z/VM and Linux on z Performance Management

GSE - UK

www.VelocitySoftware.com
www.LinuxVM.com

"If you can't Measure it,
I am Just Not Interested ™"

Topics

- **2019 topics of interest**
- **Who is Velocity Software**
  - Performance Management Overview
- **Technology does not stand still – current topics**
  - What is Velocity Software doing now
- **zOSMON**

2019 Topics of Interest

- **Applications**
  - Splunk
  - MongoDB
- **Docker**
  - Secure container,
  - z/OS Container Extensions,
- **Processor Performance**
  - z/VM 7.1, z15
  - SMT
  - LPAR Configuration, parking
- **Enterprise Efficiencies**
  - Cost of performance management in resources
  - Single pane of glass
  - Selling the mainframe to your users!!!

Who is Velocity Software

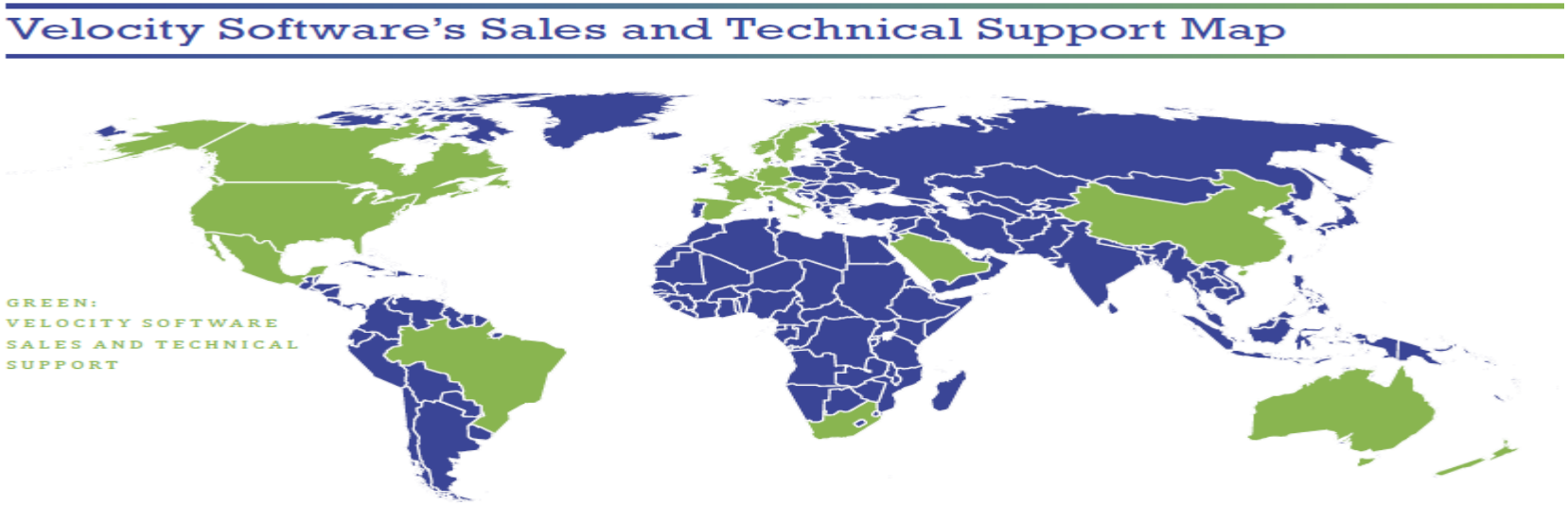
Founded 1988, Mission: Provide software to assist customers in optimizing the VM platform:

First VM/XA performance product on market (XAMAP/XAMON)

Continuous fully integrated enhancements over 30 years

200+ Installations (zVPS) (more than ½ IFLs world wide)

22 countries, 6 continents



Industries using Linux and Velocity Software

Banking, Financial:

Government / Military:

Health Care, Insurance, Retail

Manufacturing: Automotive, computing, Oil

Outsourcing

Velocity Software zVPS Provides:

- **z/VM Performance Monitor (for 31 years)**
- **NETWORK Monitoring (for 20 years)**
- **Linux on "Z" Monitoring (for 18 years)**
- **Oracle, Websphere Monitoring (for 10 years)**
- **VSE Monitoring (for 5 years)**
- **No charge features**
  - zOPERATOR for fully INTEGRATED operations management console
  - zALERT for supporting fully INTEGRATED operations
  - Distributed server monitoring (Linux, Microsoft)

zVPS 5.1

New Technologies

- **Docker (thousands of containers)**
- **MongoDB (see Marriott presentations)**
  http://VelocitySoftware.com/MongoDB.html"
- **z/VM 7.1 (done, fcp, edev, diagnose, 80 threads)**
- **SPLUNK (done) "http://VelocitySoftware.com/splunk.html"**
- **z/OS…. (common request)**
- **VSE CICS too**
- **z/OS: Send link to your z/OS people….**
  http://demo.velocitysoftware.com/zview/zview.cgi?view=myzos&heading=no&menu=no
- **See HTTP://VelocitySoftware.com/zOSMON.HTML"**

Make it easy, low overhead, amazingly fast…

- **Z15: MFC data supported! (zVPS only consumer)**

Performance Management Requirements

Performance Management User Requirements

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

Correct data (Virtual Linux CPU data wrong - SMT)

Capture ratios (is the data valid?)

Remember, 3 kinds of performance monitors

1. Products Used for performance Management
2. Products Used for Diagnostics
3. Products Turned off when there's a cpu problem

Management can not be the problem….

Infrastructure Requirements: Performance Analysis

Why Performance Analysis: Service Level Mgmt

- Diagnose problems real time
- PLATFORM SPECIFIC….
- 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
  - Why are things worse today than yesterday?
  - Did adding new workload affect overall throughput?
  - Know who/what is using resource and how to re-allocate
  - SEND IT FOR ANALYSIS…. WE LIKE DOING RESEARCH

Infrastructure Requirements: Capacity Planning

Why Capacity Planning: Future Service Levels

- How many more servers can you support with existing z14?
- What is capacity requirements for an application? (on x?)
- Avoid crises ***in advance***

Why Chargeback?

- Distributed chargeback model is by server (does NOT port to Z!)
- Shared chargeback model is by resource consumption
- Encourages efficient/effective resource use
- Align IT to your business model

Operational Requirements

- Operations will manage 100's (1000's) of servers
- Requires active performance management
- Alerts for processes in loops, disks 90% full, missing processes
- zALERT always needed
- zOPERATOR, if no enterprise monitor, or do it anyway

zVPS does “End to End” Performance Management

- **Management wants**
  - “single pane of glass” - One tool that does all (and well)
- **Complete performance management includes:**
  - z/VM System Level: CEC, LPAR data, ALL SubSystems
  - Linux – Storage, CPU, file system, network
  - Process – applications, performance data
  - Network monitor
  - VSE: partitions, CPU, I/O, CICS
  - z/OS: CICS(110), BATCH (30), SYSTEM (70)
- **Application subsystem analysis**
  - Java, WAS, Oracle, MongoDB, Docker (MQ, DB2)
- **Outside “Z” server platform analysis**
  - Linux on “x”, VMWare, KVM, Secure Software Container
  - Microsoft servers
  - VPN, gateways, utilities

z/VM Performance monitor architecture

Traditional model (1989)

ESAMON/zMON: Real time analysis

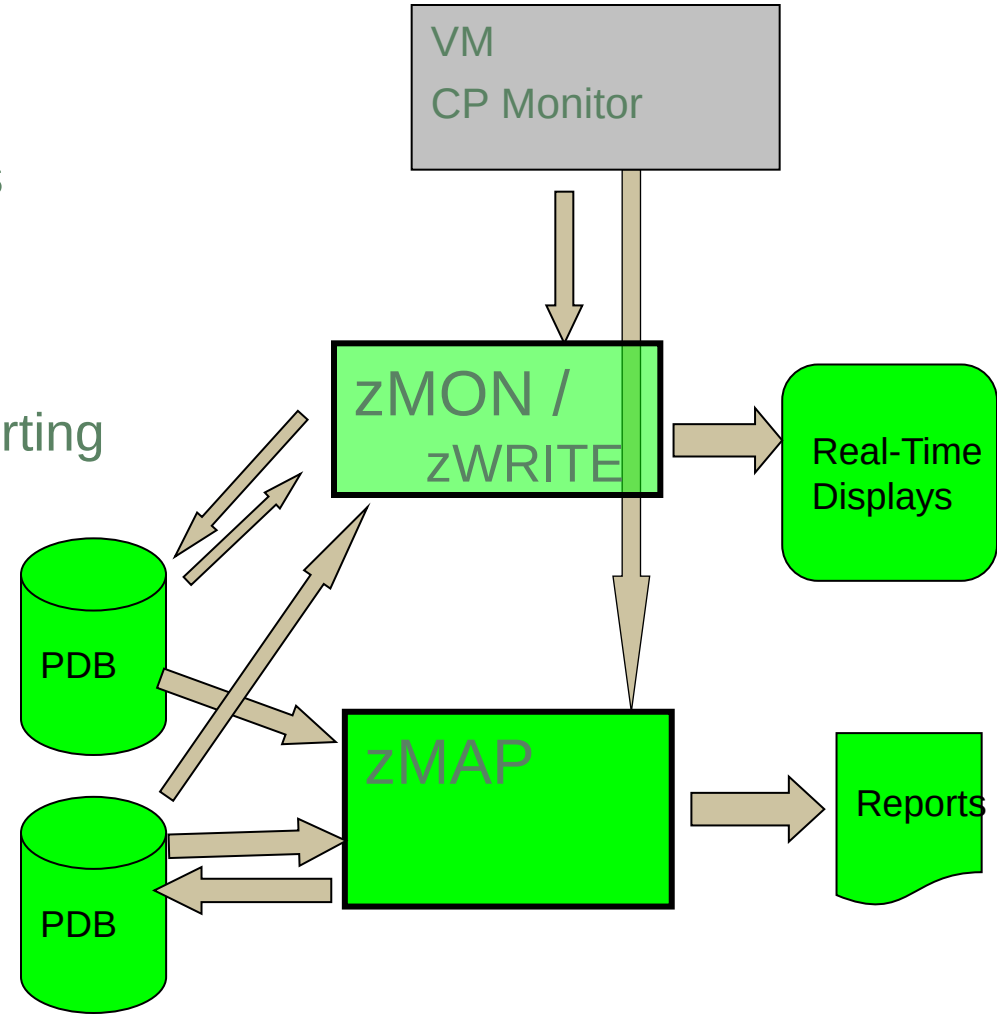
- Uses Standard CP Monitor
- Real Time Analysis

ESAMAP/zMAP: Performance Reporting

- Post (midnight) Processing
- Creates Long Term PDB
- PDB or monwrite data input

PDB (Performance DataBase)

- Complete data
- By Minute, hour, day
- Monthly/Yearly Archive



zMON 3270 zoom

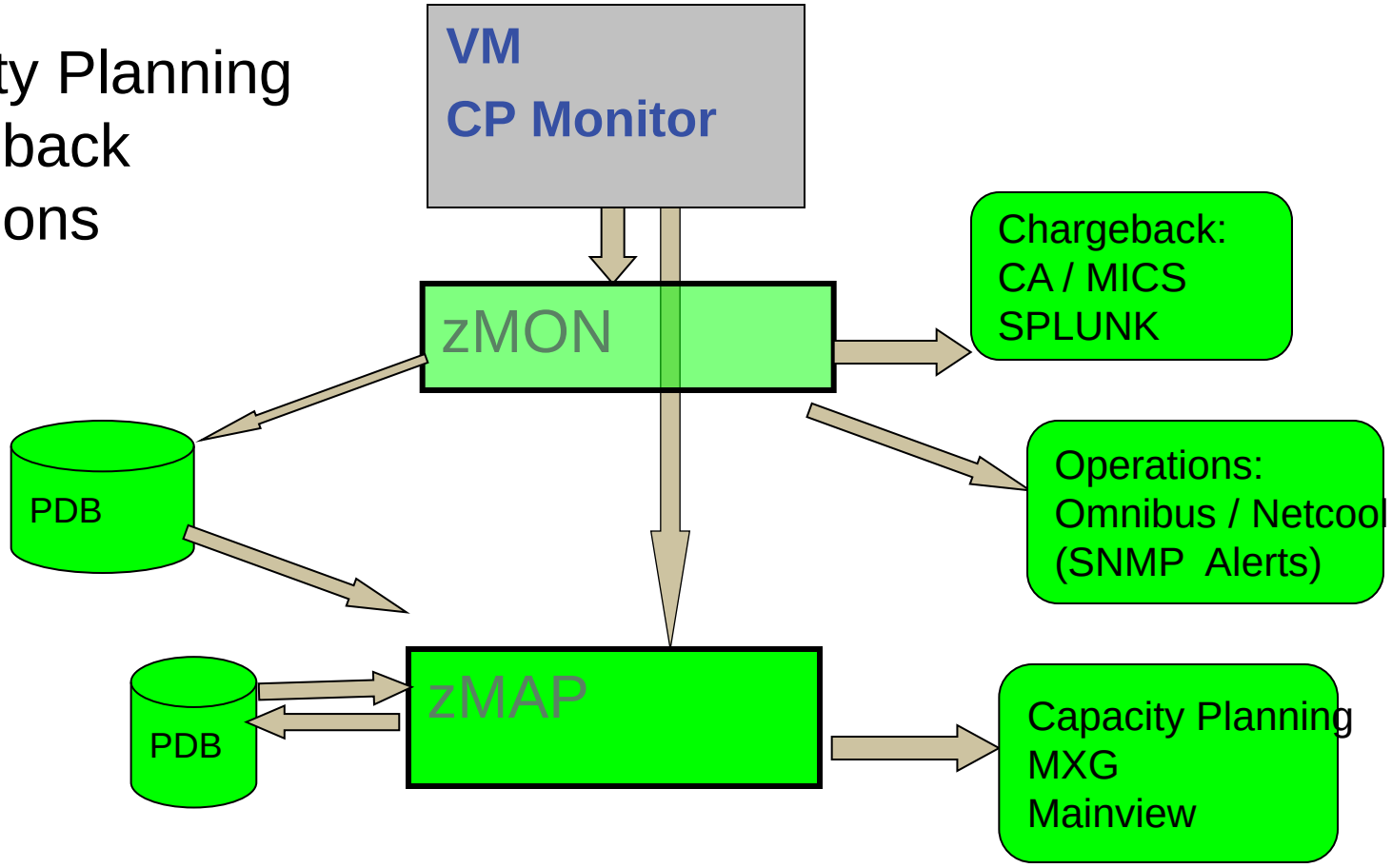
```
Screen: ESAUSP2  Velocity Software - VSIVM4      ESAMON 4.090 01/18 17:09-17:10
1 of 3  User Percent Utilization                 CLASS *              2096 44B42

                                 <-------Main Storage-------->
          UserID    <Processor>  <Resident->  Lock  <-WSSize-->
Time      /Class    Total  Virt  Total  Actv   -ed  Total  Actv
--------  --------  -----  ----  -----  -----  ----  -----  -----
17:10:00  System:   15.32 14.23   667K   665K  5448   675K   665K
          REDHAT     4.58  4.53   281K   281K  1997   284K   284K
          TEST       3.56  2.98   161K   161K   844   161K   160K
          *TheUsrs   3.12  3.02  57661  57645   290  59127  57322
          SUSE       1.63  1.57   109K   109K   839   109K   108K
          ORACLE     0.96  0.96  50503  50503    66  50437  50437
          Velocity   0.93  0.90   4552   3444    28   7385   3401
          KeyUser    0.36  0.15   2973   2973  1379   1898   1573
          Servers    0.17  0.13    943    520     5   1874    495
```

Hit PF2 to zoom on SUSE class, get:

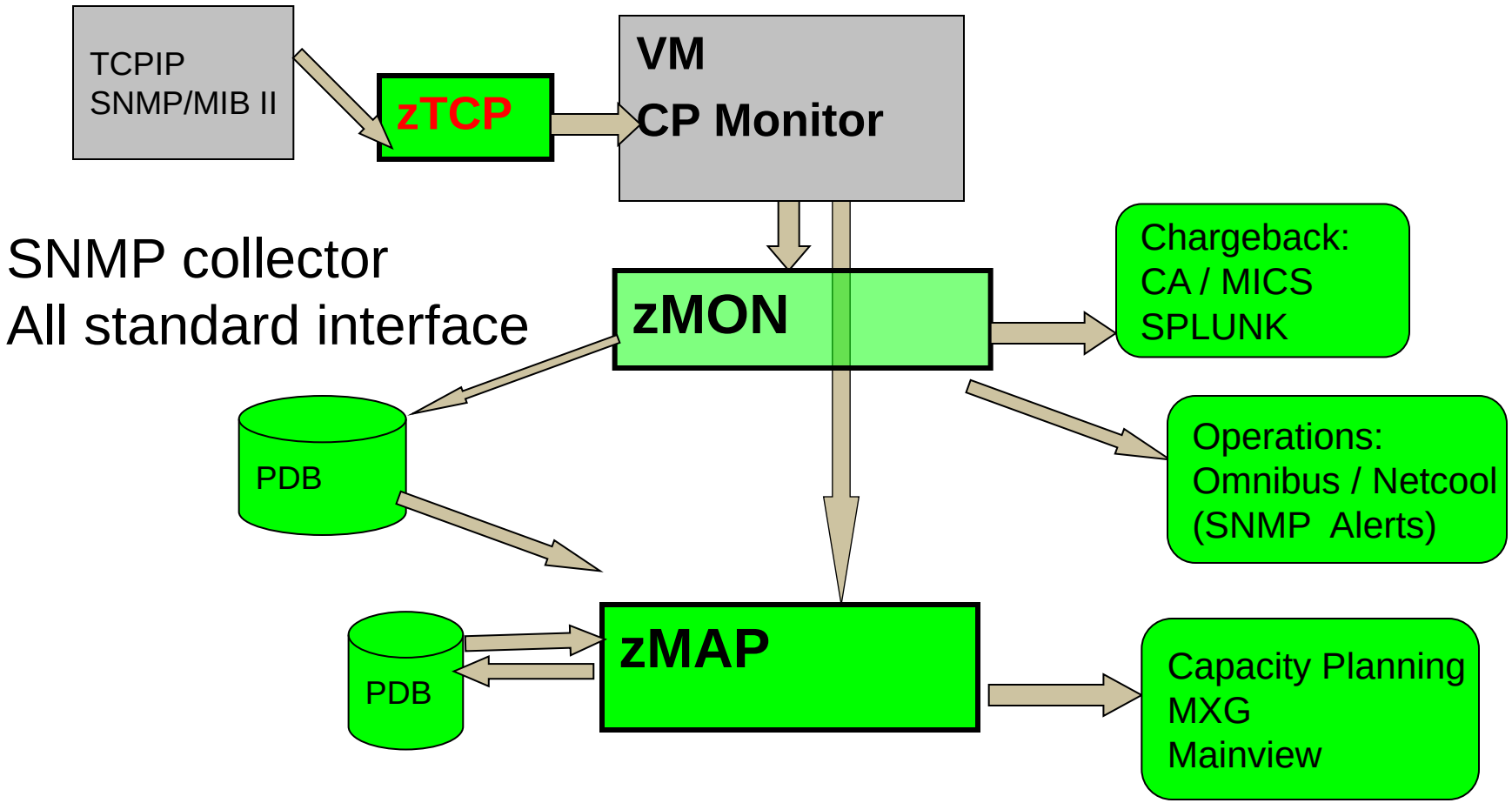
```
Screen: ESAUSP2  Velocity Software - VSIVM4      ESAMON 4.090 01/18 17:11-17:12
1 of 3  User Percent Utilization                 CLASS SUSE USER *    2096 44B42

                                 <-------Main Storage-------->
          UserID    <Processor>  <Resident->  Lock  <-WSSize-->
Time      /Class    Total  Virt  Total  Actv   -ed  Total  Actv
--------  --------  -----  ----  -----  -----  ----  -----  -----
_17:12:00 SLES11X    0.39  0.39  24223  24223   247  23976  23976
          SLES11     0.32  0.32  12404  12404   181  12199  12199
          SUSELNX2   0.25  0.23   3648   3648     0   3628   3628
          SLES9X     0.21  0.21  14632  14632    35  14597  14597
          SLES10     0.20  0.20  28935  28935   299  28636  28636
          SLES9      0.20  0.20  12722  12722   177  12545  12545
          SLES8      0.06  0.03  11251  11251     0  11201  11201
          SLES8X        0     0      0      0     0    890      0
          SUSELNX1      0     0      0      0     0    219      0
```

Add “Enterprise” Support

Capacity Planning
Chargeback
Operations



Add “Network” Support – Pre Linux



Full Network Monitor

MIB II: Transport layer, IP layer, hardware layer, icmp
Transport layer data shows connections, TCP rates, UDP rates

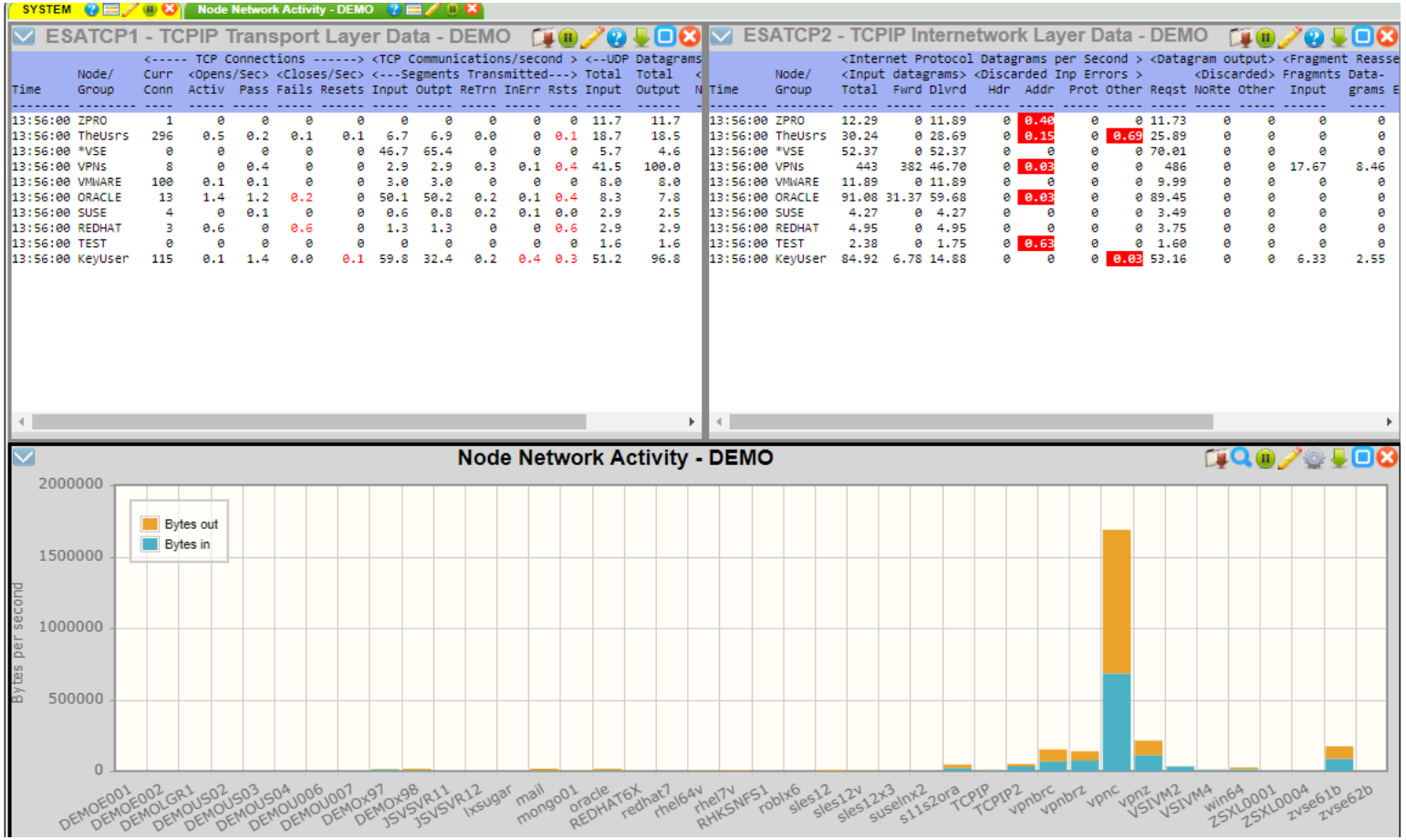
Report: ESA**TCP**1 TCPIP Transport Layer Data Report

Date/	<--------TCP Connections---------->					<-TCP Communications / sec			
Time/	Current	<Opens/Second>		<Closes/Sec>		<----Segments Transmitted-			
Node	Connects	Active	Passive	Fails	Resets	Input	Outpt	ReTran	InError
00:15:00									
Node Groups									
KeyUser	1.1	0.0	0.0	0.0	0	0.04	0.06	0.07	0.00
*TheUsrs	21.9	1.3	1.6	0.2	0	48.74	48.75	0.00	0
VsLPARs	5.3	0.1	0.5	0.1	0.3	8.02	11.95	0.29	0.08
*** Nodes *******									
oracle	16.9	0.5	1.0	0	0	24.51	24.52	0.00	0
RH5X161	0	0	0	0	0	0	0	0	0
S11R20RA	5.0	0.8	0.6	0.2	0	24.25	24.26	0	0
TCPIP	0	0.0	0.0	0.0	0	0.02	0.03	0.03	0.00
TCPIP2	0	0	0	0	0	0.01	0.01	0	0.00
TCPIP2	1.1	0.0	0.0	0.0	0	0.02	0.03	0.03	0.00
VSIVM1	2.0	0.0	0.0	0.0	0	0.49	0.59	0.10	0.01
VSIVM2	1.1	0.0	0.0	0.0	0	0.02	0.03	0.03	0.00
VSIVM4	2.2	0.0	0.4	0.0	0.3	7.51	11.33	0.15	0.07

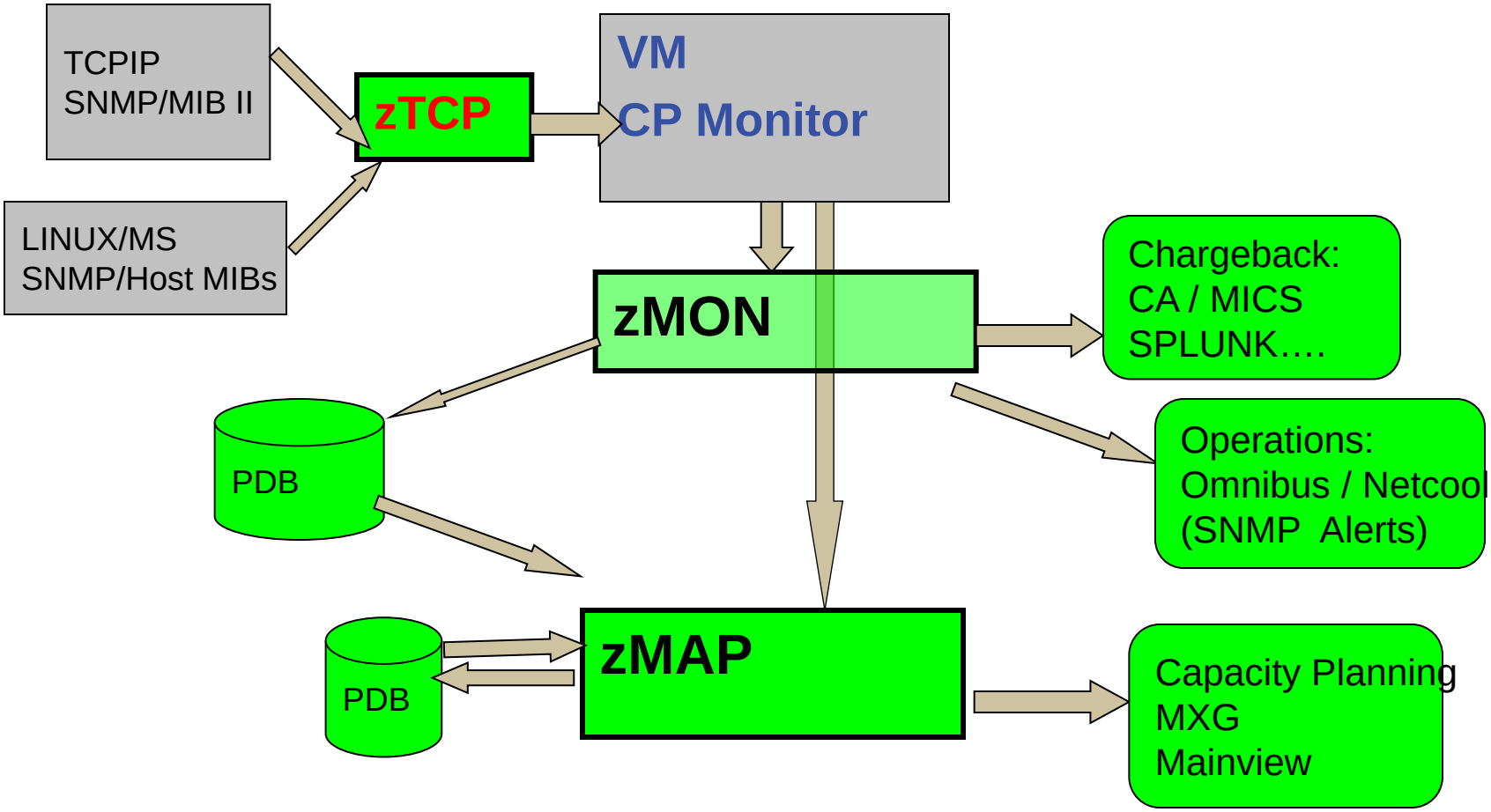
Full Network Monitor

MIB II: Transport layer, IP layer, hardware layer, icmp

Transport layer data shows connections, TCP rates, UDP rates



Add snmp “host” Support



“Host” support

- **Snmp “host” mib**
  - Process data (expensive, limited)
  - File system data
  - (no system data)
- **ucd “linux” mib**
  - System data
  - Memory data
  - Disk data (expensive)
- **Velocity mib**
  - Designed for efficiency
  - Designed for performance management
  - Process data improvements
  - Disk data improvements
  - VERY Extensible

Process Capture Ratio with Velocity mib

- **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
```

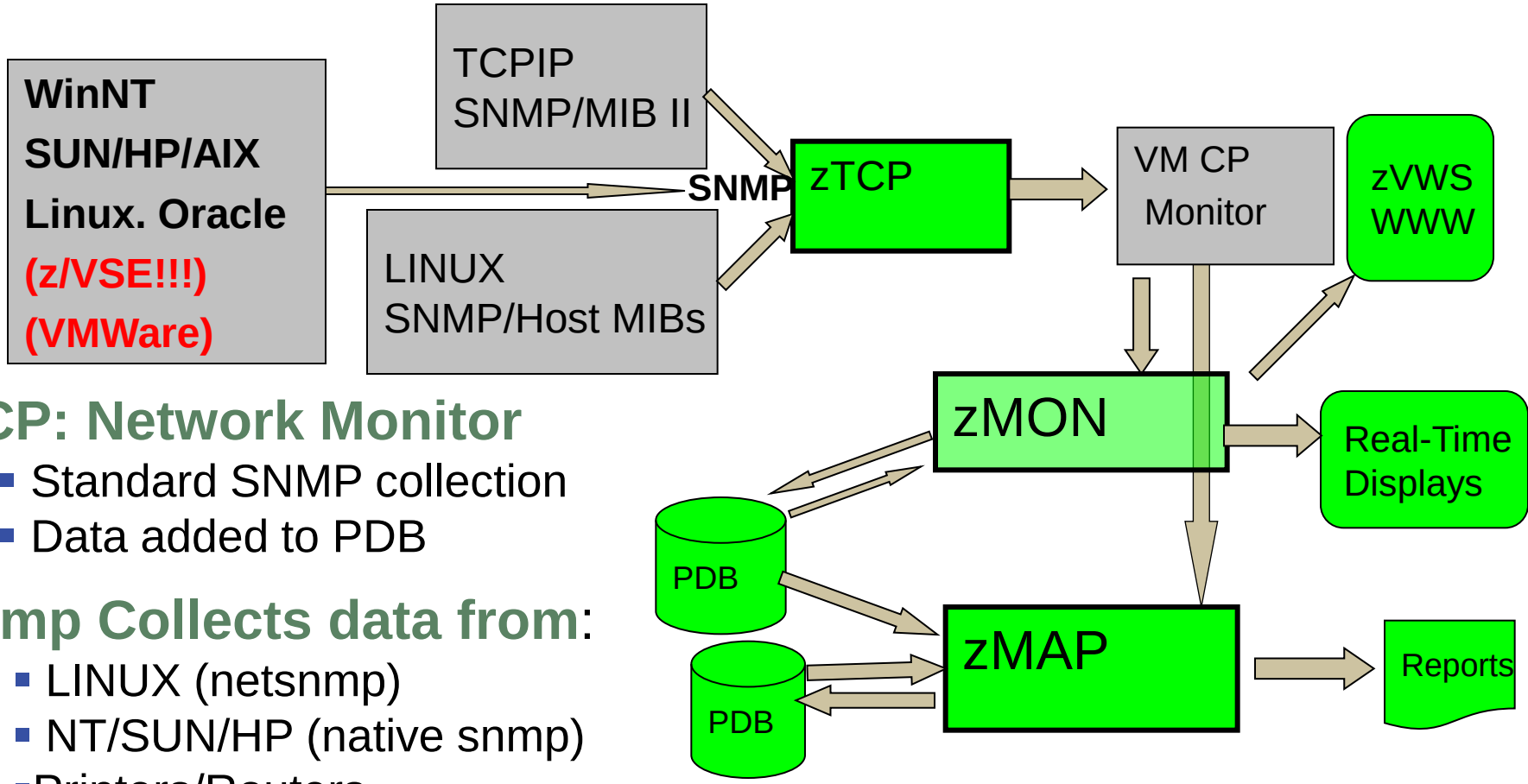
```
Report: ESALNXP      LINUX HOST Process Statistics Report
-----------------------------------------------------------
node/     <-Process Ident-> Nice <------CPU Percents---->
 Name     ID    PPID   GRP  Valu  Tot  sys user syst usrt
--------- ----- ----- ----- ---- ---- ---- ---- ---- ----
10:03:00
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 rpmbuild
```

VELOCITY SOFTWARE

PROVEN PERFORMANCE

“SNMP” collector 2018



zTCP: Network Monitor

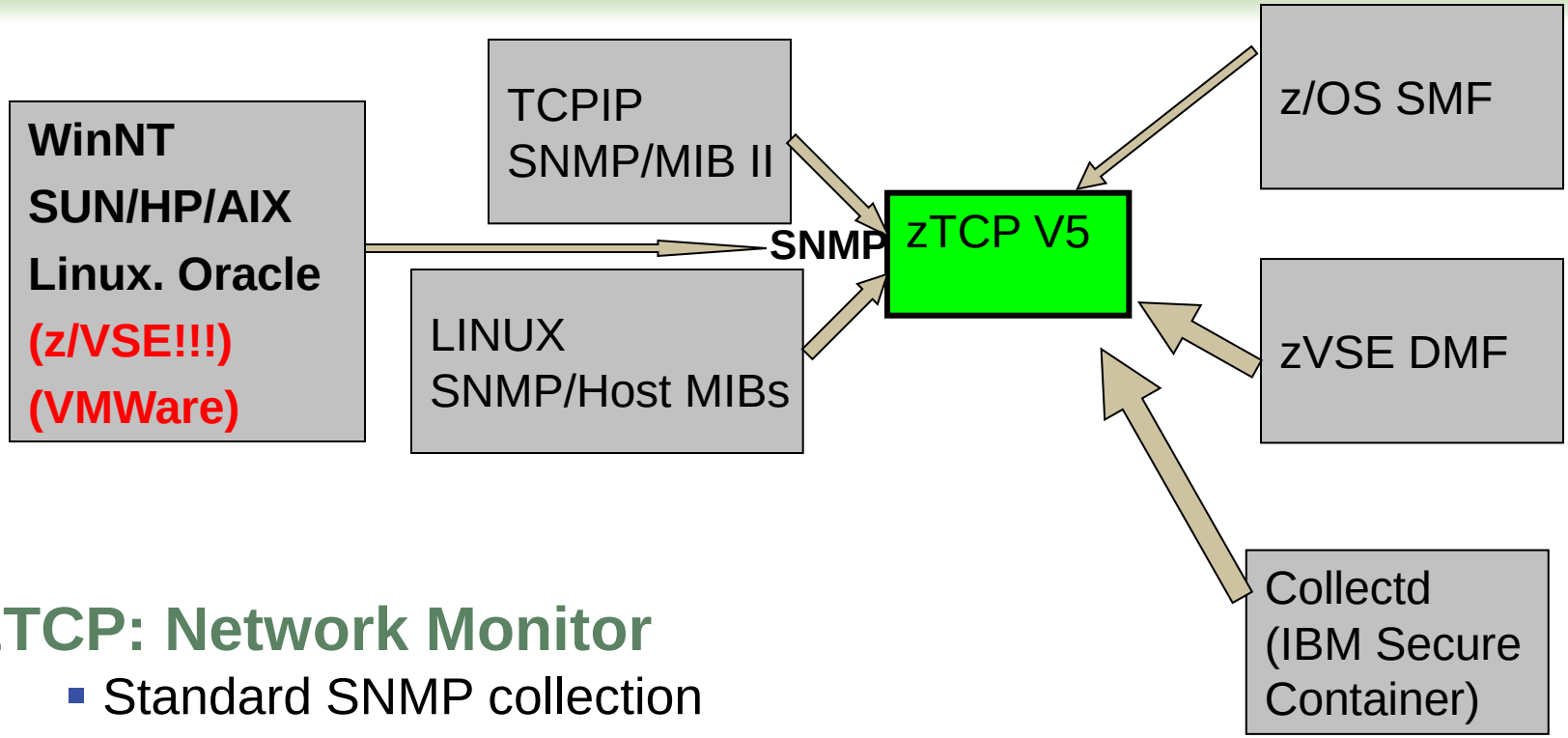
- Standard SNMP collection
- Data added to PDB

Snmp Collects data from:

- LINUX (netsnmp)
- NT/SUN/HP (native snmp)
- Printers/Routers….
- **THOUSANDS OF SERVERS?**

ZVWS Provides www access
Written in assembler, VERY FAST
Many web based applications….

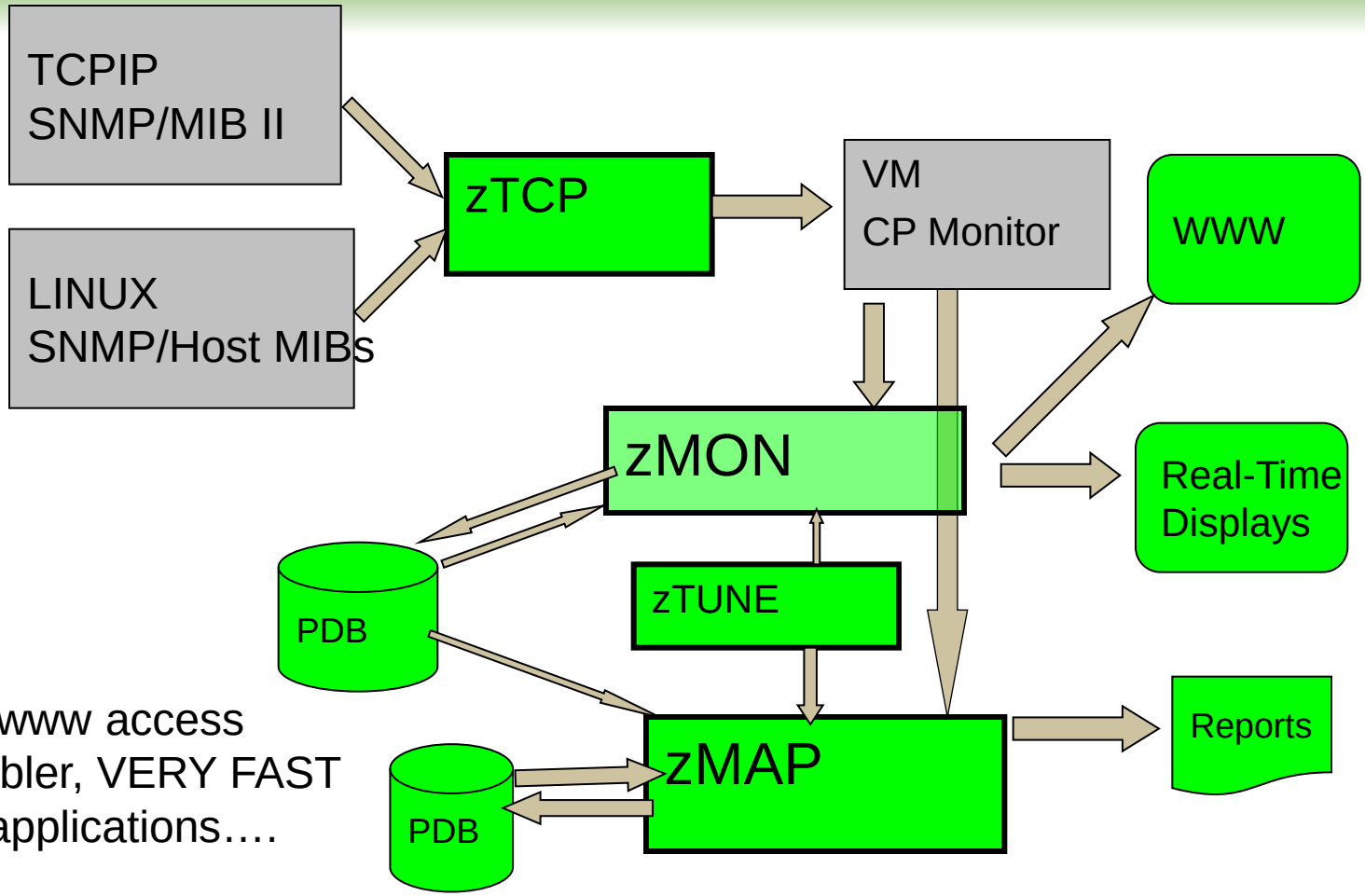
“SNMP” collector 2019



zTCP: Network Monitor

- Standard SNMP collection
- Data added to PDB
- Now accepts SMF Records
- Now accepts DMF records
- Now accepts Collectd

Modernize: Webserving, performance skills



ZVWS Provides www access
Written in assembler, VERY FAST
Many customer applications….

zTUNE: Rules based analysis

Health Checker for z/VM, Linux: zTUNE

- **Focus more now on simplifying problem resolution**
- **User reports that applications complained about zLinux / WAS performance:**

```
Report: ESATUNE      Tuning Recommendation Report
Monitor initialized:                    on 2084 serial 9ABED
------------------------------------------------------------------
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
```

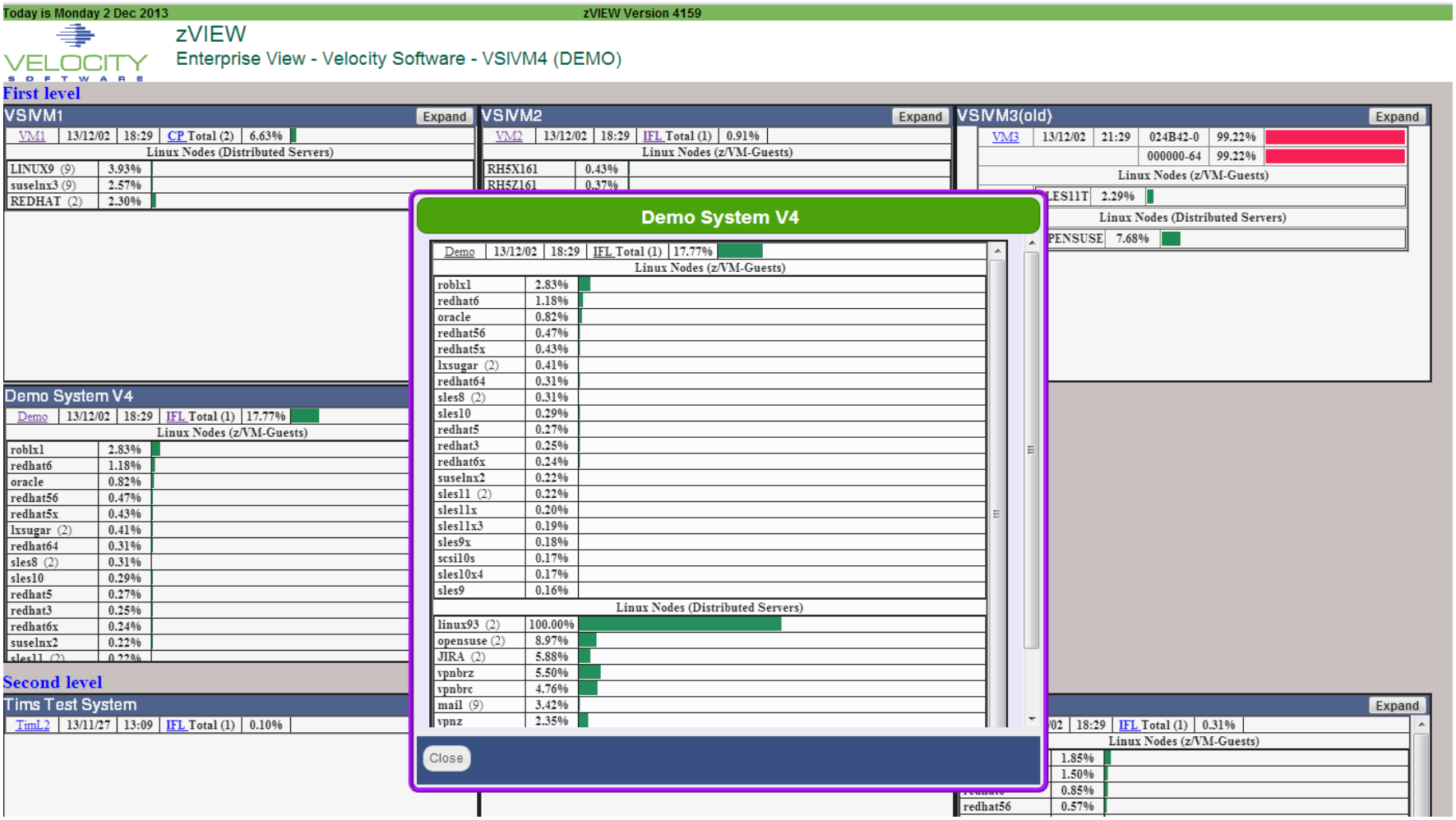
zVIEW V2

zVIEW V2 flexible,

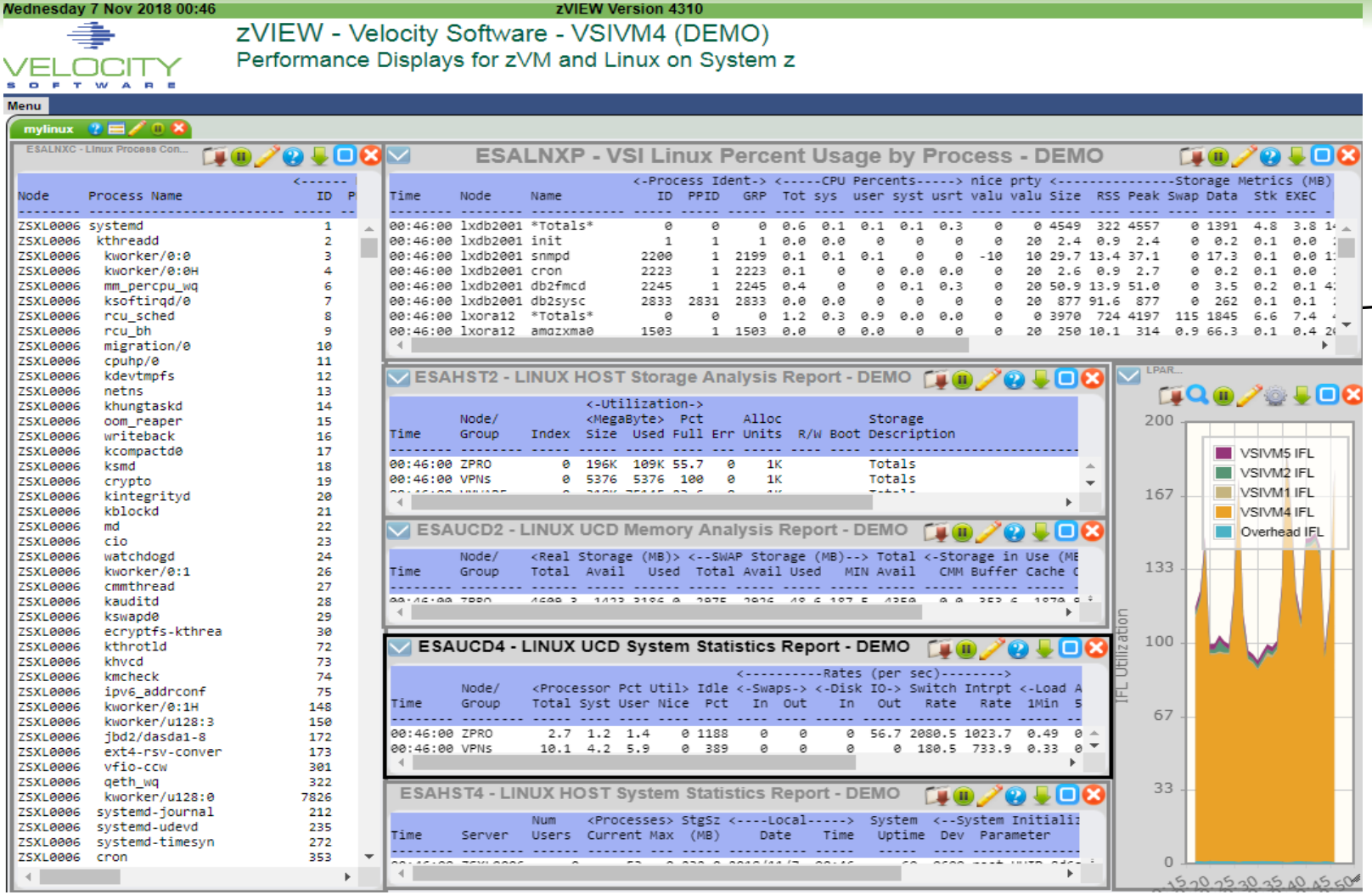
- Web based application
- Supports enterprise data
- Single pane of glass
- VERY fast, (no java)….
- Front end for everything

zVPS Enterprise View

Tailorable, expandable, zoomable

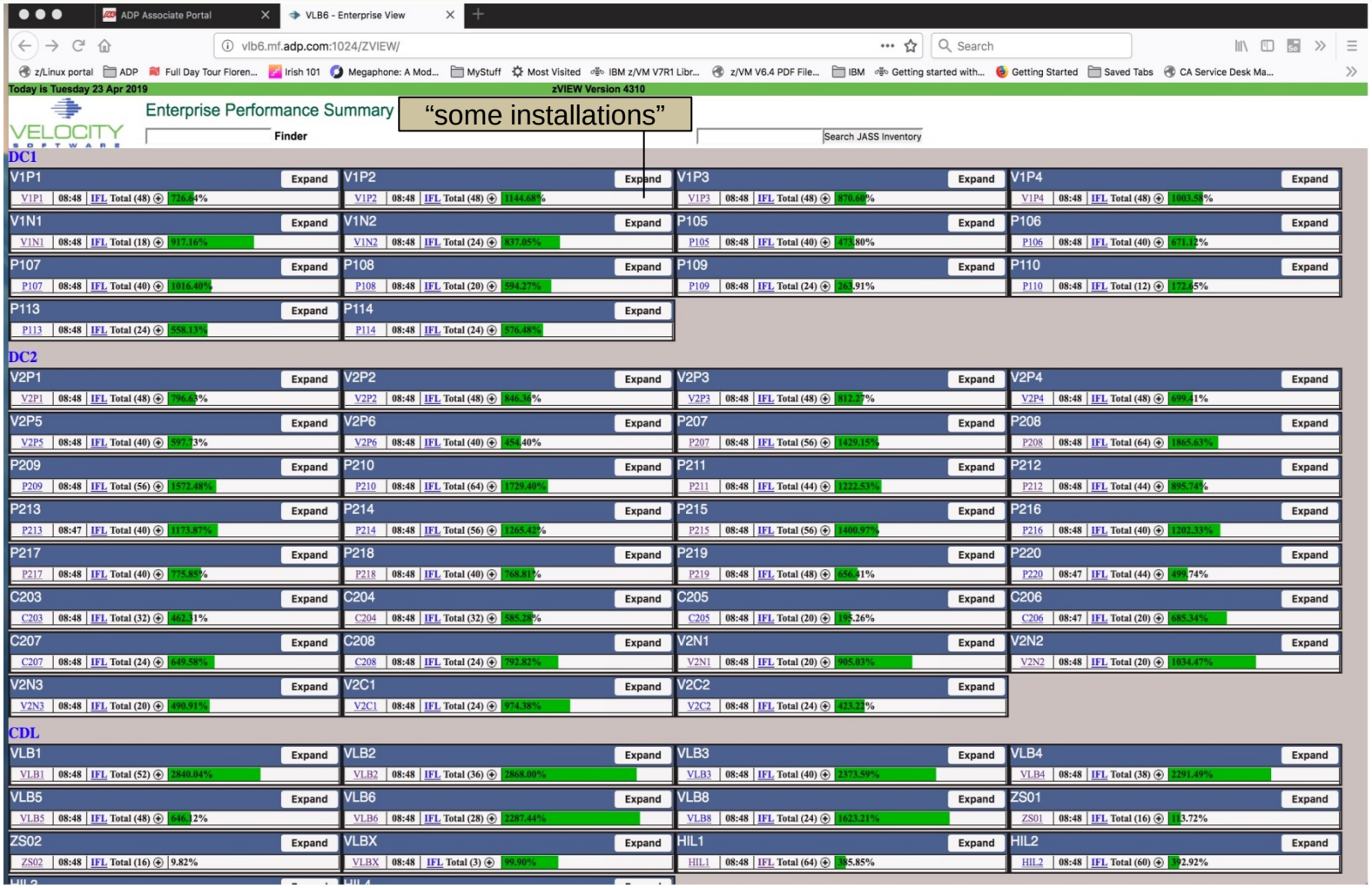


Drill down Options – How fast is fast?

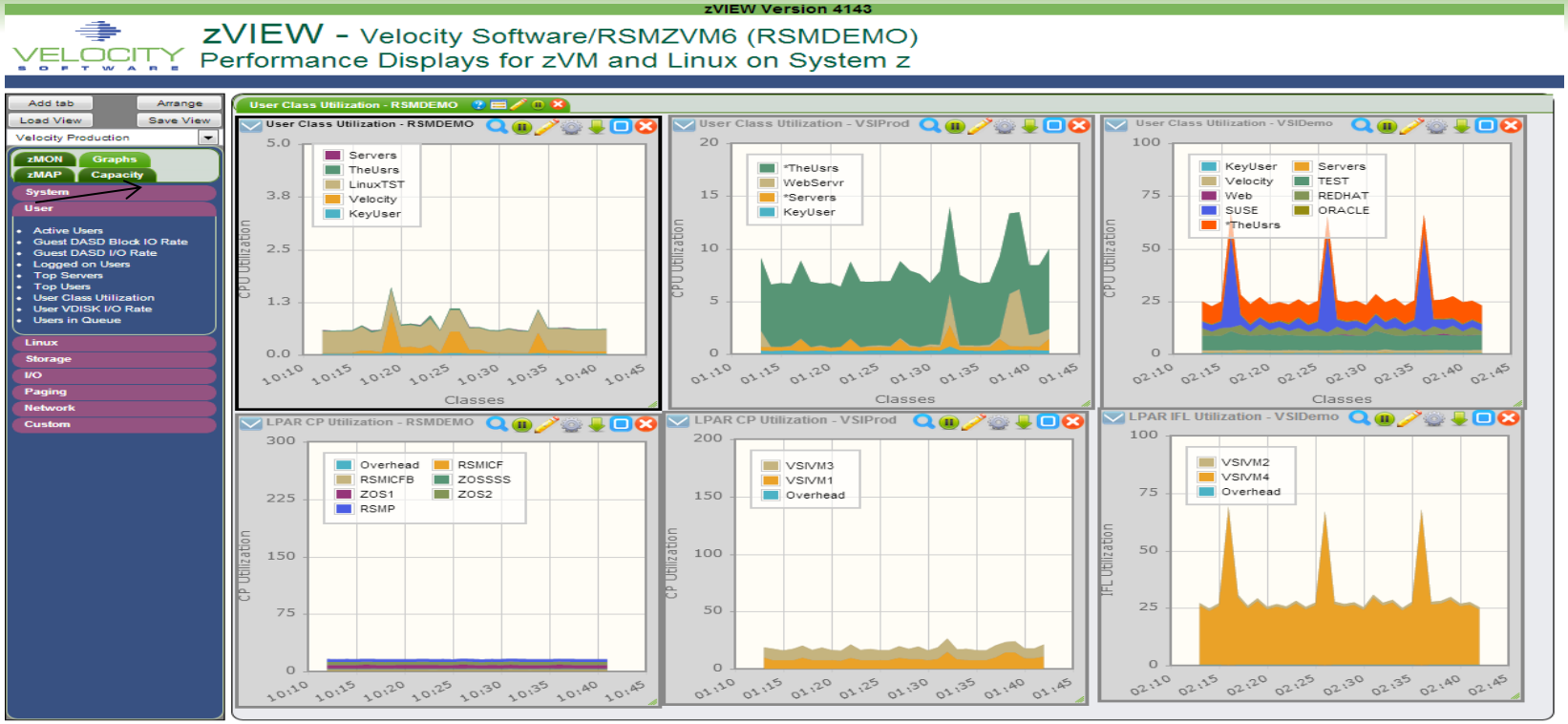


zVPS Enterprise View

Did I say scalable? A lot of LPARS….



Multiple System View (3 LPARs)



Data from multiple lpars visible on “Single pane of glass”

zALERT - Operational Support

zAlert

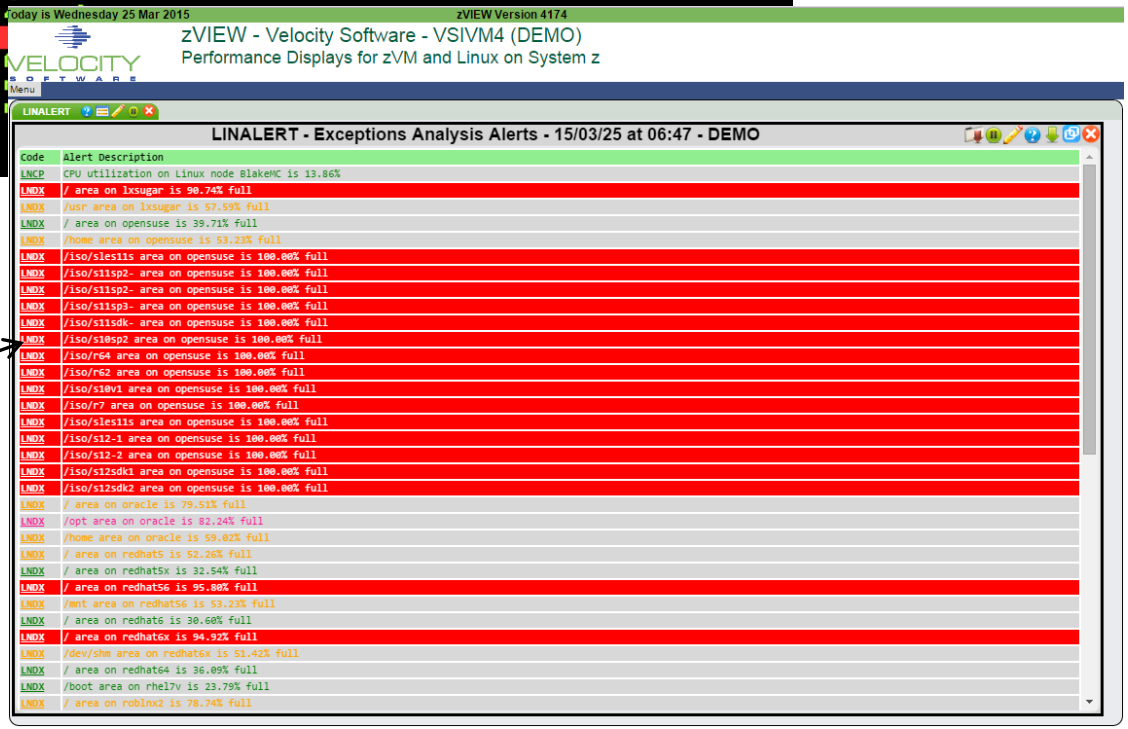
- User tailorable
- 3270 based, web based, and / or SNMP

- **Linux alert examples:**
  - Disk full
  - Missing processes (requires complete data)
  - **Looping processes (requires correct data)**
- **z/VM alert examples**
  - Page/spool space full (avoid abends), page rates
  - Looping servers
  - DASD service times
- **Network alert examples**
  - Transport errors, ICMP rates, Bandwidth thresholds
- **z/OS (zVSE)**
  - **CPU, job utilization, cec (cpu type) utilization,**
  - **CICS max task, response times, etc**

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 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 zVIEW based:

Click Thru

or SMS, email…

Operational Considerations

Issue with SNMP alerts (or other agents)

- How many control points? (one per server?)
- How many configuration files? (one plus per server?)

zVPS SNMP Alert Architecture

- **Centralized alert**
- One point of control (ZALERT)

SNMP alerts sent to any SNMP operations console

- Create “SNMP TRAPDEST” file

```
* this file is the list of snmp trap destinations
* format is ip address, and community name
67.100.74.25 velocity
```

Sending SNMP alerts by other functions:

```
/* authorized user can send alerts */
parse arg msg
‘CP SMSG ZTCP ALERT’ msg
```

Diagnostic vs Management Tools

- **Diagnostic Tools**
  - Turn on when there's a problem (but not if too heavy….)
  - Significant overhead
  - Oracle and Java have many diagnostic tools
- **z/VPS Objective is to provide "management tools"**
  - Java metrics captured at low cost
  - Oracle metrics captured at low cost
  - Objective is still a .1% agent collecting data every minute

Splunk

Operations Tool (many installations!)

- Log analyzer
- Diagnostics tool

The Problem

- Agent is very high overhead
- Each Linux runs splunk agent, feeds central database
- One installation reports 2-4% of ONE IFL just for splunk agent
  - (Using 20 IFLs just for splunk agent)

The (VERY efficient) solution

- All (almost all?) data captured by zVPS
- zVPS feeds splunk (no additional charge, big savings in cpu)
- Installation details on Velocity Software website

MongoDB (zVPS V5)

Fast DataBase

- Used for real time performance
- “read only”
- Benchmarked at 8,000 hits per second on ONE LPAR
- MongoDB engineers very impressed with “z” !!!

The Problem

- Black box?

The requirements: Management

- Marriott corporation offloading 5,000 transactions per second plus
- MongoDB on Linux on z architecture

The (VERY efficient) management solution

- MongoDB has snmp mib, fully supported by zVPS (real time, alerts…)

Docker and more (zVPS V5)

Docker container technology used for many implementations

- Docker/kubernetes
- collectd
- z/os container extensions

Docker

- Used extensively by a few large customers
- Snmp mib developed by Velocity Software

IBM Secure Container

- Black box as presented (no management capability if problems)
- Collectd implementation – one way mechanism, open source
- Supported by zvps

Z/OS container extensions

- Collectd implementation?

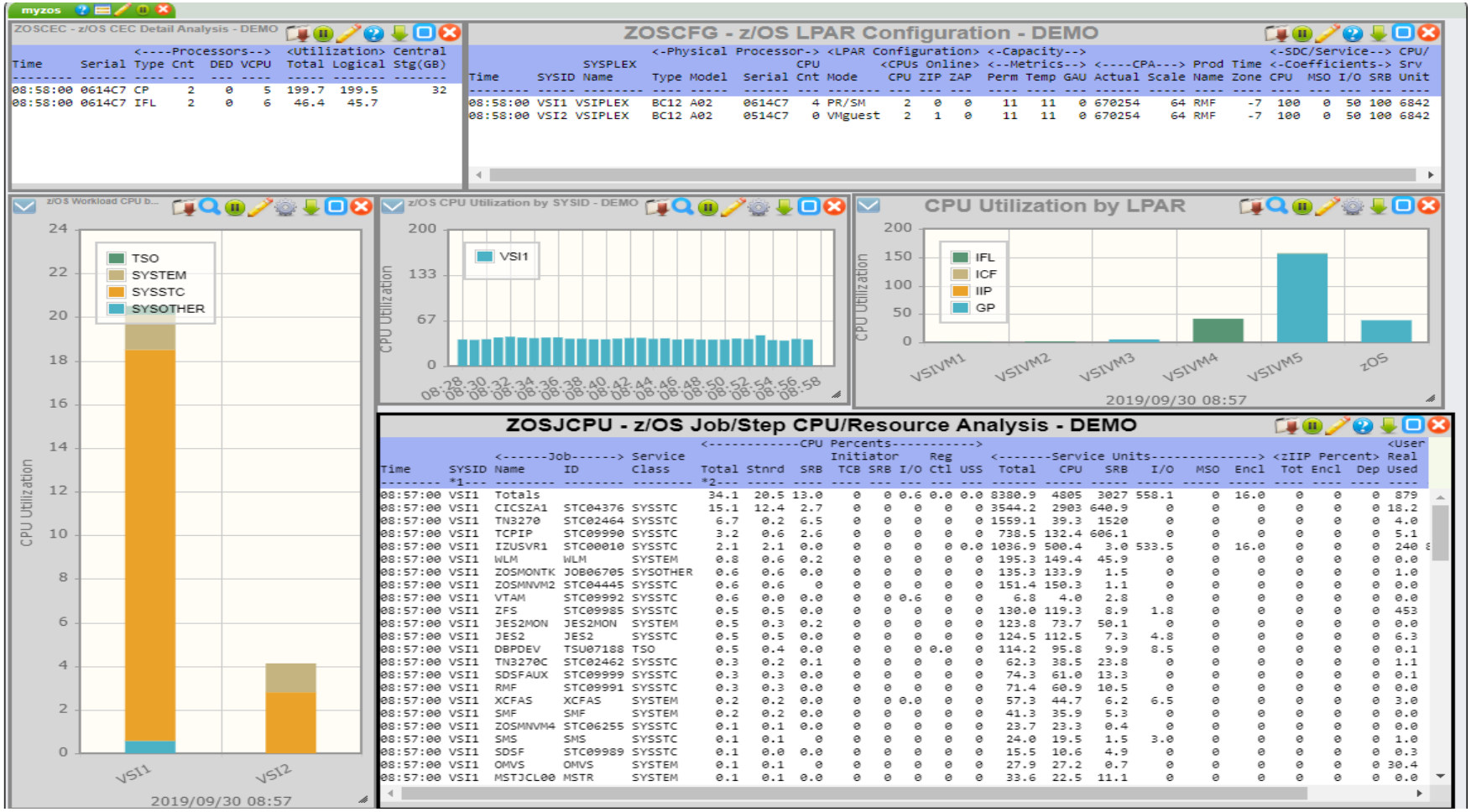
New Technologies

- z/OS…. (common request)
- VSE CICS too
- z/OS: Send link to your z/OS people….
  http://demo.velocitysoftware.com/zview/zview.cgi?view=myzos&heading=no&menu=no

Make it easy, low overhead, amazingly fast…

zOSMON fully integrated

Instant z/os system, cpu, jobs, configuration. (Tailorable)



zOSMON fully integrated

Instant z/os Graphs. (Tailorable)

http://demo.velocitysoftware.com/zview/zview.cgi?view=zosgraph&heading=no&menu=no

CICS Configuration

Work in progress… z/OS, VSE, no limit…

```
Monitor initialized: 10/01/19 at 13:15:00 on BC12 serial 0614C7
-------------------------------------------------------------------------------

SYSID <--CICS Program-> <-----Start-----> User      Platform  <----Location--->

      APPLID   JobName      Date     Time  IDentity  O/S  VRM  LPARName VMID
----  -------- -------- -------- --------  --------  ---- ---- -------- --------

13:16:00
VSI1  CICSZA1  CICSZA1  09/10/19 06:16:53            z/OS 0720
      CICSZA2  CICSZA2  09/13/19 07:50:26            z/OS 0720
V61B  CICSP1   CICSP1   09/18/19 10:46:00  PRODCICS  VSE  0420 VSIVM5   ZVSE61B
V62C  CICSP1   CICSP1   09/14/19 06:13:22  PRODCICS  VSE  0430 VSIVM5   ZVSE62C
-------------------------------------------------------------------------------

13:17:00
VSI1  CICSZA1  CICSZA1  09/10/19 06:16:53            z/OS 0720
      CICSZA2  CICSZA2  09/13/19 07:50:26            z/OS 0720
V61B  CICSP1   CICSP1   09/18/19 10:46:00  PRODCICS  VSE  0420 VSIVM5   ZVSE61B
V62C  CICSP1   CICSP1   09/14/19 06:13:22  PRODCICS  VSE  0430 VSIVM5   ZVSE62C
```

CICS by transaction id

Work in progress… Transaction data, waits by tran id

```
Report: ZOSCIX4      z/OS CICS Tranaction ID Analysis              Velocity So
Monitor initialized: 09/30/19 at 00:00:00 on BC12 serial 0514C7
-------------------------------------------------------------------------------
Time/          Transacton <----Response Time (Seconds)----> total<----------I
SYSID     Tran       Type Total  Susp  Disp   CPU  DISP ZIP  CPU
            ID Count R  T  Resp  Time  Time  Time  Wait CPU Secs Term Jrn Str
-------- ---- ----- - -- ----- ----- ----- ----- ----- --- ---- ---- --- ---
05:15:00
VSI1
 CICSZA1  CHCK     9 F TO 100.0 6554K     0     0     0   0    0    0   0   0
          CISR     9 F TO 100.0 6554K     0     0     0   0    0    0   0   0
          CSHQ     9 F TO 100.0 6554K     0     0 0.176   0    0    0   0   0
          CSNE     9 F TO 100.0 6554K     0     0     0   0    0    0   0   0
          CSSY    18 F TO 100.0 6554K     0     0     0   0    0    0   0   0
          CSSY   121 T TO 0.183 11977     0     0 1.714   0    0    0   0   0
          CSTP     9 F TO 100.0 6102K     0     0  2745   0    0    0   0   0
          STRH 37013 T TO 0.007 246.8     0     0     0   0    0    0   0   0
 CICSZA2  CHCK    14 F  S 68.57 4494K     0     0     0   0    0    0   0   0
          CISE    13 F  S 69.23 4537K     0     0     0   0    0    0   0   0
          CSHQ    14 F  S 68.57 4494K     0     0 0.395   0    0    0   0   0
          CSNE    14 F  S 68.57 4494K     0     0     0   0    0    0   0   0
          CSOL     1 D  S  1887  124M     0     0 26.62   0    0    0   0   0
          CSSY    28 F  S 68.57 4494K     0     0     0   0    0    0   0   0
          CSSY     4 T  S 0.196 12735     0     0 1.714   0    0    0   0   0
          CSTP    14 F  S 68.57 4493K     0     0 512.0   0    0    0   0   0
ZV61
 CICSP1   CSNE     1 F TO  1800  1800     0     0     0   0    0    0   0   0
          CSPQ     1 T TO 0.002 0.000 0.002 0.001     0   0  0.0    0   0   0
          CSSY     5 F TO  1800  1800 0.000 0.000 0.000   0  0.0    0   0   0
          CSTP     1 F TO  1800  1672 128.1 11.31 3.713   0 11.3    0   0   0
          IESO     1 F TO  1800  1800     0     0     0   0    0    0   0   0
          STRH  7328 T TO 0.053 0.033 0.020 0.003     0   0 21.3    0   0   0
```

CICS by Region

By minute, real time, wrapped up at night to 15 minute

```
Report: ZOSCIX2       z/OS Region Transaction Analysis
Monitor initialized: 09/30/19 at 00:00:00 on BC12 serial 0514C7
-------------------------------------------------------------------
Time/           Transacton <----Response Time (Seconds)----> total
SYSID/ Name/          Type Total  Susp  Disp   CPU  DISP ZIP  CPU
Time     ID    Count R  T  Resp  Time  Time  Time  Wait CPU Secs
----  -------  ----- - -- ----- ----- ----- ----- ----- --- ----
05:15:00
VSI1  CICSZA1     90 F  S 100.0 6509K     0     0 274.9   0    0
                 121 T  S 0.183 11977     0     0 1.714   0    0
                37013 T TO 0.007 246.8     0     0     0   0    0
      CICSZA2      1 D  S  1887  124M     0     0 26.62   0    0
                 139 F  S 68.63 4498K     0     0 52.16   0    0
                   4 T  S 0.196 12735     0     0 1.714   0    0
ZV61  CICSP1      10 F  S  1800  1787 12.81 1.131 0.371   0 11.3
                   1 T  S 0.002 0.000 0.002 0.001     0   0  0.0
                 7328 T TO 0.053 0.033 0.020 0.003     0   0 21.3
-------------------------------------------------------------------
05:30:00
VSI1  CICSZA1      1 D  S  1887  124M     0     0  7091   0    0
                  90 F  S 93.34 6076K     0     0 242.6   0    0
                 125 T  S 0.205 13382     0     0 1.722   0    0
               37312 T TO 0.006 190.5     0     0     0   0    0
      CICSZA2    127 F  S 69.44 4551K     0     0 57.48   0    0
                   1 T  S 0.262 17060     0     0 1.588   0    0
ZV61  CICSP1       1 F  S  1556  1556 0.000 0.000 0.000   0  0.0
                9428 T TO 0.012 0.004 0.008 0.003     0   0 26.7
-------------------------------------------------------------------
```

zOSMON Room for Thought….

- **Processing requirements for 40 CICS transactions/sec**
  - 140,000 transactions per hour
  - z/OS: .6-.7% GP for collector
  - zVPS: <1% of one IFL for everything, including web servers.
- **z/OS processing time**
  - 24 hours records 30/70: 24 cpu seconds on one IFL
- **zOSMON Futures**
  - DB2 (101,102)
  - MFC (113)
  - What customers want
  - Please send SMF data

Summary

Performance management is a business model

- Performance analysis and tuning
- Capacity planning
- Operational support
- Chargeback

Single pane of glass

Efficiency critical, not just a diagnostic tool

Flexibility important – architecture works….

Velocity Software thanks you for running Linux on z…

- **Please send data:**
  - When you have a problem
  - When you have a new machine
  - When you would like to see zVPS reporting capability.
- **Velocity Software in 2019 (V5) has added:**
  - Collectd support for IBM Secure container, docker, z/OS Container Extensions
  - SMF support for z/OS (70, 30, 110, more to come)
  - DMF support for z/VSE
  - MongoDB support
  - Docker mib support
- **zPRO:**
  - IBM has failed to provide an on prem cloud solution
  - xcat, cma just did not work and have been withdrawn
  - zPRO does NOT use SMAPI, JAVA, guest Linux
  - zPRO is a native solution that many installations use for on prem cloud