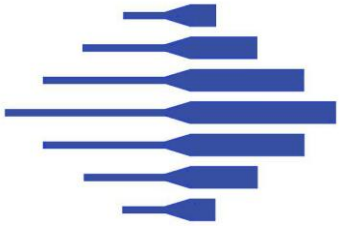
35 YEARS OF PERFORMANCE MANAGEMENT



VELOCITY SOFTWARE

# Introduction to Modernizing Performance Management and your Z environment

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Velocity Software, Inc.
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# Discussion Topics

Constant Delivery (since 1988)

Performance Management and demonstration:

- zVPS – Velocity Performance Suite

Single pane of glass

- z/VM
- Linux
- Network
- VSEMON
- zOSMON
- Applications (Docker, MongoDB, **OpenShift**)

- zTUNE, zVRM

Modernizing z/VM with zPRO

Follow up discussions

# Constant Delivery

1988: XAMAP (now zMAP)  (First VM/XA performance reporting)

1989: XAMON (now zMON)

1999: ESATCP (now zTCP)

2000: ESAWEB (now zVWS)

2002: Linux Support (continuous enhancements since 2002)

2005: Websphere, Oracle metric reporting

2007: zTUNE

2018: zPRO  – Very successful

2019: zOSMON – delving into an interesting market

2021-2022:  zPRO zScheduler, zSpool, zBackup, zDIRECT

2022: zVM, Linux Tuning Guide

2023: OpenShift/Kubernetes/zCX, zVRM

## Performance Management is a process, four components

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

## zVPS Target Users:

- Centralized performance management
- Data analyst / Linux admin
- Enterprise capacity planning
- Accounting
- Centralized Operations
- Dashboards

## Our Product Design Objectives:

- Data Accuracy, product longevity, scalability, extensible
- Minimize complexity - Keep it Simple (and elegant)
- Ease of use, easy to support
- Modernization (browser based, cross enterprise)
- Low resource consumption for zVPS (1% of one engine)
- Low resource consumption for data collection
- Provide data to dashboards (Grafana, splunk, etc)

# Product Longevity

## 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”)

- Standard 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 snmp 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)

IBM SSC: collectd

# Performance Management Portfolio

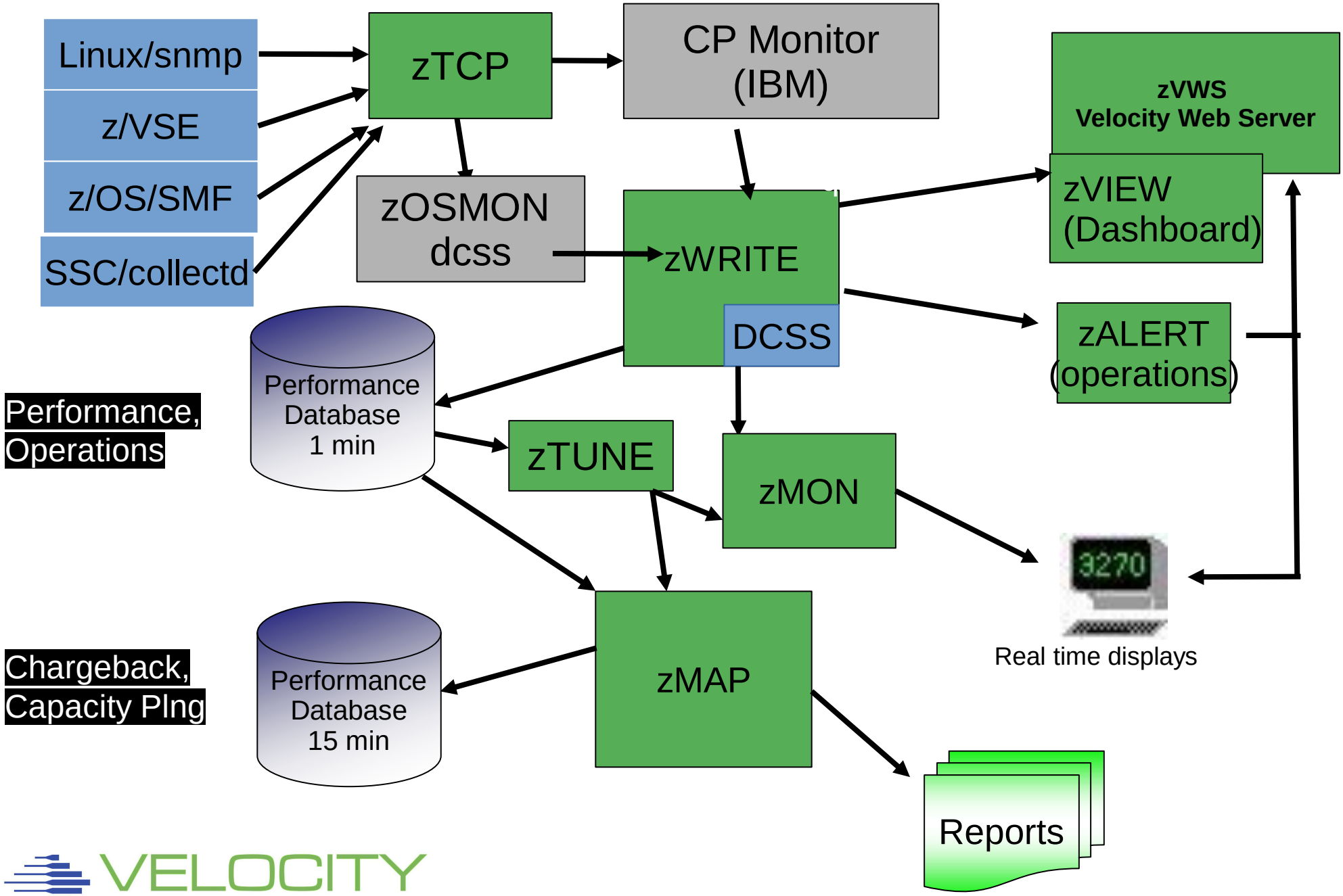
## zVPS Components

- zMAP - Performance reporting, long term performance data base
- zMON – Real time interface, short term performance data base
- zVWS – Native webserver
- zTCP – Data collector (snmp, collectd, smf, dmf)

## No charge components with graphical interface

- ESAEXTR – build your own reports, analyzer
- zVIEW – performance management dashboard
- zOPERATOR
  - Fully integrated operations console (replaces Ops Mgr)
- zALERT
  - Performance alerts and notifications (integrated)
  - Alerts to SNMP management console (NETCOOL, HPOpenView)
  - Email alerts, Cell phone text alerts

# zVPS Infrastructure

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# Health Checker for z/VM, Linux

## Why zTUNE?

- Mainframes/LinuxOne environments are Complex
- Many things get overlooked even by experts
- Experts become experts by seeing many many performance problems
- What causes problems??????
- When same problem multiple times, create a rule to look for it
- Checks for configuration “best practices”
- Inexpensive insurance to have the best skills when there is a problem

## zTUNE Components

- zTUNE RULES – 100+ performance items that get checked
- ESATUNE report produced by zmap, display on zVIEW
- Performance assistance on demand from Velocity Software experts
- Upload data for analysis at any time
- Ptrack ‘ztune’ sev1 alerts velocity management phones….

# Health Checker for z/VM, Linux

Focus more now on simplifying problem resolution

User reports that applications complained about Linux on Z WAS performance:

```
Report: ESATUNE      Tuning Recommendation Report
------------------------------------------------------------
The following changes are suggestions by Velocity Software
 to enhance performance of this system.
However, Velocity Software takes no responsibility -
 all tuning is the responsibility of the installations.
Please call 650-964-8867 if you have any questions about
 these values, or suggestions on report enhancements.

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
```

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## zVWS: Native generalized z/VM Webserver

- CMS Based
- Written in Assembler, because that is just fast
- Generalized server – completely eliminates need for SMAPI

## VelocitySoftware.com (all runs on z/VM natively)

- **VelocitySoftware.com, VelocitySoftware.de, etc**
- **VelocitySoftware.net**
- **Linuxvm.org, MVMUA.org**
- **VMWorkshop.org (great conference for VM)**
- **GGWSC.ORG**

## Velocity Applications provided by Velocity Software

- **zVIEW (Performance data presentation "dashboard"s)**
- **zPORTAL (GUI interface to managing zVPS)**
- **zPRO (No smapi, no java, No linux server requirements, no complexities)**

# Monitoring Single pane of glass

## All Platforms provided, one technology

- z/VM (CP monitor)
- Networks (snmp)
- Linux (“z” and “x”) (snmp)
- z/VSE (VSEMON – no charge, snmp, DMF)
- z/OS (zOSMON: SMF record input)
- SSC (IBM Secure Software Container – collectd)
- Microsoft (snmp – no charge)
- VMWare/ ESX (snmp – no charge)

## Many Applications

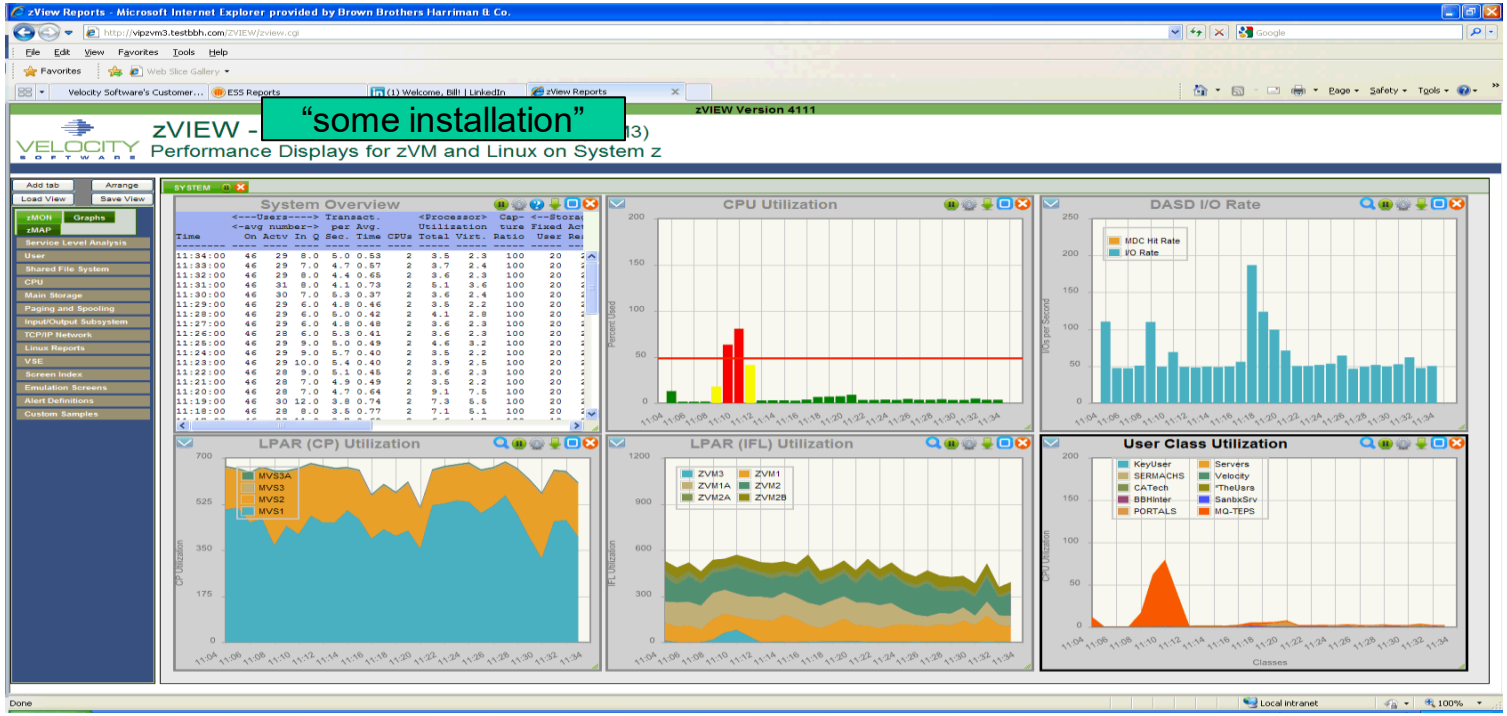
- Oracle (snmp)
- JVM (snmp)
- GPFS (snmp)
- Docker, Kubernetes (OpenShift, Rancher)
- MongoDB Enterprise

End users define their dashboard(s)

Many dashboards are provided (VSE, z/OS, Linux)

Not just for Systems Programmers.  (Applications, operations)

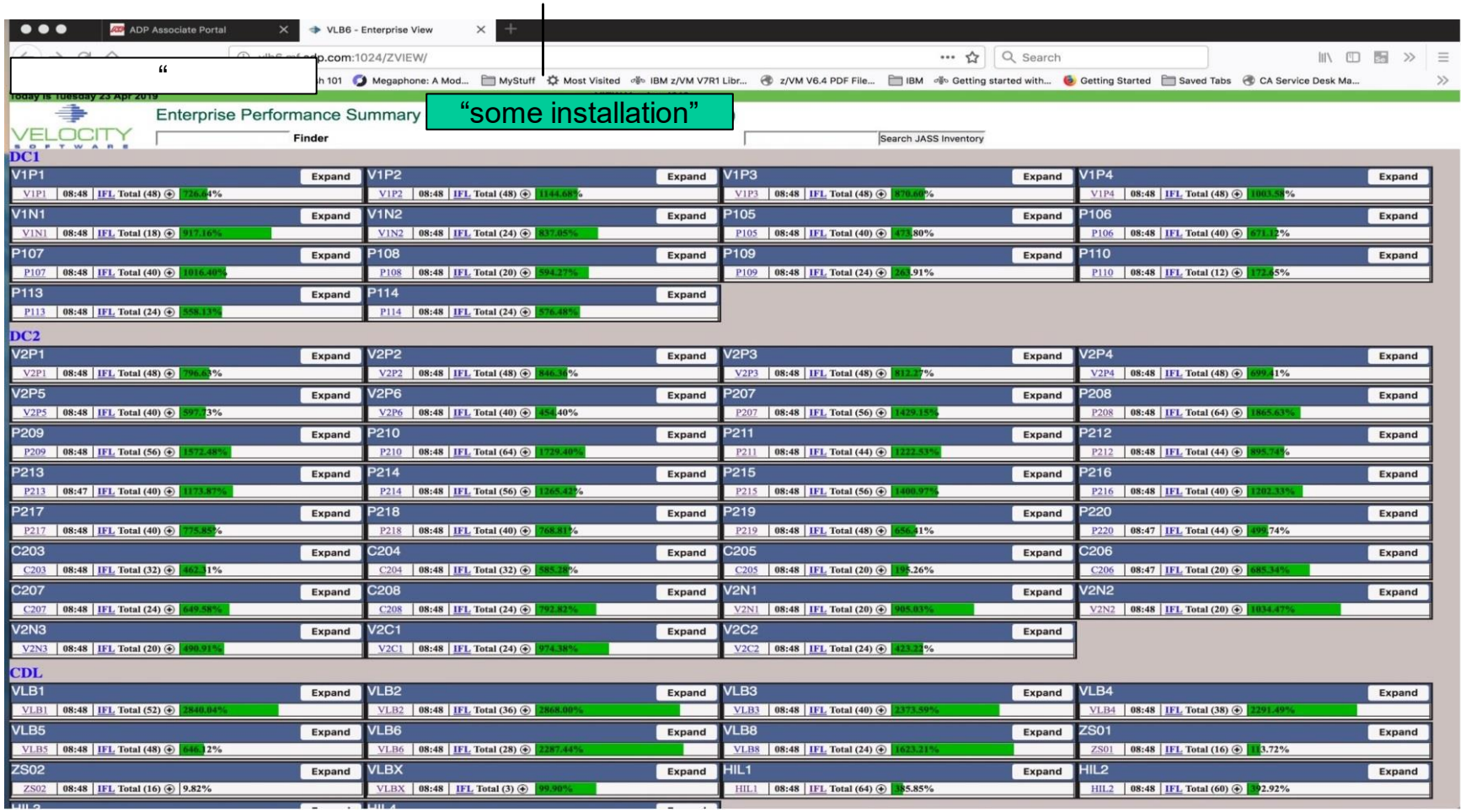
Menu driven



# zVPS Enterprise View is scalable

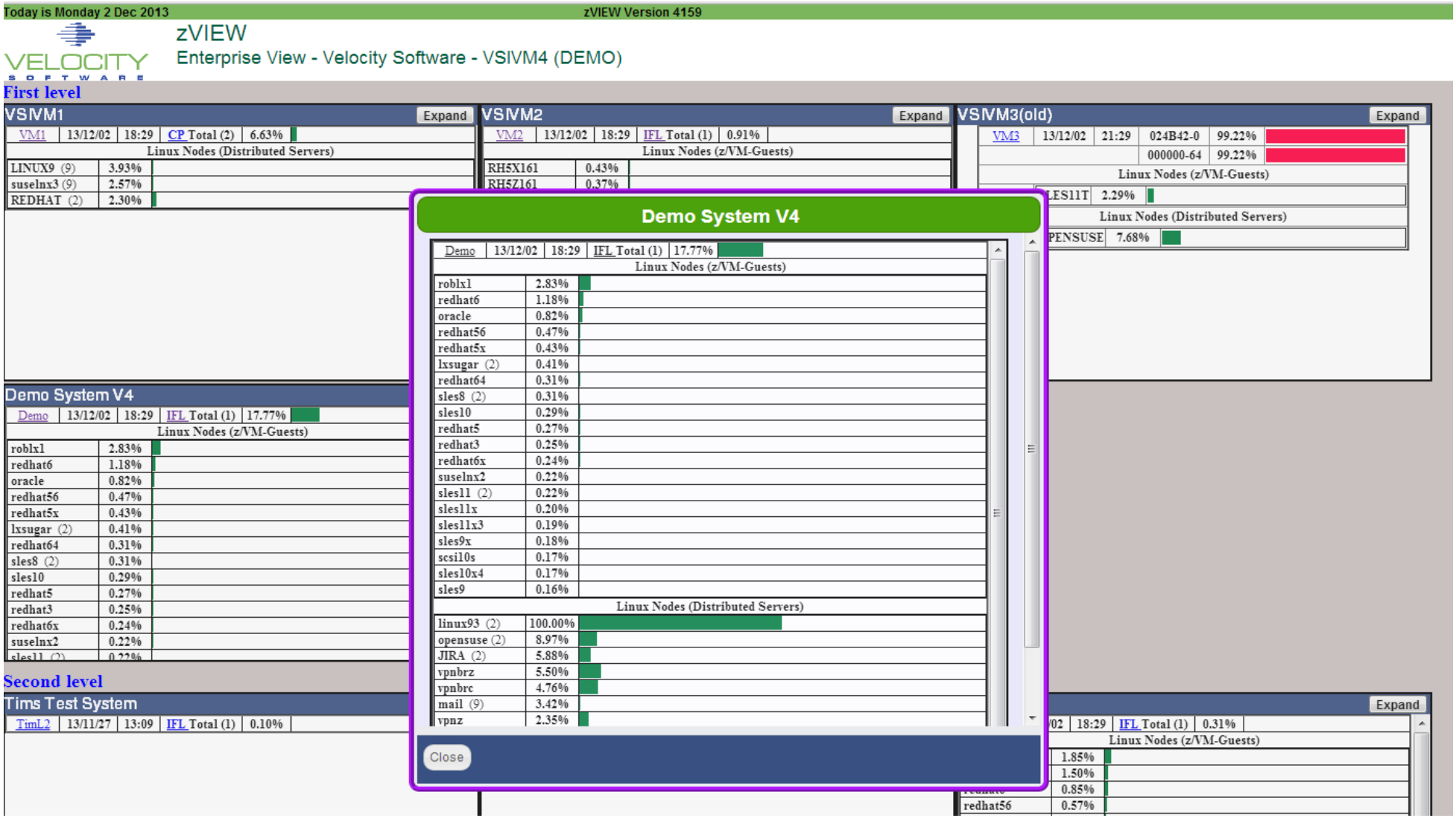
## Single pane of glass

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



# zVIEW Enterprise: All LPARs

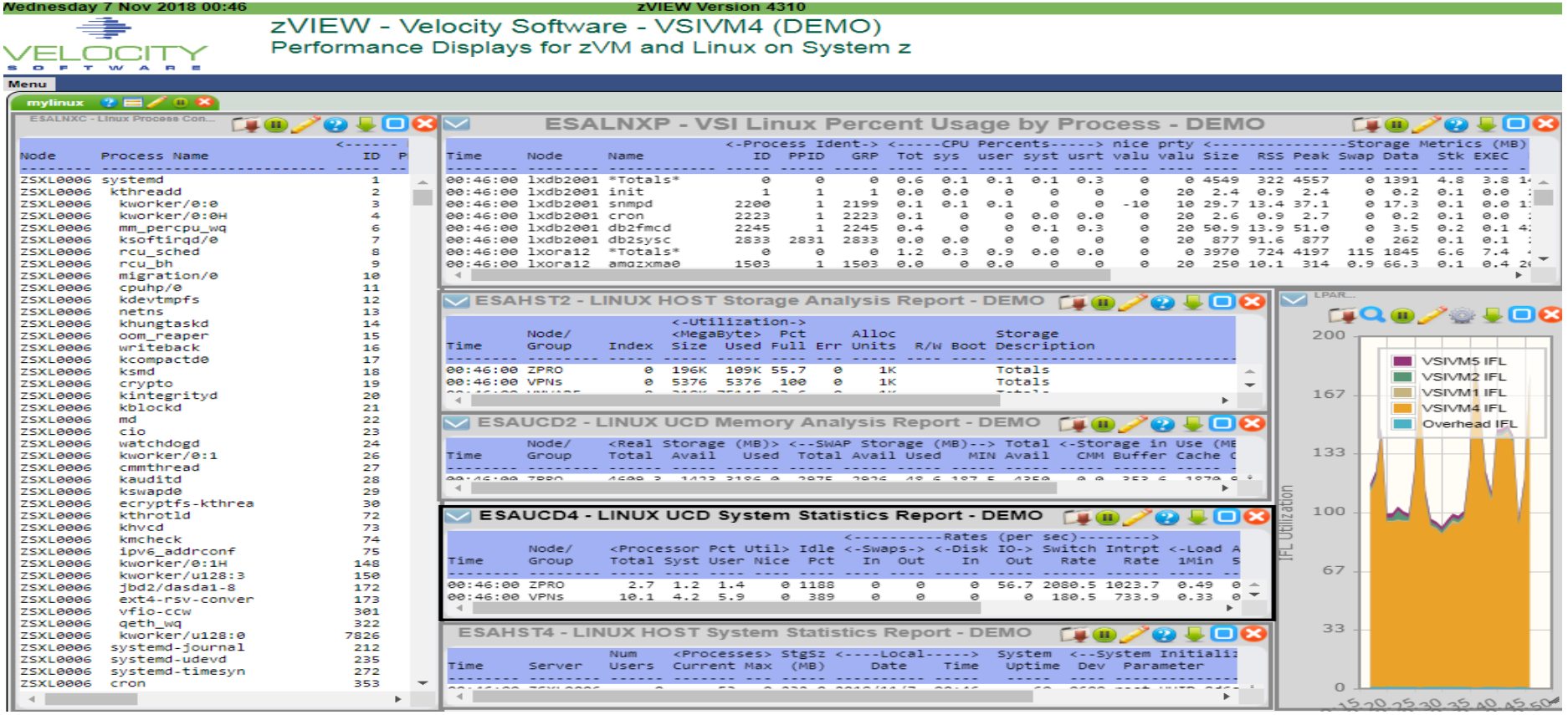
## Tailorable, expandable, zoomable



# Linux Server performance in one click

## End users define their dashboard(s)

- Linux administrator dashboard provided, everything in one click
- Secure, no need for logon to Linux (no ssh, top)
- Fast and efficient, no restriction on numbers of viewers

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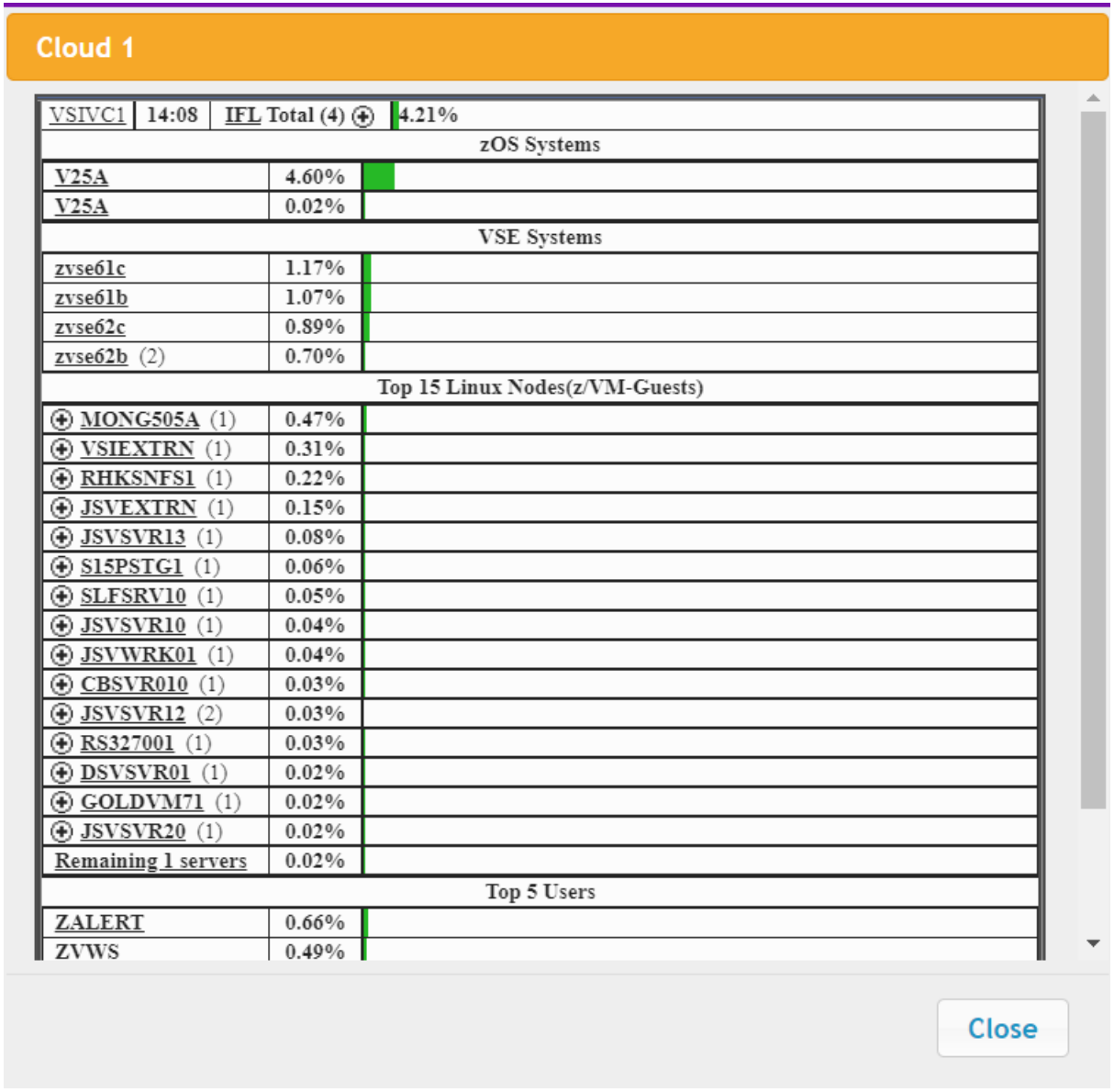
# zVPS Enterprise View – Access

## Very fast access

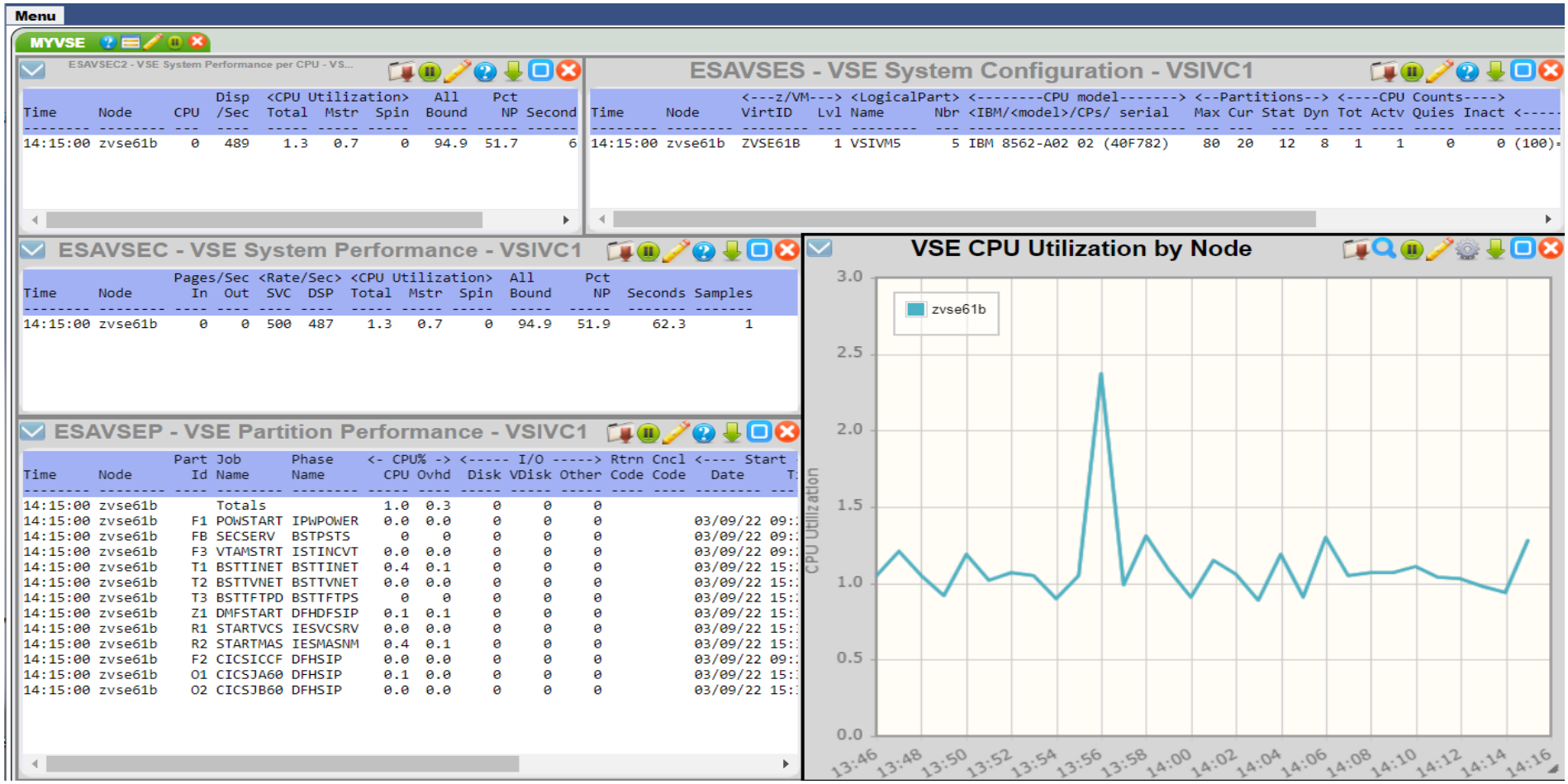
- Linux
- VSE
- z/OS



# zVSE/VSEn performance in one click

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

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

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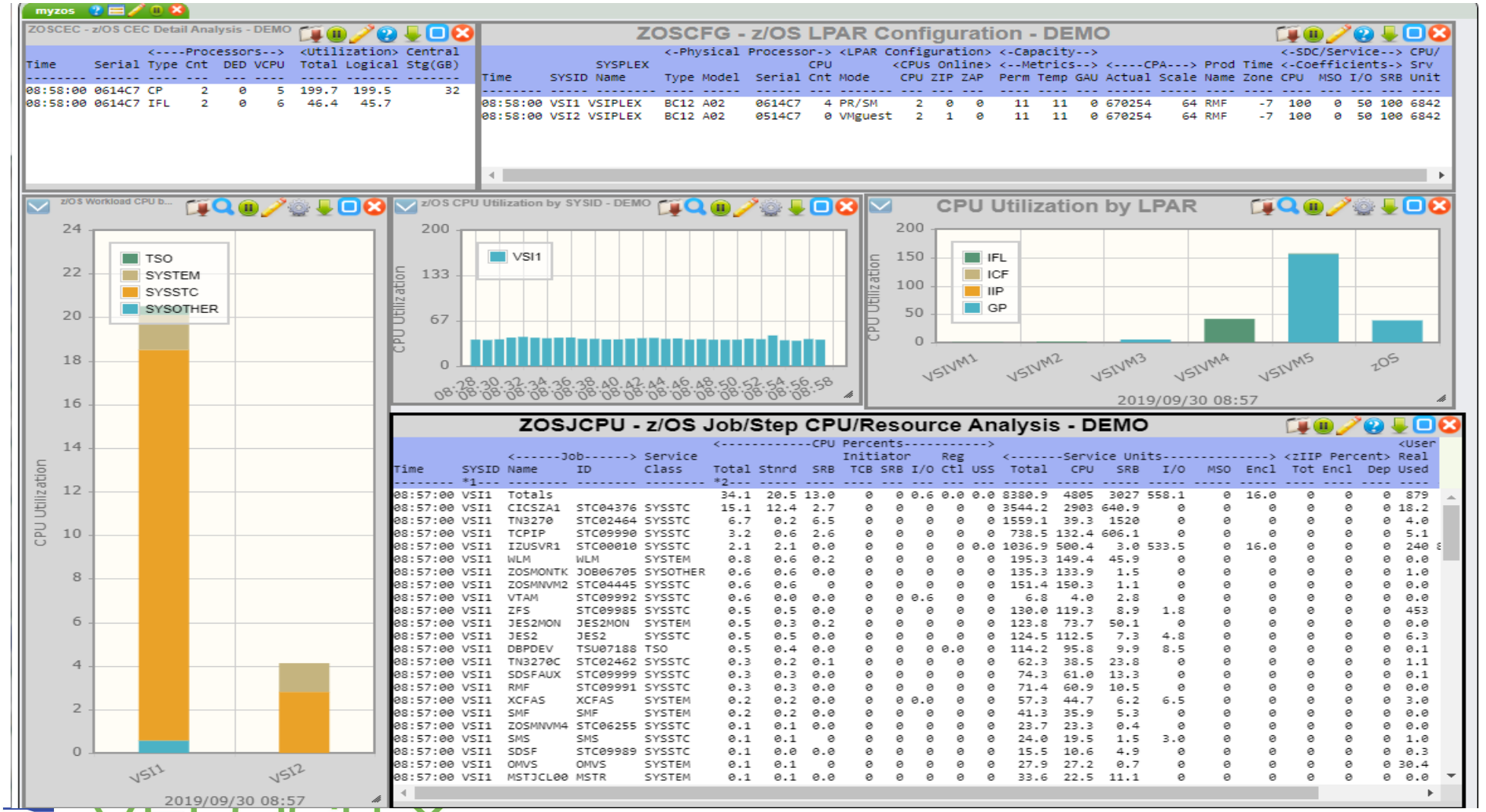
# zOSMON– one click

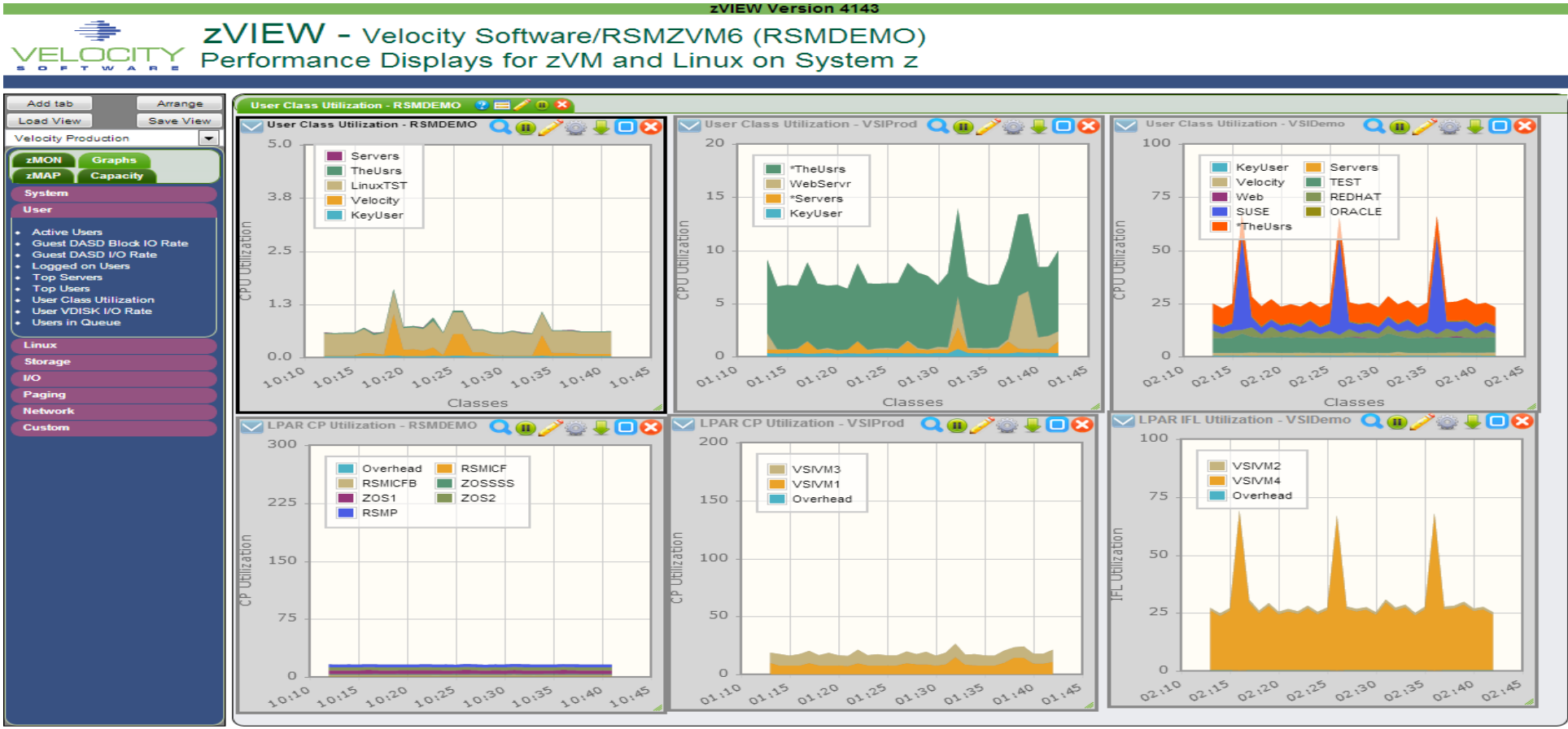
Instant z/OS system, CPU, jobs, configuration. (Tailorable)



# Single pane – enterprise wide

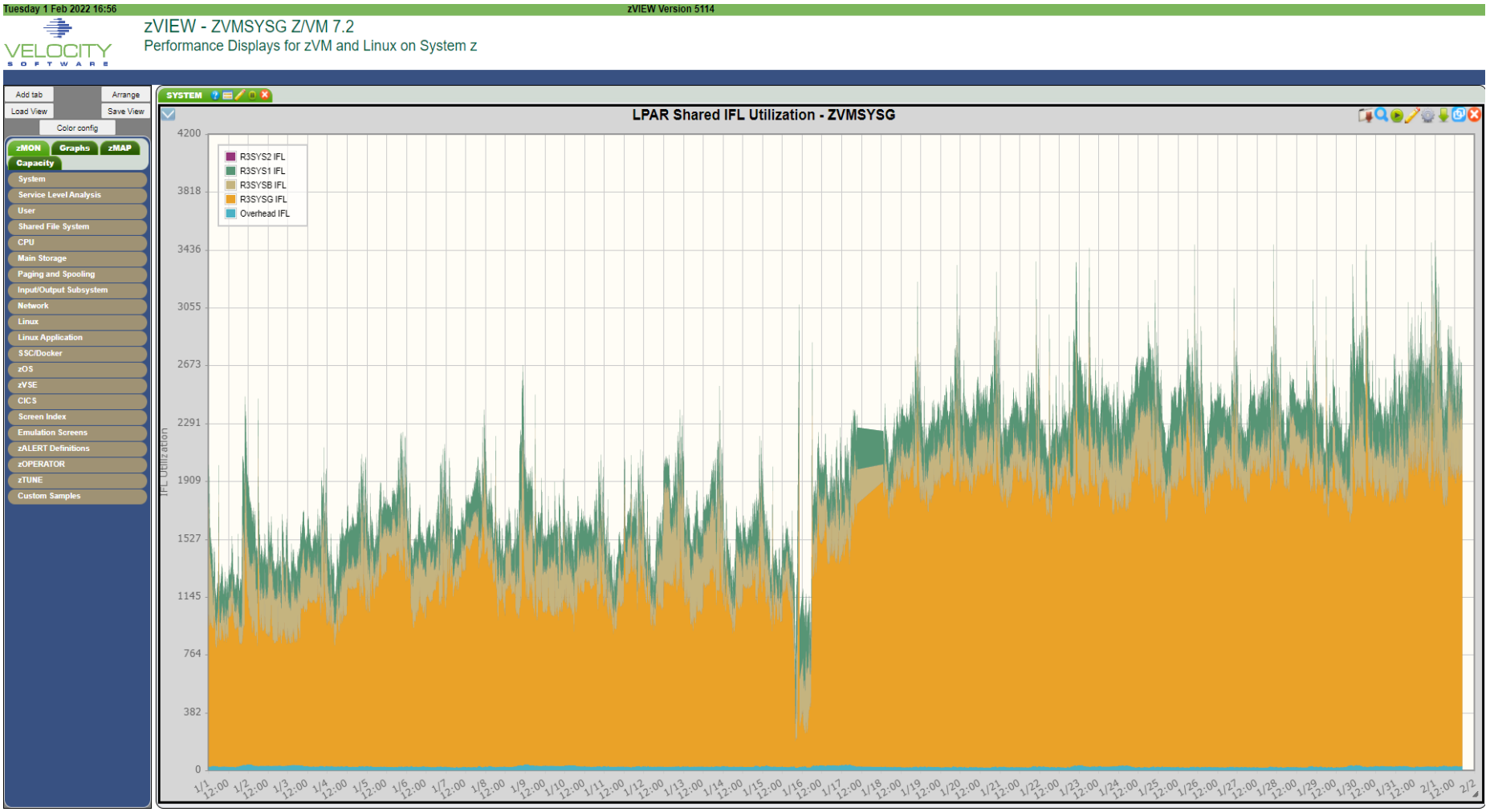
## Single pane of glass

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



# Dynamic Charts

Data extracted from database dynamically to create graph, example last month

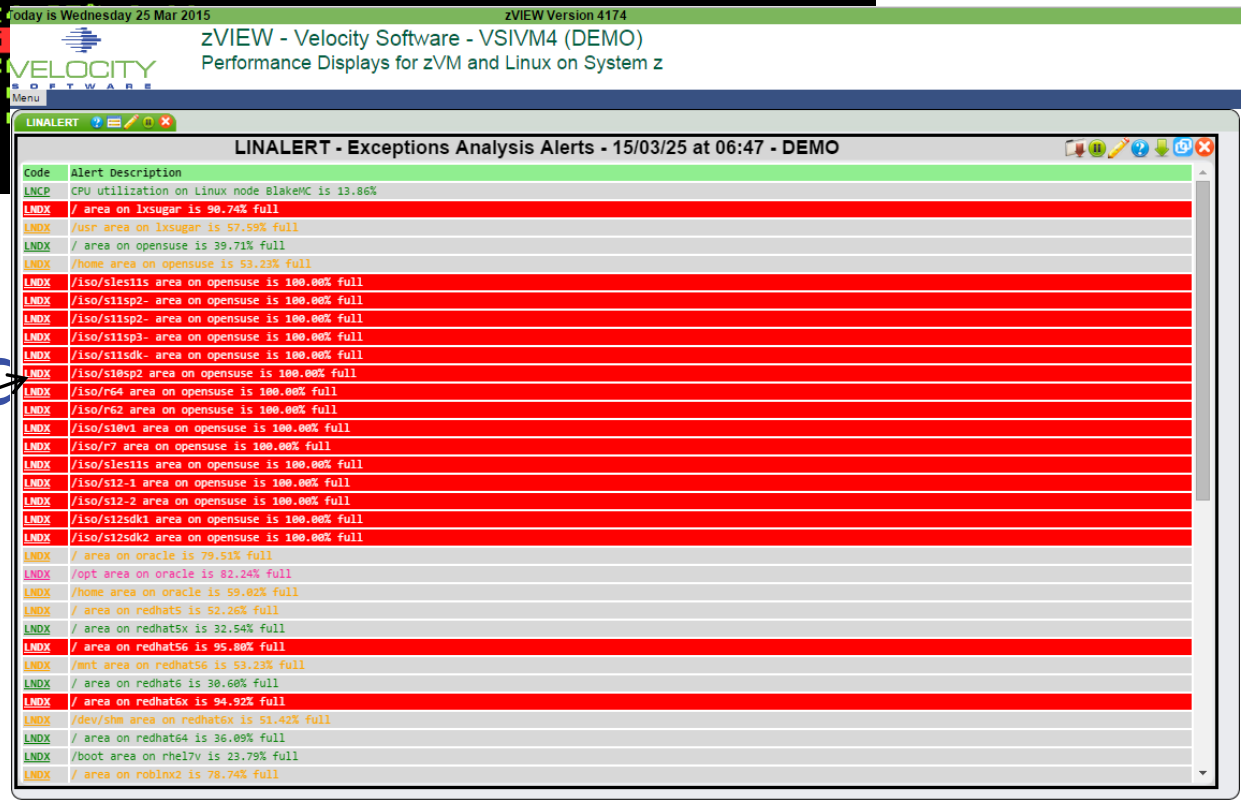


# Operational Alerts: zALERT

## 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 S11R20R
   LNSU Swap utilization for Linux
   LNSU Swap utilization for Linux
```




Or Browser based
Click Thru
or SMS, email…

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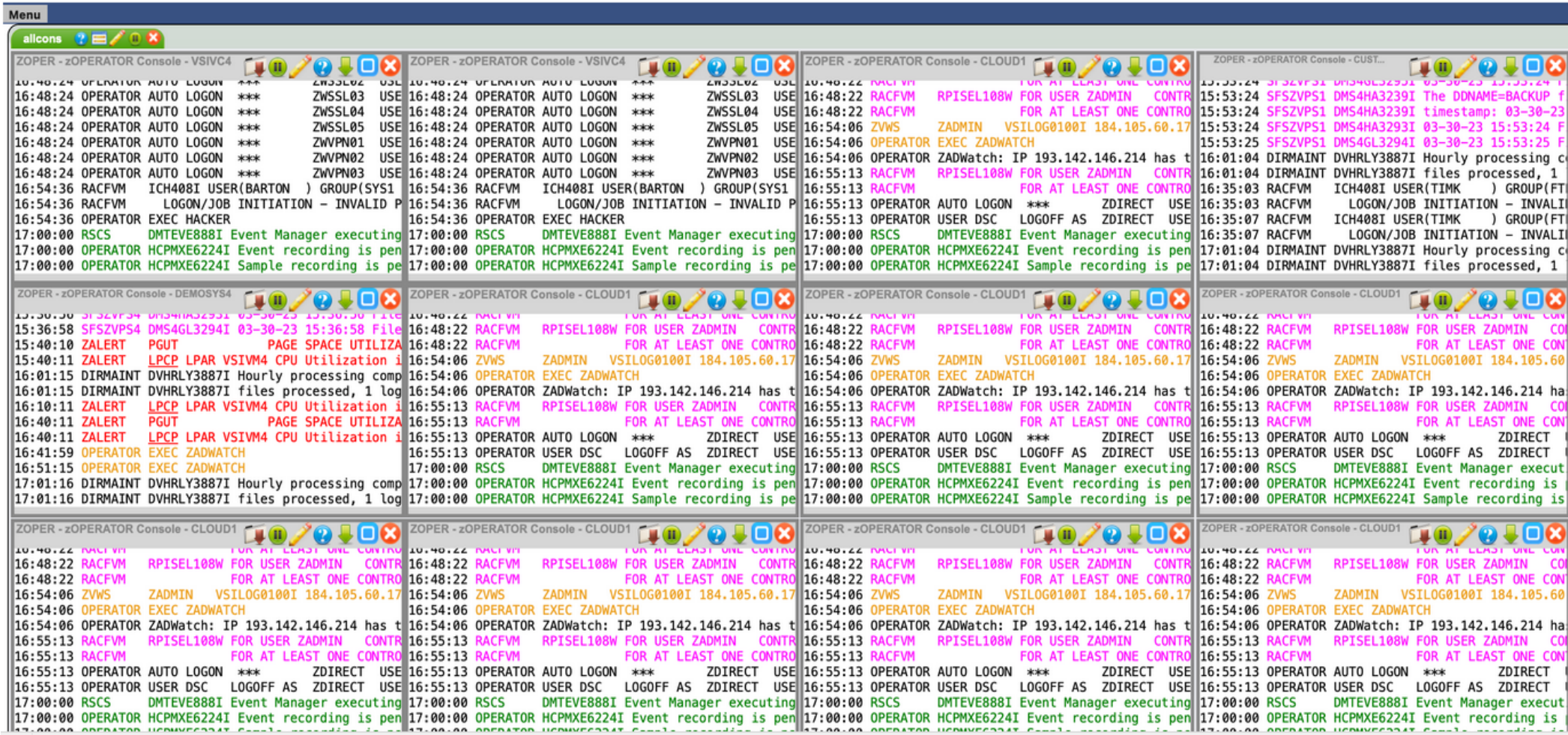
# Single pane of glass – all LPARs console



# OpenShift (Container) Analysis

## Openshift data source

- Closed system, performance management not included
- Prometheus support very expensive
- Velocity Software provides containerized snmp

## Snmpd container from Velocity Software

- Very light weight (target overhead .1% one IFL per node)
- One per node
- Standard snmp data collection with zVPS
- Standard performance management provided
- Supports Openshift, Rancher, Docker platforms
- Supports zCX!

# OpenShift CPU by container

## By CPU Consumption by pod, by container

Report: ESAK8S2 Kubernetes Resource Utilization Report

| NODE/ Time/ Date | PodName ContainerName | <---Container--> <--Process ID--> ProcID | ProcName | <--Container CPU-------> <------CPU Percents----> Tot | sys | user | syst | usrt |
|---|---|---|---|---|---|---|---|---|
| rhoscp1 | | | | | | | | |
| | console-operator-59d | | | | | | | |
| | console-operator | 17395 | console | 0.62 | 0.12 | 0.50 | 0 | 0 |
| | openshift-controller | | | | | | | |
| | openshift-controller | 29430 | cluster- | 0.38 | 0.08 | 0.30 | 0 | 0 |
| | kube-controller-mana | | | | | | | |
| | kube-controller-mana | 12030 | cluster- | 1.15 | 0.15 | 1.00 | 0 | 0 |
| | insights-operator-7f | | | | | | | |
| | insights-operator | 14827 | insights | 0.30 | 0.05 | 0.25 | 0 | 0 |
| | node-exporter-chc49 | | | | | | | |
| | node-exporter | 3207 | node_exp | 0.38 | 0.13 | 0.25 | 0 | 0 |
| | kube-apiserver-rhosc | | | | | | | |
| | kube-apiserver | 3378 | watch-te | 11.1 | 1.04 | 10.1 | 0 | 0 |
| | kube-apiserver-cert- | 5683 | cluster- | 0.18 | 0.08 | 0.10 | 0 | 0 |
| | kube-apiserver-check | 6166 | cluster- | 0.47 | 0.08 | 0.38 | 0 | 0 |
| | **prometheus-k8s-1** | | | | | | | |
| | **prometheus** | **1817314** | **promethe** | **42.1** | **0.95** | **41.1** | **0** | **0** |
| | thanos-sidecar | 1817435 | thanos | 0.15 | 0.02 | 0.13 | 0 | 0 |
| | prometheus-proxy | 1817486 | oauth-pr | 0.57 | 0.03 | 0.53 | 0 | 0 |
| | prometheus-operator- | | | | | | | |
| | prometheus-operator- | 11347 | promethe | 0.17 | 0.02 | 0.15 | 0 | 0 |
| | vsi-snmpd-vk5vd | | | | | | | |
| | **vsi-snmpd** | **1762314** | **snmpd** | **0.53** | **0.20** | **0.33** | 0 | 0 |

# CP Monitor incorrect with SMT

## All CPU numbers provided by IBM with SMT broken

- Zip / zcx has same issue
- See Velocity Software's "capture ratio" presentation
- **VSI Prorated** based on HMC and MFC data

```
Report: ESAUSP5       User SMT CPU Consumption Analysis
Monitor initialized: 03/08/23 at 07:00:01 on 8562 serial 040F78
-------------------------------------------------------------------
          <------CPU Percent Consumed    (Total)---->  <-TOTAL CPU-->
UserID    <Traditional> <MT-Equivalent> <IBM Prorate> <VSI Prorated>
/Class    Total  Virt   Total  Virtual  Total Virtual Total  Virtual
-------- ----- -----   -----  -------  ----- ------- ----- --------
07:02:00 414.9  408.0  322.7    317.3  239.7   235.8  208.2   204.7
 ***User Class Analysis***
OpenShif 355.0  350.3  276.0    272.3  204.9   202.2  178.1   175.7
 ***Top User Analysis***
RHOSCP1  142.4  140.8  110.1    108.9  82.93   82.01  71.43   70.65
RHOSCP3  125.2  123.8  97.38    96.34  72.35   71.60  62.80   62.14
RHOSCP2  86.79  85.04  68.00    66.64  49.31   48.30  43.55   42.67
```

# Time for a demo

"demo.VelocitySoftware.com/zview"

- Linux, vse, z/os
- z/VM
- Network
- Openshift (Kubernetes)
- Docker

# zPRO – The Modern Interface

## Very Simple architecture

- Simple to install (hours to install and tailor, requires zVPS)
- Uses Velocity Software's Native z/VM Web Server (zVWS)!
- No "smapi", **No "linux server" requirements**, No java
- Non-intrusive, no system modifications
- Outside services not required
- (as compared to xcat, cma, WAVE….)

## Original Intent: Private Cloud infrastructure

- Users create and manage their servers without systems support
- Protected environment
- Linux administrators can manage their "Virtual Machine"

# zPRO Product Replacements

## Event Scheduler

- Schedule and manage events across your systems

## zDIRECT: Directory and Storage Pool management

- Add/Delete DASD volumes in your storage pools

## zSPOOL: Spool management

- Manage all spool files
- View **via browser** open or closed spool files
- Allow Linux administrators to view their Linux consoles easily

## Backup & Restore

- Backup and restore key/critical files
  - (system config, directory, TCPMAINT)
- Back up files on selected minidisks, sfs file pools

## Shared File System (SFS) Management

- Manage pool servers, users/admins, space management,
- build a new pool

# zPRO – The Modern Interface

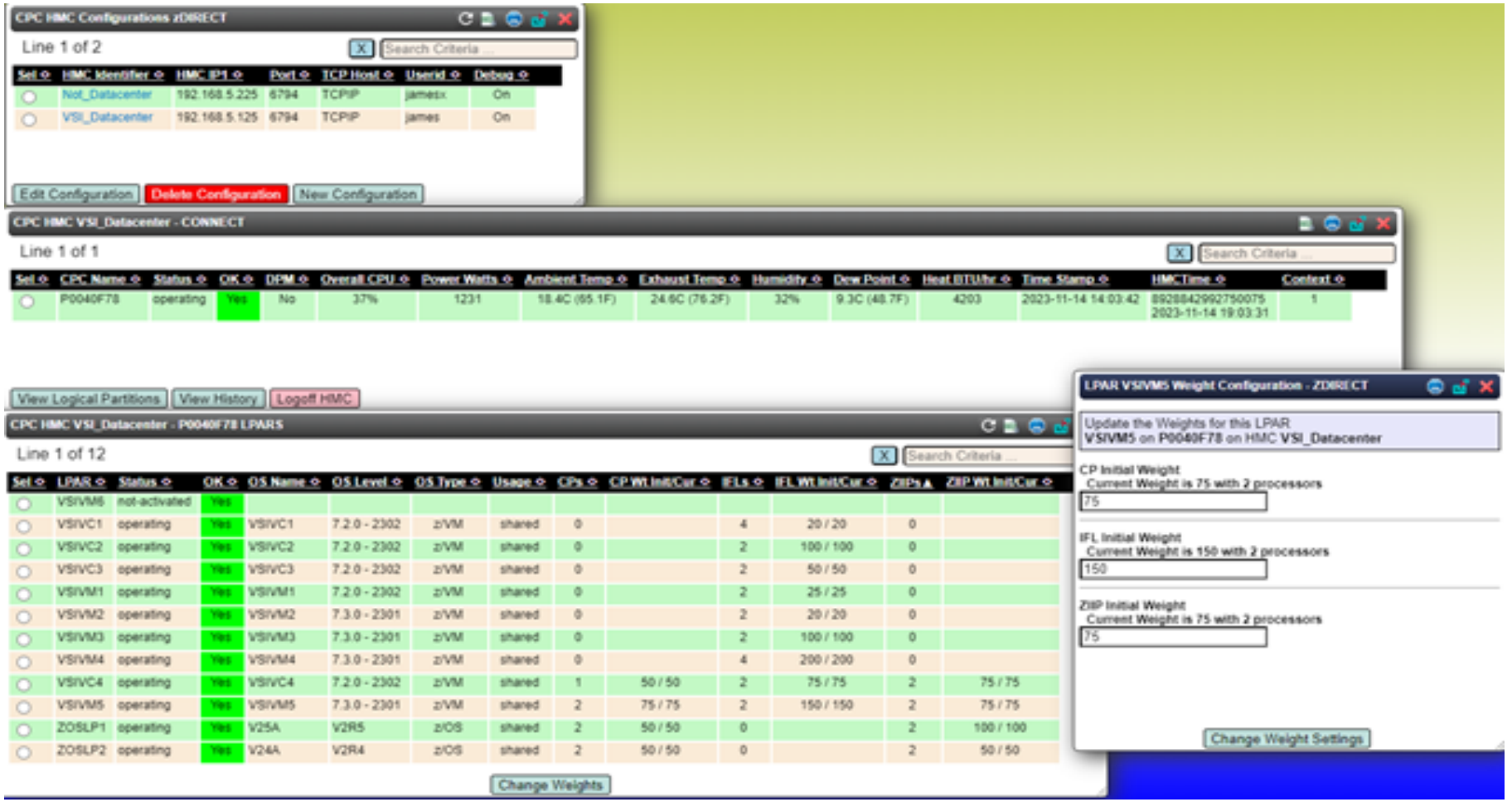
Benefits:

- Difficult time consuming tasks - simplified
- End users empowered –
- Reduced need for skilled systems programmers

## zPRO'd other complex tasks

- Lun/Edev management – connects directly to DS8K / EMC
- LPAR management – connects directly to HMC
- Linux management – API allowing Linux commands
- Directory management – DIRMAINT, VMSecure, zDIRECT
- RACF wizard
- Restful APIs available to other users

# BCP on z/OS to manage HMC? Or zPRO…

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# "Linux on Velocity"

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

- Two "working" 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)

Time for a demo

"demo.VelocitySoftware.com/zPRO"

- Linux server administration
- Demo limited to "cloud" functionality
- Create servers, modify servers, delete servers
- Limited in scope to protect other servers
- Automatic life cycle management

Empower your users

# zPRO – try it yourself!

## Velocity Software demonstration site

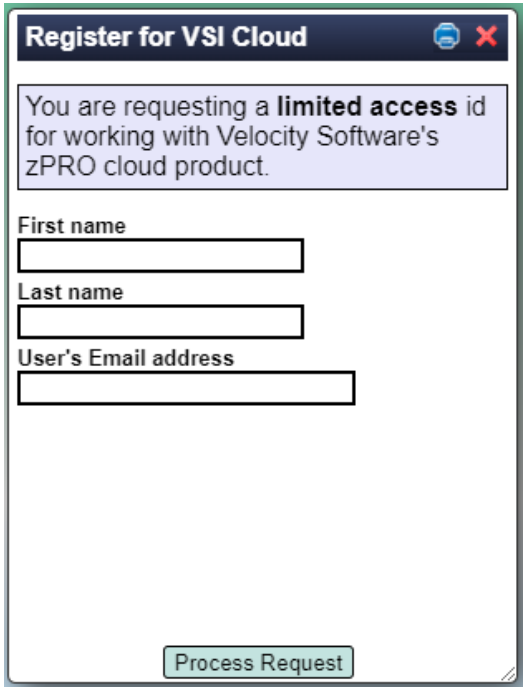
- "http://demo.VelocitySoftware.com"
- zVIEW, enterprise, zPRO, zPORTAL

## To register: https://demo.velocitysoftware.com/zpro/

Userid: **demozpro**

Password: **demodemo**

## Check email for your login info

# zVRM: Modify servers to fit workloads

The Velocity Software Resource Manager based on zVPS

Server modification "happens"

- More CPU, RAM needed and must be added
- Application resource requirements grow

Why Excessively large servers?

- That's they way they do it on Intel / VMWare
- Avoid future outage, hardware changes

zVRM, Velocity Resource Manager automates management

- CMM to reduce over sized storage when not needed
- CMM to return storage as workload increases
- Vary vcpu on/offline to meet demand
- Allows definitions of oversized servers to operate efficiently

Requires zPRO APIs, zVPS for data input

# Summary

zVPS:

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

zPRO

- Private Cloud environment
- z/VM Systems Management
- Improved productivity for all parties
- Reduces impact of lack of skills

Velocity Software

- Worldwide customer base
- Known for Performance management,
- Modernizing the platform

# Next Steps?

Trials at no charge

Support is world wide,

Currently doing business in all geographies:

- Europe, UK
- Middle east, Africa
- Asia, Australia
- South America,
- North America

Any questions?

- Follow up sessions?
- Openshift / zCX, zPRO, zOSMON, SSC, zVRM