Enterprise Monitoring and Performance Management in 2022

Barton Robinson, CTO
Velocity Software, Inc.
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

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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)

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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)
  - o

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

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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"

Tuning Topics Table of Contents

- **Performance Tuning and Analysis**
  - z/VM Performance
  - Linux Performance
  - z/VSE Performance
  - z/OS Performance
  - CICS Performance
- **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"

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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")

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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)

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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

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zVPS Infrastructure for 30+ years

Linux/snmp → zTCP → CP Monitor (IBM)

z/VSE

z/OS/SMF

collectd

zTCP → zOSMON dcss

CP Monitor (IBM) → zWRITE

zOSMON dcss → zWRITE

zWRITE | DCSS

zWRITE → zVIEW

zWRITE → zALERT (operations)

zVWS Velocity Web Server

zVIEW

Performance, Operations

Performance Database 1 min

Performance Database 1 min → zTUNE

DCSS → zMON

zTUNE → zMON

zMON → 3270 Real time displays

zALERT (operations) → 3270

Chargeback, Capacity Plng

Performance Database 15 min

zMAP

zMAP → Reports

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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/       VM          <Linux Pct CPU> <Process  Data> Capture Prorate
 Name       ServerID    Total Syst User Total Syst User   Ratio  Factor
---------   --------   ----- ---- ---- ----- ---- ---- ------- -----
10:03:00

NEALE1     LNEALE1    100.0 11.4 88.6 100.2 11.5 88.7  1.002  1.000
```

```
Report: ESALNXP          LINUX HOST Process Statistics Report
----------------------------------------------------------------
node/          <-Process Ident-> Nice <------CPU Percents---->
 Name       ID     PPID   GRP   Valu  Tot   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/         <-Process Ident-> <-----Pr
 Name         ID    PPID   GRP  Path
-----------  ----- ----- ----- --------
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
  appldata      96     4     0 appldata
  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
```

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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

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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.
```

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zVPS Enterprise View is scalable

Single pane of glass

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

zVPS Enterprise View – All LPARs in Enterprise

Tailorable, expandable, zoomable

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
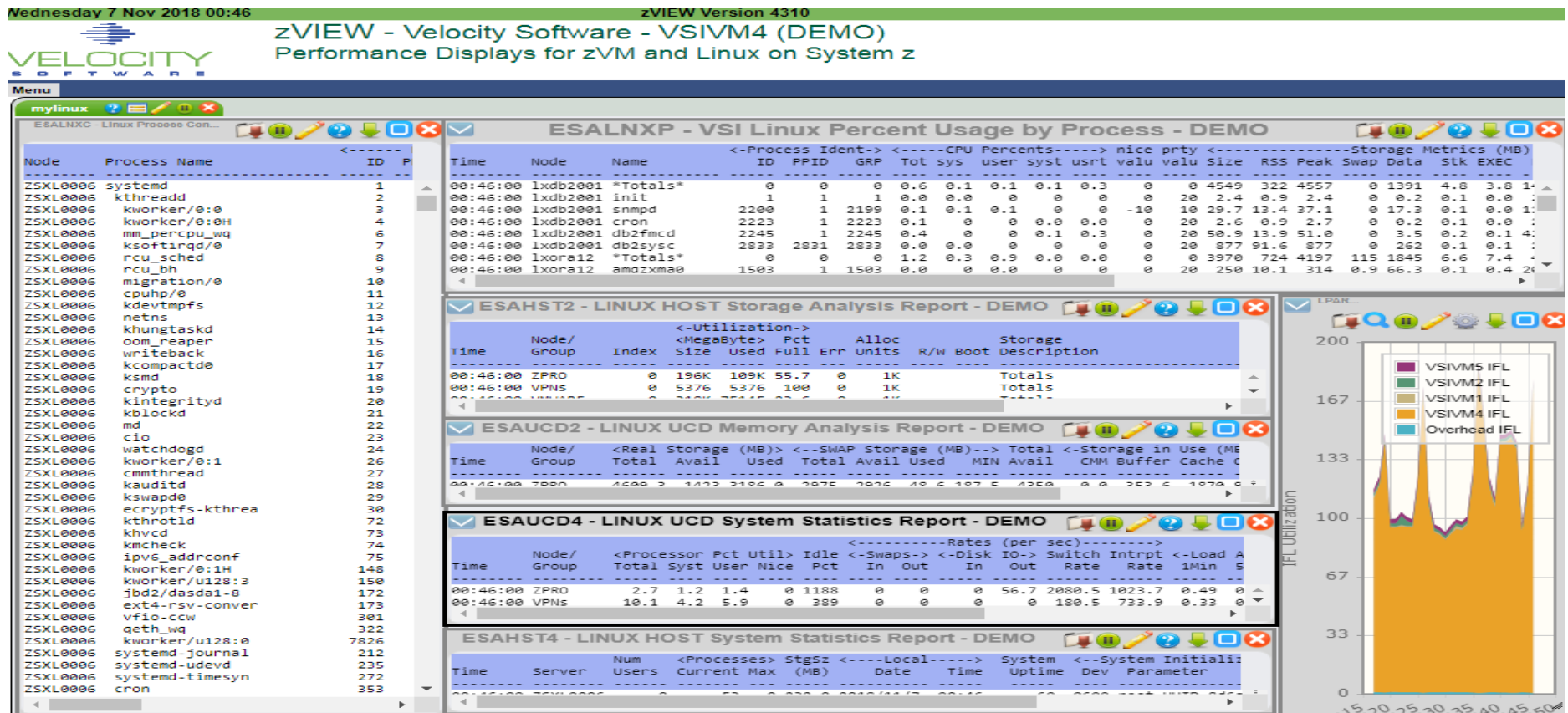
Very fast access

- **VSE**
- **z/OS**
- **Linux**

Cloud 1

VSIVC1	14:08	IFL Total (4) ⊕	4.21%

zOS Systems		
V25A	4.60%	
V25A	0.02%	

VSE Systems		
zvse61c	1.17%	
zvse61b	1.07%	
zvse62c	0.89%	
zvse62b (2)	0.70%	

Top 15 Linux Nodes(z/VM-Guests)		
⊕ MONG505A (1)	0.47%	
⊕ VSIEXTRN (1)	0.31%	
⊕ RHKSNFS1 (1)	0.22%	
⊕ JSVEXTRN (1)	0.15%	
⊕ JSVSVR13 (1)	0.08%	
⊕ S15PSTG1 (1)	0.06%	
⊕ SLFSRV10 (1)	0.05%	
⊕ JSVSVR10 (1)	0.04%	
⊕ JSVWRK01 (1)	0.04%	
⊕ CBSVR010 (1)	0.03%	
⊕ JSVSVR12 (2)	0.03%	
⊕ RS327001 (1)	0.03%	
⊕ DSVSVR01 (1)	0.02%	
⊕ GOLDVM71 (1)	0.02%	
⊕ JSVSVR20 (1)	0.02%	
Remaining 1 servers	0.02%	

Top 5 Users		
ZALERT	0.66%	
ZVWS	0.49%	

Close

z/OS performance in one click

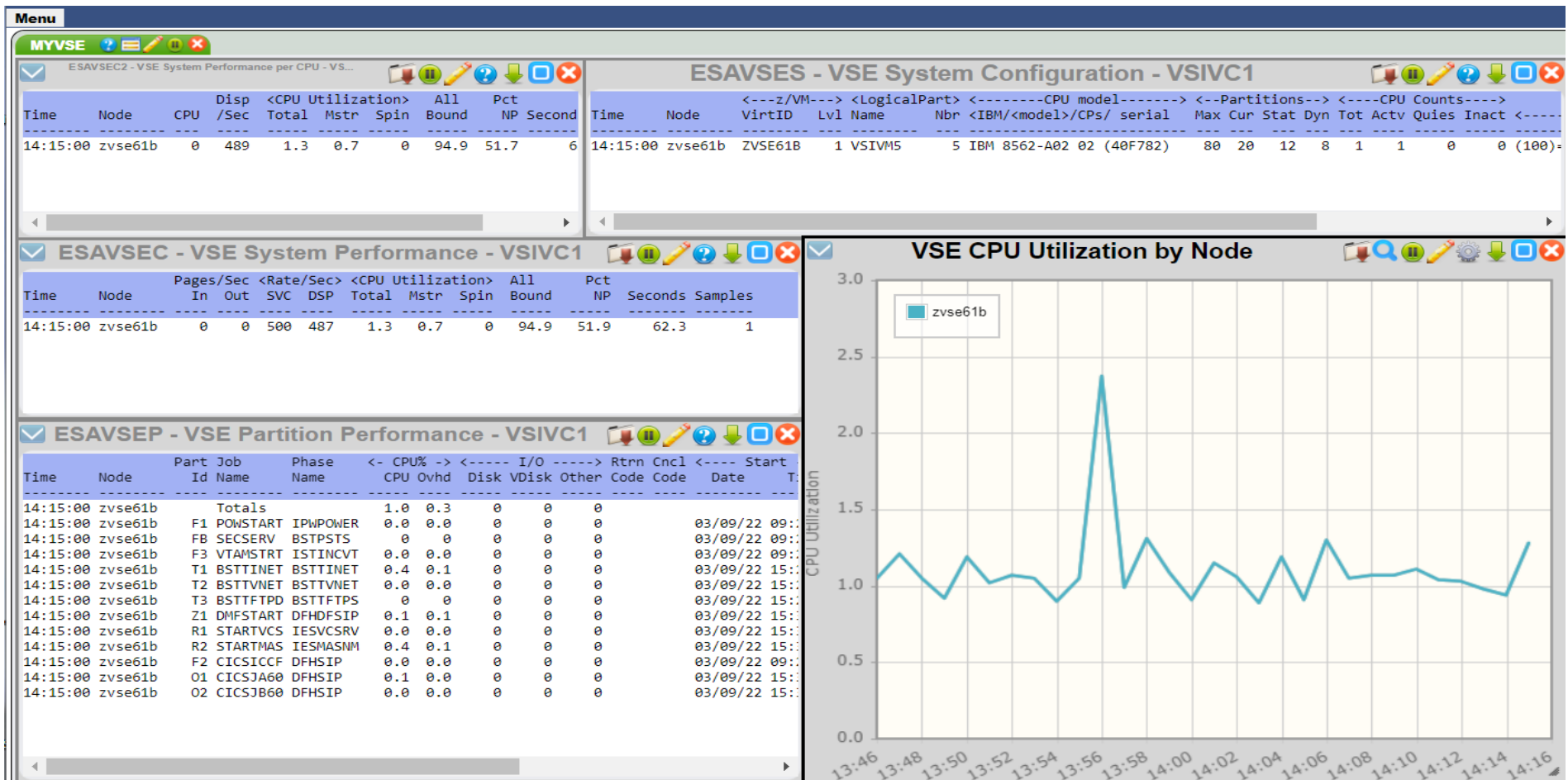## End users define their environment(s) – z/OS at one click

- Secure, no need for logon
- Fast and efficient
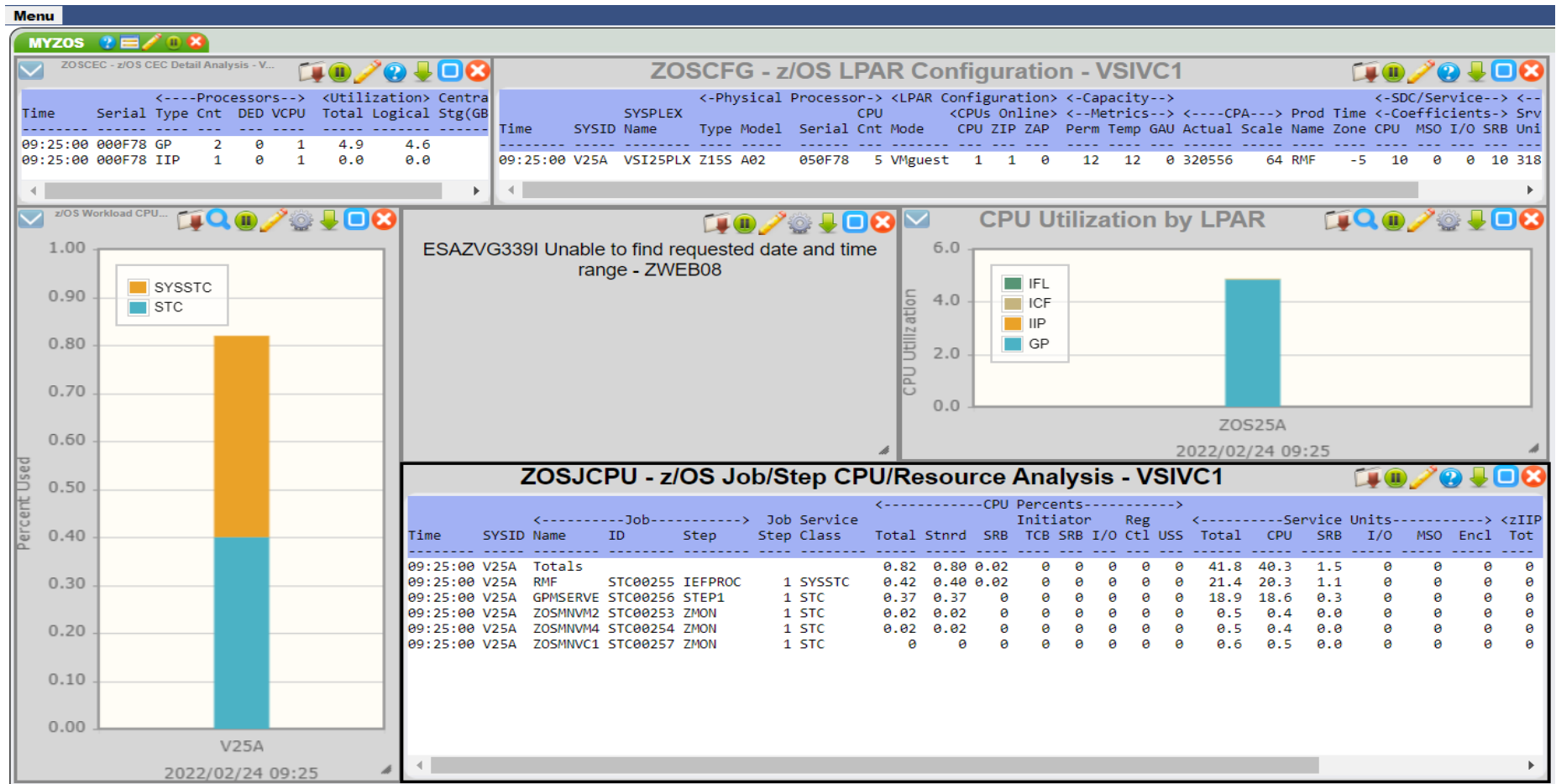
zVSE performance in one click

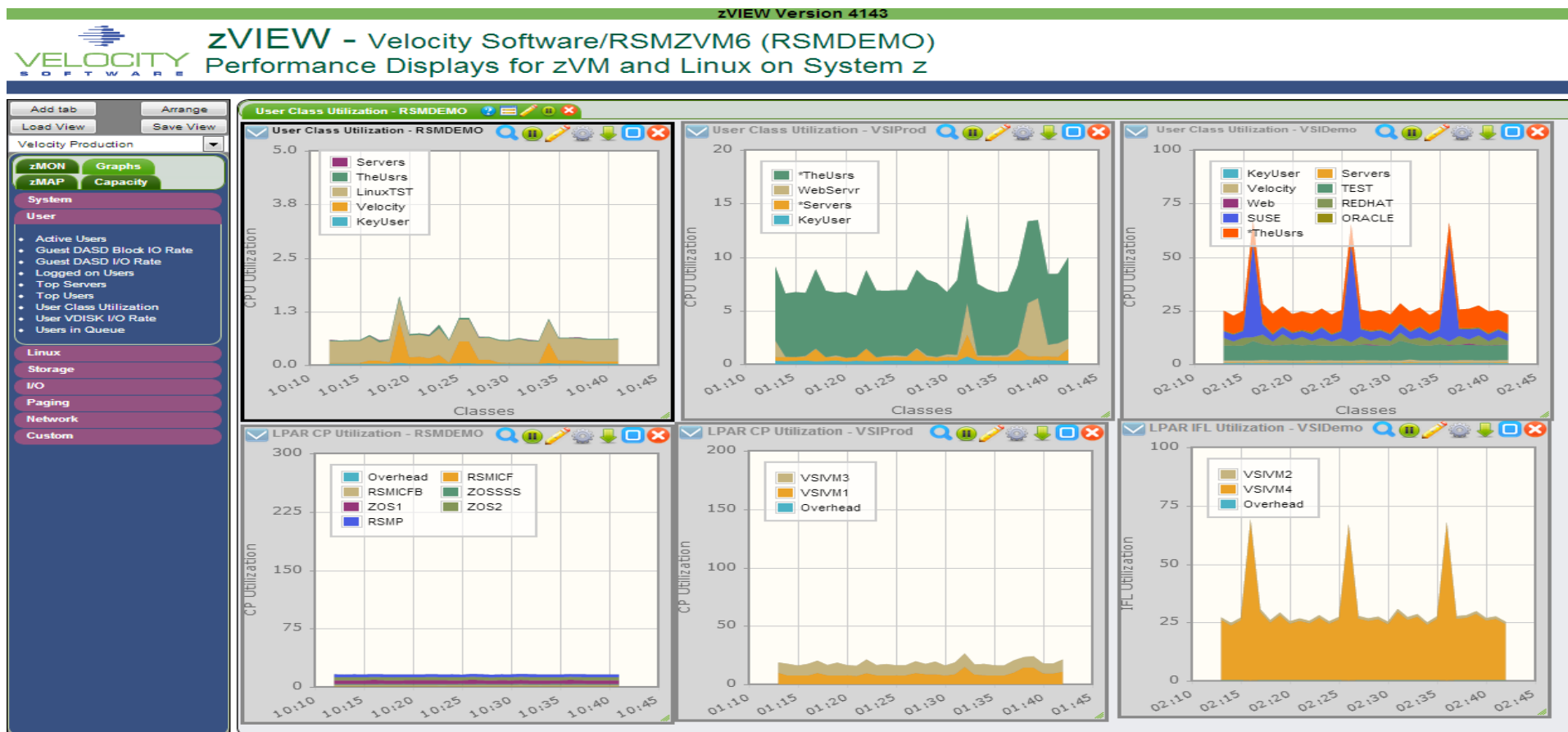## End users define their environment(s) – z/VSE at one click

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

Multiple Systems On Single Pane
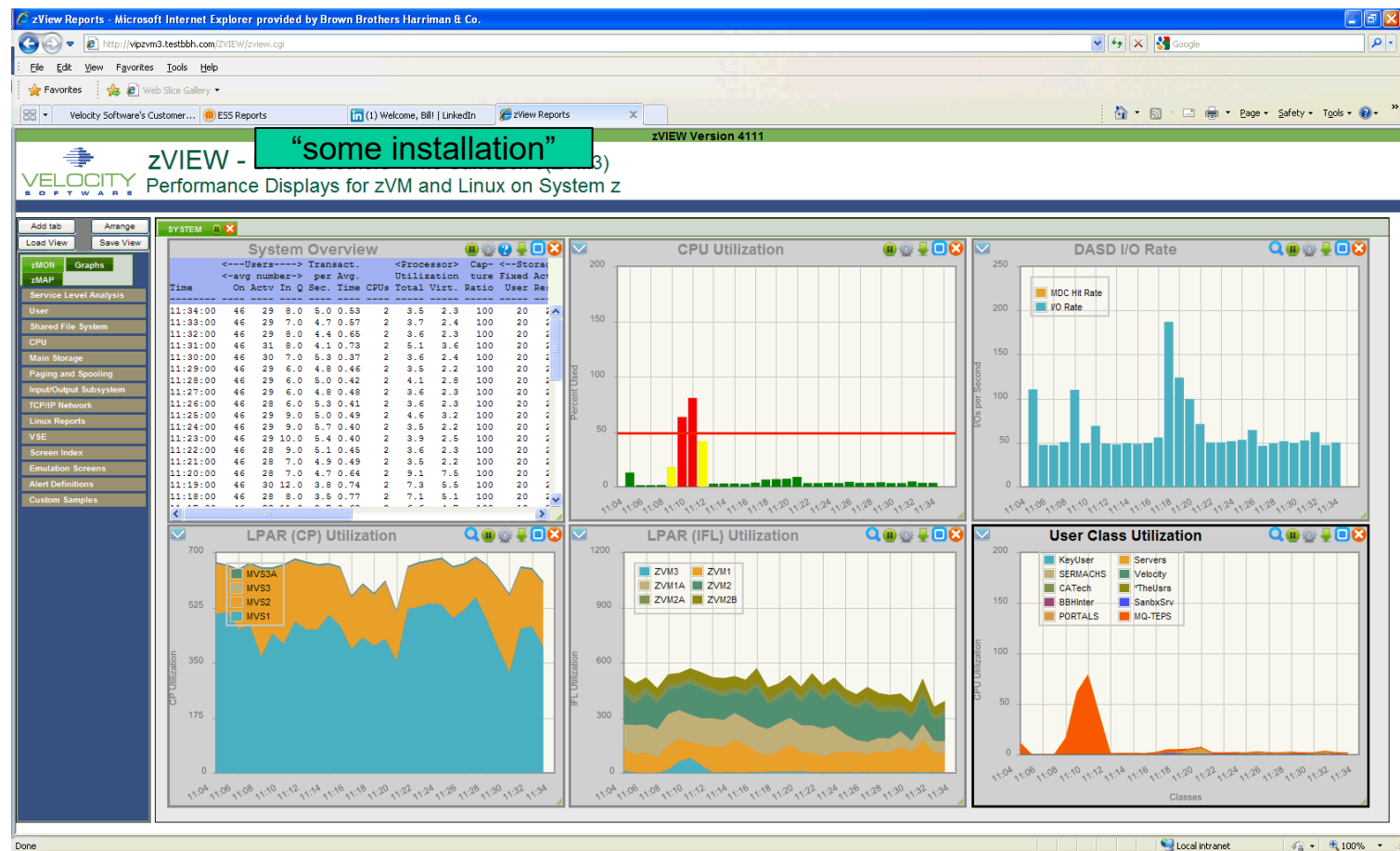
Single pane of glass

- 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
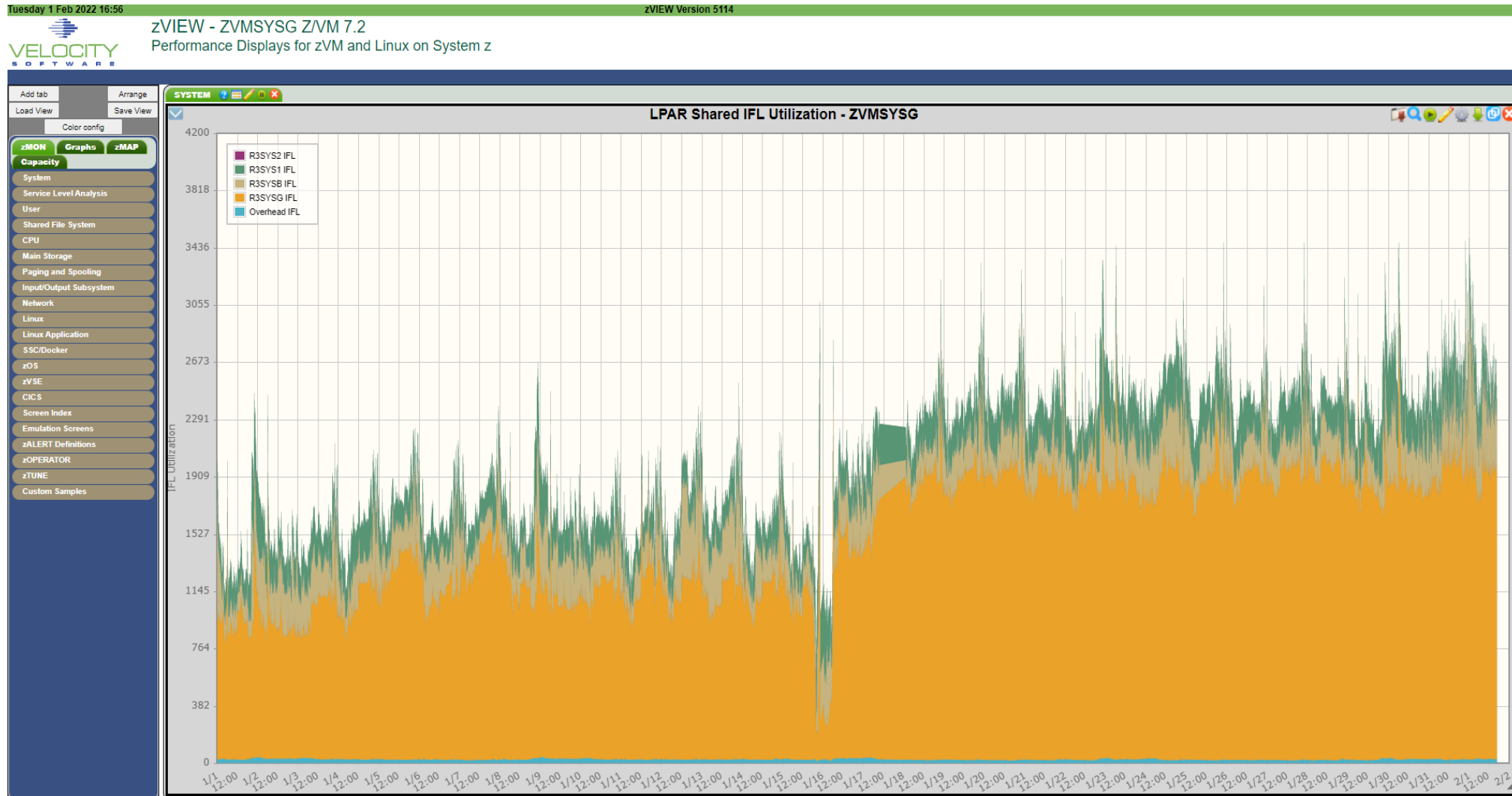
3270 Style Alerts (50+ sample alerts provided)

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)

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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

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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)

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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!!!

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