (Good citizenship)

- 1% of one engine for “Velocity”
- .1% of one engine for Linux at One minute granularity
- Scalable for thousands of servers

# *Performance Mgmt See for yourself...*

Velocity Software demonstration site

- “<http://demo.VelocitySoftware.com>”
- Zview, enterprise, zPro, Portal

## Platforms supported well:

- z/VM
- Linux
- **z/VSE: SaaS Beta Testing, no charge**
- Containers (docker)
- **Secure Software Container (SSC)**
- **OpenShift**

## Platforms where we are behind (working on it)

- z/OS: Offload to z/VM, no java, very low cost, overhead
- VMWare/ESX

## Application monitoring (Linux)

- GDPS
- Oracle, Java
- MongoDB, Postgres
- Splunk, Instana

# Velocity Software is Modernizing z/VM

See(saw) session “Modernizing the Great z/VM Platform”

zPRO modernizes z/VM with browser interface (~~3270~~)

- Most z/VM administration functions on a secure browser (zDIRECT even)
- Operational functions
- End user capabilities: change server configurations
- PaaS – and it works easily

Most Users no longer need 3270 skills

Very Simple architecture

- Simple to install (only requires z/VM and zVPS)
- Uses **Native z/VM Web Server** (zVWS)!
- No “smapi”, **No “linux server” requirements**, No java
- **Non-intrusive**, no system modifications
- Outside services not required (but we are available)
- (as compared to xcat, cma, ....)

# The Velocity Software Team: Metal to Cloud

## Dedicated to promoting and supporting the z/VM Platform

- Experienced systems programmers (z/VM, Linux, VSE, z/OS)
- Experienced performance analysts
- Providing services as needed...

## **Z15 T02 ESP – Metal to Cloud in 2 days** <http://velocitysoftware.com/MetaltoCloud>

- Two days after IBM code 20, PaaS cloud was ready:
- Four member SSI z/VM cluster operational
- RACF, TCPIP operational (Only IBM tools installed)
- zVPS Installed and operational
- zPRO Installed and operational, zDirect installed
- Installed Linux gold images
- Cloned Linux 155 times in 20 minutes
- Cloned 50 2G servers in 3 minutes
- (Compression on z15 very cool, implemented it in several places)

## zVPS:

- Continuous enhancements for 30+ years
- More than z/VM

## Velocity Software

- Worldwide customer base
- Modernizing the platform
- Supports the VM Workshop

Thank you. Happy Birthday z/VM!!!